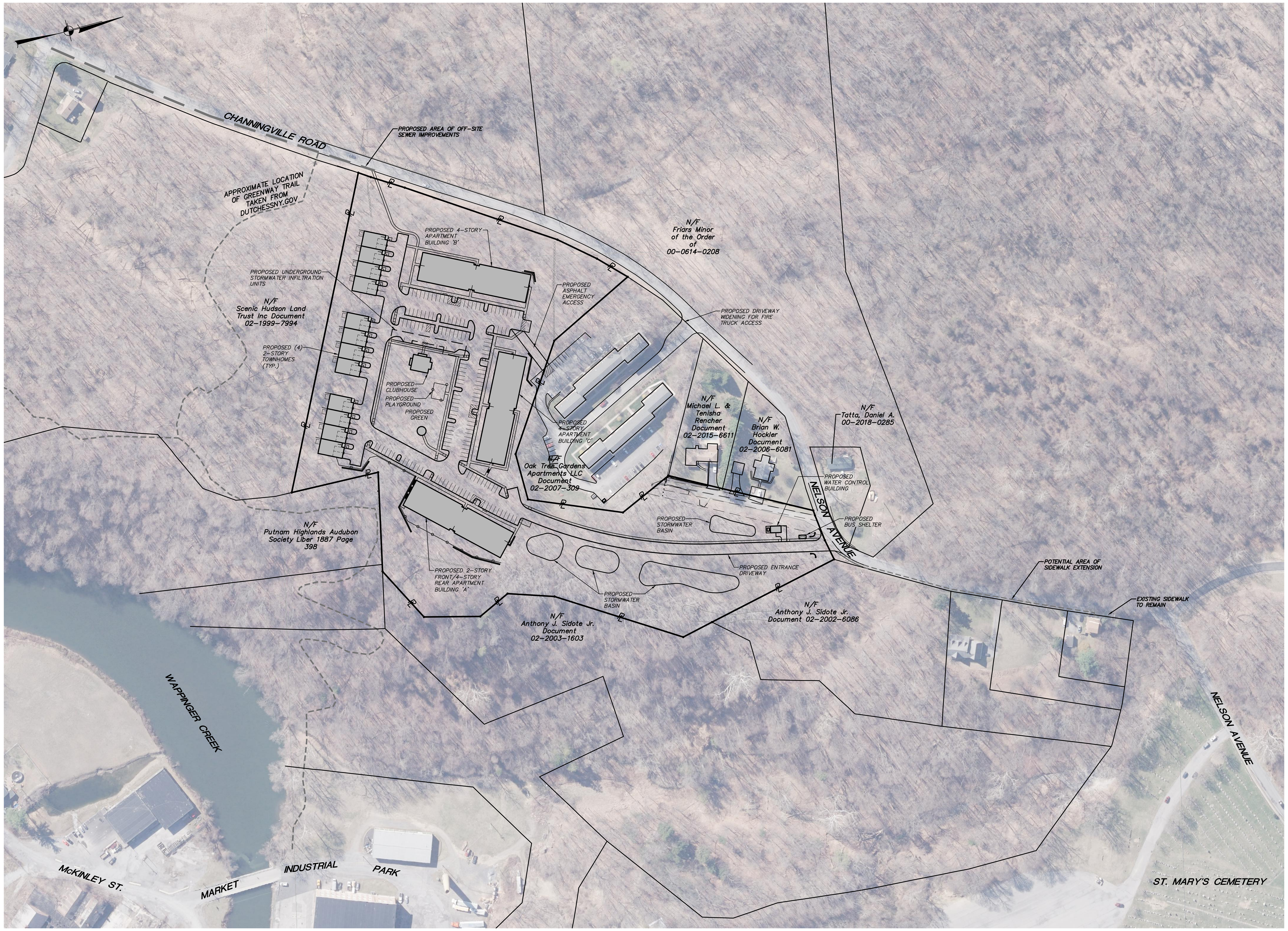


RMU ZONE REQUIREMENTS

	REQUIRED	PROVIDED
Lot Width:	50' Min.	586'±
Lot Coverage:	40% Max.	35.1%**
Greenspace:	25% Min.	64.9%***
Principal Building Height:	65' Max., 5 Stories Max., 2 Stories Min.	Less than 65', 4 Stories
Accessory Building Height:	2 Stories Max.	Less than 2 Stories
Setbacks—Principal Building		
Primary Frontage:	15' Min.	94'±
Secondary Frontage:	12' Min.	N/A
Side Setback:	0' Min. / 12' Max.	28' Min. / 83'± Max. *
Rear Setback:	10' Min.	49'±
Setbacks—Accessory Building		
Primary Frontage:	35' Min.	35'
Secondary Frontage:	5' Min.	N/A
Side Setback:	5' Min.	50'±

* Based on perimeter property line, variance required.

** The lot coverage calculation does not include the land banked parking. The land banked parking would provide an additional 6,000 s.f. of impervious coverage, totalling 36.2% coverage overall.

***The greenspace calculation does not include the land banked parking. The land banked parking would decrease greenspace by 6,000 s.f., totalling 63.9%.

PARKING REQUIREMENTS

	REQUIRED	PROVIDED
188 Units	1 per Unit x 188 Units = 188 Spaces Required	* 206 Spaces
Handicap Parking	7 Spaces	7 Spaces
Land Banked Parking	N/A	41 Spaces
	Total:	247 Spaces

* Total provided parking spaces includes 7 handicap spaces and 2 spaces per Townhome Garage.

NOTE: Although not required per code, there are 247 bedrooms in the project and 247 parking spaces with land banked parking.

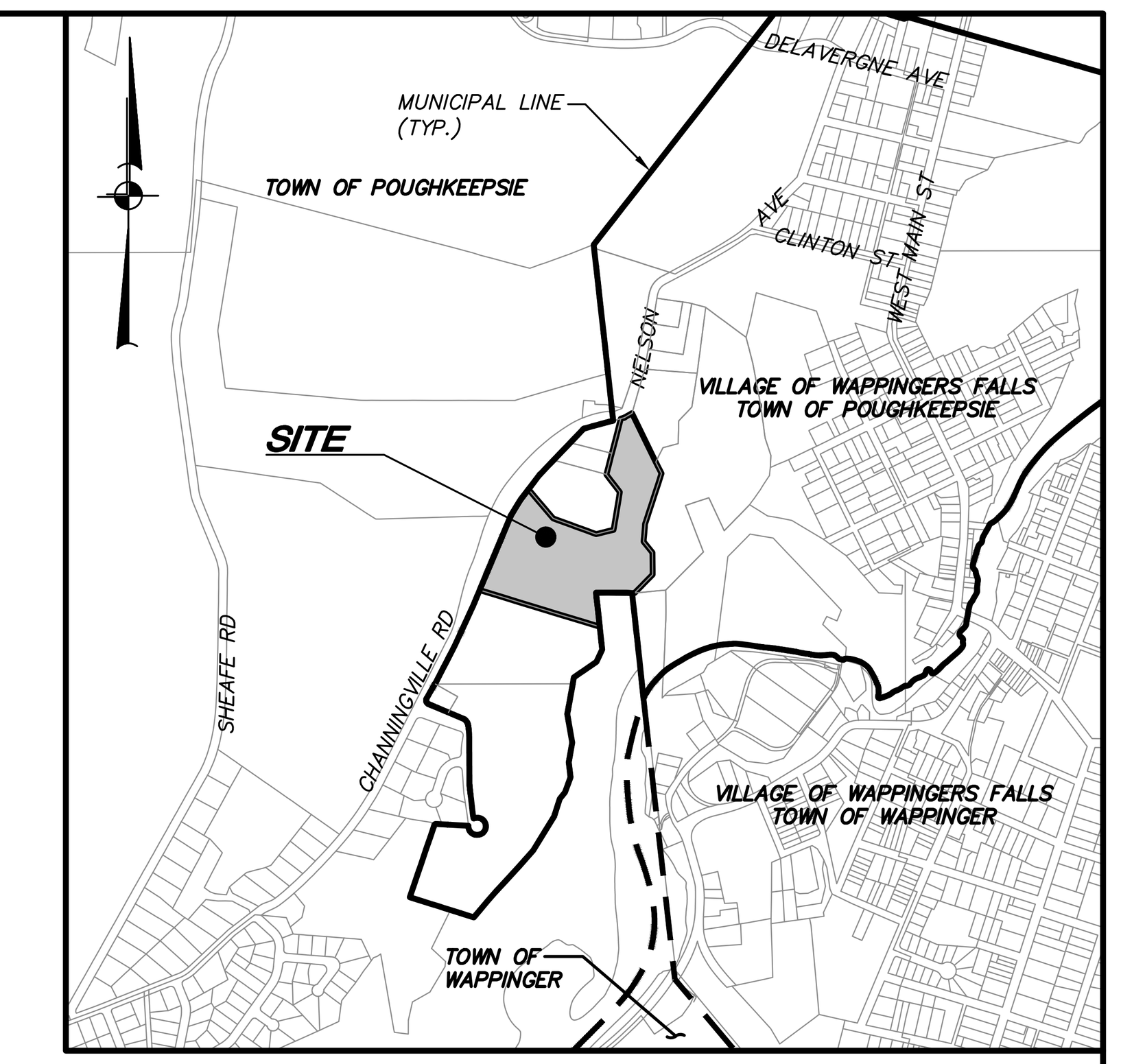
ALTERATION OF THIS DOCUMENT, UNLESS UNDER THE DIRECTION OF A LICENSED PROFESSIONAL ENGINEER, IS A VIOLATION OF SECTION 7209 OF ARTICLE 145 OF THE EDUCATION LAW.

DRAWING LIST

SHEET NO.	DRAWING NO.	DRAWING NAME:
1	OP-1	OVERALL PLAN
2	EX-1	EXISTING CONDITIONS PLAN
3	SP-1	LAYOUT & LANDSCAPE PLAN
4	SP-2	GRADING & DRAINAGE PLAN
5	SP-3	UTILITIES PLAN
6	SP-4	EROSION & SEDIMENT CONTROL PLAN
7	LP-1	LIGHTING PLAN
8	PR-1	ENTRANCE DRIVEWAY PROFILE
9	VM-1	VEHICLE MANEUVERING PLAN
10	D-1	DETAILS
11	D-2	DETAILS
12	D-3	DETAILS
13	D-4	DETAILS
14	D-5	DETAILS
15	D-6	DETAILS

PROPOSED UNIT BREAKDOWN

APARTMENTS	
6 UNITS	STUDIO APARTMENT
135 UNITS	1 BEDROOM EACH
35 UNITS	2 BEDROOMS EACH
TOWNHOMES	
12 UNITS	3 BEDROOMS EACH



LOCATION MAP SCALE: 1" = 1,000'±

OWNER/APPLICANT:

Mr. Edward Cohen
Buckingham Properties
657 E. Main Street, Mt. Kisco, NY
Tel: 914-666-7700

SITE DATA:

Zone:	RMU-Residential Mixed Use
Use:	Multi Family Dwelling
Total Acreage	13.42 AC.± (584,575.2 S.F.)
Tax Map No.:	134601-6158-13-071325

GENERAL NOTES:

1. For Drawing OP-1, subject property boundary line shown hereon taken from "Map prepared for Buckingham Properties" prepared by Bly and Houston LLP Land Surveyors, dated January 16, 2017.
2. Adjoining property boundary lines shown hereon taken from Dutchess County GIS.
3. For site plans, Boundary & Topographic information shown taken from "Map prepared for Buckingham Properties" prepared by Bly and Houston LLP Land Surveyors, dated January 16, 2017. Topographic datum is approximate USGS, contour interval is 2'.
4. Orthoimagery shown hereon taken from Wappingers GIS database. Dated 2016.

LEGEND

- EXISTING PROPERTY LINE
- EXISTING EASEMENT
- EXISTING STONE WALL
- EXISTING WIRE FENCE
- EXISTING STOCKADE FENCE
- PROPOSED CONCRETE CURB
- PROPOSED DROP CURB & RAMP
- PROPOSED EDGE OF SIDEWALK
- PROPOSED RETAINING WALL

GRAPHIC SCALE
0 50 100 200
(IN FEET)
1 inch = 100 ft.

NO.	DATE	REVISION	BY
4	9-13-23	REVISED PER VILLAGE COMMENTS	JWM
3	6-14-23	REVISED PER VILLAGE COMMENTS	SMR
2	5-10-23	REVISED PER VILLAGE COMMENTS	MEU
1	2-1-23	PLANNING BOARD SUBMISSION	DSW

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Carmel, NY 10512
(845) 225-9690
(845) 225-9717 fax
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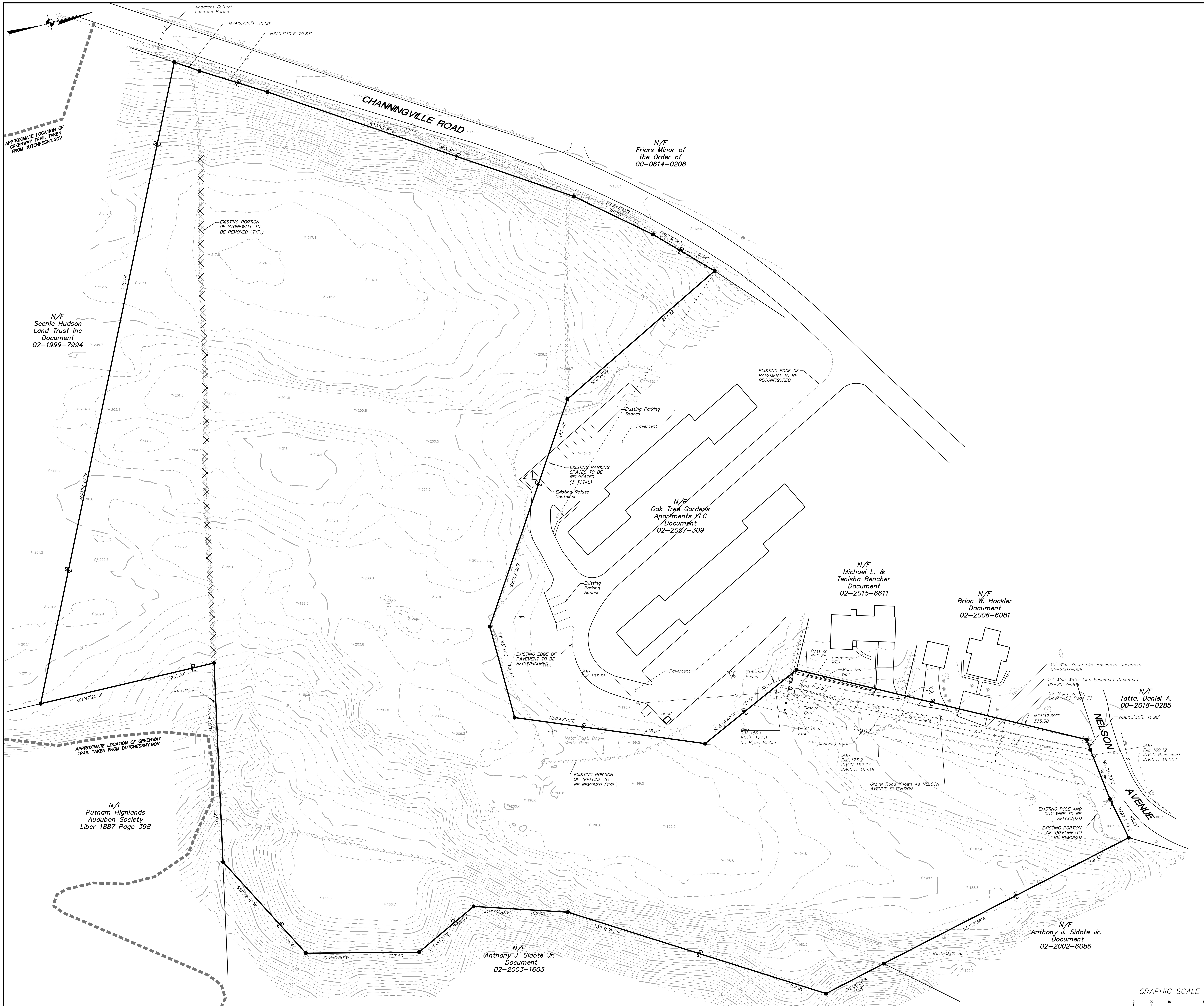
PROJECT:
BUCKINGHAM PROPERTY MANAGEMENT
CHANNINGVILLE RD & NELSON AVE, VILLAGE OF WAPPINGERS FALLS, DUTCHESS CO., NY

DRAWING:
OVERALL PLAN

STATE OF NEW YORK ★ RICHARD D. WILLIAMS JR. ★ 085866 LICENSED PROFESSIONAL ENGINEER

PROJECT NUMBER	22194.100	PROJECT MANAGER	R.D.W.
DATE	12-15-22	DRAWN BY	M.E.U.
SCALE	1" = 100'	CHECKED BY	D.L.M.

DRAWING NO. OP-1
SHEET 1 / 15


CHANNINGVILLE ROAD
NELSON AVENUE
N/F Friars Minor of the Order of 00-0614-0208
N/F Scenic Hudson Land Trust Inc Document 02-1999-7994
N/F Oak Tree Gardens Apartments LLC Document 02-2007-309
N/F Michael L. & Tenisha Rencher Document 02-2015-6611
N/F Brian W. Hockler Document 02-2006-6081
N/F Tatta, Daniel A. 00-2018-0285
N/F Putnam Highlands Audubon Society Liber 1887 Page 398
N/F Anthony J. Sidote Jr. Document 02-2003-1603
N/F Anthony J. Sidote Jr. Document 02-2002-6086
APPROXIMATE LOCATION OF GREENWAY TRAIL TAKEN FROM DUTCHESSNY.GOV
EXISTING PORTION OF STONEWALL TO BE REMOVED (TYP.)
EXISTING EDGE OF PAVEMENT TO BE RECONFIGURED
EXISTING PARKING SPACES TO BE RELOCATED (3 TOTAL)
Existing Refuse Container
Existing Parking Spaces
EXISTING PORTION OF TREELINE TO BE REMOVED (TYP.)
EXISTING POLE AND GUY WIRE TO BE RELOCATED
EXISTING PORTION OF TREELINE TO BE REMOVED
10' Wide Sewer Line Easement Document 02-2007-309
10' Wide Water Line Easement Document 02-2007-309
50' Right of Way Liber 1163 Page 73
Gravel Road Known As NELSON AVENUE EXTENSION
Apparent Culvert Location Buried
N34°25'20"E 30.00'
N32°13'30"E 79.88'
N86°13'30"E 11.90'
N28°32'30"E 335.38'
S01°47'20"W 200.00'
S22°47'10"E 215.87'
GRAPHIC SCALE
(IN FEET)
1 inch = 40 ft.

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LEGEND

- EXISTING PROPERTY LINE
- EXISTING EASEMENT
- EXISTING STONE WALL
- EXISTING WIRE FENCE
- EXISTING STOCKADE FENCE
- EXISTING UTILITY POLE w/ guy & overhead wires
- EXISTING SIGN
- EXISTING UNDERGROUND DRAINAGE PIPE
- EXISTING UNDERGROUND SEWER MAIN
- EXISTING SEWER MANHOLE
- EXISTING HYDRANT
- EXISTING WATER SHUTOFF VALVE
- EXISTING 10' CONTOUR
- EXISTING 2' CONTOUR
- EXISTING SPOT GRADE
- EXISTING TREELINE

NO.	DATE	REVISION	BY
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1	2-1-23	PLANNING BOARD SUBMISSION	DSW

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PROJECT:

BUCKINGHAM PROPERTY MANAGEMENT

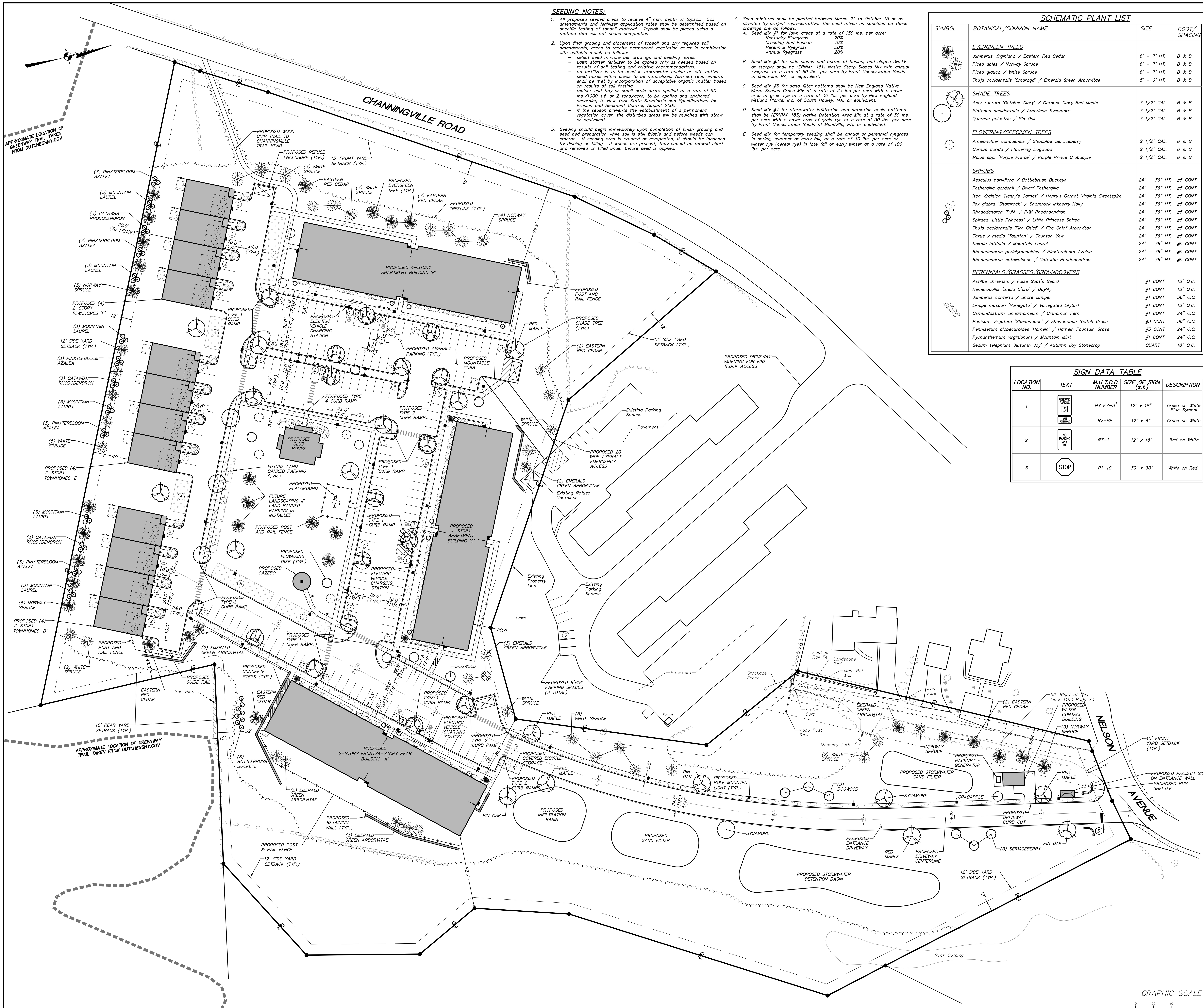
CHANNINGVILLE RD & NELSON AVE, VILLAGE OF WAPPINGERS FALLS, DUTCHESS CO., NY

DRAWING:

EXISTING CONDITIONS PLAN

STATE OF NEW YORK · RICHARD D. WILLIAMS JR. · 085866 · LICENSED PROFESSIONAL ENGINEER

PROJECT NUMBER	22194.100	PROJECT MANAGER	R.D.W.	DRAWING NO.	SHEET
DATE	12-15-22	DRAWN BY	M.E.U.	EX-1	2 / 15
SCALE	1" = 40'	CHECKED BY	D.L.M.		



SEEDING NOTES:

1. All proposed seeded areas to receive 4" min. depth of topsoil. Soil amendments and fertilizer application rates shall be determined based on specific testing of topsoil material. Topsoil shall be placed using a method that will not cause compaction.
2. Upon final grading and placement of topsoil and any required soil amendments, areas to receive permanent vegetation cover in combination with suitable mulch as follows:
   - select seed mixture per drawings and seeding notes.
   - Lawn starter fertilizer to be applied only as needed based on results of soil testing and relative recommendations.
   - no fertilizer is to be used in stormwater basins or with native seed mixes within areas to be naturalized. Nutrient requirements shall be met by incorporation of acceptable organic matter based on results of soil testing.
   - mulch: salt hay or small grain straw applied at a rate of 90 lbs./1000 s.f. or 2 tons/acre, to be applied and anchored according to New York State Standards and Specifications for Erosion and Sediment Control, August 2005.
   - if the season prevents the establishment of a permanent vegetation cover, the disturbed areas will be mulched with straw or equivalent.
3. Seeding should begin immediately upon completion of finish grading and seed bed preparation while soil is still friable and before weeds can emerge. If seeding area is crusted or compacted, it should be loosened by discing or tilling. If weeds are present, they should be mowed short and removed or tilled under before seed is applied.
4. Seed mixtures shall be planted between March 21 to October 15 or as directed by project representative. The seed mixes as specified on these drawings are as follows:
   A. Seed Mix #1 for lawn areas at a rate of 150 lbs. per acre:
      Kentucky Bluegrass 20%
      Creeping Red Fescue 40%
      Perennial Ryegrass 20%
      Annual Ryegrass 20%
   B. Seed Mix #2 for side slopes and berms of basins, and slopes 3H:1V or steeper shall be (ERNMX-181) Native Steep Slopes Mix with annual ryegrass at a rate of 60 lbs. per acre by Ernst Conservation Seeds of Meadville, PA, or equivalent.
   C. Seed Mix #3 for sand filter bottoms shall be New England Native Warm Season Grass Mix at a rate of 23 lbs per acre with a cover crop of grain rye at a rate of 30 lbs. per acre by New England Wetland Plants, Inc. of South Hadley, MA, or equivalent.
   D. Seed Mix #4 for stormwater infiltration and detention basin bottoms shall be (ERNMX-183) Native Detention Area Mix at a rate of 30 lbs. per acre with a cover crop of grain rye at a rate of 30 lbs. per acre by Ernst Conservation Seeds of Meadville, PA, or equivalent.
   E. Seed Mix for temporary seeding shall be annual or perennial ryegrass in spring, summer or early fall, at a rate of 30 lbs. per acre or winter rye (cereal rye) in late fall or early winter at a rate of 100 lbs. per acre.

SCHEMATIC PLANT LIST

SYMBOL	BOTANICAL/COMMON NAME	SIZE	ROOT/ SPACING
	EVERGREEN TREES		
	Juniperus virginiana / Eastern Red Cedar	6' - 7' HT.	B & B
	Picea abies / Norway Spruce	6' - 7' HT.	B & B
	Picea glauca / White Spruce	6' - 7' HT.	B & B
	Thuja occidentalis 'Smaragd' / Emerald Green Arborvitae	5' - 6' HT.	B & B
	SHADE TREES		
	Acer rubrum 'October Glory' / October Glory Red Maple	3 1/2" CAL.	B & B
	Platanus occidentalis / American Sycamore	3 1/2" CAL.	B & B
	Quercus palustris / Pin Oak	3 1/2" CAL.	B & B
	FLOWERING/SPECIMEN TREES		
	Amelanchier canadensis / Shadblow Serviceberry	2 1/2" CAL.	B & B
	Cornus florida / Flowering Dogwood	2 1/2" CAL.	B & B
	Malus spp. 'Purple Prince' / Purple Prince Crabapple	2 1/2" CAL.	B & B
	SHRUBS		
	Aesculus parviflora / Bottlebrush Buckeye	24" - 36" HT.	#5 CONT
	Fothergilla gardenii / Dwarf Fothergilla	24" - 36" HT.	#5 CONT
	Itea virginica 'Henry's Garnet' / Henry's Garnet Virginia Sweetspire	24" - 36" HT.	#5 CONT
	Ilex glabra 'Shamrock' / Shamrock Inkberry Holly	24" - 36" HT.	#5 CONT
	Rhododendron 'PJM' / PJM Rhododendron	24" - 36" HT.	#5 CONT
	Spiraea 'Little Princess' / Little Princess Spirea	24" - 36" HT.	#5 CONT
	Thuja occidentalis 'Fire Chief' / Fire Chief Arborvitae	24" - 36" HT.	#5 CONT
	Taxus x media 'Taunton' / Taunton Yew	24" - 36" HT.	#5 CONT
	Kalmia latifolia / Mountain Laurel	24" - 36" HT.	#5 CONT
	Rhododendron periclymenoides / Pinxterbloom Azalea	24" - 36" HT.	#5 CONT
	Rhododendron catawbiense / Catawba Rhododendron	24" - 36" HT.	#5 CONT
	PERENNIALS/GRASSES/GROUNDCOVERS		
	Astilbe chinensis / False Goat's Beard	#1 CONT	18" O.C.
	Hemerocallis 'Stella D'oro' / Daylily	#1 CONT	18" O.C.
	Juniperus conferta / Shore Juniper	#1 CONT	36" O.C.
	Liriope muscari 'Variegata' / Variegated Lilyturf	#1 CONT	18" O.C.
	Osmundastrum cinnamomeum / Cinnamon Fern	#1 CONT	24" O.C.
	Panicum virgatum 'Shenandoah' / Shenandoah Switch Grass	#3 CONT	36" O.C.
	Pennisetum alopecuroides 'Hameln' / Hameln Fountain Grass	#3 CONT	24" O.C.
	Pycnanthemum virginianum / Mountain Mint	#1 CONT	24" O.C.
	Sedum telephium 'Autumn Joy' / Autumn Joy Stonecrop	QUART	18" O.C.

SIGN DATA TABLE

LOCATION NO.	TEXT	M.U.T.C.D. NUMBER	SIZE OF SIGN (s.f.)	DESCRIPTION
1	RESERVED PARKING	NY R7-8*	12" x 18"	Green on White Blue Symbol
	VAN ACCESSIBLE	R7-8P	12" x 6"	Green on White
2	NO PARKING ANY TIME	R7-1	12" x 18"	Red on White
3	STOP	R1-1C	30" x 30"	White on Red

LEGEND

- EXISTING PROPERTY LINE
- EXISTING EASEMENT
- EXISTING STONE WALL
- EXISTING WIRE FENCE
- EXISTING STOCKADE FENCE
- EXISTING SIGN
- EXISTING TREELINE
- PROPOSED YARD SETBACK
- PROPOSED # OF STALLS TO BE STRIPED
- PROPOSED CONCRETE CURB
- PROPOSED EDGE OF SIDEWALK
- PROPOSED RETAINING WALL
- PROPOSED PAINTED CROSSWALK
- PROPOSED PAINTED STOPBAR
- PROPOSED PAINTED HANDICAP PARKING SYMBOL
- PROPOSED DOOR LOCATION
- PROPOSED STRIPED ISLAND
- PROPOSED SIGN
- PROPOSED LIGHTING
- PROPOSED ELECTRIC VEHICLE CHARGING STATION
- PROPOSED LANDSCAPING

PLANTING NOTES:

1. All proposed planting beds to receive a 12" min. depth of topsoil. Soil amendments and fertilizer application rates shall be determined based on specific testing of topsoil material.
2. Any new soils added will be amended as required by results of soil testing and placed using a method that will not cause compaction.
3. No fertilizer shall be added in stormwater basin plantings. Nutrient requirements to be met by incorporation of acceptable organic matter.
4. All plant material to be nursery grown.
5. Plants shall conform with ANSI Z60.1 American Standard for Nursery Stock in all ways including dimensions.
6. Plant material shall be taken from healthy nursery stock.
7. All plants shall be grown under climate conditions similar to those in the locality of the project.
8. Plants shall be planted in all locations designed on the plan or as staked in the field by the Landscape Architect.
9. The location and layout of landscape plants shown on the site plan shall take precedence in any discrepancies between the quantities of plants shown on the plans and the quantity of plants in the Plant List.
10. Provide a 3" layer of shredded bark mulch (or as specified) over entire watering saucer at all tree pits or over entire planting bed. Do not place mulch within 3" of tree or shrub trunks.
11. All landscape plantings shall be maintained in a healthy condition at all times during use. Any dead or diseased plants shall immediately be replaced "in kind" by the contractor or project owner.

LAND BANKED PARKING NOTES:

1. The Planning Board reserves the right to require the owner of record to construct a portion or all of the land banked parking spaces at any time.
2. The landowner will relocate the sidewalk along the south side of the central green further north on the green if the 10 land banked spaces in that area are required.

ELECTRIC VEHICLE CHARGING NOTE:

1. Conduits shall be provided for future electric vehicle charging stations as noted on plan.
2. A 220-volt outlet for electric vehicle charging shall be provided in the garage of each townhouse to allow for charging of electric vehicles.

SIDEWALK NOTE:

1. All sidewalks are 5' wide unless otherwise noted. Sidewalks adjacent to pull in parking are 7' wide.

GRAPHIC SCALE

0 20 40 80

(IN FEET)
1 inch = 40 ft.

NO.	DATE	REVISION	BY
4	9-13-23	REVISED PER VILLAGE COMMENTS	JWM
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2	5-10-23	REVISED PER VILLAGE COMMENTS	MEU
1	2-1-23	PLANNING BOARD SUBMISSION	DSW

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PROJECT:
BUCKINGHAM PROPERTY MANAGEMENT
CHANNINGVILLE RD & NELSON AVE, VILLAGE OF WAPPINGERS FALLS, DUTCHESS CO., NY

DRAWING:
LAYOUT & LANDSCAPE PLAN

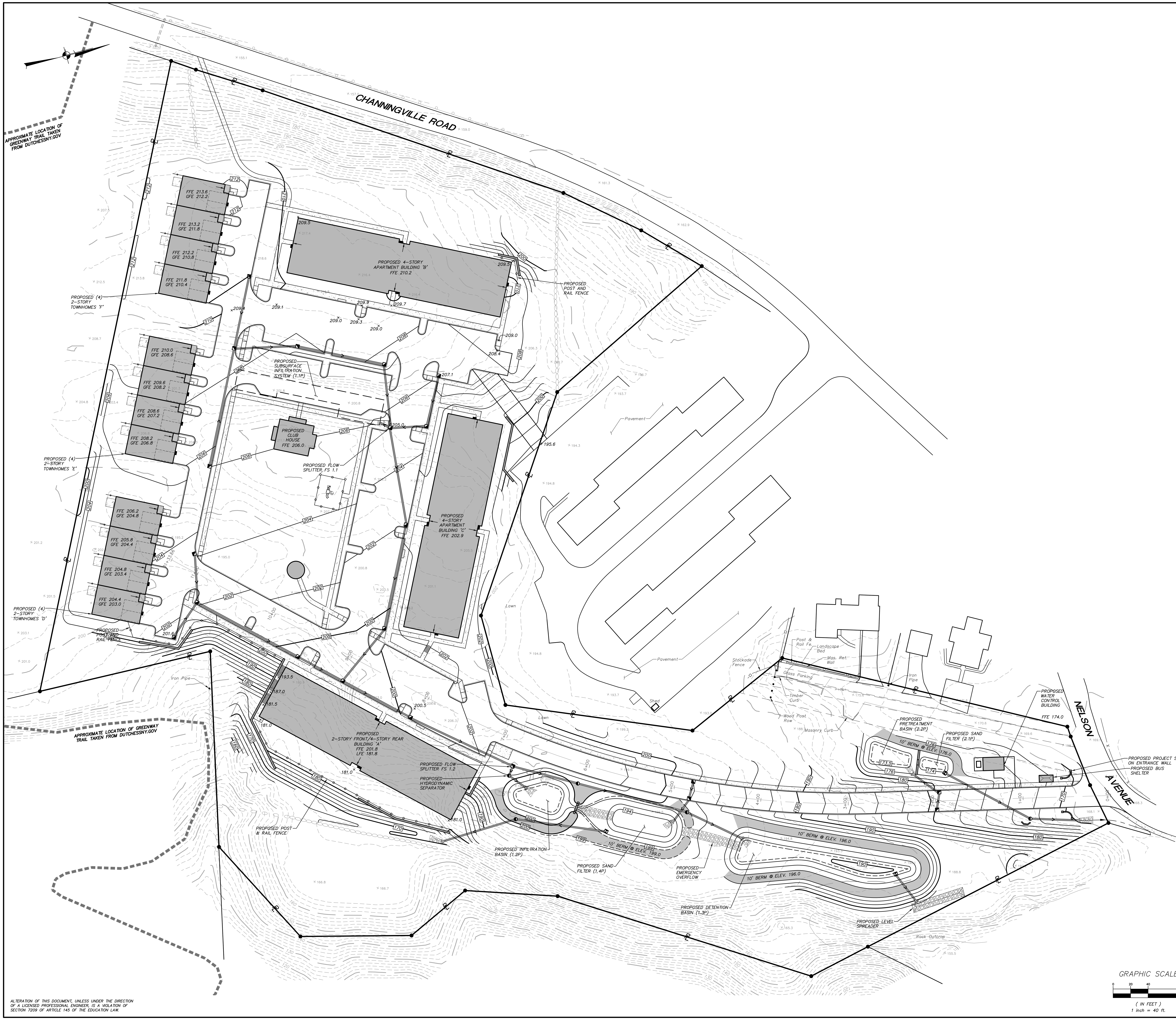
STATE OF NEW YORK · RICHARD D. WILLIAMS JR. · 085866 · LICENSED PROFESSIONAL ENGINEER

PROJECT NUMBER	22194.100	PROJECT MANAGER	R.D.W.
DATE	12-15-22	DRAWN BY	M.E.U.
SCALE	1" = 40'	CHECKED BY	D.L.M.

DRAWING NO. SP-1

SHEET 3 / 15

ALTERATION OF THIS DOCUMENT, UNLESS UNDER THE DIRECTION OF A LICENSED PROFESSIONAL ENGINEER, IS A VIOLATION OF SECTION 7209 OF ARTICLE 145 OF THE EDUCATION LAW.



CHANNINGVILLE ROAD
NELSON AVENUE
APPROXIMATE LOCATION OF GREENWAY TRAIL TAKEN FROM DUTCHESSNY.GOV
PROPOSED 4-STORY APARTMENT BUILDING 'B' FFE 210.2
PROPOSED 4-STORY APARTMENT BUILDING 'C' FFE 202.9
PROPOSED 2-STORY FRONT/4-STORY REAR BUILDING 'A' FFE 201.8 LFE 181.8
PROPOSED CLUB HOUSE FFE 206.0
PROPOSED (4) 2-STORY TOWNHOMES 'F'
PROPOSED (4) 2-STORY TOWNHOMES 'E'
PROPOSED (4) 2-STORY TOWNHOMES 'D'
FFE 213.6 GFE 212.2
FFE 213.2 GFE 211.8
FFE 212.2 GFE 210.8
FFE 211.8 GFE 210.4
FFE 210.0 GFE 208.6
FFE 209.6 GFE 208.2
FFE 208.6 GFE 207.2
FFE 208.2 GFE 206.8
FFE 206.2 GFE 204.8
FFE 205.8 GFE 204.4
FFE 204.8 GFE 203.4
FFE 204.4 GFE 203.0
PROPOSED SUBSURFACE INFILTRATION SYSTEM (1.1P)
PROPOSED FLOW SPLITTER FS 1.1
PROPOSED FLOW SPLITTER FS 1.2
PROPOSED HYDRODYNAMIC SEPARATOR
PROPOSED POST AND RAIL FENCE
PROPOSED POST & RAIL FENCE
PROPOSED INFILTRATION BASIN (1.2P)
PROPOSED SAND FILTER (1.4P)
PROPOSED EMERGENCY OVERFLOW
PROPOSED DETENTION BASIN (1.3P)
PROPOSED LEVEL SPREADER
PROPOSED PRETREATMENT BASIN (2.2P)
PROPOSED SAND FILTER (2.1P)
PROPOSED WATER CONTROL BUILDING
FFE 174.0
PROPOSED PROJECT SIGN ON ENTRANCE WALL
PROPOSED BUS SHELTER
10' BERM ELEV. 199.0
10' BERM ELEV. 196.0
10' BERM ELEV. 176.0
Pavement
Lawn
Shed
Iron Pipe
Stockade Fence
Post & Rail Fe
Landscape Bed
Mas. Ret. Wall
Grass Parking
Timber Curb
Wood Post Row
Masonry Curb
Rock Outcrop
GRAPHIC SCALE
(IN FEET)
1 inch = 40 ft.

LEGEND

- EXISTING PROPERTY LINE
- EXISTING EASEMENT
- EXISTING STONE WALL
- EXISTING WIRE FENCE
- EXISTING STOCKADE FENCE
- EXISTING SIGN
- EXISTING UNDERGROUND DRAINAGE PIPE
- EXISTING 10' CONTOUR
- EXISTING 2' CONTOUR
- EXISTING SPOT GRADE
- PROPOSED 10' CONTOUR
- PROPOSED 2' CONTOUR
- PROPOSED SPOT ELEVATION (×100.5)
- PROPOSED TOP OF CURB & BOTTOM OF CURB ELEVATIONS (TC 101.0 / BC 100.5)
- PROPOSED TOP OF WALL & BOTTOM OF WALL ELEVATIONS (TW 105.0 / BW 100.0)
- PROPOSED DRAINAGE MANHOLE
- PROPOSED CATCH BASIN
- PROPOSED OUTLET STRUCTURE
- PROPOSED END SECTION
- PROPOSED DRAINAGE PIPE
- PROPOSED GRASS SWALE
- PITCH TO DRAIN (PTD)

REQUIRED POST-CONSTRUCTION STORMWATER MANAGEMENT PRACTICE COMPONENTS:

1. Pursuant to the NYSDEC "SPDES General Permit for Stormwater Discharges from Construction Activity" (GP-0-20-001), all construction projects needing post-construction stormwater management practices shall prepare a SWPPP that also includes practices designed in conformance with the most current version of the technical standard, New York State Stormwater Management Design Manual ("Design Manual"). Where post-construction stormwater management practices are not designed in conformance with this technical standard, the owner or operator must demonstrate equivalence to the technical standard. The following list of SWPPP components is provided in accordance with Part III.B.2a-f and III.B.3:

   a. Identification of all post-construction stormwater management practices to be constructed as part of the project; This plan, and details/notes shown hereon serve to satisfy this SWPPP requirement.

   b. A site map/construction drawing(s) showing the specific location and size of each post-construction stormwater management practice; This plan, and details/notes shown hereon serve to satisfy this SWPPP requirement.

   c. A Stormwater Modeling and Analysis Report including pre-development conditions, post-development conditions, the results of the stormwater modeling, a summary table demonstrating that each practice has been designed in conformance with the sizing criteria, identification of and justification for any deviations from the Design Manual, and identification of any design criteria that are not required. The required analysis is provided in the report titled Preliminary Stormwater Pollution Prevention Plan for Buckingham Property Management.

   d. Soil testing results and locations. This SWPPP requirement is provided in the report titled Preliminary Stormwater Pollution Prevention Plan for Buckingham Property Management.

   e. Infiltration testing results. This SWPPP requirement is provided in the report titled Preliminary Stormwater Pollution Prevention Plan for Buckingham Property Management.

   f. An operations and maintenance plan that includes inspection and maintenance schedules and actions to ensure continuous and effective operation of each post-construction stormwater management practice. The plan shall identify the entity that will be responsible for the long term operation and maintenance of each practice. The Permanent Stormwater Facilities Maintenance Schedule provided on these plans serves to satisfy this requirement.

2. Enhanced Phosphorus Removal Standards – Beginning on September 30, 2008, all construction projects identified in Table 2 of Appendix B that are located in the watersheds identified in Appendix C shall prepare a SWPPP that includes post-construction stormwater management practices designed in conformance with the Enhanced Phosphorus Removal Standards included in the most current version of the technical standard, New York Stormwater Management Design Manual. At a minimum, the post-construction stormwater management practice component of the SWPPP shall include items 2.a – 2.f above. The project is not located in a watershed identified in Appendix C.

NO.	DATE	REVISION	BY
4	9-13-23	REVISED PER VILLAGE COMMENTS	JWM
3	6-14-23	REVISED PER VILLAGE COMMENTS	SMR
2	5-10-23	REVISED PER VILLAGE COMMENTS	MEU
1	2-1-23	PLANNING BOARD SUBMISSION	DSW

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PROJECT:

BUCKINGHAM PROPERTY MANAGEMENT

CHANNINGVILLE RD & NELSON AVE, VILLAGE OF WAPPINGERS FALLS, DUTCHESS CO., NY

DRAWING:

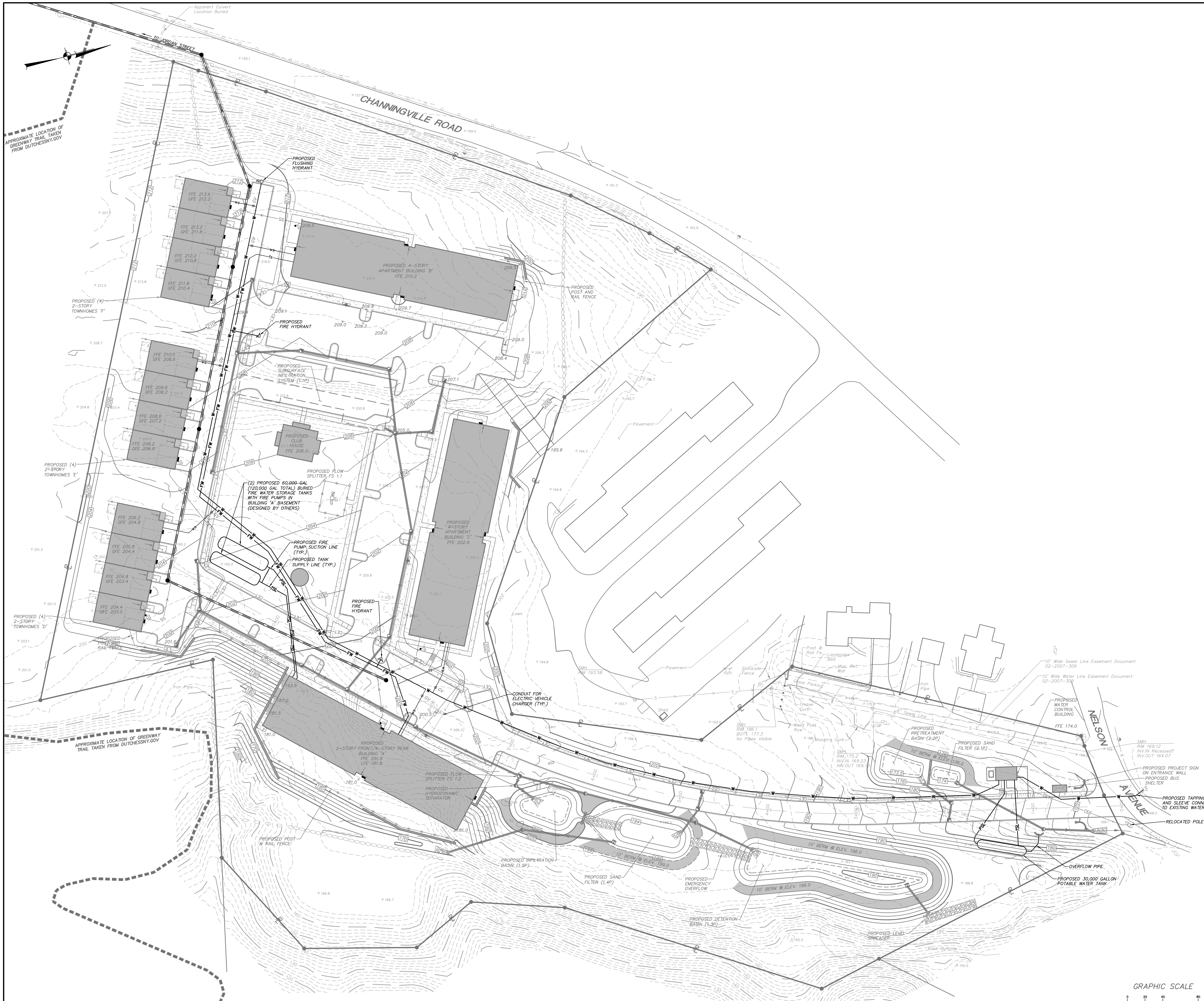
GRADING & DRAINAGE PLAN

STATE OF NEW YORK · RICHARD D. WILLIAMS JR. · LICENSED PROFESSIONAL ENGINEER · 085866

PROJECT NUMBER	22194.100	PROJECT MANAGER	R.D.W.
DATE	12-15-22	DRAWN BY	M.E.U.
SCALE	1" = 40'	CHECKED BY	D.L.M.

DRAWING NO. SP-2 — SHEET 4 / 15

ALTERATION OF THIS DOCUMENT, UNLESS UNDER THE DIRECTION OF A LICENSED PROFESSIONAL ENGINEER, IS A VIOLATION OF SECTION 7209 OF ARTICLE 145 OF THE EDUCATION LAW.



LEGEND

Symbol	Description
PL	EXISTING PROPERTY LINE
	EXISTING EASEMENT
	EXISTING STONE WALL
X	EXISTING WIRE FENCE
□	EXISTING STOCKADE FENCE
	EXISTING UTILITY POLE w/ guy & overhead wires
	EXISTING SIGN
	EXISTING UNDERGROUND DRAINAGE PIPE
S	EXISTING UNDERGROUND SEWER MAIN
(S)	EXISTING SEWER MANHOLE
	EXISTING HYDRANT
	EXISTING WATER SHUTOFF VALVE
100	EXISTING 10' CONTOUR
	EXISTING 2' CONTOUR
698.6 ×	EXISTING SPOT GRADE
100	PROPOSED 10' CONTOUR
	PROPOSED 2' CONTOUR
×100.5 100.5	PROPOSED SPOT ELEVATION
TC 101.0 ×BC 100.5	PROPOSED TOP OF CURB & BOTTOM OF CURB ELEVATIONS
TW 105.0 ×BW 100.0	PROPOSED TOP OF WALL & BOTTOM OF WALL ELEVATIONS
●	PROPOSED SEWER MANHOLE
◐	PROPOSED DRAINAGE MANHOLE
	PROPOSED CATCH BASIN
	PROPOSED OUTLET STRUCTURE
◀	PROPOSED END SECTION
⊗ GV	PROPOSED WATER GATE VALVE
	PROPOSED FIRE HYDRANT
WV	PROPOSED WATER VALVE
	PROPOSED DRAINAGE PIPE
	PROPOSED 8"ø PVC SDR 35 SEWER MAIN
SS	PROPOSED PVC SDR 35 SEWER SERVICE LINE
fs	PROPOSED FIRE SERVICE LINE
ws	PROPOSED DOMESTIC WATER SERVICE LINE
TSL	PROPOSED 2"ø HDPE TANK SUPPLY LINE
PSL	PROPOSED 6"ø PVC DR-18 PUMP SUPPLY LINE
W	PROPOSED 6"ø PVC DR-18 WATER MAIN
FW	PROPOSED FIRE WATER MAIN
	PROPOSED GRASS SWALE
PTD	PITCH TO DRAIN
CO	PROPOSED CLEAN OUT
CS	EXISTING CURB STOP
CET	PROPOSED BURIED CABLE, ELECTRIC, AND TELECOMMUNICATIONS
TX	PROPOSED TRANSFORMER
e	PROPOSED CONDUIT FOR FUTURE VEHICLE CHARGER

UTILITY NOTE:

Cable, electric, and telecommunications shown for reference only. Location of these utilities to be designed and laid out by supplier.

NO.	DATE	REVISION	BY
4	9-13-23	REVISED PER VILLAGE COMMENTS	JWM
3	6-14-23	REVISED PER VILLAGE COMMENTS	SMR
2	5-10-23	REVISED PER VILLAGE COMMENTS	MEU
1	2-1-23	PLANNING BOARD SUBMISSION	DSW

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PROJECT:

BUCKINGHAM PROPERTY MANAGEMENT

CHANNINGVILLE RD & NELSON AVE, VILLAGE OF WAPPINGERS FALLS, DUTCHESS CO., NY

DRAWING:

UTILITIES PLAN

STATE OF NEW YORK · RICHARD D. WILLIAMS JR. · 085866 · LICENSED PROFESSIONAL ENGINEER

PROJECT NUMBER	22194.100	PROJECT MANAGER	R.D.W.	DRAWING NO. SP-3
DATE	12-15-22	DRAWN BY	M.E.U.	SHEET 5 / 15
SCALE	1" = 40'	CHECKED BY	D.L.M.	

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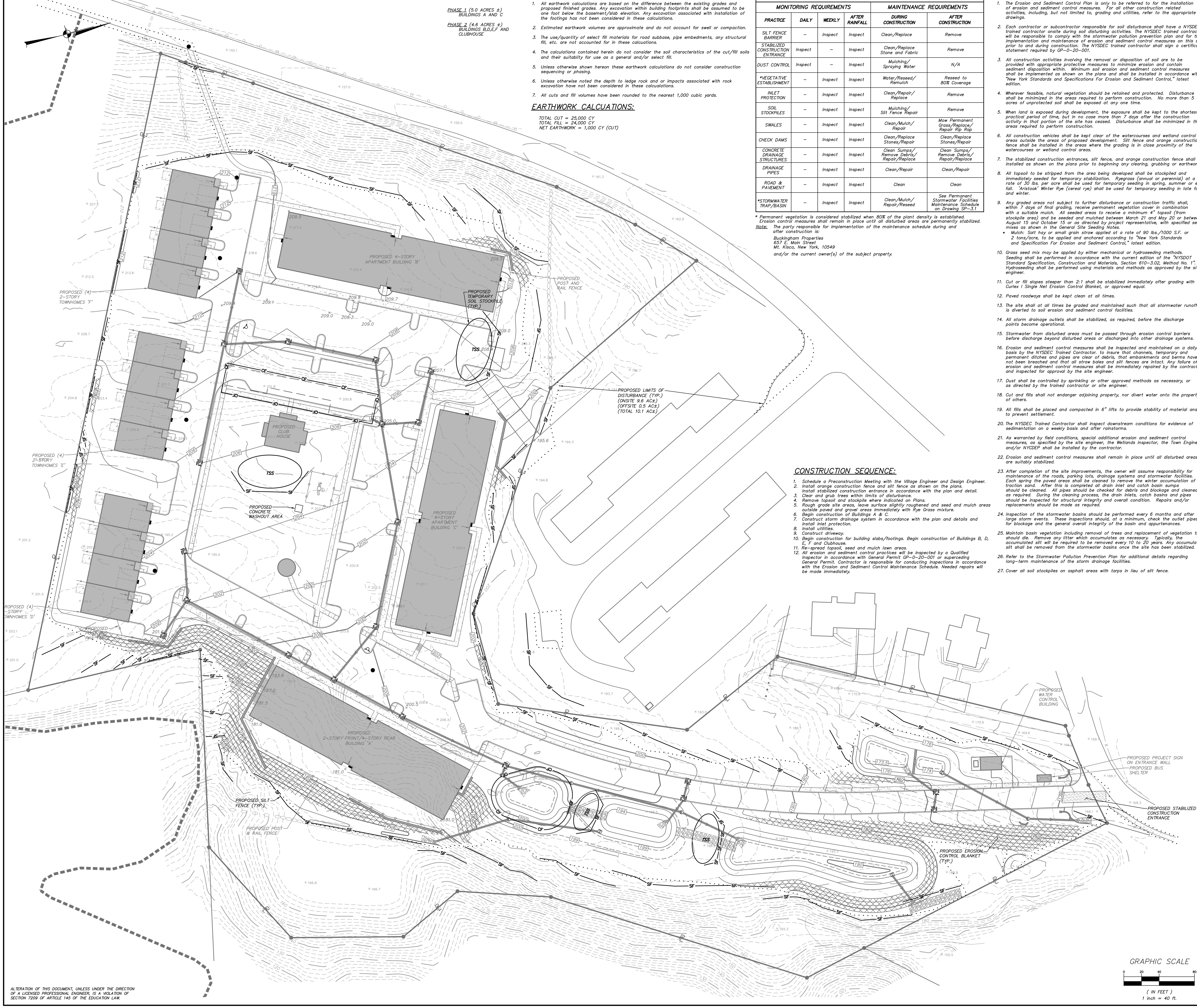

EARTHWORK NOTES:

1. All earthwork calculations are based on the difference between the existing grades and proposed finished grades. Any excavation within building footprints shall be assumed to be one foot below the basement/slab elevation. Any excavation associated with installation of the footings has not been considered in these calculations.
2. Estimated earthwork volumes are approximate and do not account for swell or compaction.
3. The use/quantity of select fill materials for road subbase, pipe embedments, any structural fill, etc. are not accounted for in these calcuations.
4. The calculations contained herein do not consider the soil characteristics of the cut/fill soils and their suitablity for use as a general and/or select fill.
5. Unless otherwise shown hereon these earthwork calculations do not consider construction sequencing or phasing.
6. Unless otherwise noted the depth to ledge rock and or impacts associated with rock excavation have not been considered in these calcualations.
7. All cuts and fill volumes have been rounded to the nearest 1,000 cubic yards.

EARTHWORK CALCUATIONS:

TOTAL CUT = 25,000 CY
TOTAL FILL = 24,000 CY
NET EARTHWORK = 1,000 CY (CUT)

EROSION AND SEDIMENT CONTROL MAINTENANCE SCHEDULE

MONITORING REQUIREMENTS				MAINTENANCE REQUIREMENTS	
PRACTICE	DAILY	WEEKLY	AFTER RAINFALL	DURING CONSTRUCTION	AFTER CONSTRUCTION
SILT FENCE BARRIER	–	Inspect	Inspect	Clean/Replace	Remove
STABILIZED CONSTRUCTION ENTRANCE	Inspect	–	Inspect	Clean/Replace Stone and Fabric	Remove
DUST CONTROL	Inspect	–	Inspect	Mulching/ Spraying Water	N/A
*VEGETATIVE ESTABLISHMENT	–	Inspect	Inspect	Water/Reseed/ Remulch	Reseed to 80% Coverage
INLET PROTECTION	–	Inspect	Inspect	Clean/Repair/ Replace	Remove
SOIL STOCKPILES	–	Inspect	Inspect	Mulching/ Silt Fence Repair	Remove
SWALES	–	Inspect	Inspect	Clean/Mulch/ Repair	Mow Permanent Grass/Replace/ Repair Rip Rap
CHECK DAMS	–	Inspect	Inspect	Clean/Replace Stones/Repair	Clean/Replace Stones/Repair
CONCRETE DRAINAGE STRUCTURES	–	Inspect	Inspect	Clean Sumps/ Remove Debris/ Repair/Replace	Clean Sumps/ Remove Debris/ Repair/Replace
DRAINAGE PIPES	–	Inspect	Inspect	Clean/Repair	Clean/Repair
ROAD & PAVEMENT	–	Inspect	Inspect	Clean	Clean
*STORMWATER TRAP/BASIN	–	Inspect	Inspect	Clean/Mulch/ Repair/Reseed	See Permanent Stormwater Facilities Maintenance Schedule on Drawing SP–3.1

* Permanent vegetation is considered stabilized when 80% of the plant density is established. Erosion control measures shall remain in place until all disturbed areas are permanently stabilized.

Note: The party responsible for implementation of the maintenance schedule during and after construction is:

Buckingham Properties
657 E. Main Street
Mt. Kisco, New York, 10549

and/or the current owner(s) of the subject property.

CONSTRUCTION SEQUENCE:

1. Schedule a Preconstruction Meeting with the Village Engineer and Design Engineer.
2. Install orange construction fence and silt fence as shown on the plans. Install stabilized construction entrance in accordance with the plan and detail.
3. Clear and grub trees within limits of disturbance.
4. Remove topsoil and stockpile where indicated on Plans.
5. Rough grade site areas, leave surface slightly roughened and seed and mulch areas outside paved and gravel areas immediately with Rye Grass mixture.
6. Begin construction of Buildings A & C.
7. Construct storm drainage system in accordance with the plan and details and install inlet protection.
8. Install utilities.
9. Construct driveway.
10. Begin construction for building slabs/footings. Begin construction of Buildings B, D, E, F and Clubhouse.
11. Re–spread topsoil, seed and mulch lawn areas.
12. All erosion and sediment control practices will be inspected by a Qualified Inspector in accordance with General Permit GP–0–20–001 or superceding General Permit. Contractor is responsible for conducting inspections in accordance with the Erosion and Sediment Control Maintenance Schedule. Needed repairs will be made immediately.

EROSION & SEDIMENT CONTROL NOTES:

1. The Erosion and Sediment Control Plan is only to be referred to for the installation of erosion and sediment control measures. For all other construction related activities, including, but not limited to, grading and utilities, refer to the appropriate drawings.
2. Each contractor or subcontractor responsible for soil disturbance shall have a NYSDEC trained contractor onsite during soil disturbing activities. The NYSDEC trained contractor will be responsible to comply with the stormwater pollution prevention plan and for the implementation and maintenance of erosion and sediment control measures on this site prior to and during construction. The NYSDEC trained contractor shall sign a certification statement required by GP–0–20–001.
3. All construction activities involving the removal or disposition of soil are to be provided with appropriate protective measures to minimize erosion and contain sediment disposition within. Minimum soil erosion and sediment control measures shall be implemented as shown on the plans and shall be installed in accordance with "New York Standards and Specifications For Erosion and Sediment Control," latest edition.
4. Wherever feasible, natural vegetation should be retained and protected. Disturbance shall be minimized in the areas required to perform construction. No more than 5 acres of unprotected soil shall be exposed at any one time.
5. When land is exposed during development, the exposure shall be kept to the shortest practical period of time, but in no case more than 7 days after the construction activity in that portion of the site has ceased. Disturbance shall be minimized in the areas required to perform construction.
6. All construction vehicles shall be kept clear of the watercourses and wetland control areas outside the areas of proposed development. Silt fence and orange construction fence shall be installed in the areas where the grading is in close proximity of the watercourses or wetland control areas.
7. The stabilized construction entrances, silt fence, and orange construction fence shall be installed as shown on the plans prior to beginning any clearing, grubbing or earthwork.
8. All topsoil to be stripped from the area being developed shall be stockpiled and immediately seeded for temporary stabilization. Ryegrass (annual or perennial) at a rate of 30 lbs. per acre shall be used for temporary seeding in spring, summer or early fall. 'Aristook' Winter Rye (cereal rye) shall be used for temporary seeding in late fall and winter.
9. Any graded areas not subject to further disturbance or construction traffic shall, within 7 days of final grading, receive permanent vegetation cover in combination with a suitable mulch. All seeded areas to receive a minimum 4" topsoil (from stockpile area) and be seeded and mulched between March 21 and May 20 or between August 15 and October 15 or as directed by project representative, with specified seed mixes as shown in the General Site Seeding Notes.
   - Mulch: Salt hay or small grain straw applied at a rate of 90 lbs./1000 S.F. or 2 tons/acre, to be applied and anchored according to "New York Standards and Specification For Erosion and Sediment Control," latest edition.
10. Grass seed mix may be applied by either mechanical or hydroseeding methods. Seeding shall be performed in accordance with the current edition of the "NYSDOT Standard Specification, Construction and Materials, Section 610–3.02, Method No. 1". Hydroseeding shall be performed using materials and methods as approved by the site engineer.
11. Cut or fill slopes steeper than 2:1 shall be stabilized immediately after grading with Curlex I Single Net Erosion Control Blanket, or approved equal.
12. Paved roadways shall be kept clean at all times.
13. The site shall at all times be graded and maintained such that all stormwater runoff is diverted to soil erosion and sediment control facilities.
14. All storm drainage outlets shall be stabilized, as required, before the discharge points become operational.
15. Stormwater from disturbed areas must be passed through erosion control barriers before discharge beyond disturbed areas or discharged into other drainage systems.
16. Erosion and sediment control measures shall be inspected and maintained on a daily basis by the NYSDEC Trained Contractor. to insure that channels, temporary and permanent ditches and pipes are clear of debris, that embankments and berms have not been breached and that all straw bales and silt fences are intact. Any failure of erosion and sediment control measures shall be immediately repaired by the contractor and inspected for approval by the site engineer.
17. Dust shall be controlled by sprinkling or other approved methods as necessary, or as directed by the trained contractor or site engineer.
18. Cut and fills shall not endanger adjoining property, nor divert water onto the property of others.
19. All fills shall be placed and compacted in 6" lifts to provide stability of material and to prevent settlement.
20. The NYSDEC Trained Contractor shall inspect downstream conditions for evidence of sedimentation on a weekly basis and after rainstorms.
21. As warranted by field conditions, special additional erosion and sediment control measures, as specified by the site engineer, the Wetlands Inspector, the Town Engineer and/or NYCDEP shall be installed by the contractor.
22. Erosion and sediment control measures shall remain in place until all disturbed areas are suitably stabilized.
23. After completion of the site improvements, the owner will assume responsibility for maintenance of the roads, parking lots, drainage systems and stormwater facilities. Each spring the paved areas shall be cleaned to remove the winter accumulation of traction sand. After this is completed all drain inlet and catch basin sumps should be cleaned. All pipes should be checked for debris and blockage and cleaned as required. During the cleaning process, the drain inlets, catch basins and pipes should be inspected for structural integrity and overall condition. Repairs and/or replacements should be made as required.
24. Inspection of the stormwater basins should be performed every 6 months and after large storm events. These inspections should, at a minimum, check the outlet pipes for blockage and the general overall integrity of the basin and appurtenances.
25. Maintain basin vegetation including removal of trees and replacement of vegetation that should die. Remove any litter which accumulates as necessary. Typically, the accumulated silt will be required to be removed every 10 to 20 years. Any accumulated silt shall be removed from the stormwater basins once the site has been stabilized.
26. Refer to the Stormwater Pollution Prevention Plan for additional details regarding long–term maintenance of the storm drainage facilities.
27. Cover all soil stockpiles on asphalt areas with tarps in lieu of silt fence.

LEGEND

- EXISTING PROPERTY LINE
- EXISTING EASEMENT
- EXISTING STONE WALL
- EXISTING WIRE FENCE
- EXISTING STOCKADE FENCE
- EXISTING SIGN
- EXISTING UNDERGROUND DRAINAGE PIPE
- EXISTING 10' CONTOUR
- EXISTING 2' CONTOUR
- 698.6 × EXISTING SPOT GRADE
- PROPOSED 10' CONTOUR
- PROPOSED 2' CONTOUR
- PROPOSED SEWER MANHOLE
- PROPOSED DRAINAGE MANHOLE
- PROPOSED CATCH BASIN
- PROPOSED OUTLET STRUCTURE
- PROPOSED END SECTION
- PROPOSED FIRE HYDRANT
- PROPOSED WELL
- PROPOSED DRAINAGE PIPE
- PROPOSED GRASS SWALE
- SF PROPOSED SILT FENCE
- CF PROPOSED CONSTRUCTION FENCE
- PROPOSED LIMITS OF DISTURBANCE
- TSS SF PROPOSED TEMPORARY SOIL STOCKPILE
- PROPOSED STABILIZED CONSTRUCTION ENTRANCE
- PROPOSED EROSION CONTROL BLANKET
- PROPOSED DRAINAGE STRUCTURE W/ INLET PROTECTION

REQUIRED EROSION CONTROL SWPPP CONTENTS:

Pursuant to the NYSDEC "SPDES General Permit for Stormwater Discharges from Construction Activity" (GP–0–20–001), all Stormwater Pollution Prevention Plan's (SWPPP) shall include erosion and sediment control practices designed in conformance with the most current version of the technical standard, "New York Standards and Specifications for Erosion and Sediment Control." Where erosion and sediment control practices are not designed in conformance with this technical standard, the owner or operator must demonstrate equivalence to the technical standard. The following list of required SWPPP components is provided in accordance with Part III.B.1a–l of General Permit GP–0–20–001:

a. Background Information: The subject project consists of the construction of a residential apartment and townhome complex.

b. Site map / construction drawing: These plans serve to satisfy this SWPPP requirement.

c. Description of the soils present at the site: Onsite soils located within the proposed limits of disturbance consist of Farmington–Rock Outcrop Complex (FeE) and Galway–Farmington Complex (GfB, GfC & GfD). These soil types belong to the Hydrologic Soil Group "C" and "D."

d. Construction phasing plan / sequence of operations: The Construction Sequence and phasing found on these plans provide the required phasing. A Construction Sequence and Erosion and Sediment Control Maintenance Schedule has been provided. The Erosion and Sediment Control Notes contained hereon outline a general sequence of operations for the proposed project. In general all erosion and sediment control facilities shall be installed prior to commencement with land disturbing activities, and areas of disturbance shall be limited to the shortest period of time as practicable.

e. Description of erosion and sediment control practices: This plan, and details / notes shown hereon serve to satisfy this SWPPP requirement.

f. Temporary and permanent soil stabilization plan: The Sedimentation and Erosion Control Notes and Details provided heron identify temporary and permanent stabilization measures to be employed with respect to specific elements of the project, and at the various stages of development.

g. Site map / construction drawing: This plan serves to satisfy this SWPPP requirement.

h. The dimensions, material specifications, installation details, and operation and maintenance requirements for all erosion and sediment control practices: The details, Erosion and Sediment Control Notes, and Erosion and Sediment Control Maintenance Schedule serve to satisfy this SWPPP requirement.

i. An inspection schedule: Inspections are to be performed once weekly and by a qualified professional as required by the General Permit GP–0–20–001. In addition the NYSDEC Trained Contractor shall perform additional inspections as cited in the Sedimentation and Erosion Control Notes.

j. A description of pollution prevention measures that will be used to control litter, construction chemicals and construction debris: In general, all construction litter / debris shall be collected and removed from the site. The general contractor shall supply either waste barrels or dumpster for proper waste disposal. Any construction chemicals utilized during construction shall either be removed from site daily by the contractor or stored in a structurally sound and weatherproof building. No hazardous waste shall be disposed of onsite, and shall ultimately be disposed of in accordance with all federal, state and local regulations. Material Safety Data Sheets (MSDS), material inventory, and emergency contact numbers shall be maintained by the general contractor for all construction chemicals utilized onsite. Finally, temporary sanitary facilities (portable toilets) shall be provided onsite during the entire length of construction, and inspected weekly for evidence of leaking holding tanks.

k. A description and location of any stormwater discharges associated with industrial activity other than construction at the site: There are no known industrial stormwater discharges present or proposed at the site.

l. Identification of any elements of the design that are not in conformance with the technical standard, "New York Standards and Specifications for Erosion and Sediment Control." All proposed elements of this SWPPP have been designed in accordance with the "New York Standards and Specifications for Erosion and Sediment Control."

GRAPHIC SCALE

0 20 40 80

(IN FEET)
1 inch = 40 ft.

NO.	DATE	REVISION	BY
4	9–13–23	REVISED PER VILLAGE COMMENTS	JWM
3	6–14–23	REVISED PER VILLAGE COMMENTS	SMR
2	5–10–23	REVISED PER VILLAGE COMMENTS	MEU
1	2–1–23	PLANNING BOARD SUBMISSION	DSW

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PROJECT:
BUCKINGHAM PROPERTY MANAGEMENT
CHANNINGVILLE RD & NELSON AVE, VILLAGE OF WAPPINGERS FALLS, DUTCHESS CO., NY

DRAWING:
EROSION & SEDIMENT CONTROL PLAN

STATE OF NEW YORK · RICHARD D. WILLIAMS JR. · 085866 · LICENSED PROFESSIONAL ENGINEER

PROJECT NUMBER	22194.100	PROJECT MANAGER	R.D.W.	DRAWING NO.	SHEET
DATE	12–15–22	DRAWN BY	M.E.U.	SP–4	6 / 15
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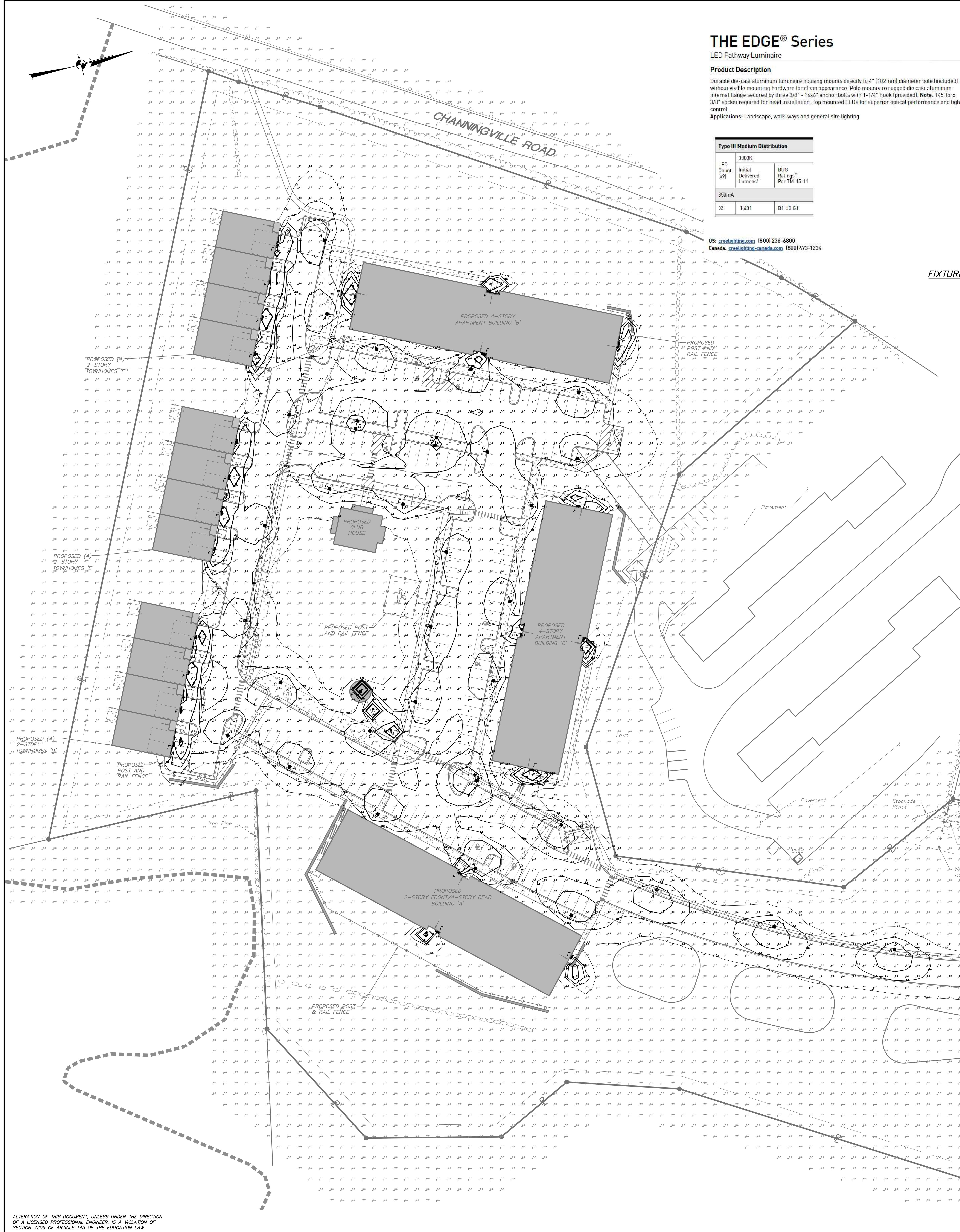

THE EDGE® Series

LED Pathway Luminaire

Product Description

Durable die-cast aluminum luminaire housing mounts directly to 4" (102mm) diameter pole (included) without visible mounting hardware for clean appearance. Pole mounts to rugged die cast aluminum internal flange secured by three 3/8" - 16x6" anchor bolts with 1-1/4" hook (provided). **Note:** T45 Torx 3/8" socket required for head installation. Top mounted LEDs for superior optical performance and light control.

Applications: Landscape, walk-ways and general site lighting

Type III Medium Distribution		
LED Count (x9)	3000K	
	Initial Delivered Lumens*	BUG Ratings** Per TM-15-11
350mA		
02	1,431	B1 U0 G1

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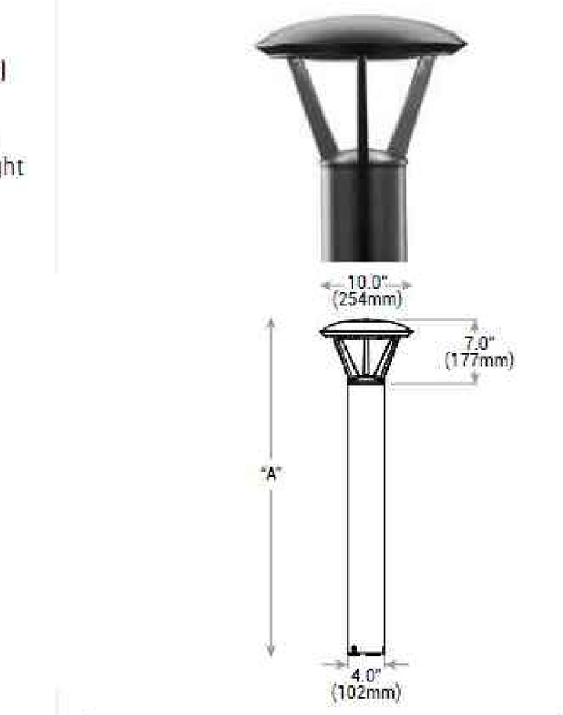
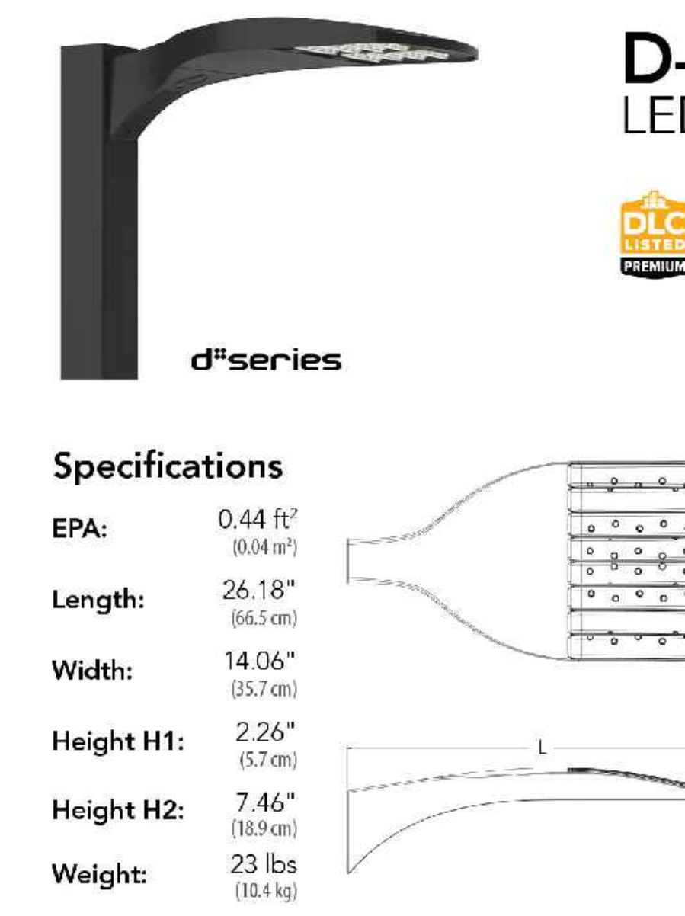
Canada: creelighting-canada.com (800) 473-1234



CREE LIGHTING

FIXTURE D



D-Series Size 0

LED Area Luminaire

d"series

Specifications

EPA: 0.44 ft² (0.04 m²)
Length: 26.18" (66.5 cm)
Width: 14.06" (35.7 cm)
Height H1: 2.26" (5.7 cm)
Height H2: 7.46" (18.9 cm)
Weight: 23 lbs (10.4 kg)

Forward Optics

LED Count	Drive Current (mA)	Performance Package	System Watts	Distribution Type	30K (3000K, 70 CRI) Lumens	B	U	G	LPW
20	530	P1	33W	T1S	4,906	1	0	1	148
				T2M	4,545	1	0	2	137
				T3M	4,597	1	0	2	138
				T3LG	4,107	1	0	1	124
				T4M	4,666	1	0	2	141
				T4LG	4,244	1	0	1	128
				TFTM	4,698	1	0	2	141
				T5M	4,801	3	0	1	145
				T5W	4,878	3	0	1	147
				T5LG	4,814	2	0	1	145
				BLC3	3,344	0	0	1	101
				BLC4	3,454	0	0	2	104
				RCCO	3,374	0	0	1	102
				LCCO	3,374	0	0	1	102
				AFR	4,906	1	0	1	148

LITHONIA LIGHTING. One Lithonia Way • Conyers, Georgia 30012 • Phone: 1-800-705-SERV (7378)
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FIXTURES A, B & C

LEGEND

- EXISTING PROPERTY LINE
- EXISTING EASEMENT
- EXISTING STONE WALL
- EXISTING WIRE FENCE
- EXISTING STOCKADE FENCE
- EXISTING SIGN
- EXISTING TREELINE
- PROPOSED YARD SETBACK
- PROPOSED # OF STALLS TO BE STRIPED
- PROPOSED CONCRETE CURB
- PROPOSED EDGE OF SIDEWALK
- PROPOSED RETAINING WALL
- PROPOSED PAINTED CROSSWALK
- PROPOSED PAINTED STOPBAR
- PROPOSED PAINTED HANDICAP PARKING SYMBOL
- PROPOSED DOOR LOCATION
- PROPOSED STRIPED ISLAND
- PROPOSED SINGLE POLE SIGN
- PROPOSED LIGHTING

CONCEPT CPL6105

Weight : 30.4lb - 13.8 kg

- 3000K (30K) and 4000K (40K).
- 1 to 4 LED modules (30 to 120 watts).
- Light distribution available in type II, III, IV and V.
- Tool-less access.
- IP66.
- CSA / CSA-US certified.
- Dark sky compliant with lens #4 (flat lens).

LED Module	System Watts[2] (W)	LED Current (mA)	3000K Lumen Output[3]	B	U	G	Efficacy (LM/W)
18 LED05 L3	30	530	2733	1	0	1	89

FIXTURE F

LUMINAIRE SCHEDULE

Sym	Qty	Catalog Number	Description	Lamp	Mounting Height	Watts
A	20	DSX0 LED P1 27K 80CRI T3M HS	Lithonia D-Series Size 0 Area Luminaire P1 Performance Package 2700K 80 CRI Type 3 Houseside Shield	LED	15'-0"	33.2
B	3	DSX0 LED P1 27K 80CRI T3M HS	Lithonia D-Series Size 0 Area Luminaire P1 Performance Package 2700K 80 CRI Type 3 Houseside Shield	LED	15'-0"	66.4
C	12	DSX0 LED P1 27K 80CRI T3M	Lithonia D-Series Size 0 Area Luminaire P1 Performance Package 2700K 80 CRI Type 3	LED	15'-0"	33.2
D	2	PWY-EDG-5M-02-E-UH-350-30K	Cree Lighting The Edge Series Pathway Luminaire, Type V Medium Optic, LED, 3000K	LED	3'-0"	28.0
E	1	S5852W.19	Sistemalux ZIP D/L 5 LED Osram Oslon Square with Lens CA11934 900mA 2700K (mounted in proposed gazebo)	LED	10'-0"	15.7
F	23	CP6-4XX 18LED05 30W 120V L3 30K HSS	Lumca Post Top Light with House Side Shield 3000K	LED	6'-6"	30.3

STATISTICS

DESCRIPTION	SYMBOL	AVG	MAX	MIN	AVG/MAX	AVG/MIN
Project Area	+	0.2 fc	12.0 fc	0.0 fc	N/A	N/A

LIGHT CONTOUR LEGEND

0.1	0.10 Foot Candles
0.5	0.50 Foot Candles
1	1.00 Foot Candles
2	2.00 Foot Candles
5	5.00 Foot Candles

* Photometric calculations shown on plan are in foot candles.

LIGHTING NOTES:

1. See Drawing OP-1 for General Notes.
2. All lighting shall be as noted on the plan or approved equal.
3. Calculation values shown in this plan are taken on a horizontal plane at ground level using a 0.90 light loss factor for LEDs. Topographical information and landscaping have not been accounted for in these calculations.
4. All lighting on this plan shall be directed and/or shielded so as to preclude objectionable glare from being observable from adjoining streets and properties.
5. Photometric modeling based on specified fixtures shown hereon.
6. Individual apartment balcony lights not shown. These lights are under canopy lights. They will be operated by individual occupants and will not be continuously on.

Luminaire characteristics: Power input: 4W to 33.5W; Lumens: 170lm to 2600lm (for 3000K, 90CRI); Luminaire efficacy: Up to 84 lm/W

Source: White LED module (LM-80) 2700K: 90CRI, 3000K: 90CRI, 4000K: 90CRI.

Lumen maintenance: 70% of initial lumens at 50 000 hours (L70), (LM79).

Optics: Narrow flood and flood adjustable ±15°.

Material: Body: Die-cast aluminum with stainless steel front trim. Diffuser: 10mm thick tempered semiacid-etched glass Hardware: Stainless steel screws and silicone gaskets Back box: Polypropylene

Mounting: Recessed installation in false ceiling.

Electrical: Microzip: Remote LED driver options on page 10. Minizip, zip and megazip: Integral high efficiency LED driver, rated at 50 000 hours, 120-277V.

Dimming: 0-10V dimming (120-277V), down to 15%.

Finish: Stainless steel finish. Painted finish follows a double powder paint in 3 step process: surface treatment containing ceramic nano particles (Bonderite). Epoxy primer paint. Polyester powder paint with high resistance against UV rays and harsh weather conditions.

PHOTOMETRIC DATA

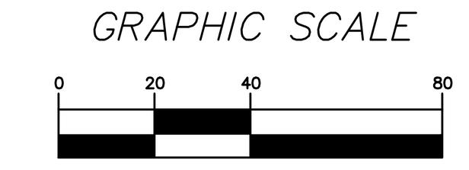
CCT (K)	CRI	LOAD (W)	OPTIC	LUMENS (lm)	B U G	EFFICACY (lm / W)	MAX CANDELA (cd)	MODELS (round / square)
2700K	90	4W	Flood 36°	160	1 0 1	45	380	S5515H / S5525H
3000K				170	1 0 1	47	405	S5515W / S5525W
4000K				175	1 0 1	48	415	S5515N / S5525N

Efficacy based on IESNA LM-79 test reports. Visit sistemalux.com for complete photometric data.

JP - R0 Last update: November 24, 2021 Due to continuous improvements, the information herein may be changed without notice
SISTEMALUX 9320 Boul. St-Laurent, suite 100, Montréal (Québec) Canada H2N 1N7, P.: 514.523.1339 F.: 514.525.6107 www.sistemalux.com

FIXTURE E

GRAPHIC SCALE



(IN FEET)
1 inch = 40 ft.

NO.	DATE	REVISION	BY
3	9-13-23	REVISED PER VILLAGE COMMENTS	JWM
2	6-14-23	REVISED PER VILLAGE COMMENTS	SMR
1	5-10-23	REVISED PER TOWN COMMENTS	MEU

INSITE ENGINEERING, SURVEYING & LANDSCAPE ARCHITECTURE, P.C.
3 Garrett Place
Carmel, NY 10512
(845) 225-9690
(845) 225-9717 fax
www.insite-eng.com

PROJECT:
BUCKINGHAM PROPERTY MANAGEMENT
CHANNINGVILLE RD & NELSON AVE, VILLAGE OF WAPPINGERS FALLS, DUTCHESS CO., NY

DRAWING:
LIGHTING PLAN

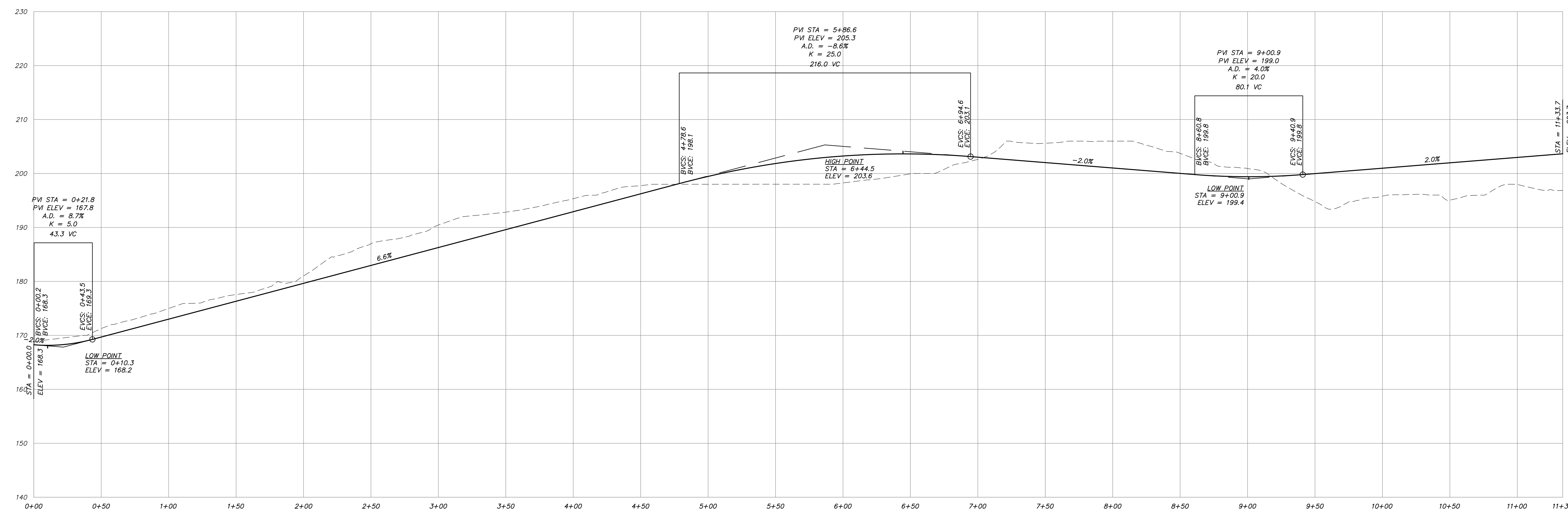
STATE OF NEW YORK · RICHARD D. WILLIAMS JR. · 085866 · LICENSED PROFESSIONAL ENGINEER

PROJECT NUMBER	22194.100	PROJECT MANAGER	R.D.W.
DATE	2-1-23	DRAWN BY	J.F.R.
SCALE	1" = 40'	CHECKED BY	D.L.M.

DRAWING NO. LP-1

SHEET 7 / 15

ALTERATION OF THIS DOCUMENT, UNLESS UNDER THE DIRECTION OF A LICENSED PROFESSIONAL ENGINEER, IS A VIOLATION OF SECTION 7209 OF ARTICLE 145 OF THE EDUCATION LAW.



ENTRANCE DRIVEWAY

SCALE: HORIZ. 1" = 40'
VER. 1" = 10'

GRAPHIC SCALE

0 20 40 80

(IN FEET)
1 inch = 40 ft.

NO.	DATE	REVISION	BY
4	9-13-23	REVISED PER VILLAGE COMMENTS	JWM
3	6-14-23	REVISED PER VILLAGE COMMENTS	SMR
2	5-10-23	REVISED PER VILLAGE COMMENTS	MEU
1	2-1-23	PLANNING BOARD SUBMISSION	DSW

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Carmel, NY 10512
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PROJECT:

BUCKINGHAM PROPERTY MANAGEMENT

CHANNINGVILLE RD & NELSON AVE, VILLAGE OF WAPPINGERS FALLS, DUTCHESS CO., NY

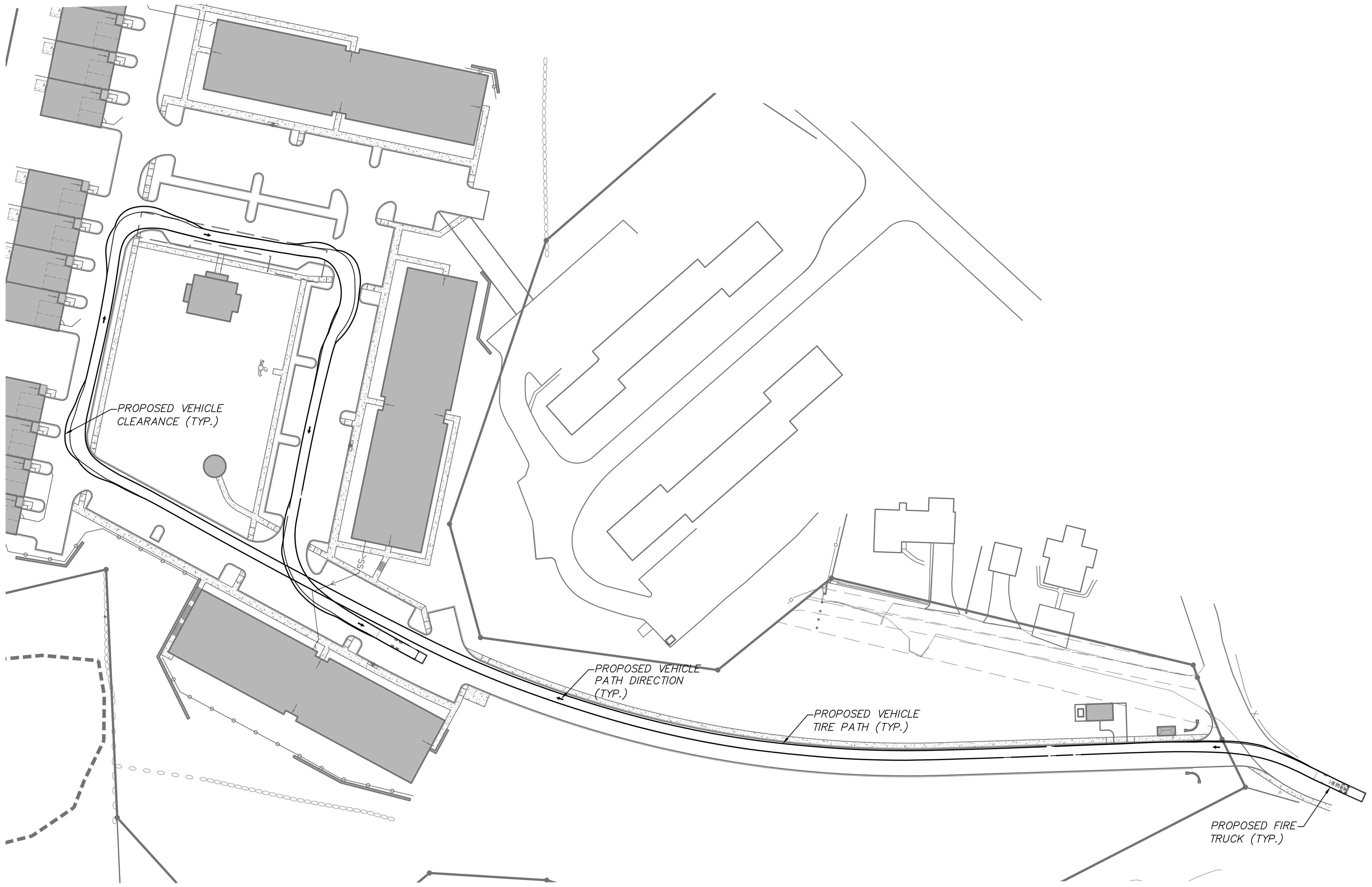
DRAWING:

ENTRANCE DRIVEWAY PROFILE

STATE OF NEW YORK · RICHARD D. WILLIAMS JR. · 085886 · LICENSED PROFESSIONAL ENGINEER

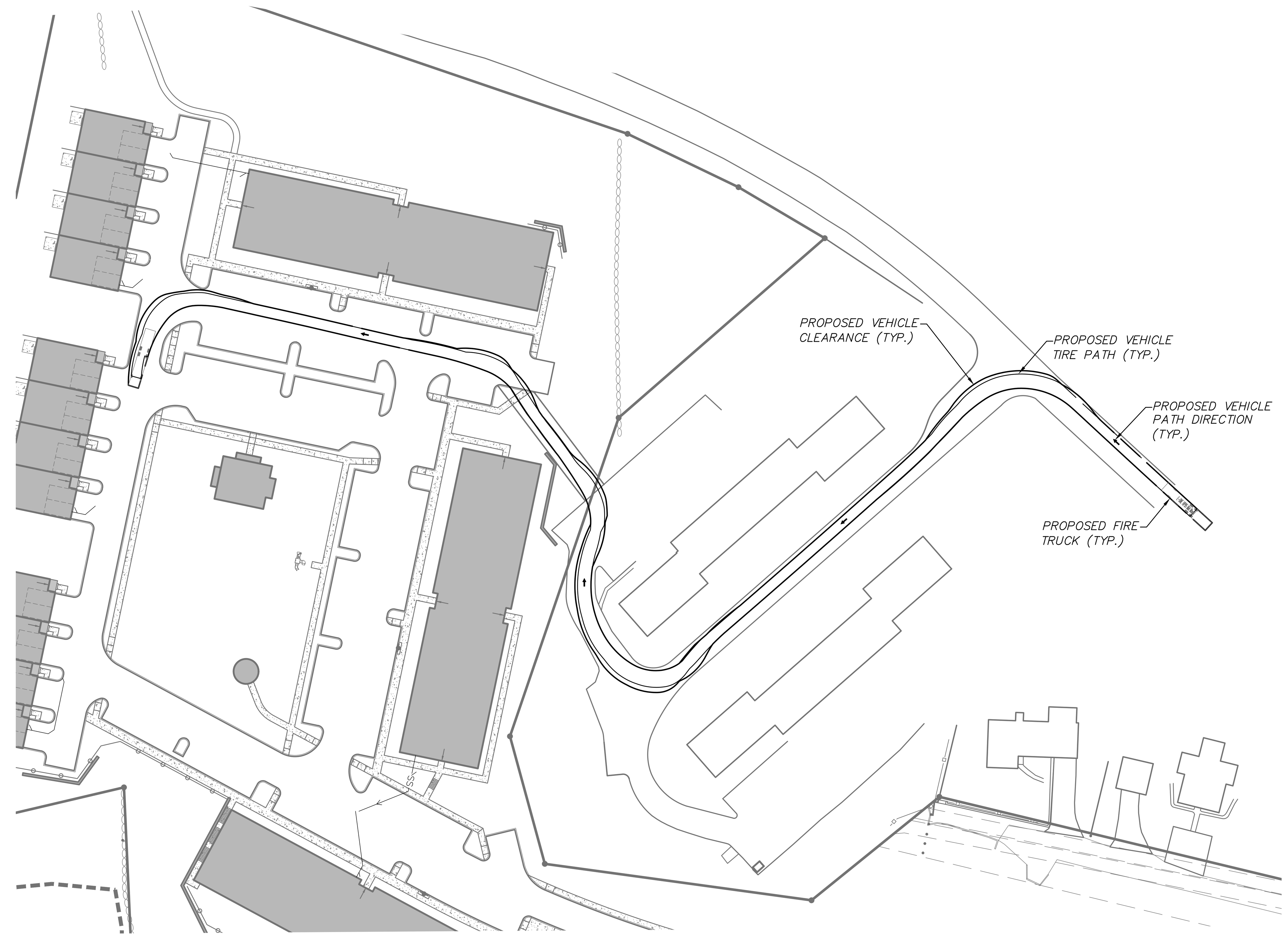
PROJECT NUMBER	22194.100	PROJECT MANAGER	R.D.W.	DRAWING NO.	SHEET
DATE	12-15-22	DRAWN BY	M.E.U.	PR-1	8 / 15
SCALE	1" = 40'	CHECKED BY	E.M.S.		

ALTERATION OF THIS DOCUMENT, UNLESS UNDER THE DIRECTION OF A LICENSED PROFESSIONAL ENGINEER, IS A VIOLATION OF SECTION 7209 OF ARTICLE 145 OF THE EDUCATION LAW.



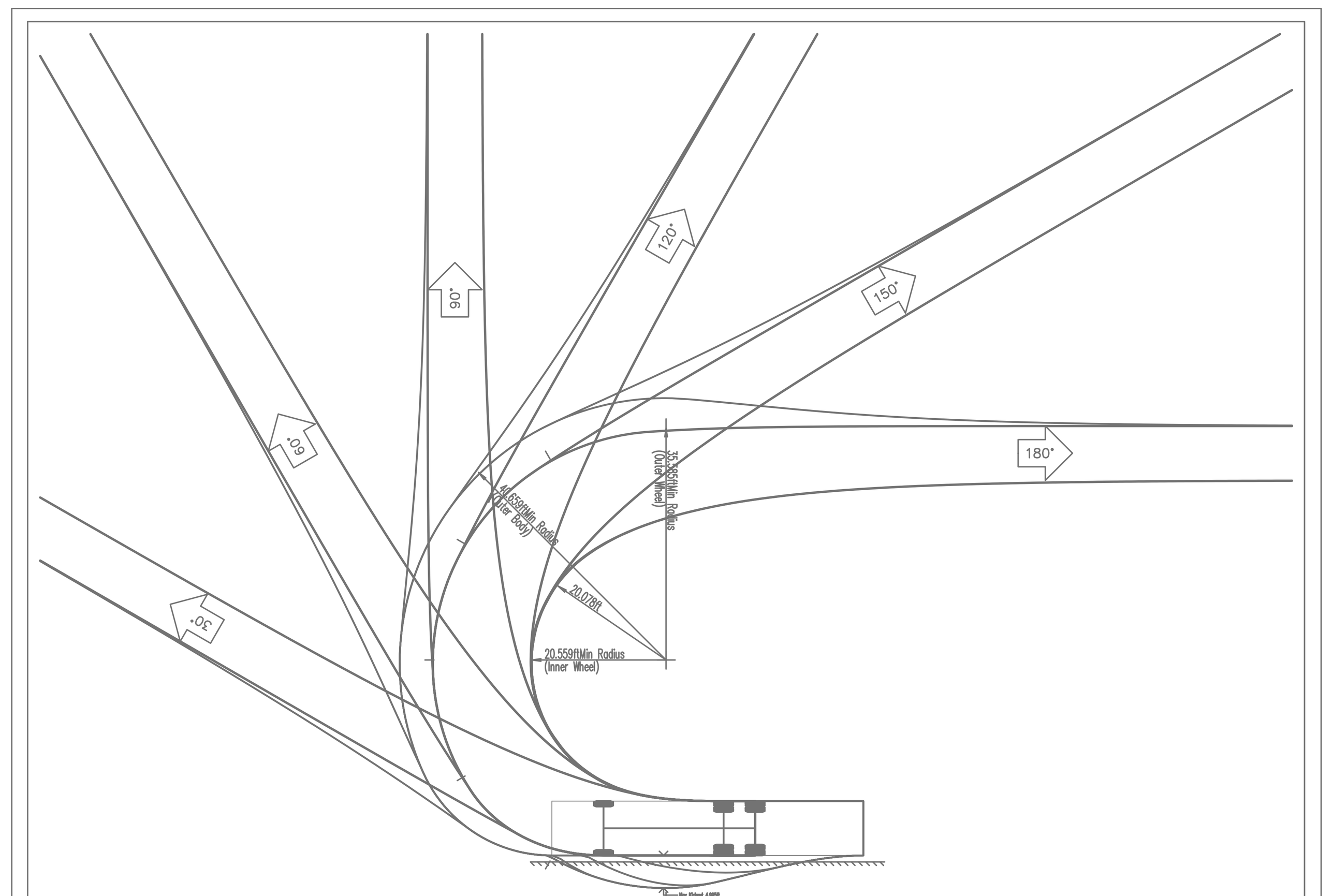
FIRE TRUCK SITE MANEUVERING PLAN

SCALE: 1" = 60'



FIRE TRUCK EMERGENCY ACCESS PATH MANEUVERING PLAN

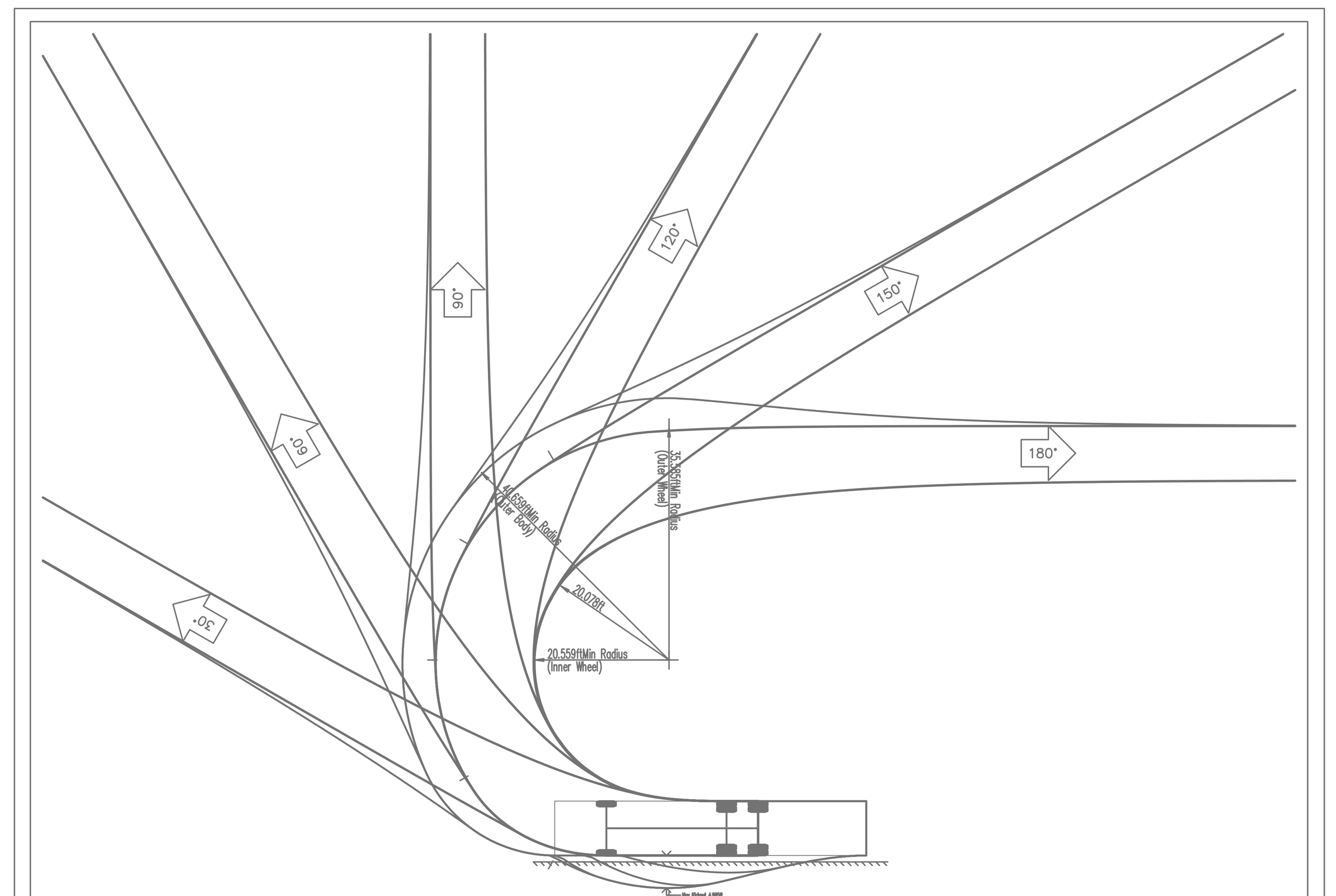
SCALE: 1" = 60'



Vehicle Tracking V23.00.2518(20220215) (c) Autodesk, Inc. www.Autodesk.com

Notes:
Turn(s) based upon a design speed of 5.00mph.

Title:
E-ONE HP95 Mid Mount



Vehicle Tracking V23.00.2518(20220215) (c) Autodesk, Inc. www.Autodesk.com

Notes:
Turn(s) based upon a design speed of 5.00mph.

Title:
E-ONE HP95 Mid Mount

GRAPHIC SCALE

0 30 60 120

(IN FEET)
1 inch = 60 ft.

ALTERATION OF THIS DOCUMENT, UNLESS UNDER THE DIRECTION OF A LICENSED PROFESSIONAL ENGINEER, IS A VIOLATION OF SECTION 7209 OF ARTICLE 145 OF THE EDUCATION LAW.

NO.	DATE	REVISION	BY
1	9-13-23	REVISED PER VILLAGE COMMENTS	JWM

INSITE ENGINEERING, SURVEYING & LANDSCAPE ARCHITECTURE, P.C.
3 Garrett Place
Carmel, NY 10512
(845) 225-9690
(845) 225-9717 fax
www.insite-eng.com

PROJECT:
BUCKINGHAM PROPERTY MANAGEMENT
CHANNINGVILLE RD & NELSON AVE, VILLAGE OF WAPPINGERS FALLS, DUTCHESS CO., NY

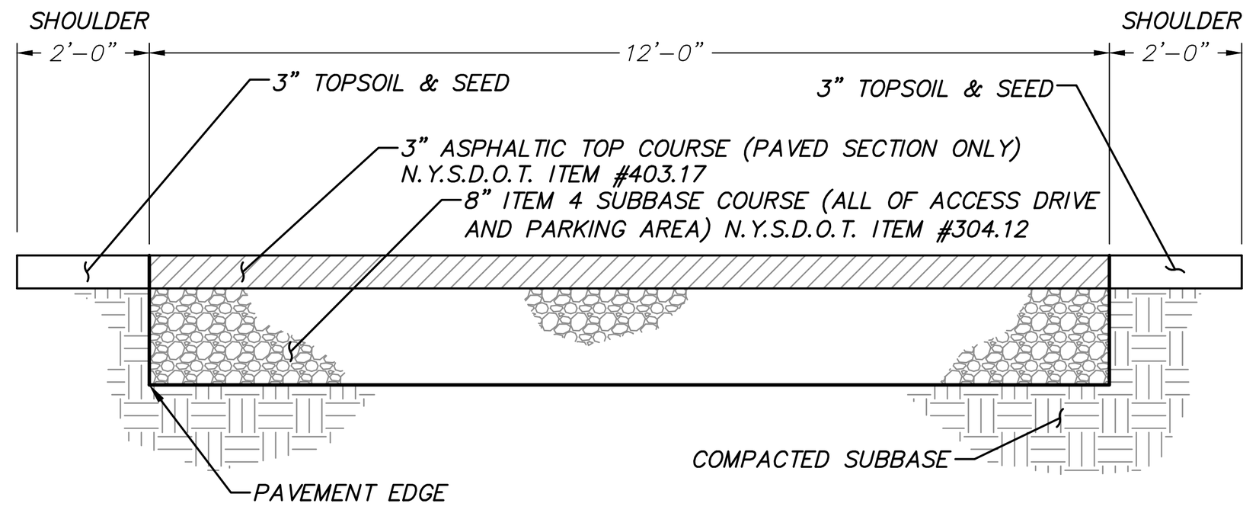
DRAWING:
VEHICLE MANEUVERING PLAN

STATE OF NEW YORK · RICHARD D. WILLIAMS JR. · 085866 · LICENSED PROFESSIONAL ENGINEER

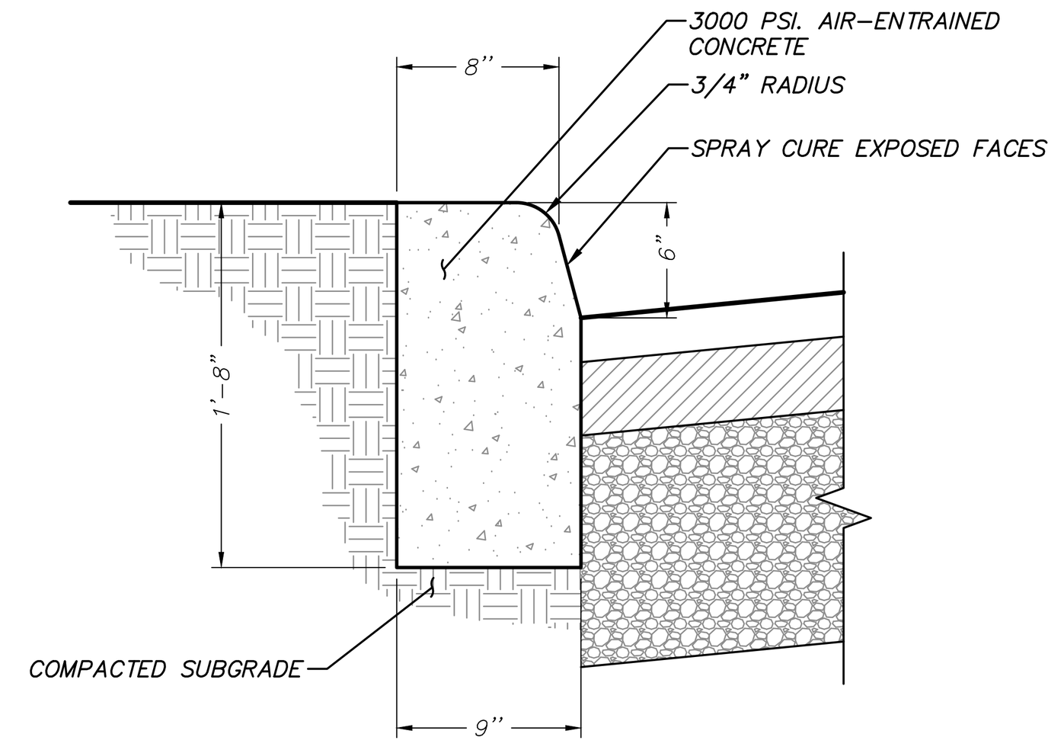
PROJECT NUMBER	22194.100	PROJECT MANAGER	R.D.W.
DATE	8-22-23	DRAWN BY	M.E.U.
SCALE	1" = 60'	CHECKED BY	D.L.M.

DRAWING NO. VM-1

SHEET 9 / 15

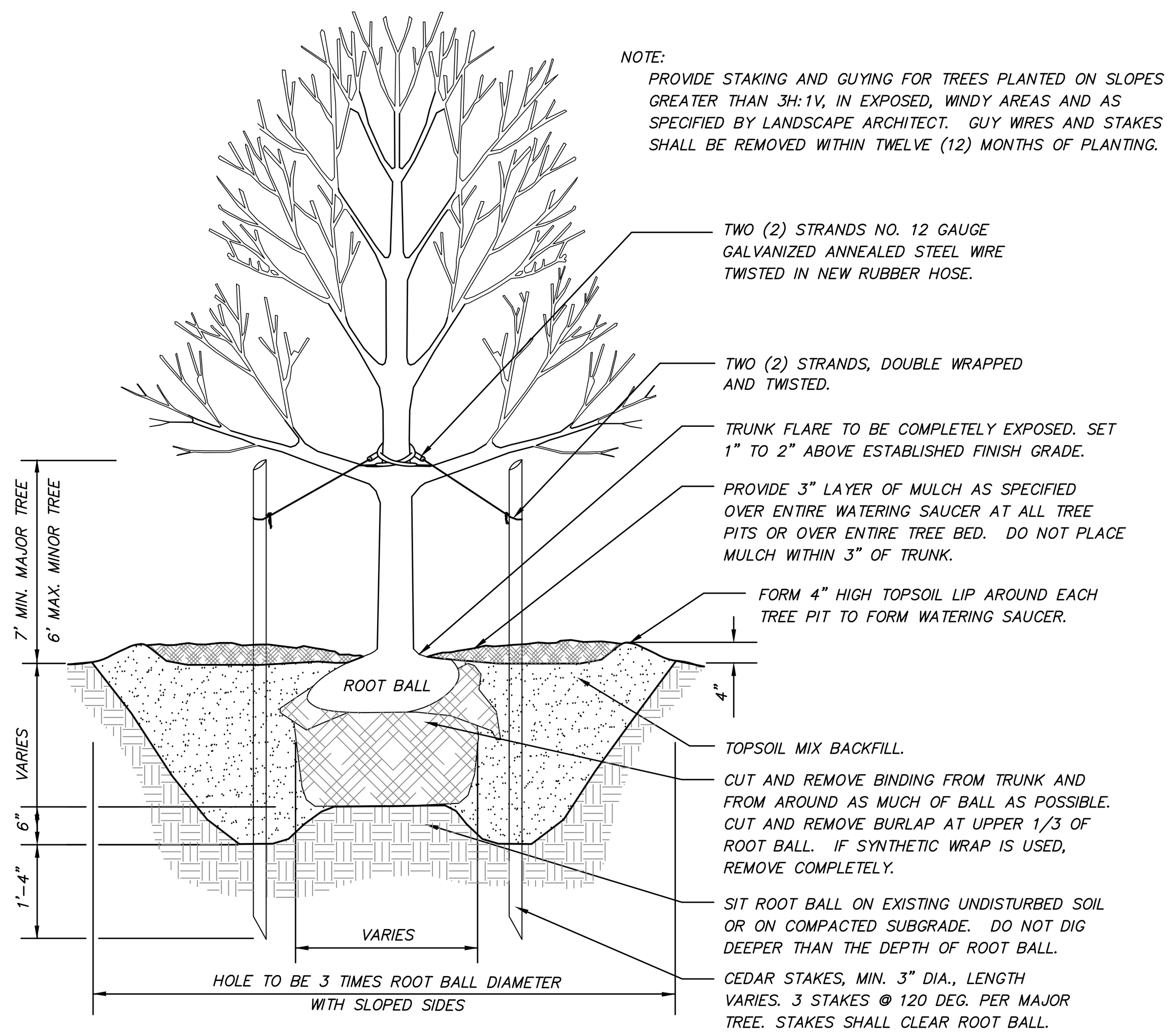


EMERGENCY ACCESS PAVEMENT DETAIL
(N.T.S.)

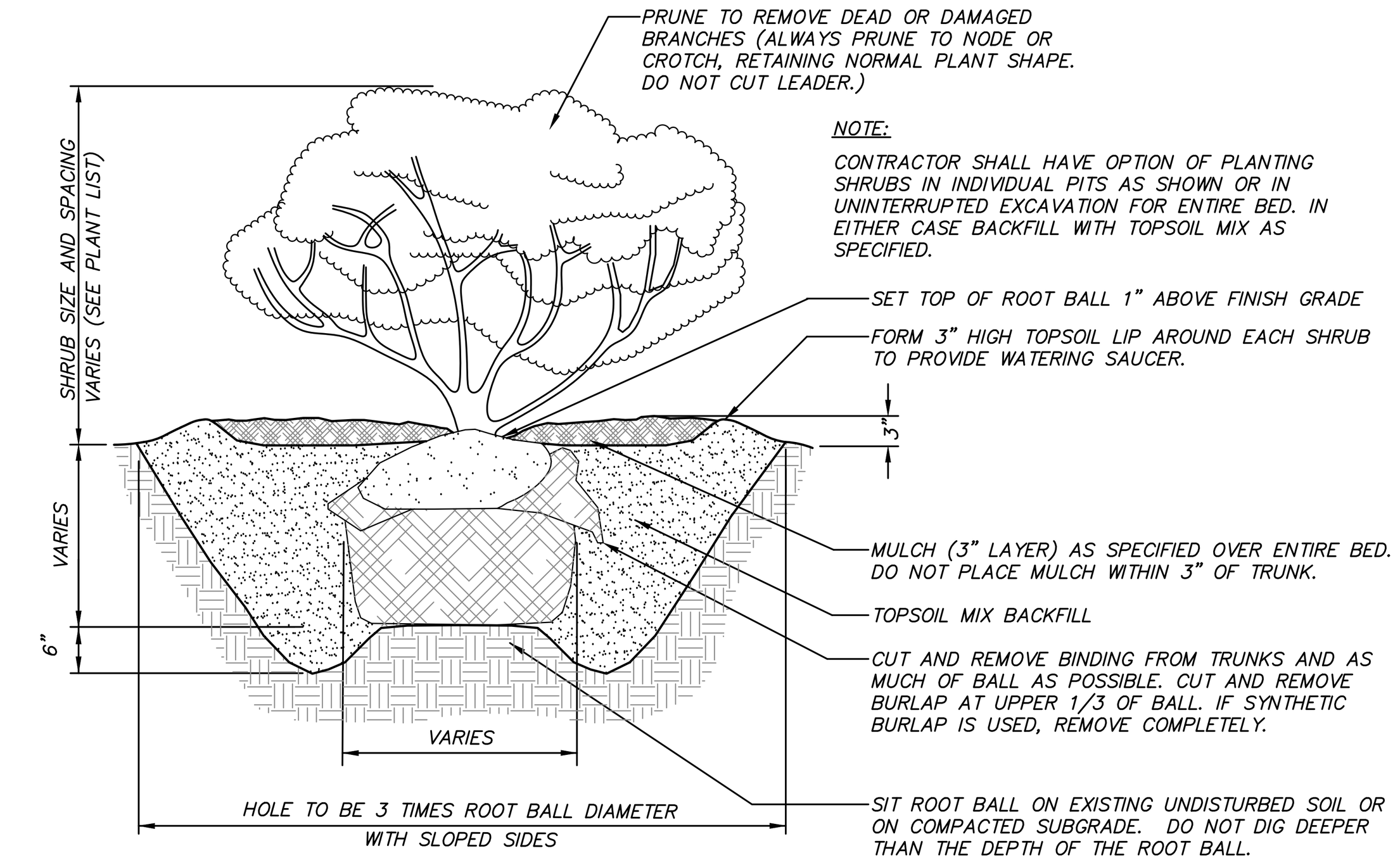


NOTE:
TRANSVERSE JOINTS 1/2" WIDE SHALL BE INSTALLED IN THE CURB 10'-0" APART AND SHALL BE FILLED WITH CELLULAR COMPRESSION MATERIALS AS SPECIFIED, RECESSED 1/4" IN FROM FRONT FACE AND TOP OF CURB.

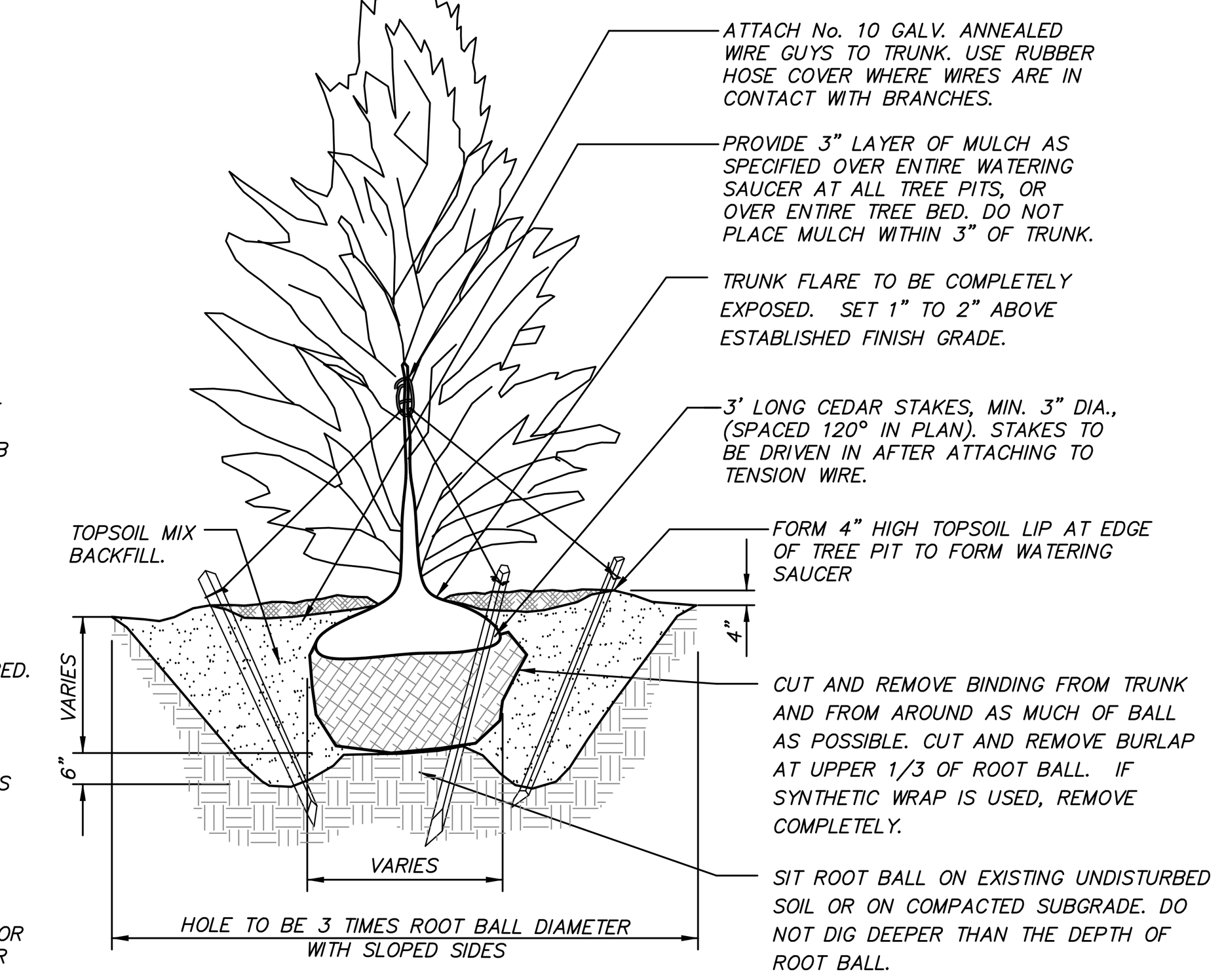
CONCRETE CURB DETAIL
(N.T.S.)



TREE PLANTING DETAIL
(N.T.S.)

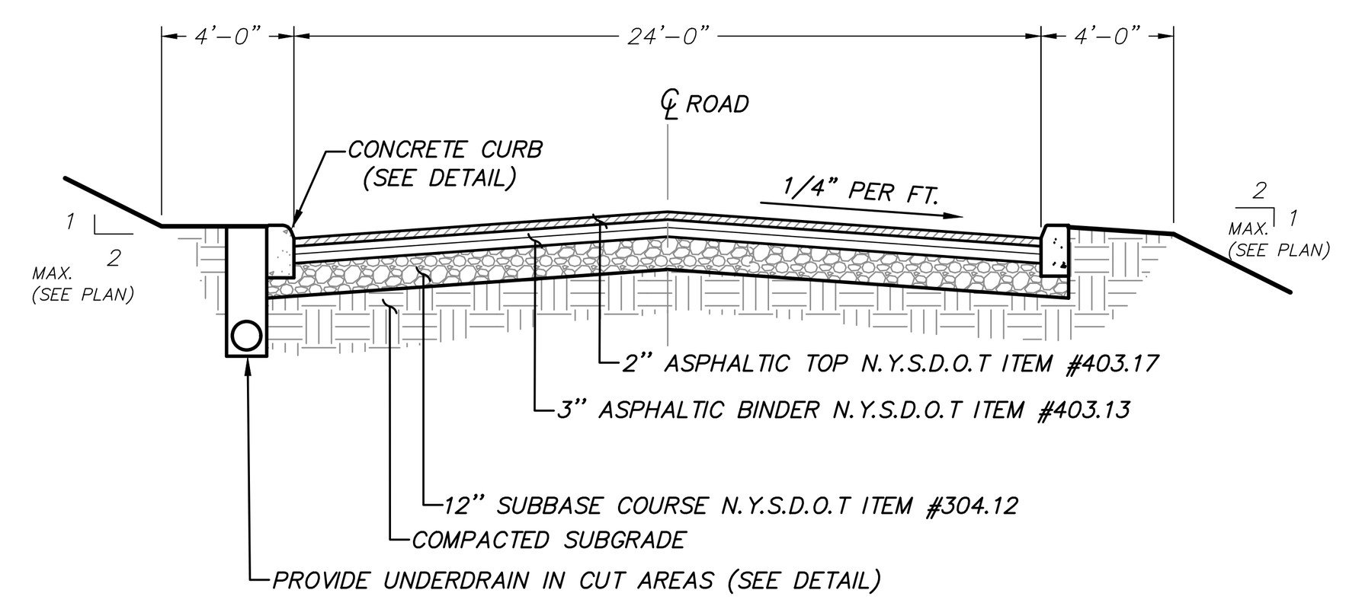


SHRUB PLANTING DETAIL
(N.T.S.)

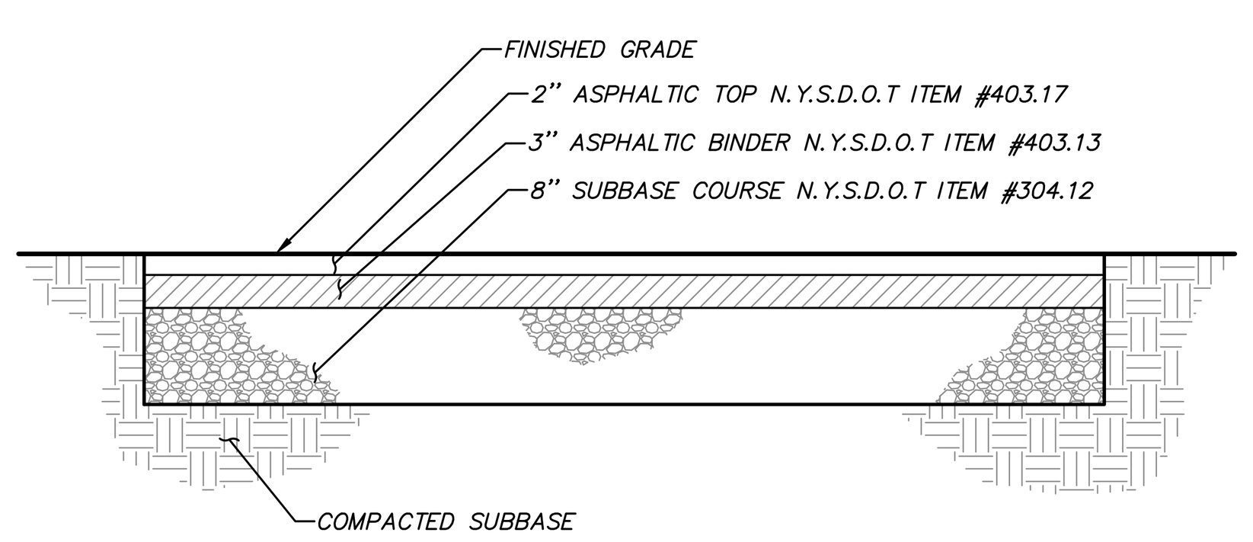


NOTE:
PROVIDE STAKING AND GUYING FOR TREES PLANTED ON SLOPES GREATER THAN 3H:1V, IN EXPOSED, WINDY AREAS AND AS SPECIFIED BY LANDSCAPE ARCHITECT. GUY WIRES AND STAKES SHALL BE REMOVED WITHIN TWELVE MONTHS OF PLANTING.

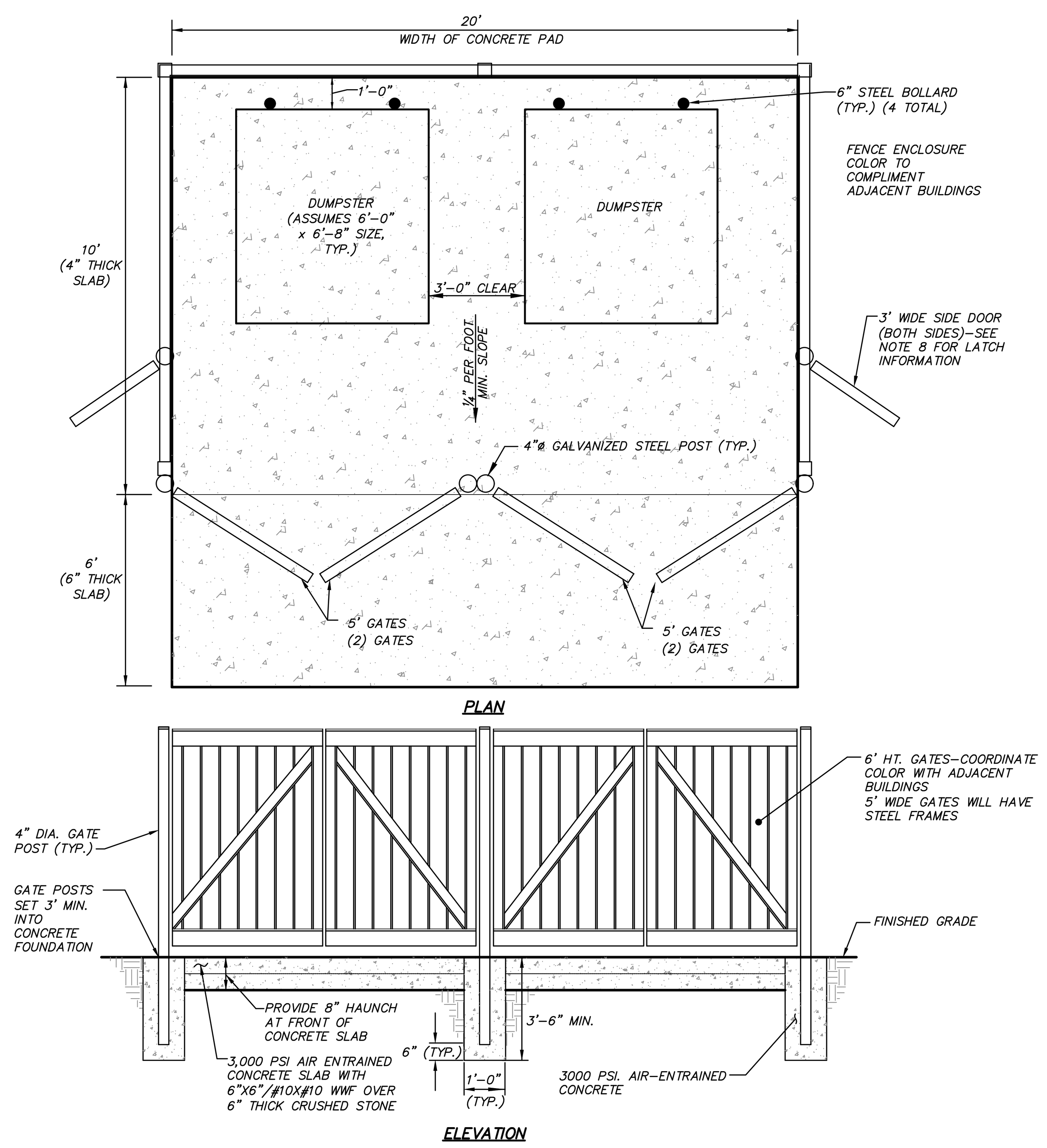
EVERGREEN TREE PLANTING DETAIL
(N.T.S.)



ENTRANCE DRIVEWAY PAVEMENT DETAIL
(N.T.S.)



DRIVEWAY & PARKING PAVEMENT DETAIL
(N.T.S.)



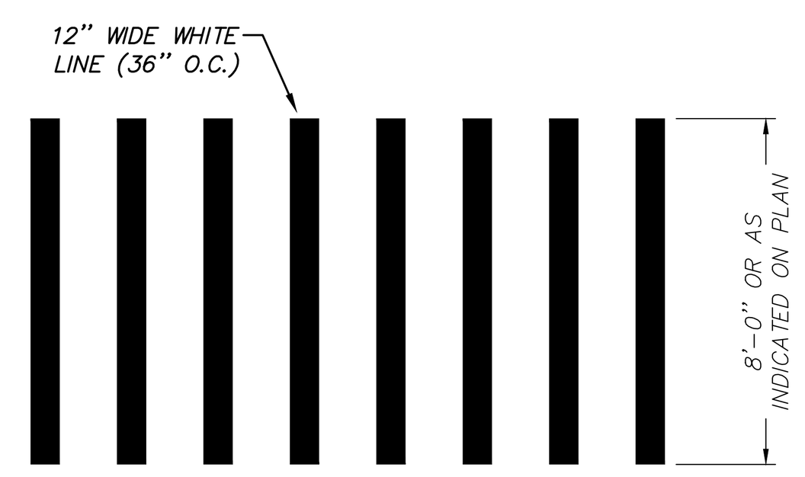
GENERAL NOTES:

1. CHECK WITH REFUSE HAULER PRIOR TO INSTALLATION OF REFUSE ENCLOSURE FOR FINAL DIMENSIONS.

ACCESSIBILITY NOTES:

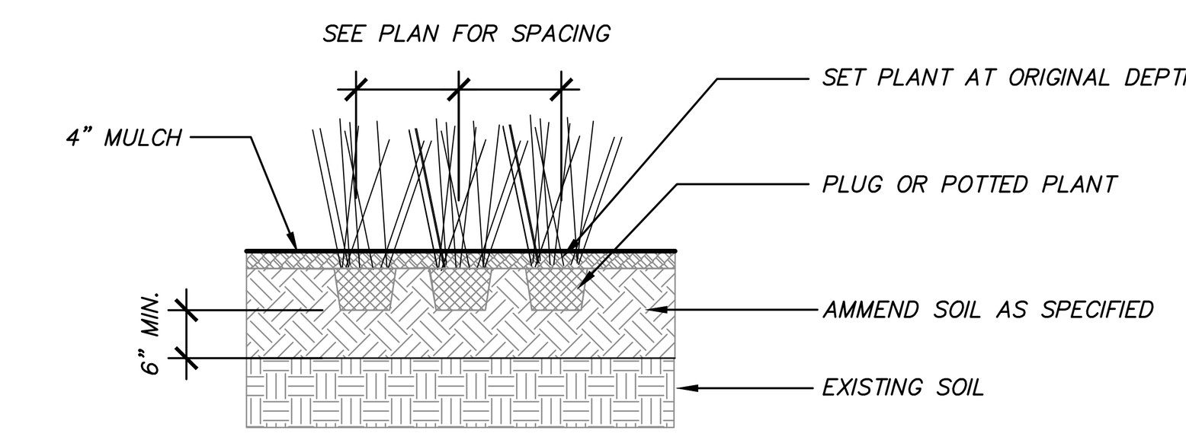
1. VERTICAL CHANGE IN LEVEL BETWEEN FINISHED GRADE OF CONCRETE PAD FOR DUMPSTER ENCLOSURE AND ADJACENT PAVEMENT AT GATE OPENINGS SHALL NOT EXCEED 1/4"; 1/4" TO 1/2" VERTICAL CHANGE SHALL BE BEVELED WITH A SLOPE NOT STEEPER THAN 2H:1V.
4. GATE(S) DESIGNATED FOR ACCESSIBLE ENTRY INTO DUMPSTER ENCLOSURE SHALL BE MAINTAINED TO BE RELATIVELY FREE SWINGING AND EASY TO OPEN AND CLOSE.
5. SHOULD INDIVIDUAL GATE BE DESIGNATED FOR ACCESSIBLE ENTRY, IT SHALL BE LABELED AS SUCH.
6. A 36" MINIMUM CLEAR DISTANCE SHALL BE MAINTAINED BETWEEN DUMPSTERS AND IN FRONT OF DUMPSTER AS NECESSARY TO PROVIDE ACCESSIBLE ROUTE WITHIN DUMPSTER ENCLOSURE TO SIDE ACCESS DOORS TO DUMPSTERS AND / OR REFUSE CARTS.
7. ACCESSIBLE REFUSE CONTAINERS SHALL BE PROVIDED – TRASH CAN(S), REFUSE CARTS, AND/OR DUMPSTERS WITH ACCESSIBLE SIDE OPENINGS.
8. GATE LATCH HARDWARE FOR ACCESSIBLE ENTRY GATES SHALL BE EASY TO OPERATE, U-SHAPED HANDLE OR LEVER-OPERATED MECHANISM AND COMPLY IN ALL WAYS WITH ADA REQUIREMENTS. MOUNTED HEIGHT OF OPERABLE PARTS SHALL BE 34" MINIMUM AND 48" MAXIMUM ABOVE GROUND.

REFUSE ENCLOSURE DETAIL
(N.T.S.)

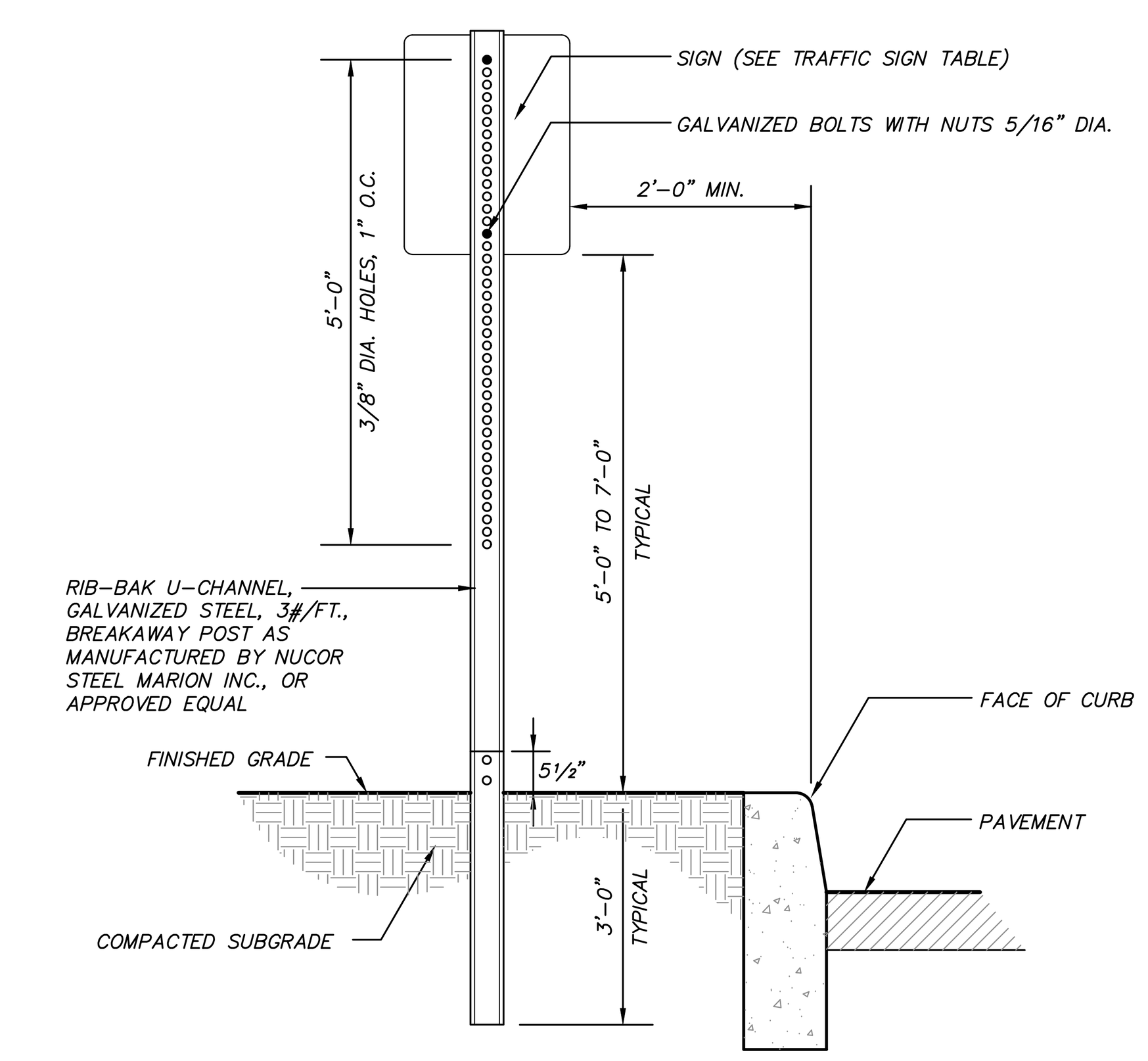


NOTE:
INSTALLATION TO CONFORM WITH CURRENT NYSDOT STANDARDS AND SPECIFICATIONS.

CROSSWALK MARKING DETAIL (TYPE 2)
(N.T.S.)

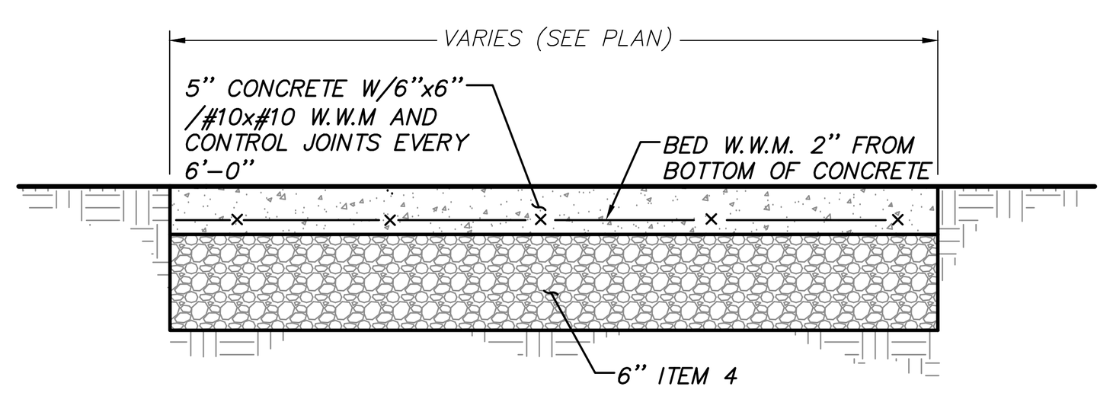


PERENNIAL / ORNAMENTAL GRASS PLANTING DETAIL
(N.T.S.)



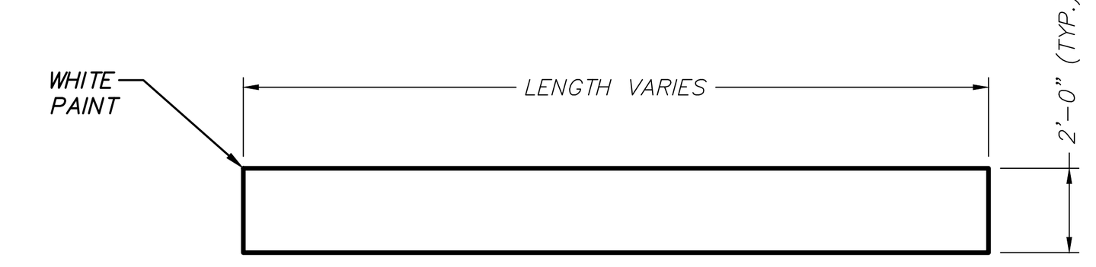
NOTE: FOR HANDICAP PARKING SIGNAGE, SIGNS SHALL BE INSTALLED AT A CLEAR HEIGHT OF BETWEEN 5'-0" AND 7'-0" ABOVE GRADE OF PARKING SPACE AND SUCH THAT SIGNS SHALL NOT BE OBSCURED BY A VEHICLE PARKED IN THE SPACE.

TRAFFIC SIGN DETAIL
(N.T.S.)



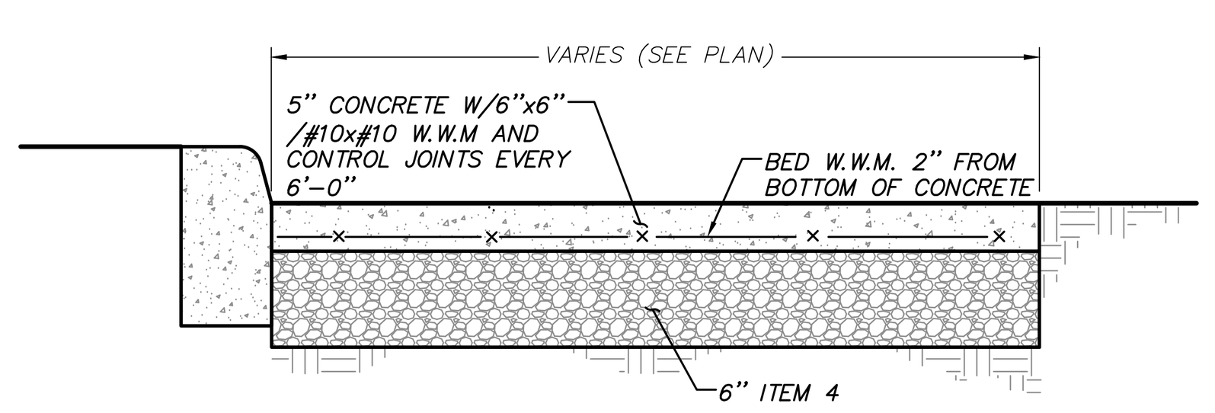
NOTE:
4,000 psi CONCRETE 28 DAYS

CONCRETE SIDEWALK DETAIL
(N.T.S.)



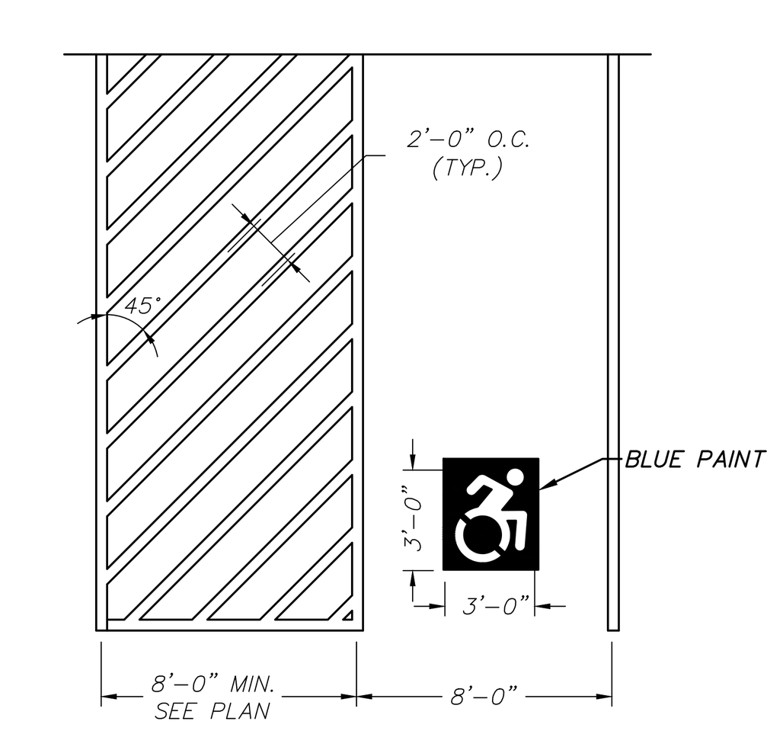
NOTES:
INSTALLATION TO CONFORM WITH CURRENT NYSDOT STANDARDS AND SPECIFICATIONS.

PAINTED STOP BAR DETAIL
(N.T.S.)



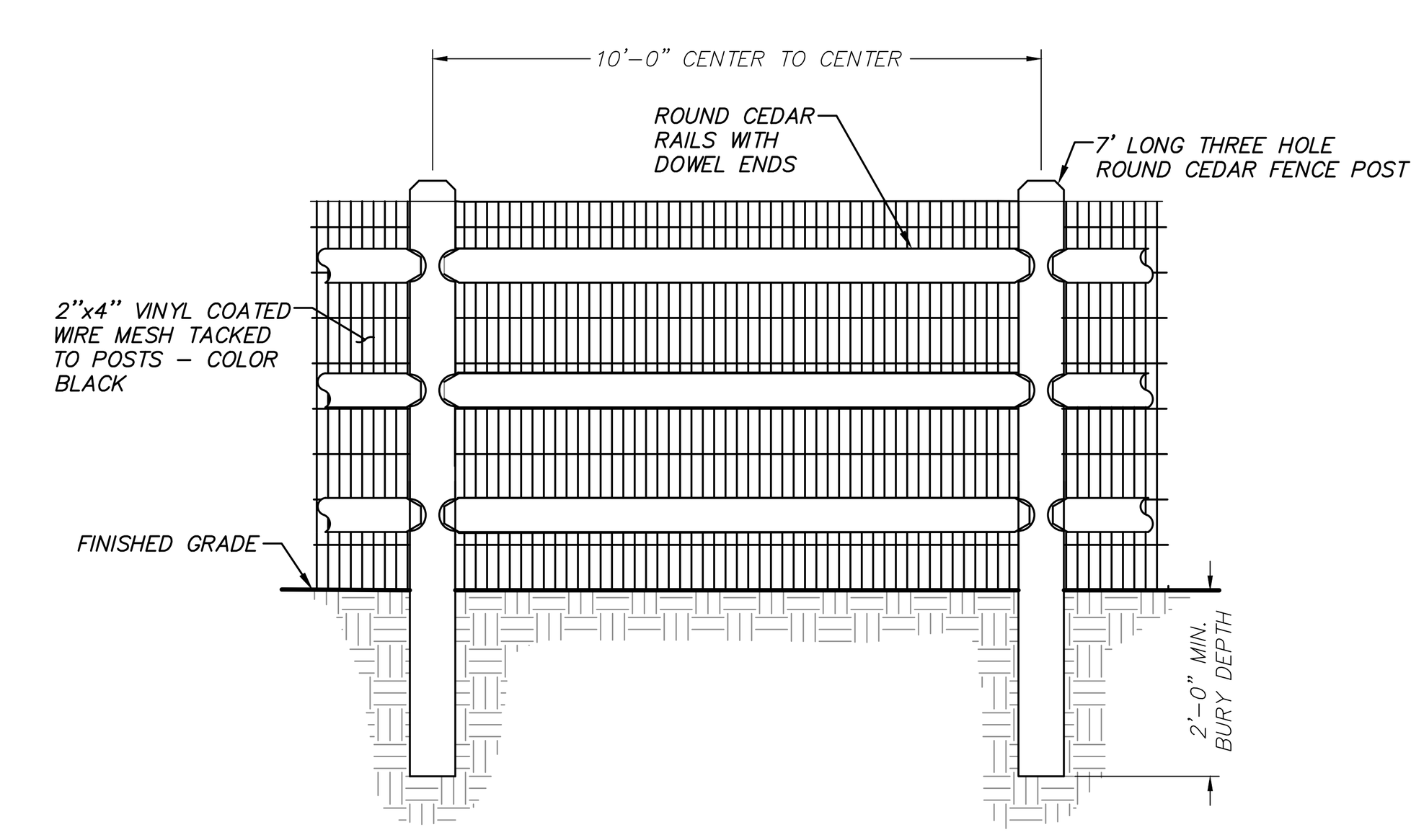
NOTE:
4,000 psi CONCRETE 28 DAYS

CONCRETE CURB & SIDEWALK DETAIL
(N.T.S.)



NOTE:
ALL HANDICAP STRIPING SHALL BE 4" WIDE BLUE PAINT.

PAINTED NYS ACCESSIBLE PARKING DETAIL
(N.T.S.)



POST AND RAIL FENCE DETAIL
(N.T.S.)

NO.	DATE	REVISION	BY
4	9-13-23	REVISED PER VILLAGE COMMENTS	JWM
3	6-14-23	REVISED PER VILLAGE COMMENTS	SMR
2	5-10-23	REVISED PER VILLAGE COMMENTS	MEU
1	2-1-23	PLANNING BOARD SUBMISSION	DSW

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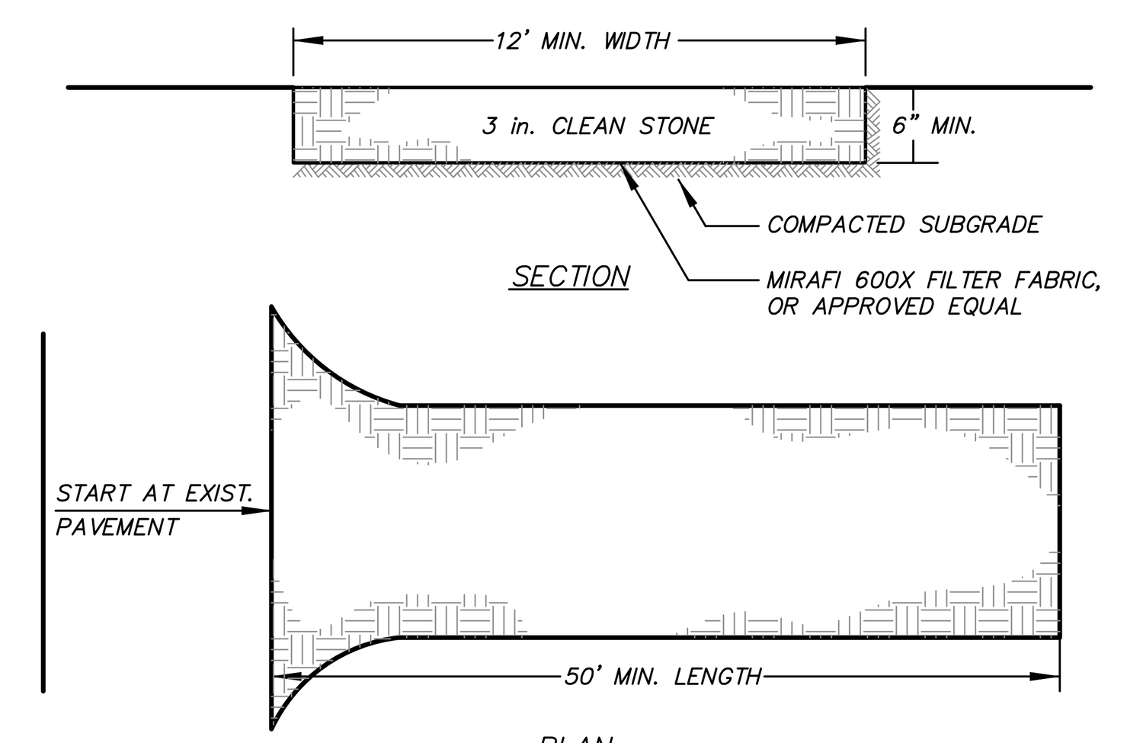
PROJECT:
BUCKINGHAM PROPERTY MANAGEMENT
CHANNINGVILLE RD & NELSON AVE, VILLAGE OF WAPPINGERS FALLS, DUTCHESS CO., NY

DRAWING:
DETAILS

PROJECT NUMBER	22194.100	PROJECT MANAGER	R.D.W.
DATE	12-15-22	DRAWN BY	M.E.U.
SCALE	AS SHOWN	CHECKED BY	E.M.S.

DRAWING NO. D-1
SHEET 10 / 15

ALTERATION OF THIS DOCUMENT, UNLESS UNDER THE DIRECTION OF A LICENSED PROFESSIONAL ENGINEER, IS A VIOLATION OF SECTION 7209 OF ARTICLE 145 OF THE EDUCATION LAW.

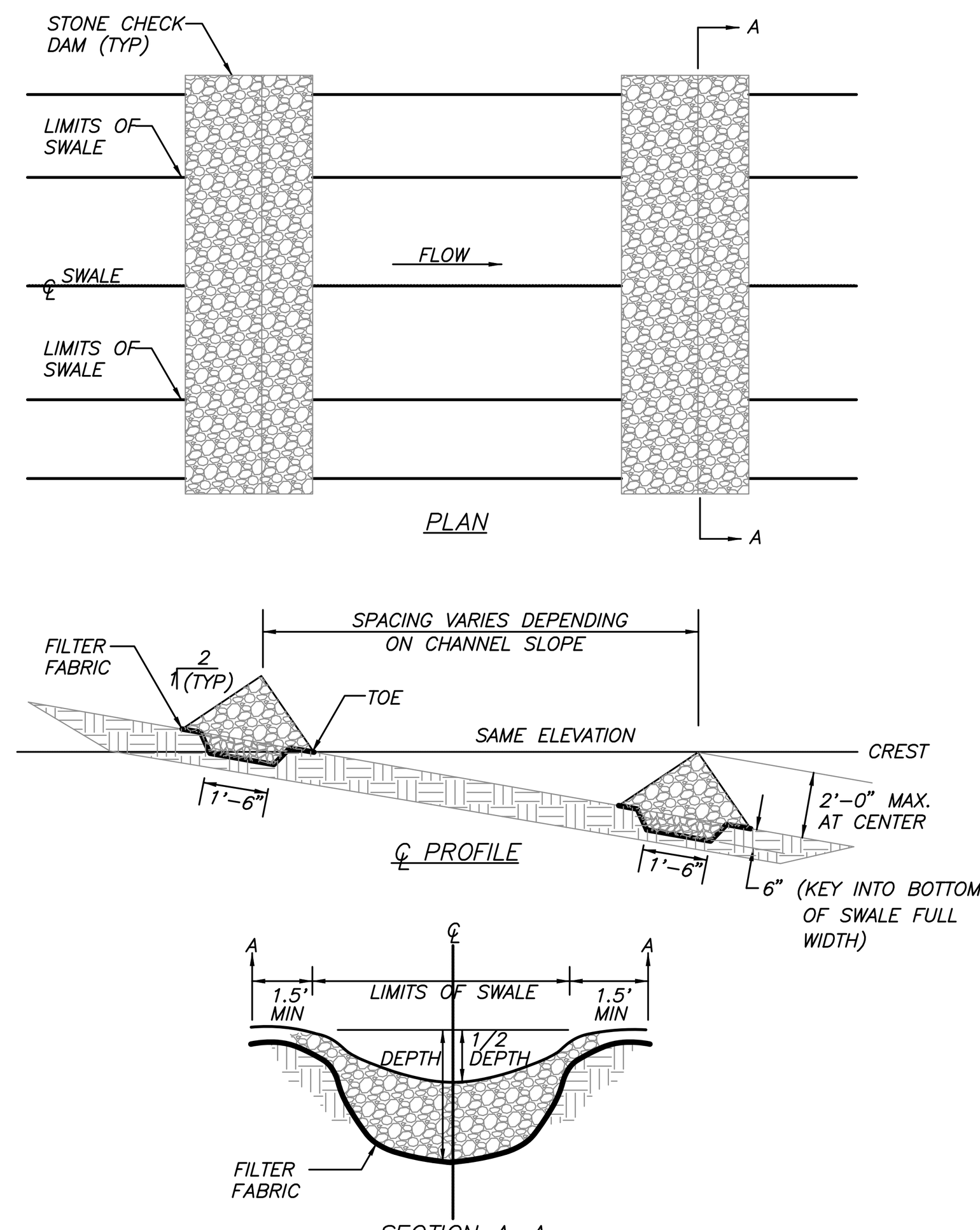


INSTALLATION NOTES

1. STONE SIZE – USE 3" STONE
2. LENGTH – AS REQUIRED, BUT NOT LESS THAN 50 FEET (EXCEPT ON A SINGLE RESIDENCE LOT WHERE A 30 FOOT MINIMUM LENGTH WOULD APPLY.)
3. THICKNESS – NOT LESS THAN SIX (6) INCHES.
4. WIDTH – 12 FOOT MINIMUM, BUT NOT LESS THAN THE FULL WIDTH AT POINTS WHERE INGRESS OR EGRESS OCCUR.
5. FILTER CLOTH – WILL BE PLACED OVER THE ENTIRE AREA PRIOR TO PLACING OF STONE. FILTER CLOTH WILL NOT BE REQUIRED ON A SINGLE FAMILY RESIDENCE LOT.
6. SURFACE WATER – ALL SURFACE WATER FLOWING OR DIVERTED TOWARD CONSTRUCTION ENTRANCES SHALL BE PIPED ACROSS 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 RIGHT OF WAY THIS MAY REQUIRE PERIODIC TOP DRESSING WITH ADDITIONAL STONE AS CONDITIONS DEMAND AND REPAIR AND/OR CLEANOUT OF ANY MEASURES USED TO TRAP SEDIMENT. ALL SEDIMENT SPILLED, DROPPED, WASHED OR TRACKED ONTO PUBLIC RIGHT OF WAY MUST BE REMOVED IMMEDIATELY.
8. WASHING – WHEELS SHALL BE CLEANED TO REMOVE SEDIMENT PRIOR TO ENTRANCE ONTO PUBLIC RIGHT 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 DETAIL

(N.T.S.)

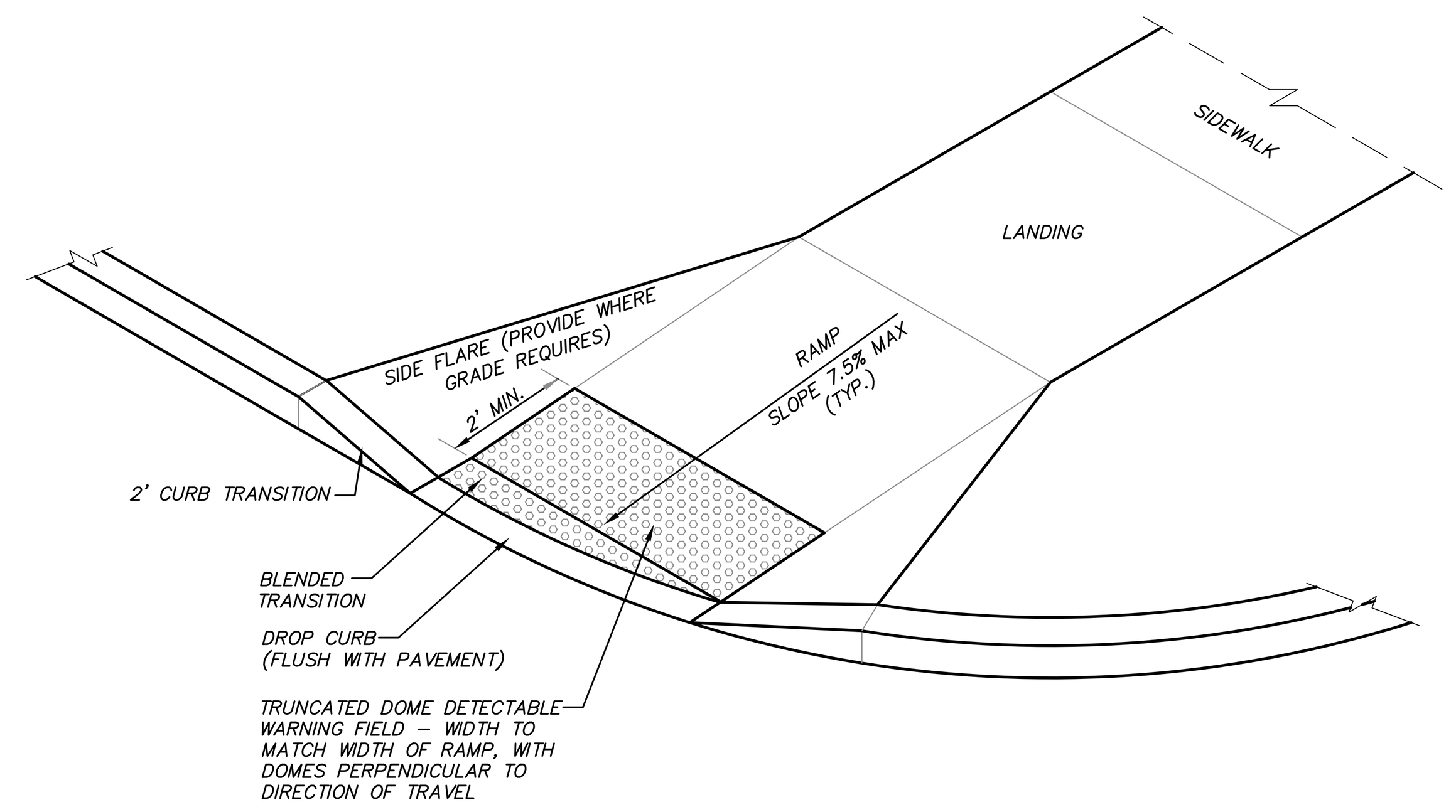


NOTES:

1. STONE SHALL BE PLACED ON A FILTER FABRIC FOUNDATION.
2. SET SPACING OF CHECK DAMS SO THAT THE ELEVATIONS OF THE CREST OF THE DOWNSTREAM DAM IS AT THE SAME ELEVATION OF THE TOE OF THE UPSTREAM DAM.
3. EXTEND THE STONE A MINIMUM OF 1.5 FEET BEYOND THE DITCH BANKS TO PREVENT CUTTING AROUND THE DAM.
4. PROTECT THE CHANNEL DOWNSTREAM OF THE LOWEST CHECK DAM FROM SCOUR AND EROSION WITH STONE LINER AS APPROPRIATE.
5. ENSURE THAT CHANNEL APPURTENANCES SUCH AS CULVERT ENTRANCES BELOW CHECK DAMS ARE NOT SUBJECT TO DAMAGE OR BLOCKAGE FROM DISPLACED STONE.

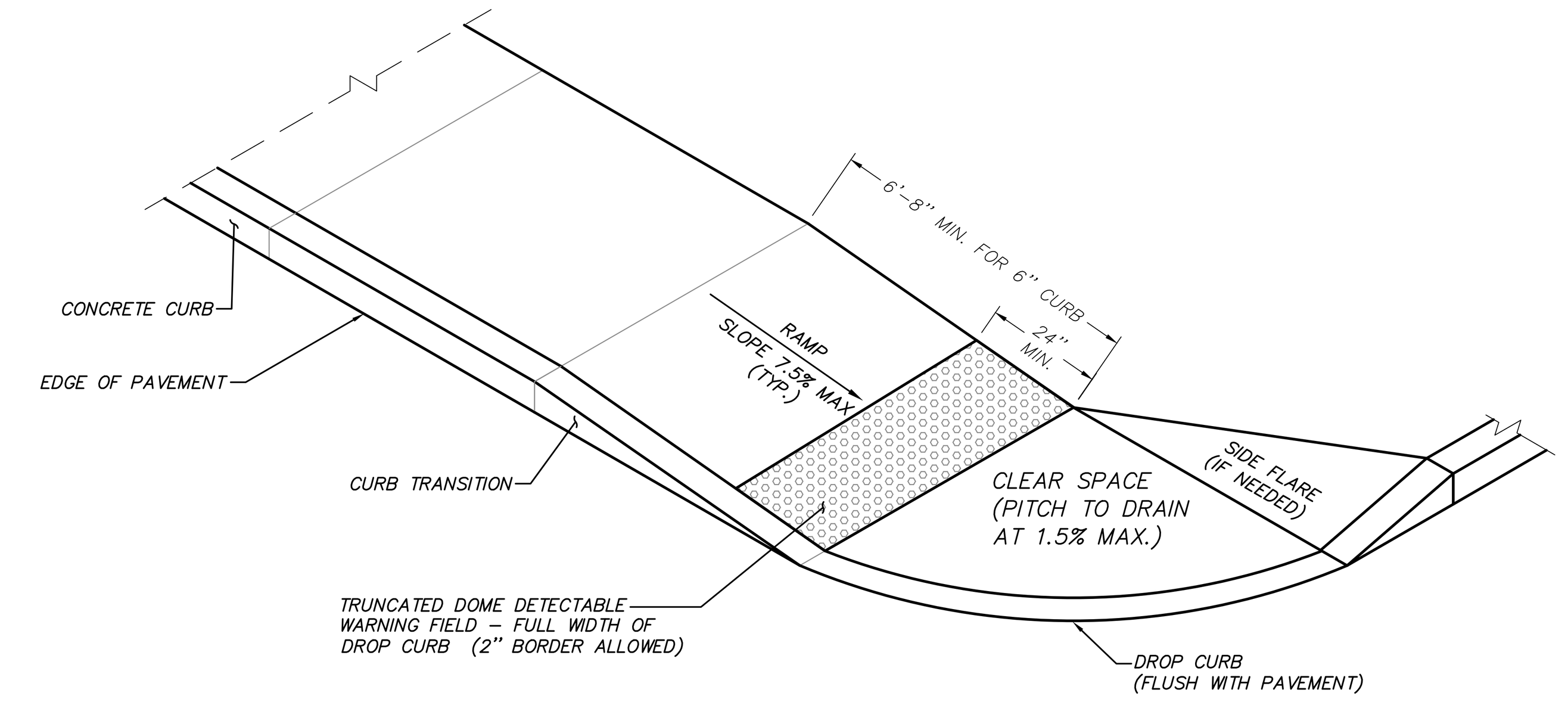
STONE CHECK DAM DETAIL

(N.T.S.)



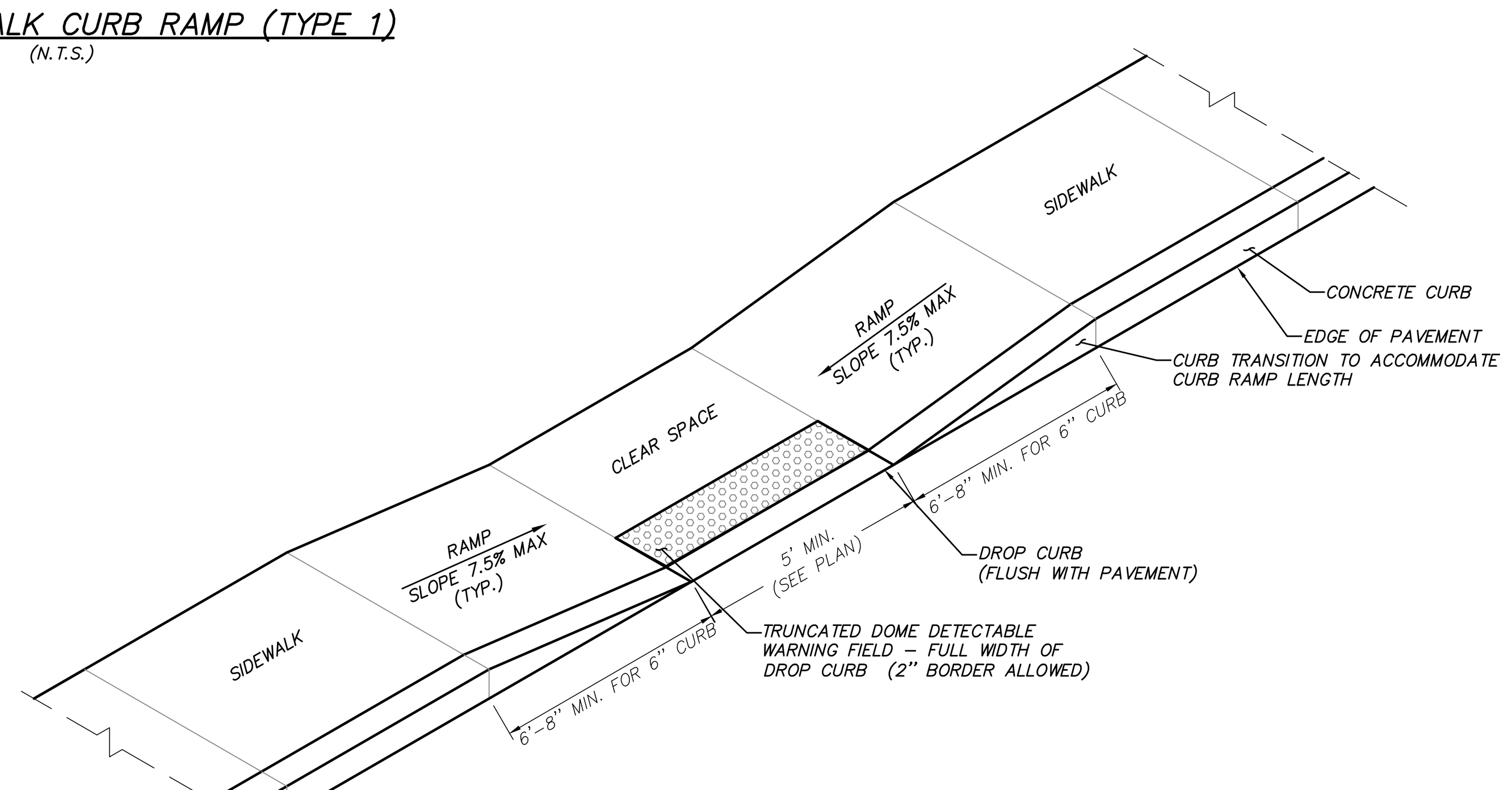
SIDEWALK CURB RAMP (TYPE 1)

(N.T.S.)



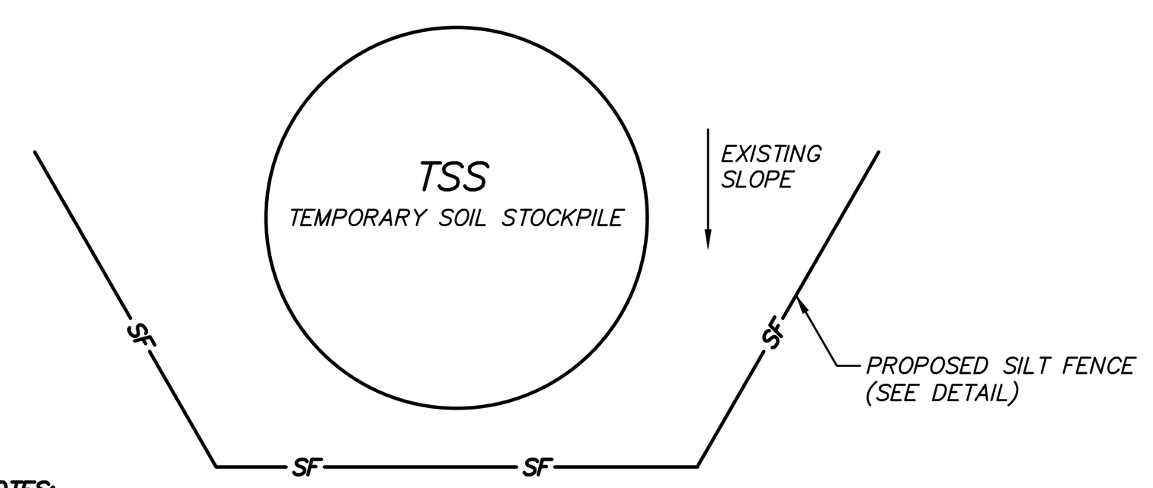
SIDEWALK CURB RAMP (TYPE 2)

(N.T.S.)



SIDEWALK CURB RAMP (TYPE 3)

(N.T.S.)

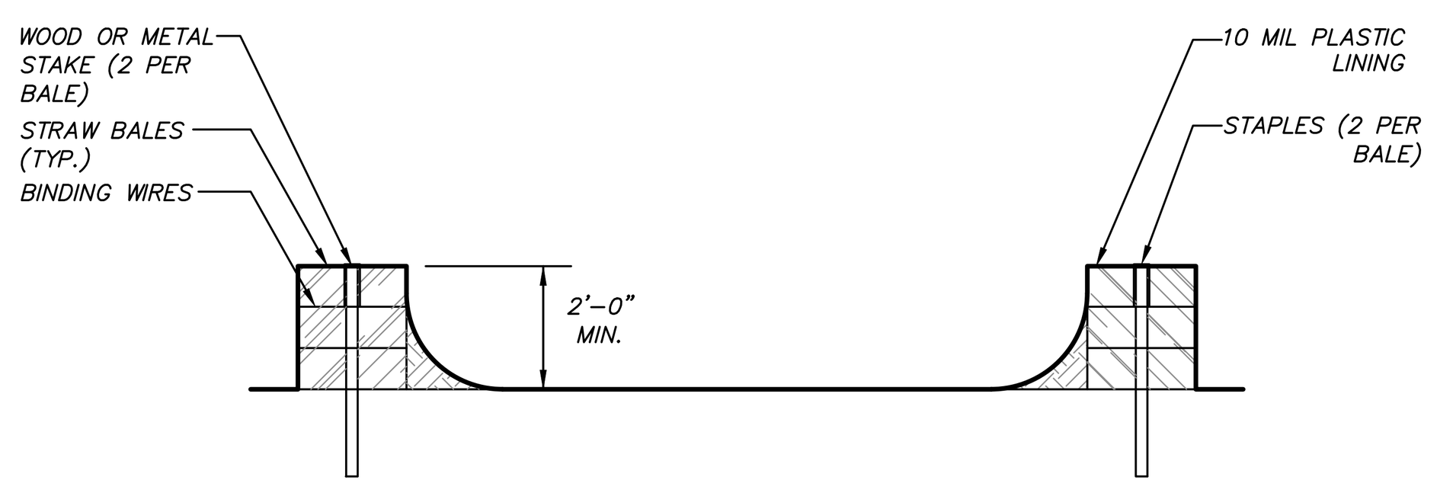


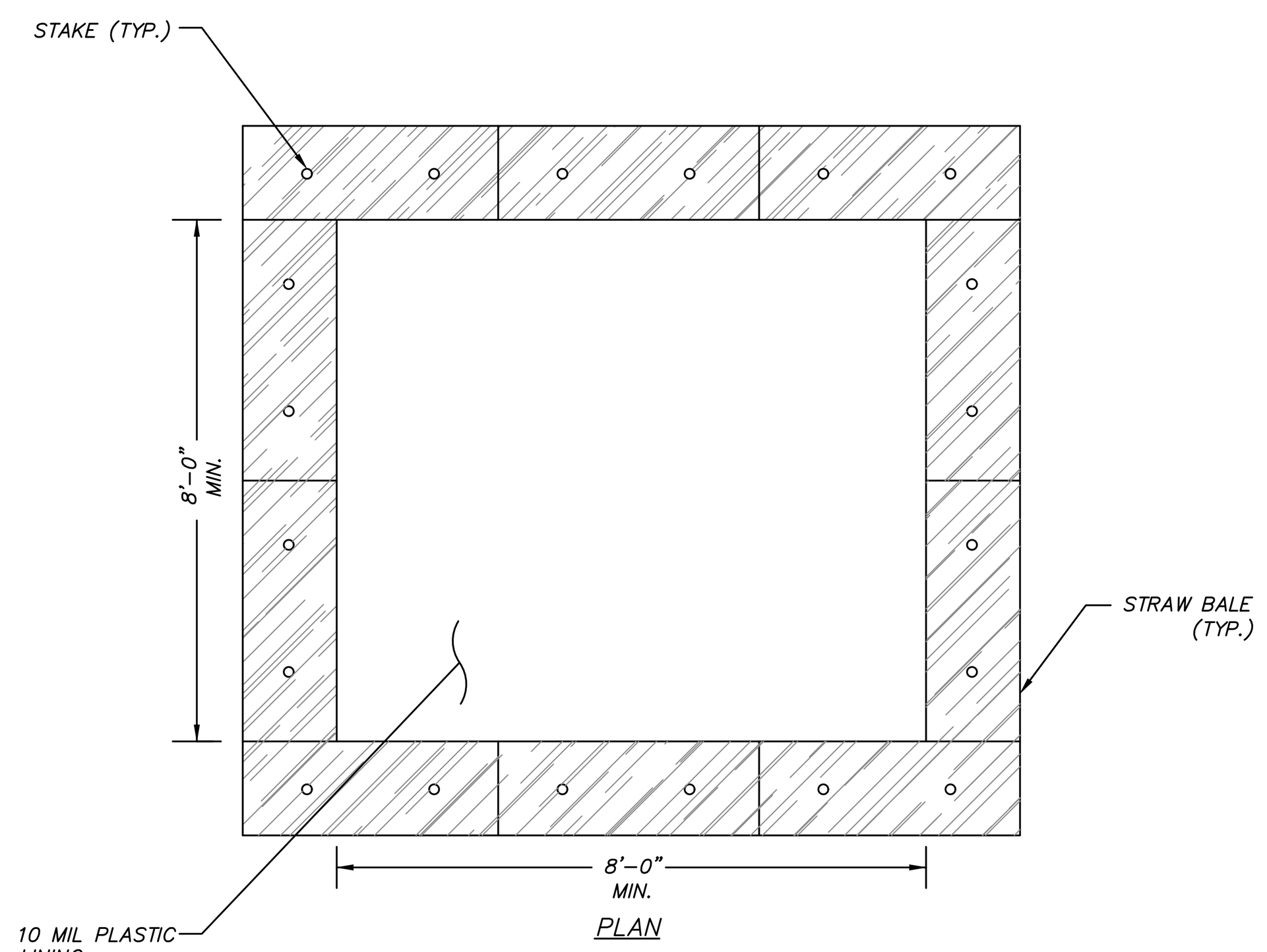
NOTES:

1. AREA CHOSEN FOR STOCKPILE LOCATION SHALL BE DRY AND STABLE.
2. MAXIMUM SLOPE OF STOCKPILE SHALL BE 2:1.
3. UPON COMPLETION OF SOIL STOCKPILING, EACH PILE SHALL BE IMMEDIATELY SEEDED WITH K31 PERENNIAL TALL FESCUE.
4. ALL STOCKPILES SHALL BE PROTECTED WITH SILT FENCING INSTALLED ON THE DOWNGRADIENT SIDE.

TEMPORARY SOIL STOCKPILE DETAIL

(N.T.S.)



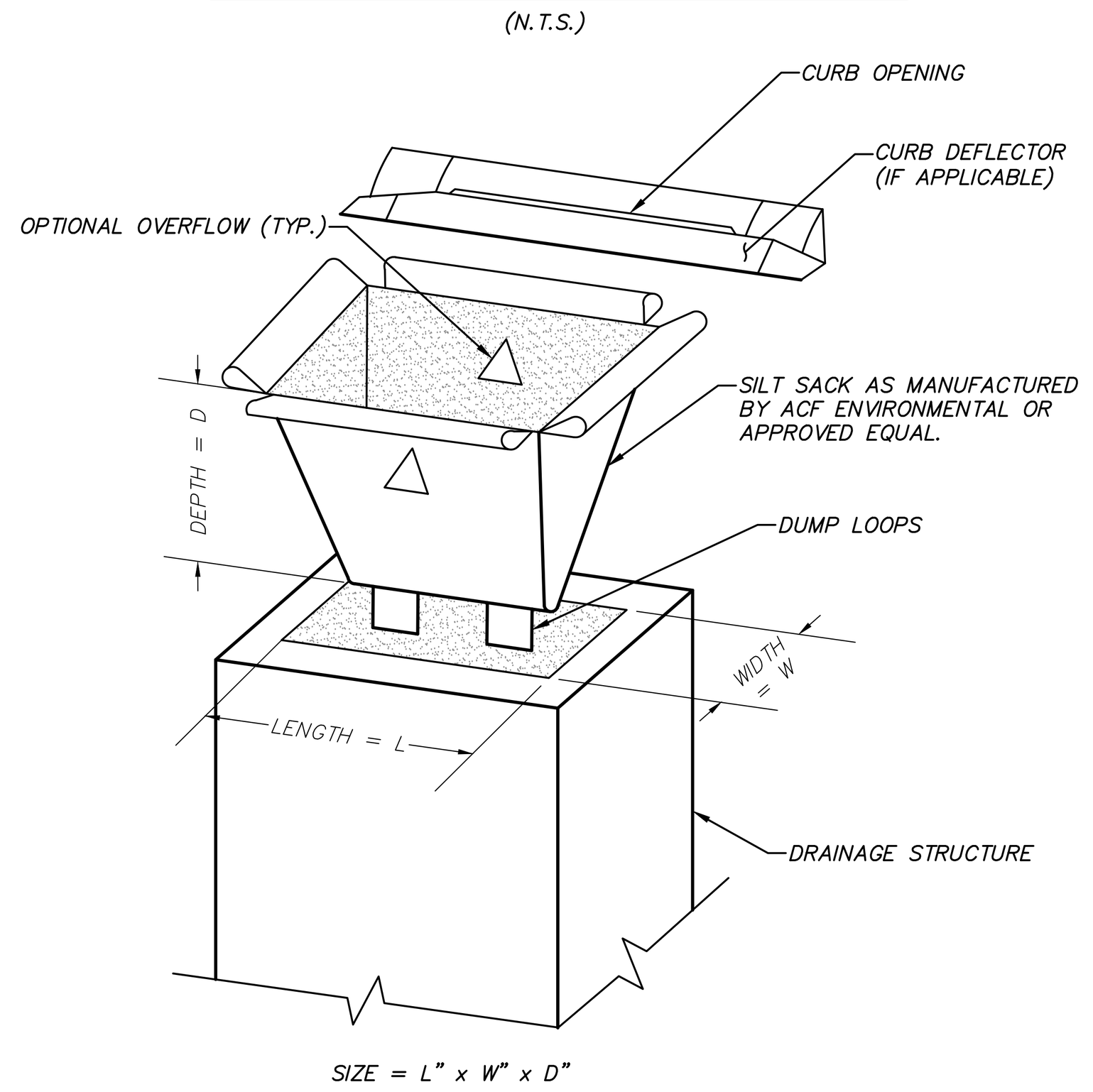


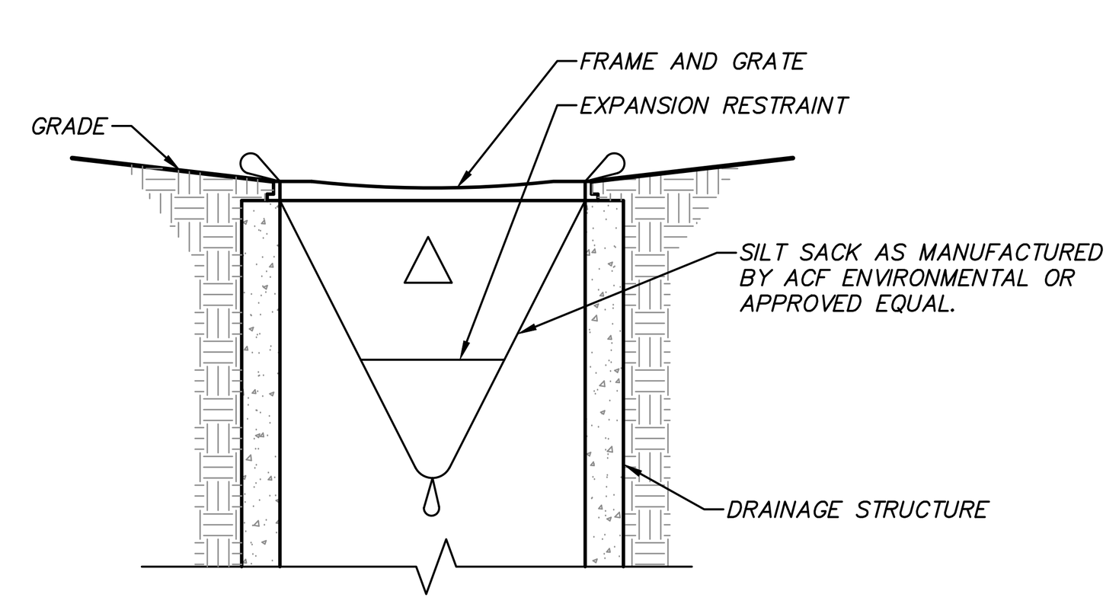
CONCRETE WASHOUT AREA DETAIL

(N.T.S.)

NOTES

1. TEMPORARY CONCRETE WASHOUT TYPE ABOVE GRADE WILL BE CONSTRUCTED AS SHOWN ABOVE, WITH RECOMMENDED MINIMUM LENGTH AND MINIMUM WIDTH OF 8 FT.
2. THE WASHOUT WILL BE MINIMUM OF 100 FT FROM DRAINAGE SWALES, STORM DRAIN INLETS, WETLANDS, STREAMS AND OTHER SURFACE WATERS.
3. PLASTIC LINING WILL BE FREE OF HOLES, TEARS, OR OTHER DEFECTS THAT COMPROMISE THE IMPERMEABILITY OF THE MATERIAL.



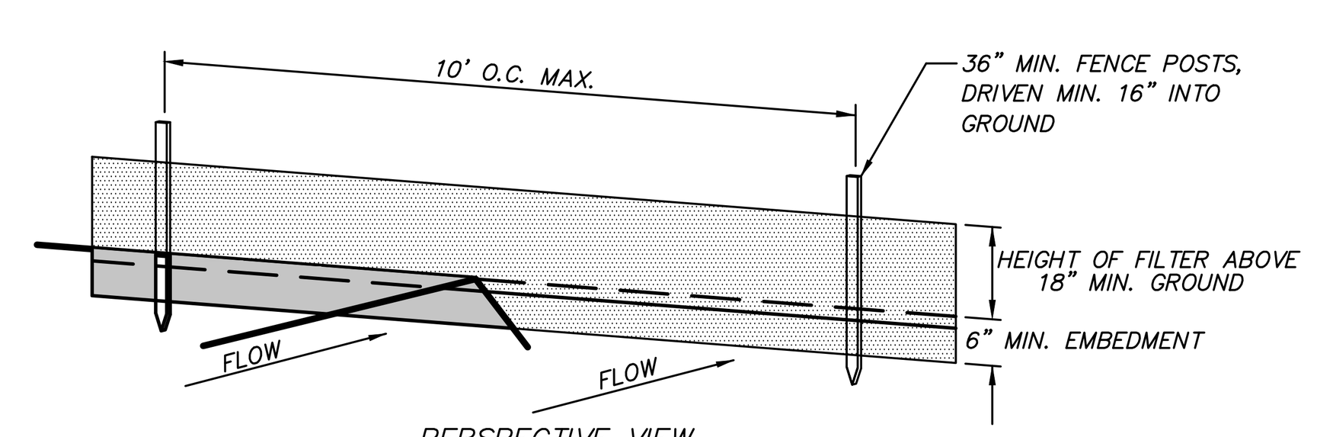


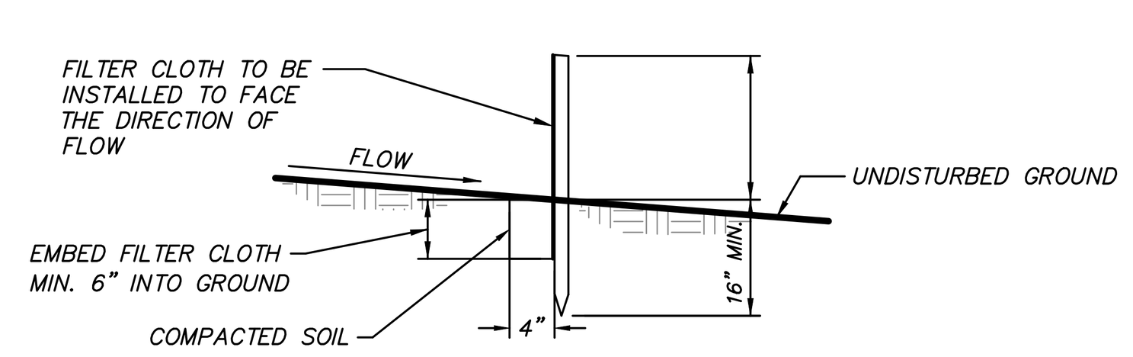
NOTE:
FABRIC FOR INSERT SHALL MEET THE FOLLOWING:

FABRIC PROPERTIES	MINIMUM ACCEPTABLE VALUE	TEST METHOD
Grab Tensile Strength (lbs)	110	ASTM D 4632
Mullen Burst Strength (PSI)	300	ASTM D 3786
Puncture Strength (lbs)	60	ASTM D 4833
Minimum Trapezoidal Tear Strength (lbs)	50	ASTM D 4533
Flow Through Rate (gal/min/sf)	25	ASTM D 4491
Equivalent Opening Size	40–80	US Std Sieve ASTM D 4751

MANUFACTURED INSERT INLET PROTECTION DETAIL

(N.T.S.)





CONSTRUCTION NOTES FOR FABRICATED SILT FENCE

1. FILTER CLOTH TO BE FASTENED SECURELY TO POSTS AT TOP AND MID SECTION.
2. WHEN TWO SECTIONS OF FILTER CLOTH ADJOIN EACH OTHER THEY SHALL BE OVERLAPPED BY SIX INCHES AND FOLDED.
3. MAINTENANCE SHALL BE PERFORMED AS NEEDED AND MATERIAL REMOVED WHEN "BULGES" DEVELOP IN THE SILT FENCE.

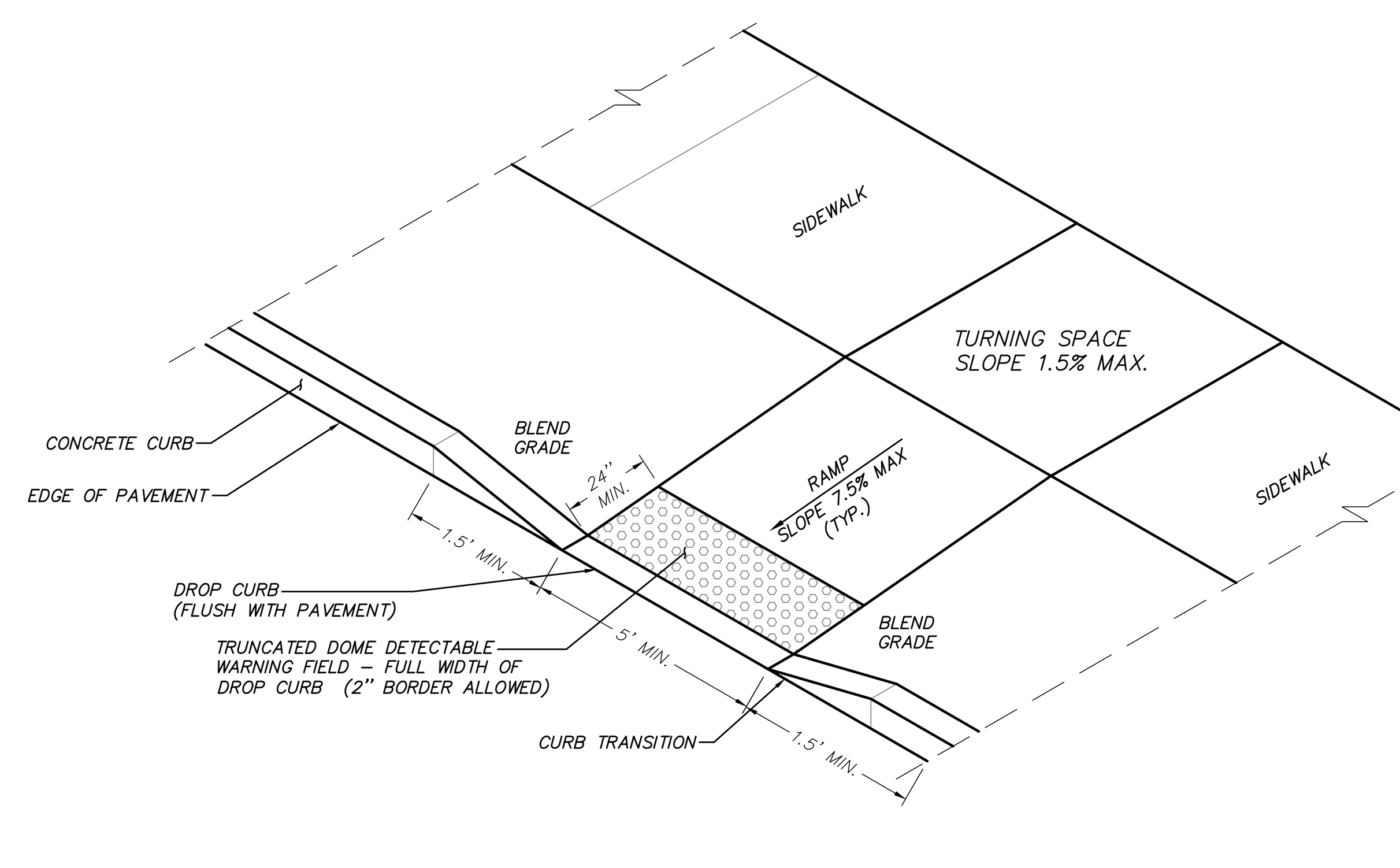
POSTS: STEEL EITHER T OR U TYPE OR 2" HARDWOOD

FILTER CLOTH: FILTER X, MIRAFI 100X, STABILINKA T140N, OR APPROVED EQUAL

PREFABRICATED UNIT: GEOFAB, ENVIROFENCE, OR APPROVED EQUAL

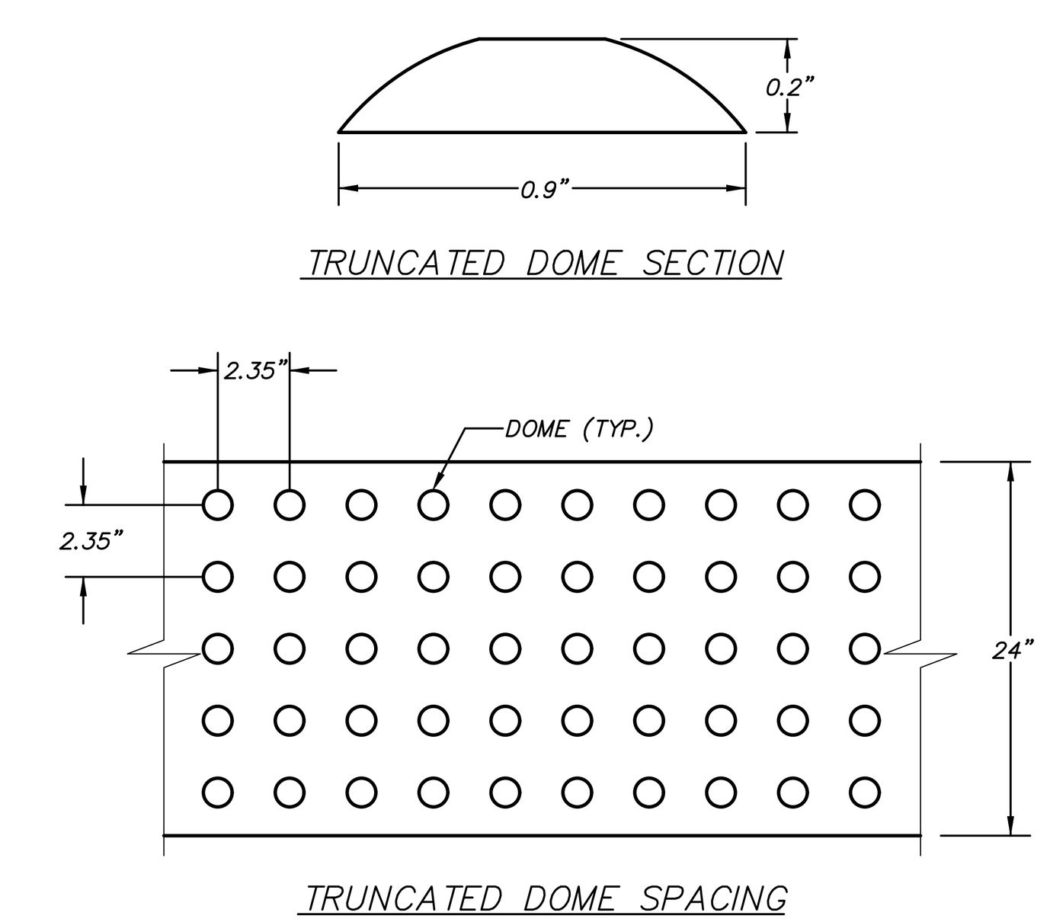
SILT FENCE DETAIL

(N.T.S.)



SIDEWALK CURB RAMP (TYPE 4)

(N.T.S.)

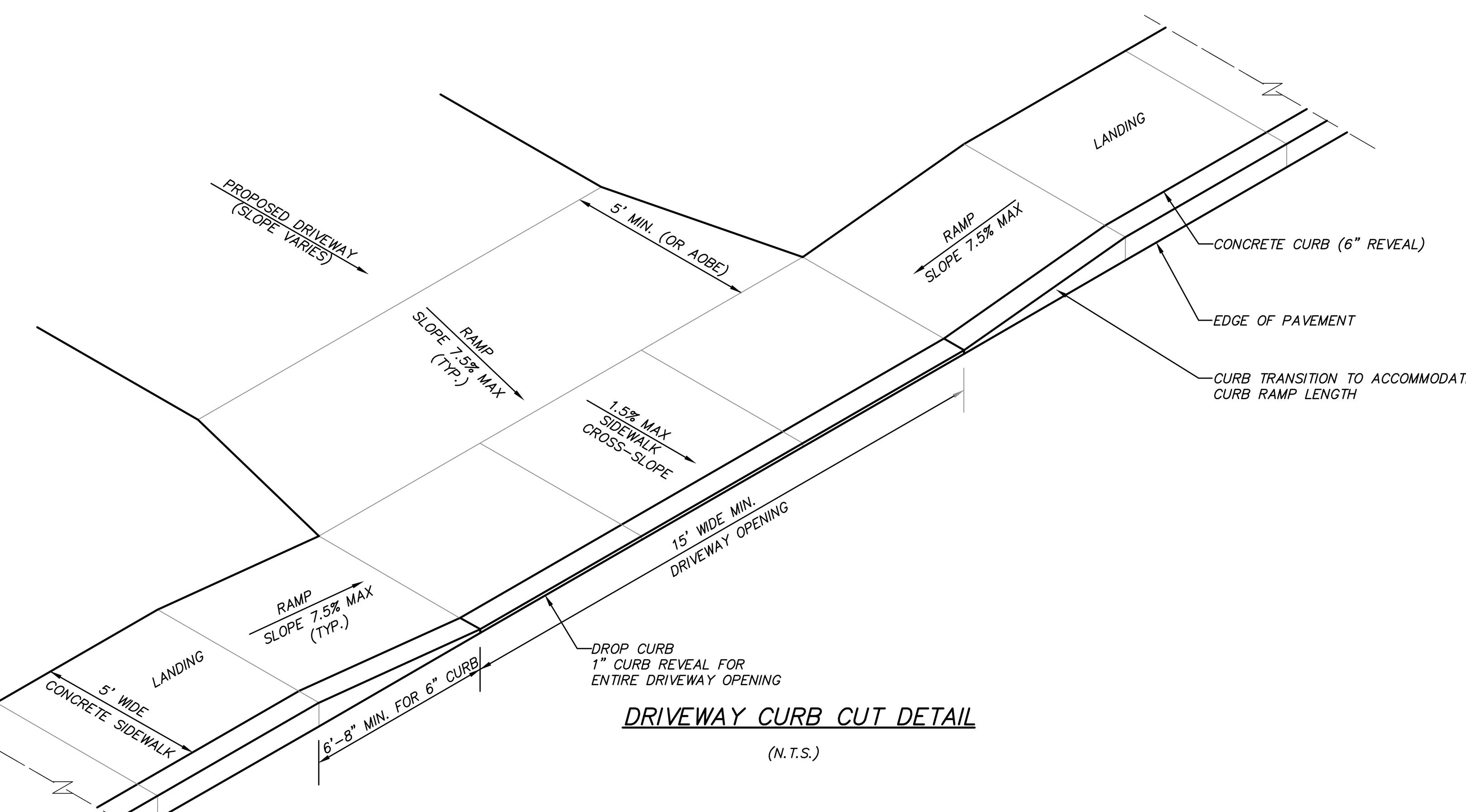


NOTES:

1. The detectable warning field shall consist of raised truncated domes with a nominal diameter of 0.9 inches, a nominal height of 0.2 inches, and a nominal spacing of 2.35 inches on center in accordance with the Department of Justice–Code of Federal Regulations, 28 CFR Part 36, Chapter 4 "ADA Standards for Accessible Design", revised as of July 1, 1994.
2. The details provided are not drawn to scale. The quantity of domes depicted on the detectable warning field (the domes and the entire 24 inch level surface) is for illustration only.
3. The size of the detectable warning field shall be 24 inches in the direction of travel and shall extend the full width of the curb ramp or flush surface, exclusive of side flares.
4. Detectable warnings shall be located so that the edge of the warning field nearest to the roadway or street surface is 6 inches to 8 inches from the edge of the roadway/street, or from the front of the dropped curb, where a dropped curb continues across the bottom of the sidewalk curb ramp.
5. Domes shall be aligned on a square grid in the predominant direction of travel.
6. The detectable warning field shall be the color specified in the contract documents. Detectable warning surfaces shall contrast visually with adjacent gutter, street, highway, or pedestrian access route surface, either light–on–dark or dark–on–light.
7. Provide a broom finish, flush to adjacent sidewalk/curb, on all areas to receive the detectable warning fields.

TRUNCATED DOME DETAIL

(N.T.S.)



DRIVEWAY CURB CUT DETAIL

(N.T.S.)

ALTERATION OF THIS DOCUMENT, UNLESS UNDER THE DIRECTION OF A LICENSED PROFESSIONAL ENGINEER, IS A VIOLATION OF SECTION 7209 OF ARTICLE 145 OF THE EDUCATION LAW.

NO.	DATE	REVISION	BY
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2	5–10–23	REVISED PER VILLAGE COMMENTS	MEU
1	2–1–23	PLANNING BOARD SUBMISSION	DSW

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Carmel, NY 10512
(845) 225–9690
(845) 225–9717 fax
www.insite–eng.com

PROJECT:
BUCKINGHAM PROPERTY MANAGEMENT
CHANNINGVILLE RD & NELSON AVE, VILLAGE OF WAPPINGERS FALLS, DUTCHESS CO., NY

DRAWING:
DETAILS

STATE OF NEW YORK · RICHARD D. WILLIAMS JR. · 085866 · LICENSED PROFESSIONAL ENGINEER

PROJECT NUMBER	22194.100	PROJECT MANAGER	R.D.W.	DRAWING NO. D–2
DATE	12–15–22	DRAWN BY	M.E.U.	SHEET 11 / 15
SCALE	AS SHOWN	CHECKED BY	E.M.S.	

SEWER TESTING PROCEDURES

TESTS FOR NON–PRESSURE PIPELINES FOR TRANSPORT OF SEWAGE

The leakage shall be determined by exfiltration, infiltration or low pressure air.

A. Exfiltration Testing

1. Exfiltration tests shall be made by filling a section of pipeline with water and measuring the quantity of leakage.
2. The head of water at the beginning of the test shall be at least 2 feet above the highest pipe within the section being tested.
   a. Should groundwater be present within the section being tested, the head of water for the test shall be 2 feet above the hydraulic gradient of the groundwater.
   b. Should the requirement of 2 feet of water above the highest pipe subject any joint at the lower end of the test section to a differential head of greater than 11.5 feet, another method of testing shall be employed.

B. Infiltration Testing

1. Infiltration tests will be allowed only when the water table gauges determine the groundwater level to be 2 feet or more above the highest pipe of the section being tested.
2. Infiltration test shall be made by measuring the quantity of water leaking into a section of pipeline.
3. Measurement of the infiltration shall be by means of a calibrated weir constructed at the outlet of the section being tested.

C. Allowable Leakage for Non–Pressure Pipelines

1. The allowable leakage (exfiltration or infiltration) for non–pressure pipelines shall not exceed the following in gallons per 24 hours per inch of diameter per mile of pipe:

Type of Pipe	Leakage
Ductile iron – mechanical or push–on joints	100
Polyvinyl chloride, thermal plastic or fiberglass with rubber joints	100
Cast iron soil pipe	0

2. Regardless of the above allowable leakage, any spurting leaks detected shall be permanently stopped.

D. Low Pressure Air Testing

1. Air testing for acceptance shall not be performed until the backfilling has been completed.
2. Low pressure air tests shall conform to or ASTM F1417–92, Section 8.2.2, Time–Pressure Drop Method for a 0.5 psi drop, except as specified herein and shall not be limited to type or size of pipe.
3. All sections of pipelines shall be cleaned and flushed prior to testing.
4. The air test shall be based on the starting pressure of 3.5 to 4.0 psi gauge. The time allowed for the 0.5 psi drop in pressure, measured in seconds, will be computed based on the size and length of the test section by the Engineer.
   a. When groundwater is present, the average test pressure of 3 psig shall be above any back pressure due to the groundwater level.
   b. The maximum pressure allowed under any condition in air testing shall be 10 psig. The maximum groundwater level for air testing is 13 feet above the top of the pipe.
5. The equipment required for air testing shall be furnished by the Contractor and shall include the necessary compressor, valves, gauges and plugs to allow for the monitoring of the pressure, release of pressure and a separable test gauge.
   a. The test gauge shall be sized to allow for the measuring of the 0.5 psig loss allowed during the test period and shall be on a separate line to the test section.

E. Deflection Testing

1. Deflection testing shall be performed 30 days after backfilling. The test shall be made by passing a ball or cylinder no less then 95% of the pipe diameter through the pipe. The test shall be performed without mechanical pulling devices. Pipes that fail to pass required ball or cylinder shall be corrected. The pipe shall be re–tested after correction until satisfactory deflection test results confirm deflection less than 5%.

F. Manhole Testing

1. General
   a. Each manhole shall be tested by either exfiltration, infiltration or vacuum testing.
   b. A manhole will be acceptable if the leakage does not exceed an allowance of one gallon per vertical foot of depth for 24 hours. Regardless of the allowable leakage, any leaks detected shall be permanently stopped.
2. Exfiltration tests shall be performed after backfilling. The test shall be made by filling the manhole with water and observing the level for a minimum of eight hours.
3. Infiltration tests shall be performed after backfilling when the groundwater level is above the joint of the top section of a precast manhole.
4. Vacuum testing shall be performed after backfilling in accordance with the latest revision of ASTM C1244–02 as follows:
   a. The test head shall be placed at the top of the manhole in accordance with the manufacturer's recommendations.
   b. A vacuum of 10 in. of mercury shall be drawn on the manhole, the valve on the vacuum line of the test head closed, and the vacuum pump shut off. The time shall be measured for the vacuum to drop to 9 in. of mercury.
   c. The manhole shall pass if the time for the vacuum reading to drop from 10 in. of mercury to 9 in. of mercury meets or exceeds the values indicated below:

Minimum Test Times for Various Manhole Diameters in Seconds:

Depth (ft)	Diameter (inches) 48	60
	Time (seconds)	
8 or less	20	26
10	25	33
12	30	39
14	35	46
16	40	52
18	45	59
20	50	65

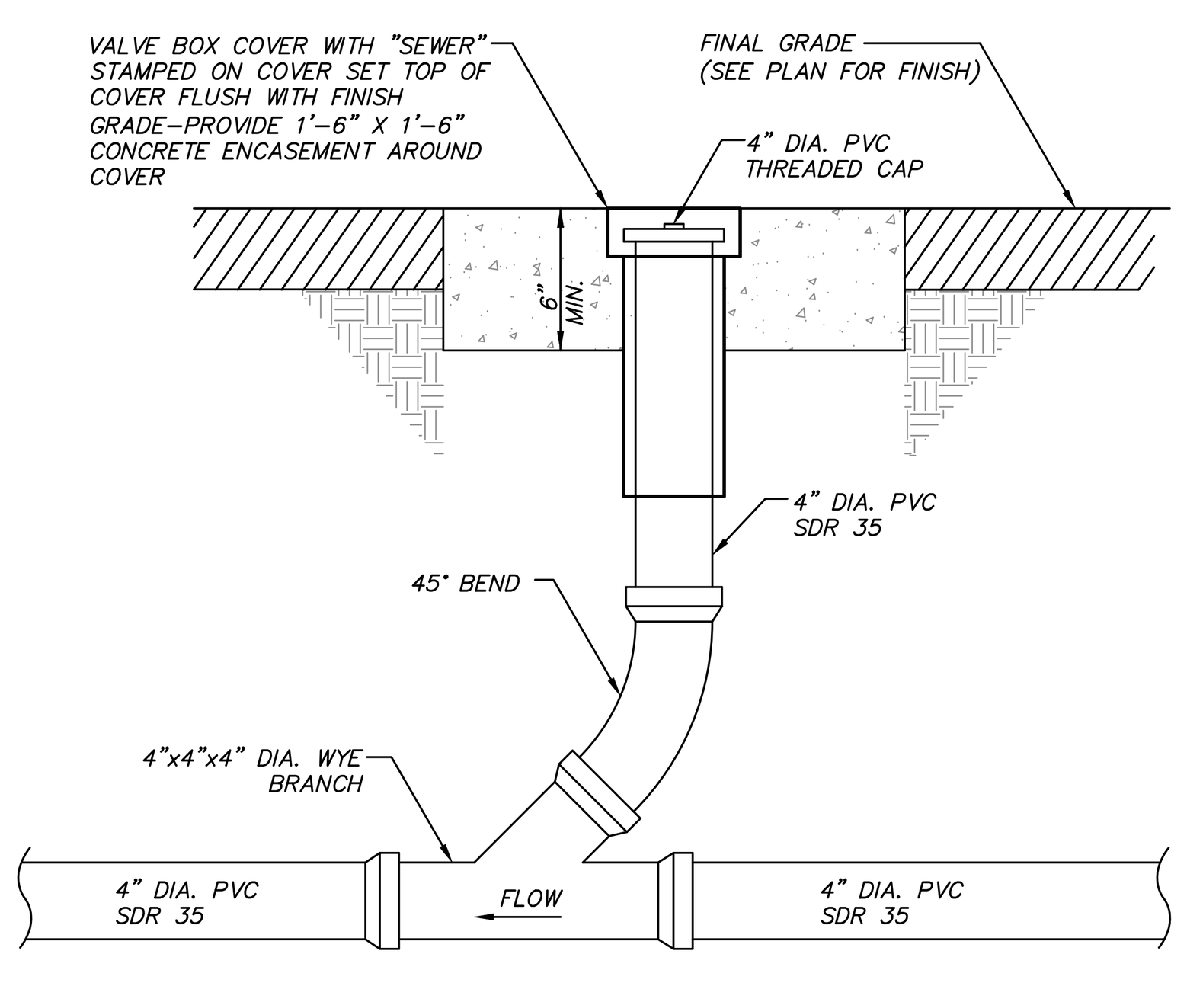
   d. If the manhole fails the initial test, necessary repairs shall be made by an approved method. The manhole shall then be retested until a satisfactory test is obtained.

SEWER MAIN NOTES

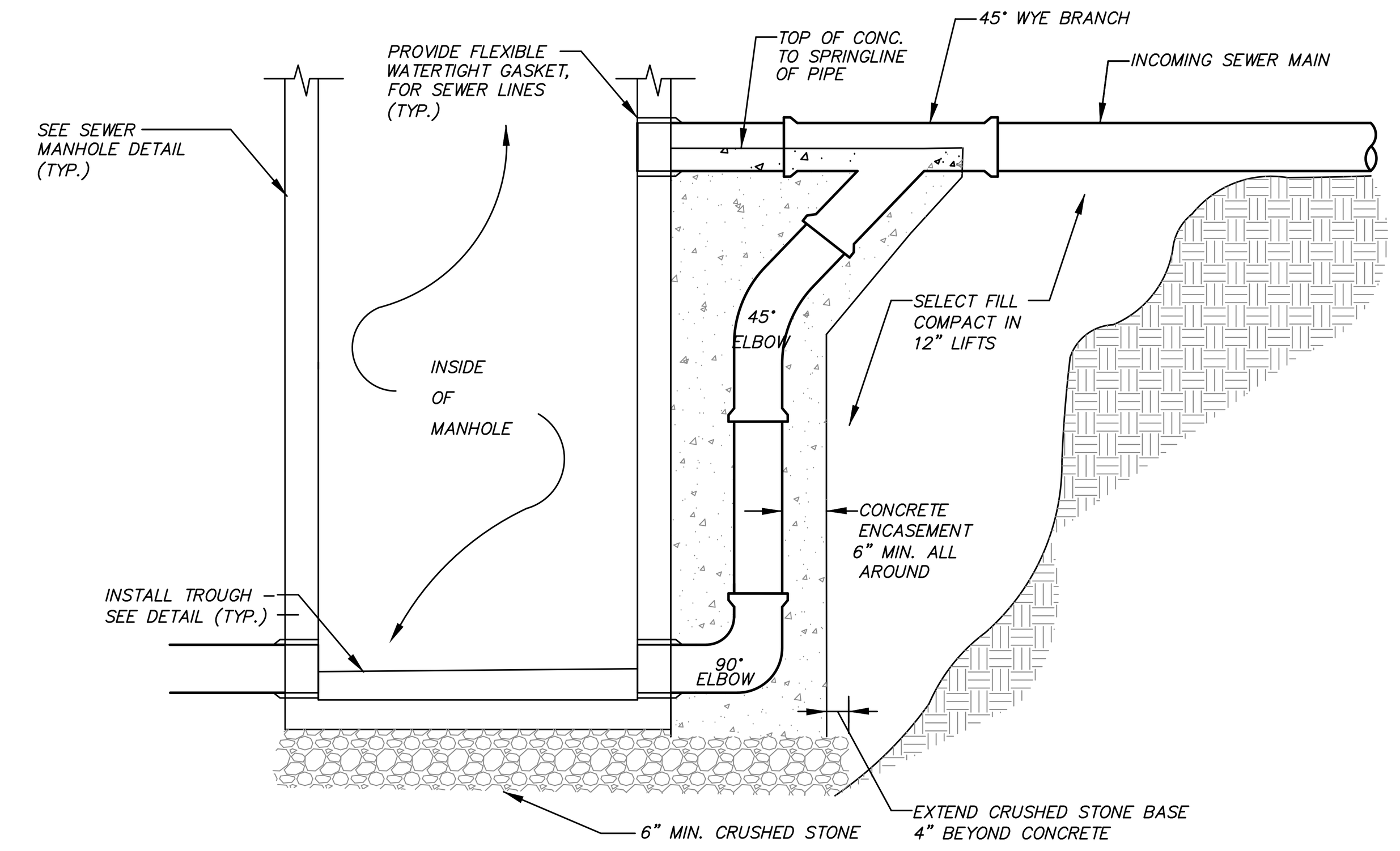
1. All sewer mains & sewer services shown on these plans shall be polyvinyl chloride (PVC) SDR 35 with factory installed push on gaskets.
2. Sanitary Sewers and manholes shall be laid at least 10 feet horizontally from any existing or proposed water main or drainage pipe and drainage manholes. The distance shall be measured edge to edge. In cases where it is not practical to maintain a 10 foot horizontal separation, the Design Engineer and Dutchess County Department of Health may allow deviation with prior approval on a case–by–case basis, if supported by data from the Design Engineer prior to sewer line installation. The horizontal separation also applies to service connections.
3. Sewers crossing water mains or drainage pipes shall be laid to provide a minimum vertical separation of 18 inches between the outside of the sewer main and the water main or drainage pipe. The crossing shall be arranged so that the sewer joints will be equidistant and as far as possible from the water main joints. Where a water main or drainage pipe crosses under a sewer, adequate structural support shall be provided for the sewer to maintain line and grade. In cases where it is not practical to maintain a 18" vertical separation, the Design Engineer and Dutchess County Department of Health may allow deviation with prior approval on a case–by–case basis, if supported by data from the Design Engineer prior to the sewer line installation. The vertical separation also applies to service connections.
4. Sanitary sewer service lines shall be tested in conjunction with the sewer mains to cleanout or the property line or easement line, and in accordance with the latest Dutchess County Department of Health Rules & Regulations.
5. Testing of the manholes with the pipeline shall not be permitted. Manholes & sanitary sewer lines shall be tested independently of each other.
6. The owner/applicant shall be responsible for acquiring supervision of the construction of the sanitary sewer main system by a person or firm qualified to practice professional engineering in the state of New York.
7. The owner/applicant shall be responsible for providing Three (3) copies of as–built drawings signed and sealed by a licensed and registered New York State Professional Engineer to the Dutchess County Department of Health at the completion of the construction.
8. The Design Engineer and Dutchess County Department of Health shall be notified forty eight (48) hours before construction is started.
9. The sanitary sewer mains shall not be placed into service until a certificate of construction compliance has been submitted to and accepted by the Dutchess County Department of Health.
10. The Dutchess County Department of Health must be notified forty eight (48) hours prior to pressure testing the sewer main improvements.
11. Manhole frames & covers to be Campbell pattern #1007 with 24"ø gravel opening or approved equal. M.H. covers to be marked "SEWER". (use solid covers where necessary.)
12. The exterior of all manholes shall be covered with an approved asphalt waterproofing.
13. Concrete base slabs shall be air entrained concrete with a minimum design strength of 3,000 psi.
15. The contractor shall submit shop drawings of the precast manholes to the Design Engineer for review and acceptance.
16. Precast manholes shall have minimum reinforcement of 0.12 sq.. in. per lin. ft. for 48" barrel & be designed in accordance with A.S.T.M. C–478, and withstand an H–20 design loading.
17. Precast base sections to have the required number of gaskets and openings as shown and specified.
18. Precast manhole sections shall employ a watertight gasket arrangement between each section approved by the Design Engineer.
19. Openings for pipes shall be precast or machine cored. Gaskets or collars for pipe connections to manholes shall be resilient and watertight and compatible with the type of pipe being used.
20. The length of pipes entering or leaving any manhole shall be greater than 2'–0".
21. Precast manholes under 6'–0" deep shall have a "Flat Top" slab roof.
22. Gaskets or collars for pipe connections to manhole shall provide a minimum of 0.1' drop across the manhole.
23. The contractor shall notify the Design Engineer every day that sewer main installation shall occur.

DCDOH Standard Notes for Central Sewer Projects:

1. The design, construction and installation shall be in accordance with this plan and generally accepted standards in effect at the time of construction which include:
   - "New York State design Standards for Intermediate Sized Wastewater Treatment Systems", NYSDEC
   - "Appendix 75–A Waste Treatment – Individual Household Systems, New York State Sanitary Code."
   - "Recommended Standards for Sewage Treatment Works and Water Works, (Ten States)."
   - "New York State Department of Health and Dutchess County Department of Health policies, procedures and standards."
   - "Dutchess County Department of Health Sanitary Code, Article XI and Article XIX."
   - "Dutchess County Environmental Health Services Division Certificate of Approval letter."
2. This plan is approved as meeting the appropriate and applied technical standards, guidelines, policies and procedures for arrangement of sewage disposal and treatment and water supply facilities.
3. Upon completion of the facilities, the finished works shall be inspected, tested, and certified complete to the DC EHSD by the New York State licensed Professional Engineer supervising construction. No part of the facilities shall be placed into service until accepted by the DC EHSD.
4. Approval of any plan(s) or amendment thereto shall be valid for a period of 5 years from the date of approval. Following the expiration of said approval, the plan(s) shall be re–submitted to the Commissioner of Health for consideration for re–approval. Re–submission or revised submission of plans and/or associated documents shall be subject to compliance with the technical standards, guidelines, polices and procedures in effect at the time of the re–submission.
5. The DC EHSD shall be notified sixty days prior to any change in use; use changes may require re–approval by the DC EHSD.
6. All required Erosion & Sediment Control and Stormwater Pollution Prevention Water Quality & Quality Control structures, permanent and temporary, are shown on the plans.
7. No buildings are to be occupied and the new wastewater collection system shall not be placed into service, until a "Certificate of Construction Compliance" is issued under section 19.7 of Artical 19 of the Dutchess County Sanitary Code.
8. No cellar, footing, floor, garage, cooler, or roof drains shall be discharged into the sewage collection system.
9. All buildings shall be constructed at an elevation high enough to ensure gravity flow to the sewage collection system.
10. The undersigned owners of the property hereon state that they are familiar with this map, its contents and its legends and hereby consent to all said terms and conditions as stated hereon.
11. Pump stations and dosing systems must be installed under the supervision of a New York State registered design professional who shall certify in writing that the system is installed in accordance with the approved plan and that the system operates as intended.
12. All concrete tanks shall be 4,000 psi concrete.



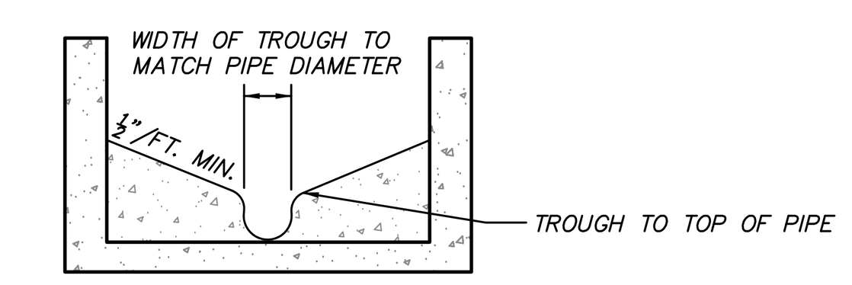
4" SEWER SERVICE LINE CLEANOUT DETAIL
(N.T.S.)



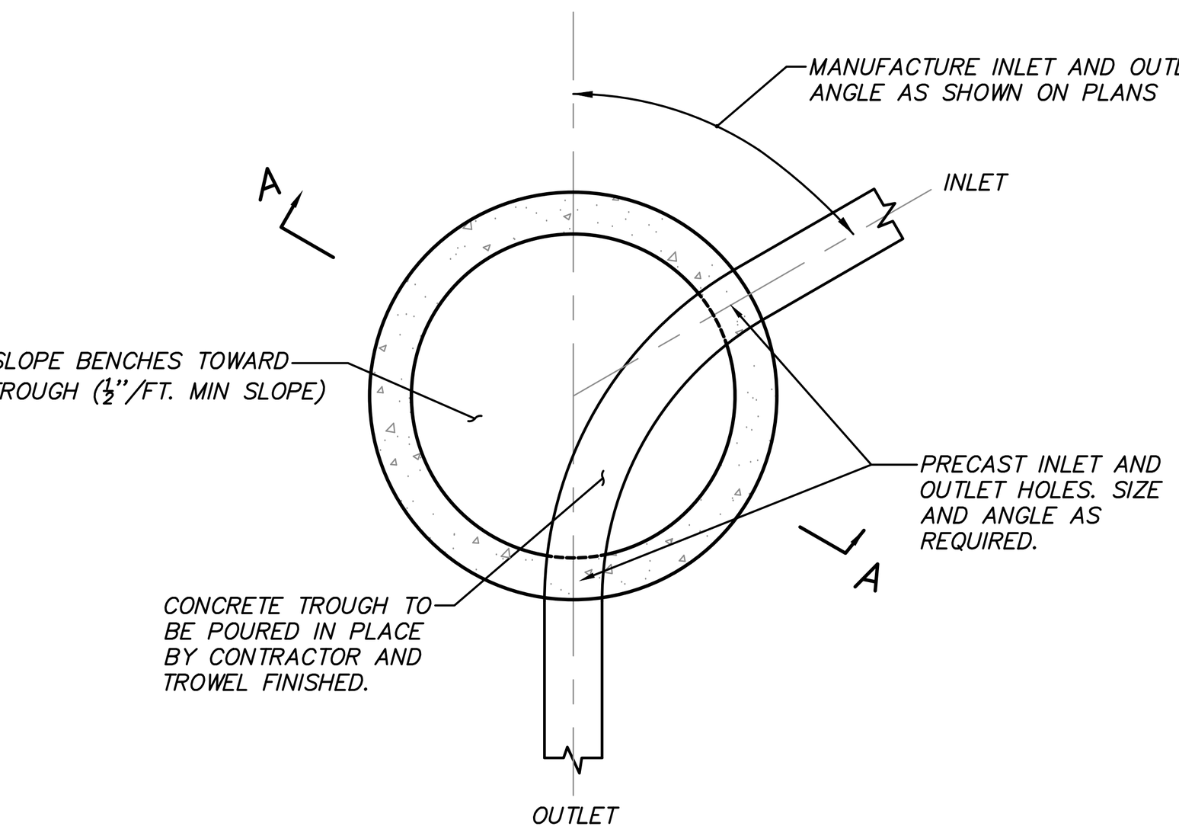
EXTERNAL DROP MANHOLE DETAIL
(N.T.S.)

EXTERNAL DROP MANHOLE NOTES:

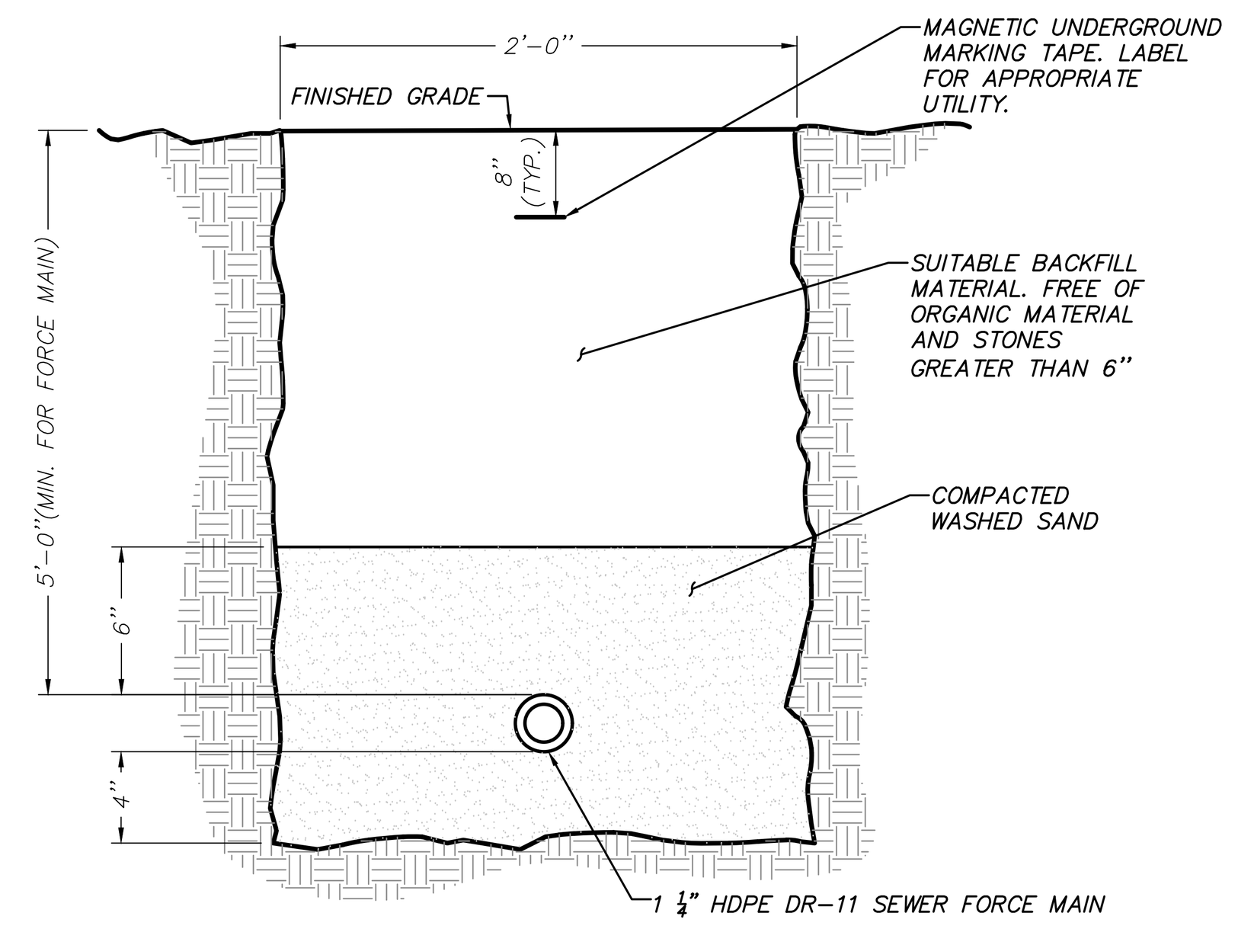
1. TO BE USED WHEN INCOMING SEWER IS MORE THAN 2'–0" HIGHER THAN THE OUTGOING SEWER.
2. PIPE SIZE AND TYPE OF DROP CONNECTION TO BE SAME AS MAIN OR LATERAL.
3. ALL JOINTS SHOULD BE SEALED INSIDE AND OUT WITH CEMENT GROUT CONTAINING 2 PARTS CEMENT AND 1 PART SAND AND ANTI–HYDRO OR OTHER APPROVED ADDITIVE IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS TO INSURE WATER TIGHTNESS.



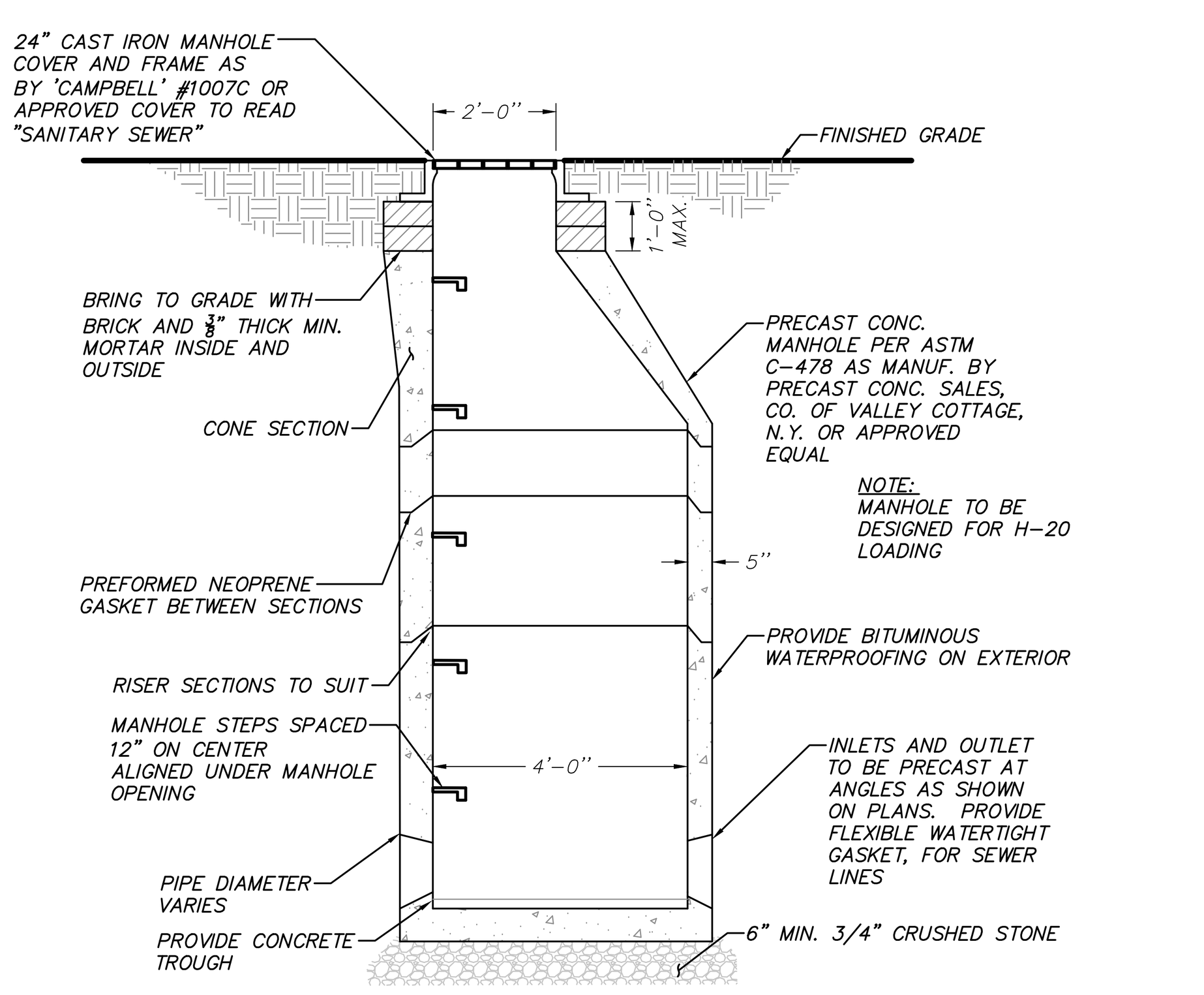
SECTION A–A



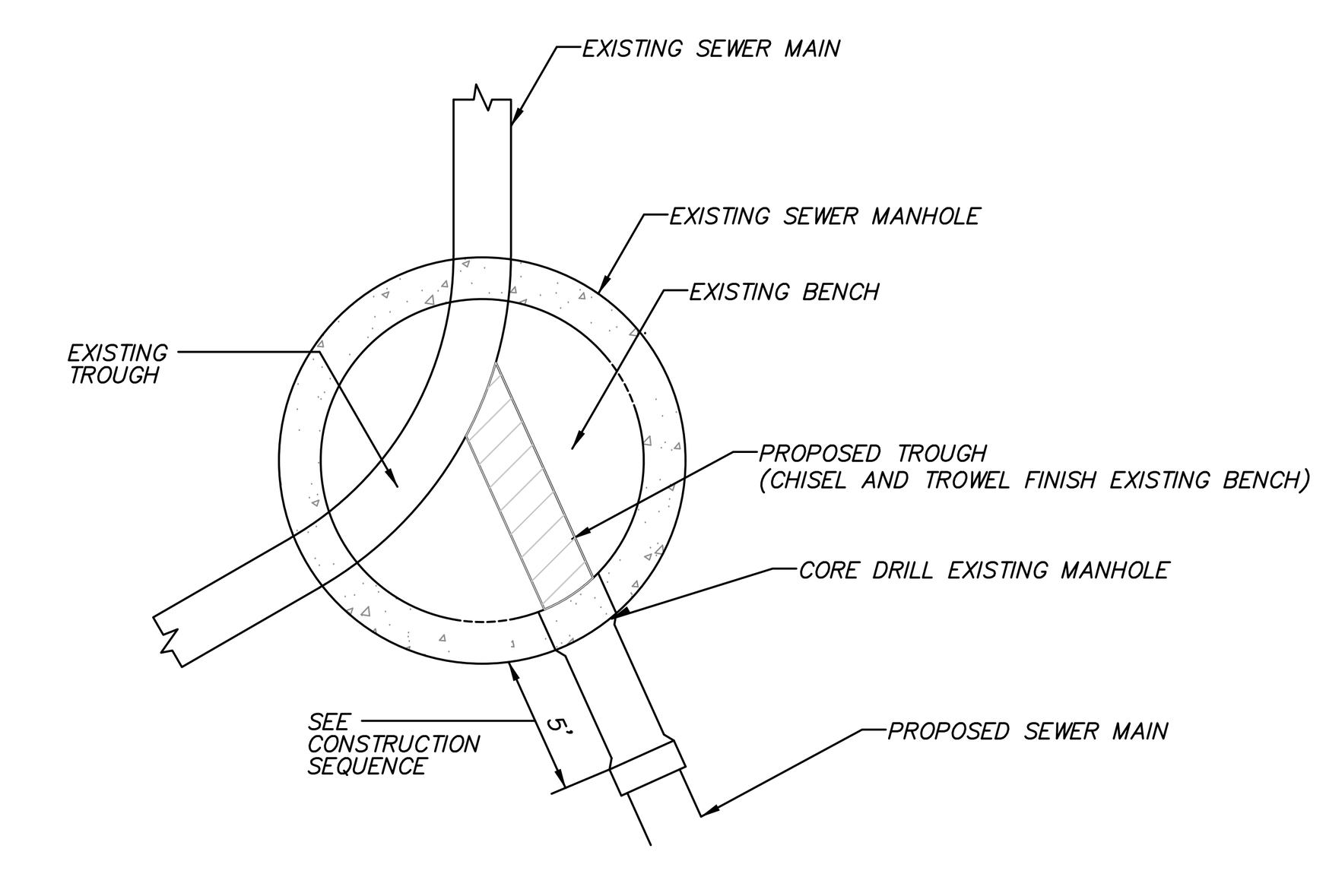
MANHOLE TROUGH DETAIL
(N.T.S.)



HDPE SEWER FORCE MAIN TRENCH DETAIL
(N.T.S.)



SEWER MANHOLE DETAIL
(N.T.S.)

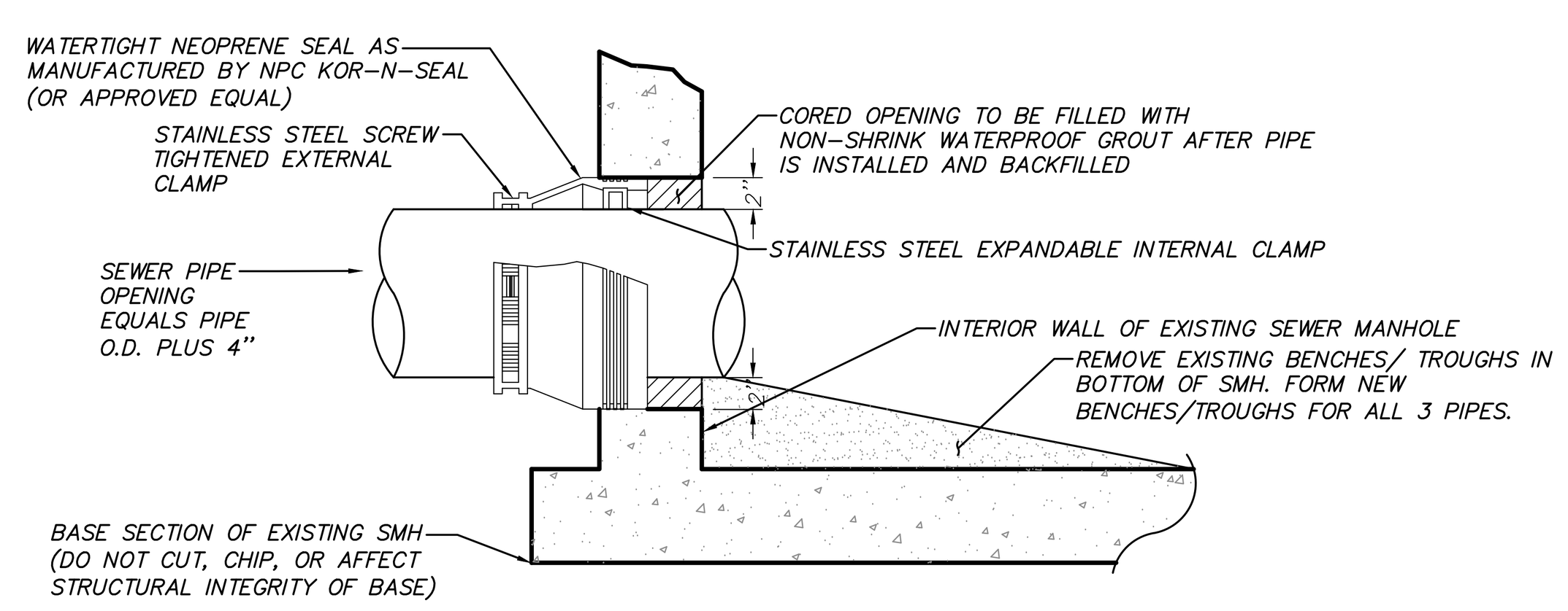


PLAN

CONNECTION TO EXISTING SEWER MANHOLE CONSTRUCTION SEQUENCE

1. Install proposed sewer main piping to within 5' of the existing sewer manhole.
2. Perform required acceptance testing of the sewer main.
3. After testing of new sewer main, core drill existing manhole and connect proposed piping to existing manhole.
4. Once the new sewer main has been connected to the existing sewer manhole form new trough by chiseling and trowel finish existing bench and trough.

PROPOSED SEWER CONNECTION TO EXISTING SEWER MANHOLE DETAIL
(N.T.S.)



PROPOSED SEWER CONNECTION TO EXISTING SEWER MANHOLE DETAIL
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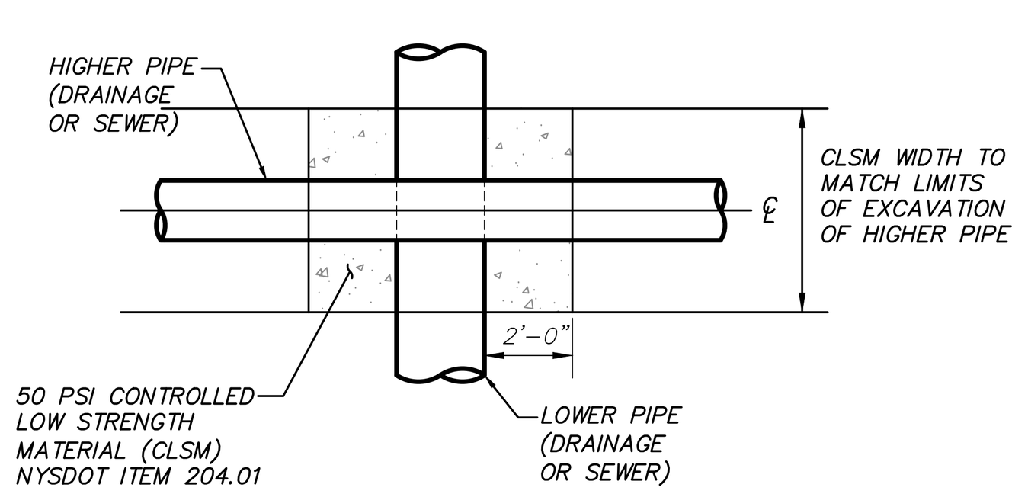
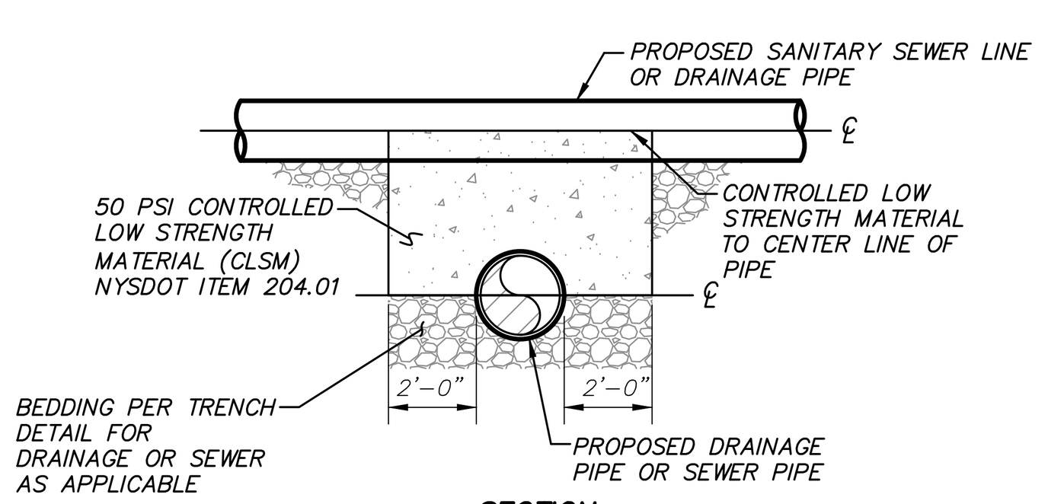


PLAN

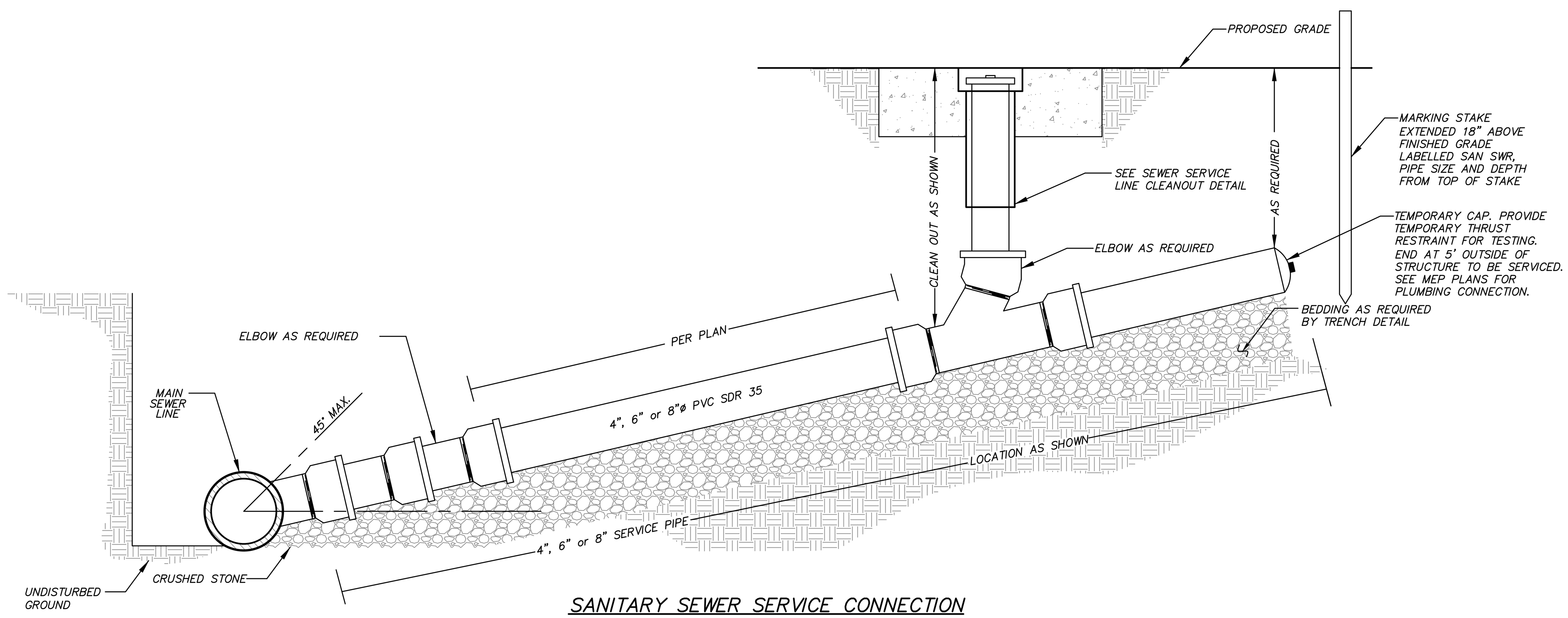


SECTION

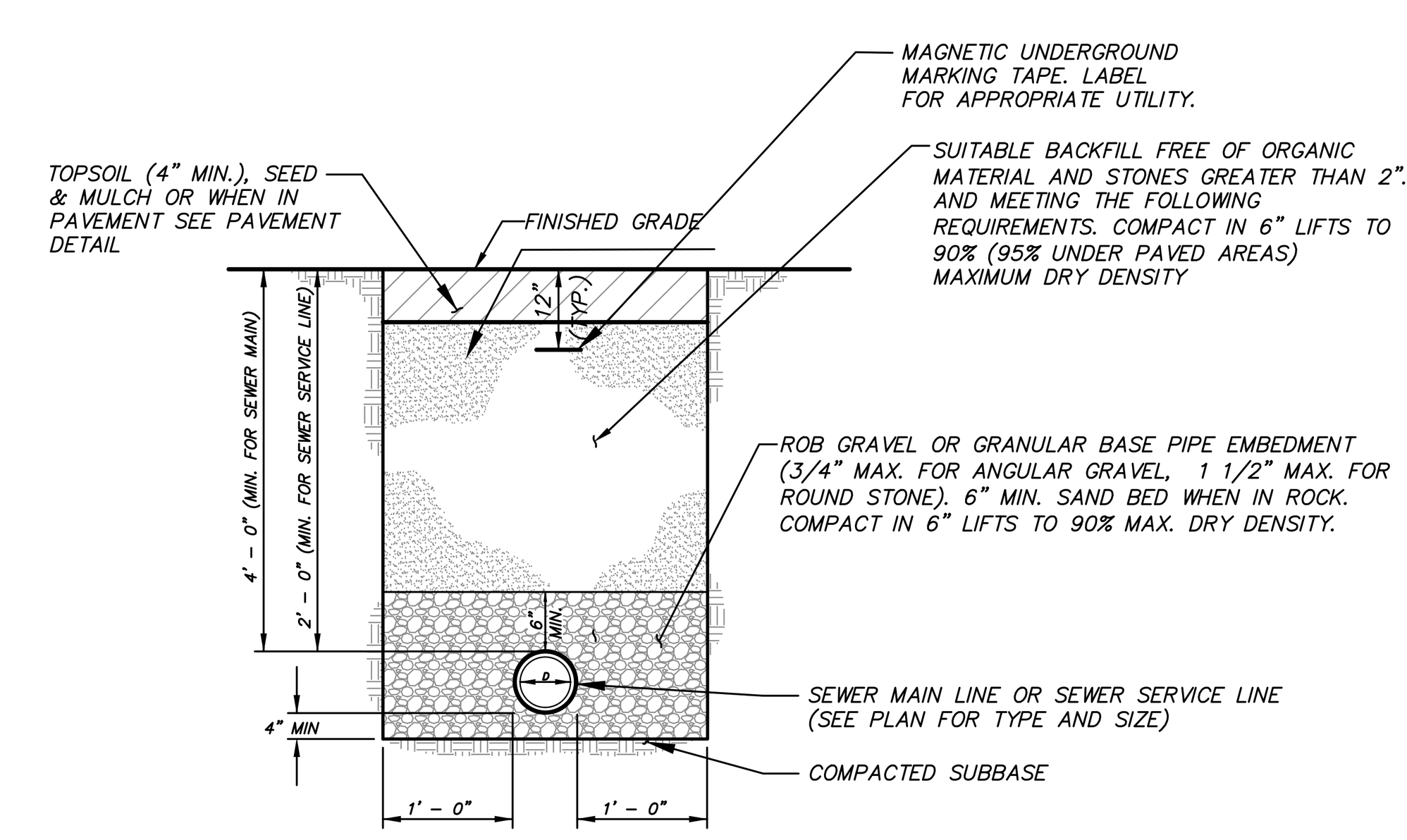
NOTES:

1. DETAIL TO BE USED ONLY WHEN THERE IS LESS THAN 18" SEPARATION BETWEEN DRAINAGE PIPE AND SANITARY SEWER PIPE.
2. PIPE AT LOWER ELEVATION TO BE INSTALLED PRIOR TO PIPE AT HIGHER ELEVATION.
3. WIDTH OF CLSM BEDDING TO MATCH TRENCH WIDTH.

SEWER PIPE TO DRAINAGE PIPE CROSSING DETAIL
(N.T.S.)



SANITARY SEWER SERVICE CONNECTION
(N.T.S.)



SEWER MAIN/SEWER SERVICE LINE TRENCH DETAIL
(N.T.S.)

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PROJECT:
BUCKINGHAM PROPERTY MANAGEMENT
CHANNINGVILLE RD & NELSON AVE, VILLAGE OF WAPPINGERS FALLS, DUTCHESS CO., NY

DRAWING:
DETAILS

STATE OF NEW YORK · RICHARD D. WILLIAMS JR. · 085866 · LICENSED PROFESSIONAL ENGINEER

PROJECT NUMBER	22194.100	PROJECT MANAGER	R.D.W.
DATE	12–15–22	DRAWN BY	M.E.U.
SCALE	AS SHOWN	CHECKED BY	E.M.S.

DRAWING NO. D–3

PVC PIPE WATER MAIN NOTES:

1. All water mains shall be PVC Class 200 DR 18 pipe with factory installed push–on gaskets. All pipe shall be in conformance with the latest edition AWWA C900.
2. All water main fittings shall be Class 350 ductile iron mechanical joints in accordance with the latest edition of AWWA/ANSI Standards C111/A21.11. "GRIP RING" restrained joint connections shall be provided at every fitting (as manufactured by ROMAC Industries, Inc. or approved equal).
3. Thrust blocks shall be installed at all changes in horizontal or vertical alignment.
4. All water mains and appurtenances shall be installed in accordance with the latest edition of AWWA C605.
5. Gate valves shall be "Mueller" or approved equal, iron body, non–rising stem conventional packing, resilient seated, mechanical joint with restrained joint gaskets, pressure class 350, opening shall be left (CCW) and operation shall be by 2" square wrench nut.
6. All water mains and appurtenances (including water service lines up to the curb stop) shall be pressure tested and leakage tested to the satisfaction of the Design Engineer, and the Dutchess County Department of Health. This shall be done in accordance with the latest edition of AWWA Standard C605.
7. All water mains and appurtenances shall be flushed, disinfected, and tested to the satisfaction of the Design Engineer, and the Dutchess County Department of Health. This shall be done in accordance with the latest edition of AWWA Standard C651, section 4.4.3, the "Continuous Feed Method". The "tablet method" will not be allowed.
8. Water mains shall be laid at least 10 feet horizontally from any existing or proposed sanitary or storm sewer main. The distance shall be measured edge to edge. In cases where it is not practical to maintain a 10 foot separation, the Design Engineer and Dutchess County Department of Health may allow deviation with prior approval on a case–by–case basis, if supported by data from the Design Engineer prior to the installation of the water lines. The horizontal separation shall also apply to service connections.
9. Water mains crossing sanitary or storm sewer mains shall be laid to provide a minimum vertical distance of 18 inches between the outside of the water main and the outside of the sewer. This shall be the case where the water main is either above or below the sewer. The crossing shall be arranged so that the sewer joints will be equidistant and as far as possible from the water main joints. Where a water main crosses under a sewer, adequate structural support shall be provided for the sewer to maintain line and grade. In cases where it is not practical to maintain the 18 inch vertical separation, the Design Engineer and Dutchess County Department of Health may allow deviation with prior approval on a case–by–case basis, if supported by data from the Design Engineer prior to the installation of the water lines. The vertical separation also applies to water service connections.

9. The Design Engineer, Dutchess County Department of Health, and Village's Authorized Representative shall be notified forty eight (48) hours before construction is started.

10. The water mains shall not be placed into service until a certificate of construction compliance has been submitted to and accepted by the Dutchess County Department of Health.
11. The Dutchess County Department of Health must be notified forty eight (48) hours prior to pressure testing the water main improvements.
12. The contractor shall notify the Design Engineer every day that water main construction shall occur.

PVC PIPE WATER TESTING PROCEDURES

TESTS ON PRESSURE PIPING FOR TRANSPORT OF WATER

A. Hydrostatic Pressure Test
Hydrostatic testing shall be performed in accordance with the revision of AWWA C605, Section 7.3, "Hydrostatic Testing".

1. Test pressure shall be as scheduled or, where no pressure is scheduled, shall be 150% of the maximum working pressure or 150 psi, whichever is higher.
2. Test pressure shall be held on the piping for a period of at least 2 hours, unless a longer period is requested by the Engineer.
3. The test medium shall be water.

B. Hydrostatic Leakage Test

1. The leakage test shall be conducted concurrently with the pressure test.
2. The rate of leakage shall be determined at 15–minute intervals by means of volumetric measurement of the makeup water added to maintain the test pressure. The test shall proceed until the rate of leakage has stabilized or is decreasing below an allowable value, for three consecutive 15–minute intervals. After this, the test pressure shall be maintained for at least another 15 minutes.
   a. At the completion of the test, the pressure shall be released at the furthermost point from the point of application.
3. All exposed piping shall be examined during the test and all leaks, defective material or joints shall be repaired or replaced before repeating the tests.
4. The allowable leakage will be determined by the following formula.

$$Q = \frac{LD\sqrt{P}}{148,000}$$

Where:
- Q = quantity of makeup water, in gallons per hour
- L = length of pipe tested, in feet
- D = nominal diameter of the pipe, in inches
- P = average test pressure during the hydrostatic test, in pounds per square inch (gauge)

5. Regardless of the above allowables, any visible leaks shall be permanently stopped.
6. The test medium shall be water.

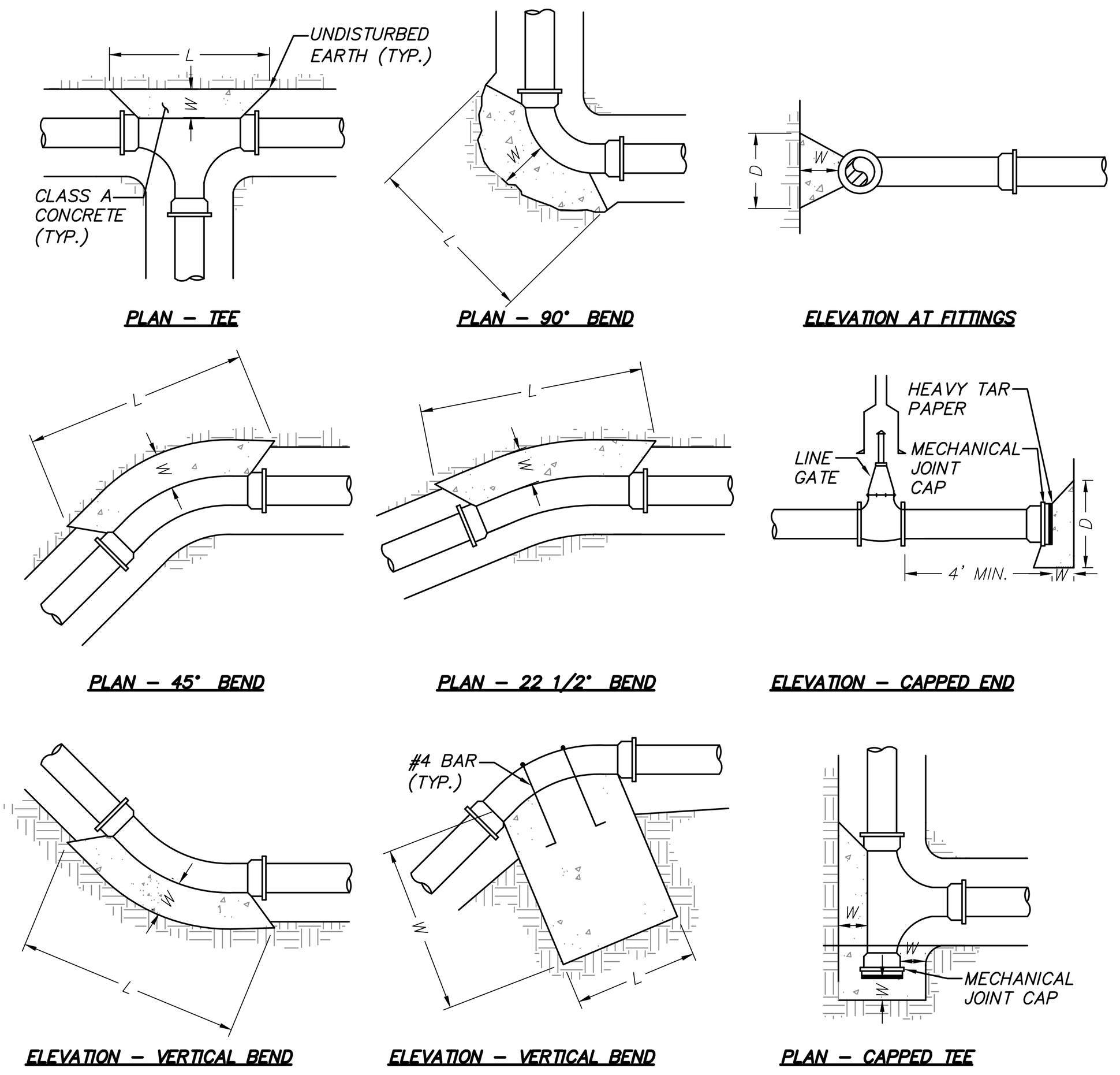
C. Disinfection
Prior to placing the water main into service, the new pipe shall be cleaned and disinfected in accordance with the latest revision of AWWA C651, Section 4.4.3, "The Continuous Feed Method". The "Tablet Method" will not be accepted.

1. All work under this section shall be performed in the presence of the Design Engineer, and a representative of the public health authority having jurisdiction, as required.
2. Chlorination shall be scheduled such that sampling and flushing will be performed during normal daylight working hours. The contractor shall provide acceptable backflow prevention on all supply water to prevent any potential backflow contamination or cross connection.
3. Chlorination shall be by the use of a solution of water and liquid chlorine, calcium hypochlorite or sodium hypochlorite and the solution shall be contained in the pipe or structure as specified.
4. Prior to chlorination, all dirt and foreign matter shall be removed by a thorough cleaning and flushing of the pipeline or structure.
5. The chlorine solution shall be introduced to pipelines through corporation stops placed in the horizontal axis of the pipe, to structures by means of tubing extending directly into the structure, or other approved methods.
6. The application of the chlorine solution shall be by means of a controlled solution feed device. The rate of chlorine solution flow shall be in such proportion to the rate of water entering the pipe or structure that the resulting free chlorine residual shall be between 25 and 50 parts per million (PPM) or milligrams per liter (mg/l).
7. The chlorine treated water shall be retained in the pipe or structure at least 24 hours, unless otherwise directed. During the retention period, all valves and hydrants within the treated sections shall be operated.
8. The chlorine residual shall be not less than 10 PPM (or mg/l) at any point in the pipe or structure at the end of the 24–hour retention period.
9. When making repairs to, or when specified, structures and portions of pipelines shall be chlorinated by a concentrated chlorine solution containing not less than 200 PPM (mg/l) of free chlorine. The solution shall be applied with a brush or sprayed on the entire inner surface of the empty pipes or structures. The structures disinfected shall remain in contact with the strong chlorine solution for at least 30 minutes.
10. After the required retention of chlorinated water in the pipe or structures, they shall be thoroughly flushed until the replacement water shall, upon test, both chemically and bacteriological, be proven equal to water quality served by the public from the existing water supply system.
11. The disposal of chlorinated water from any pipe or structure shall be such that it will not cause damage to any vegetation, fish, or animal life.
12. The Contractor shall make all arrangements for the testing of water quality by an approved independent laboratory. Two acceptable bacteriological test, taken at least 24 hours apart, shall be collected from the new water main. At least 1 set of samples must be collected from every 1,000 LF of the new water main, plus one set from the end of the line and at least one set from each branch. The results for all tests shall be forwarded to the Design Engineer and the public health authority having jurisdiction.
13. All water quality requirements shall be fulfilled prior to the passage of any water through the new system to a public supply or the use of the new system.

ALTERATION OF THIS DOCUMENT, UNLESS UNDER THE DIRECTION OF A LICENSED PROFESSIONAL ENGINEER, IS A VIOLATION OF SECTION 7209 OF ARTICLE 145 OF THE EDUCATION LAW.

DCDOH Standard Notes for Public Water Systems with Distribution Improvements:

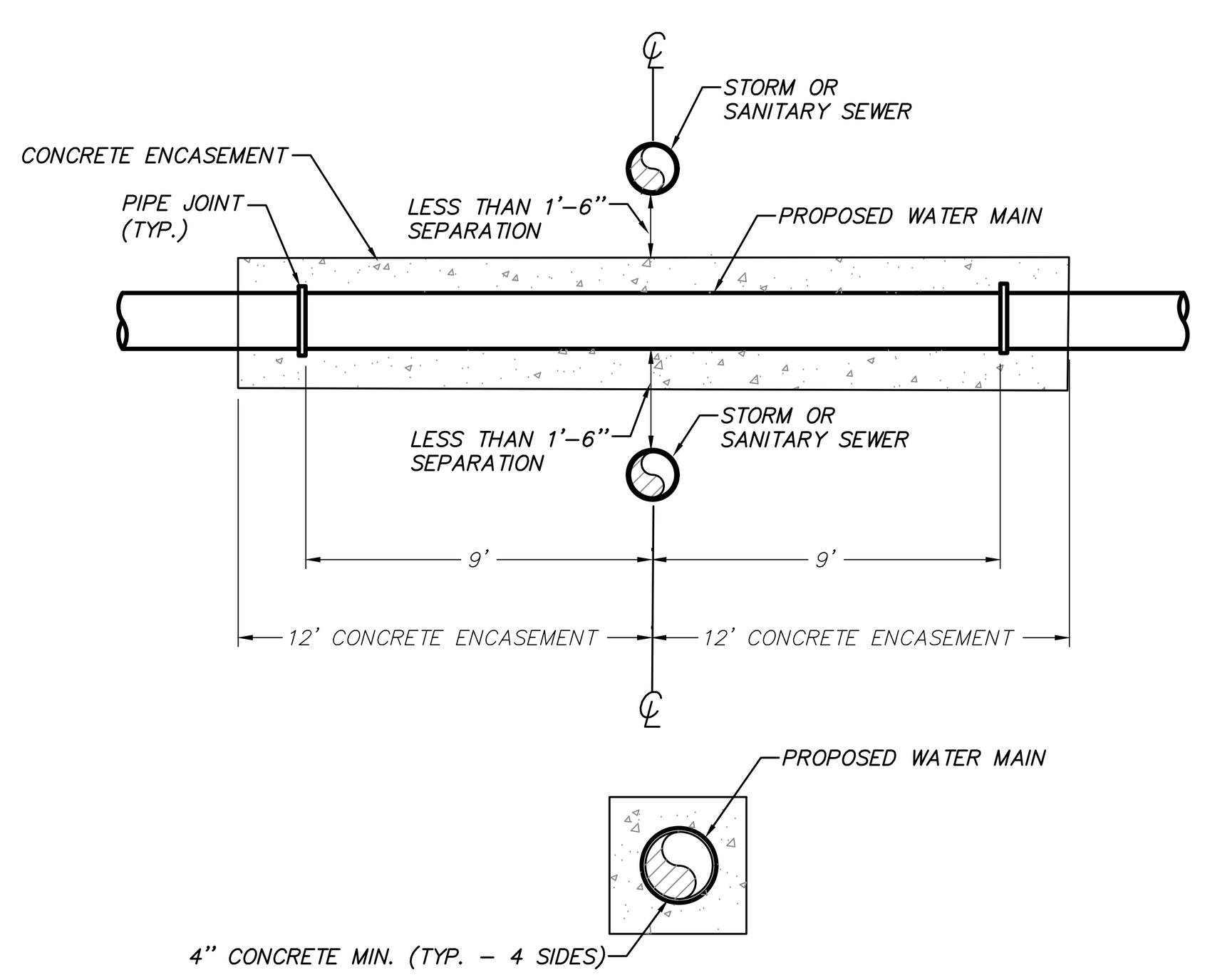
1. The design, construction and installation shall be in accordance with this plan and generally accepted standards in effect at the time of construction which include:
   - "New York State design Standards for Intermediate Sized Wastewater Treatment Systems", NYSDEC
   - "Appendix 75–A Waste Treatment – Individual Household Systems, New York State Sanitary Code."
   - "Recommended Standards for Sewage Treatment Works and Water Works, (Ten States)."
   - "New York State Department of Health and Dutchess County Department of Health policies, procedures and standards."
   - "New York State and Dutchess County Department of Health Sanitary Code."
   - "Dutchess County Environmental Health Services Division Certificate of Approval letter."
2. This plan is approved as meeting the appropriate and applied technical standards, guidelines, policies and procedures for arrangement of sewage disposal and treatment and water supply facilities, and, as a condition of this approval, a construction inspection by a representative of the Dutchess County Health Department shall be done to determine that construction at the time of inspection was completed in general conformance with the approved plans and any amendment thereof.
3. Upon completion of the facilities, the finished works shall be inspected, tested, and certified complete to the DC EHSD by the New York State licensed Professional Engineer supervising construction. No part of the facilities shall be placed into service until accepted by the DC EHSD.
4. Approval of any plan(s) or amendment thereto shall be valid for a period of 5 years from the date of approval. Following the expiration of said approval, the plan(s) shall be re–submitted to the Commissioner of Health for consideration for re–approval. Re–submission or revised submission of plans and/or associated documents shall be subject to compliance with the technical standards, guidelines, polices and procedures in effect at the time of the re–submission.
5. All onsite wastewater treatment system existing or approved within 300 feet of the proposed wells are shown on this plan along with any other environmental hazards in the area that may affect the design and functional ability of the well.
6. All proposed wells and service lines on this plan are accessible for installation and placement.
7. No cellar, footing, floor, garage, cooler or roof drains shall be discharged within 50 feet of any well.
8. All required Erosion & Sediment Control and Stormwater Pollution Prevention Water Quality & Quantity Control structures, permanent and temporary, are shown on the plans.
9. No buildings are to be occupied and the new water system shall not be placed into service, until a "Completed Works Approval" is issued under section 5–1.22(d) of Part 5 of the New York State Sanitary Code (10NYCRR5).
10. The undersigned owners of the property hereon state that they are familiar with this map, its contents and its legends and hereby consent to all said terms and conditions as stated hereon.



THRUST BLOCK SCHEDULE									
PIPE SIZE	CAP/TEE		22 1/2°		45°		90°		W
	L	D	L	D	L	D	L	D	
4"	2'	1.5'	2'	1.5'	2'	1.5'	2'	1.5'	1.5'
6"	2'	1.5'	2'	1.5'	2'	1.5'	2'	1.5'	1.5'
8"	3'	2'	2'	2'	2'	2'	3'	2'	1.5'

THRUST BLOCK DETAILS

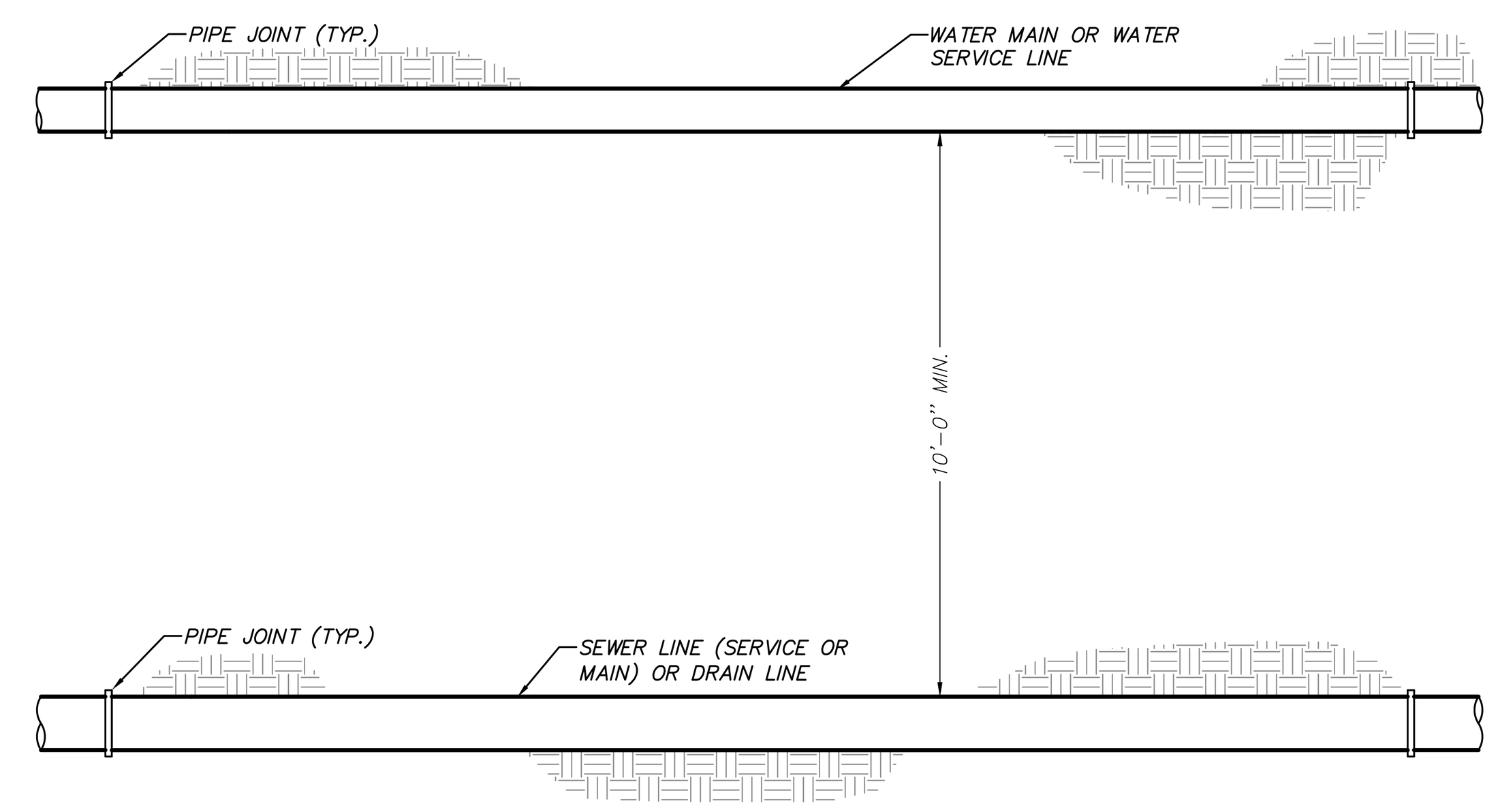
(N.T.S.)



WATER MAIN CONCRETE ENCASEMENT DETAIL

(N.T.S)

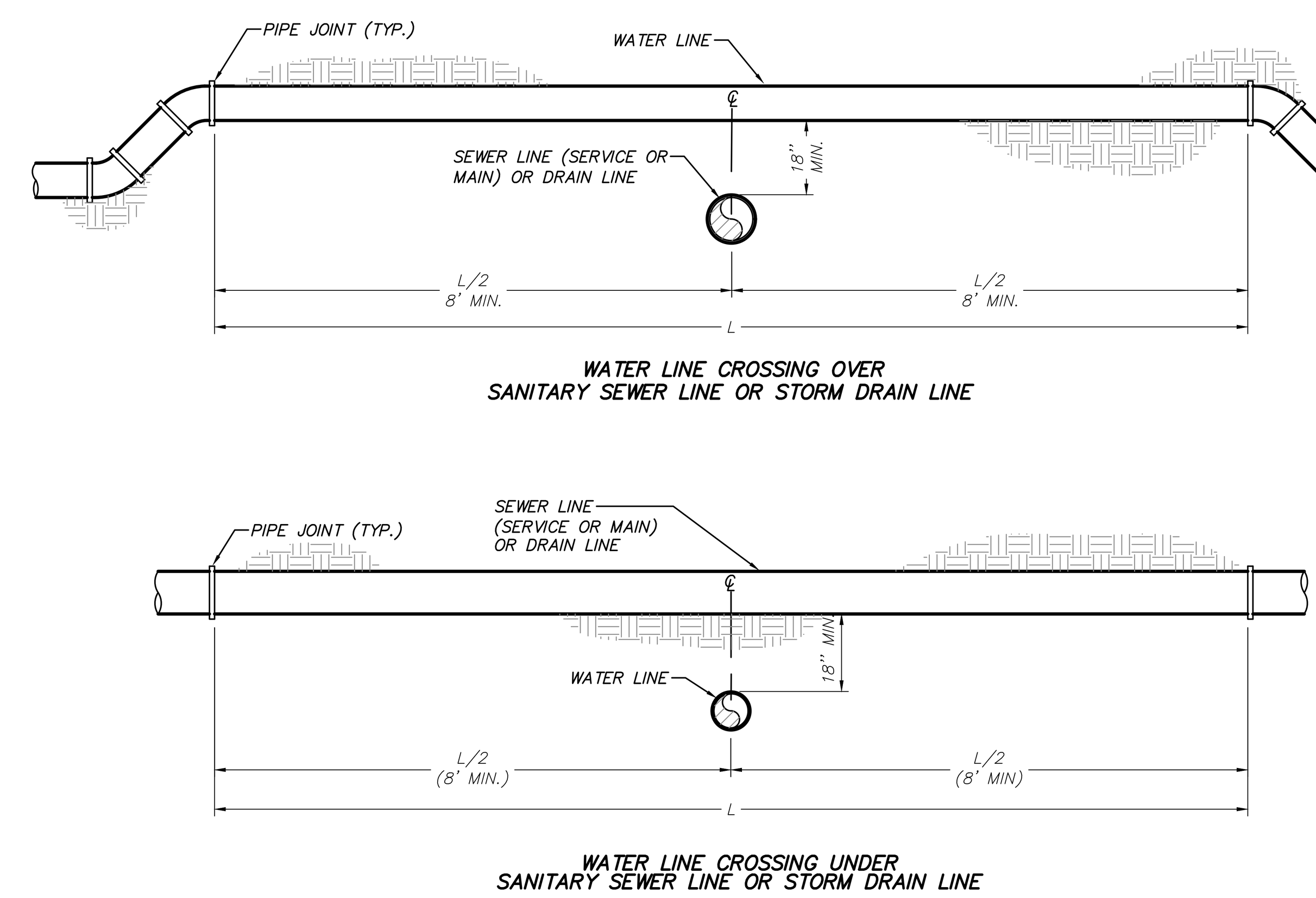
NOTE: CONCRETE ENCASEMENT IS ONLY TO BE USED WHEN 18" MINIMUM SEPARATION IS NOT POSSIBLE. CONCRETE ENCASEMENT REQUIRES PRIOR APPROVAL BY THE DESIGN ENGINEER & THE DEPARTMENT OF HEALTH.



NOTES:
1. WHEN THE 10' SEPARATION CANNOT BE MAINTAINED, THE WATER LINE SHALL BE ENCASED IN CONCRETE (SEE DETAIL) ONLY WITH PRIOR APPROVAL OF THE DESIGN ENGINEER AND DEPARTMENT OF HEALTH.
2. THE 10' SEPARATION APPLIES TO WATER MAINS AND WATER SERVICE CONNECTIONS.

WATER LINE HORIZONTAL SEPARATION DETAIL

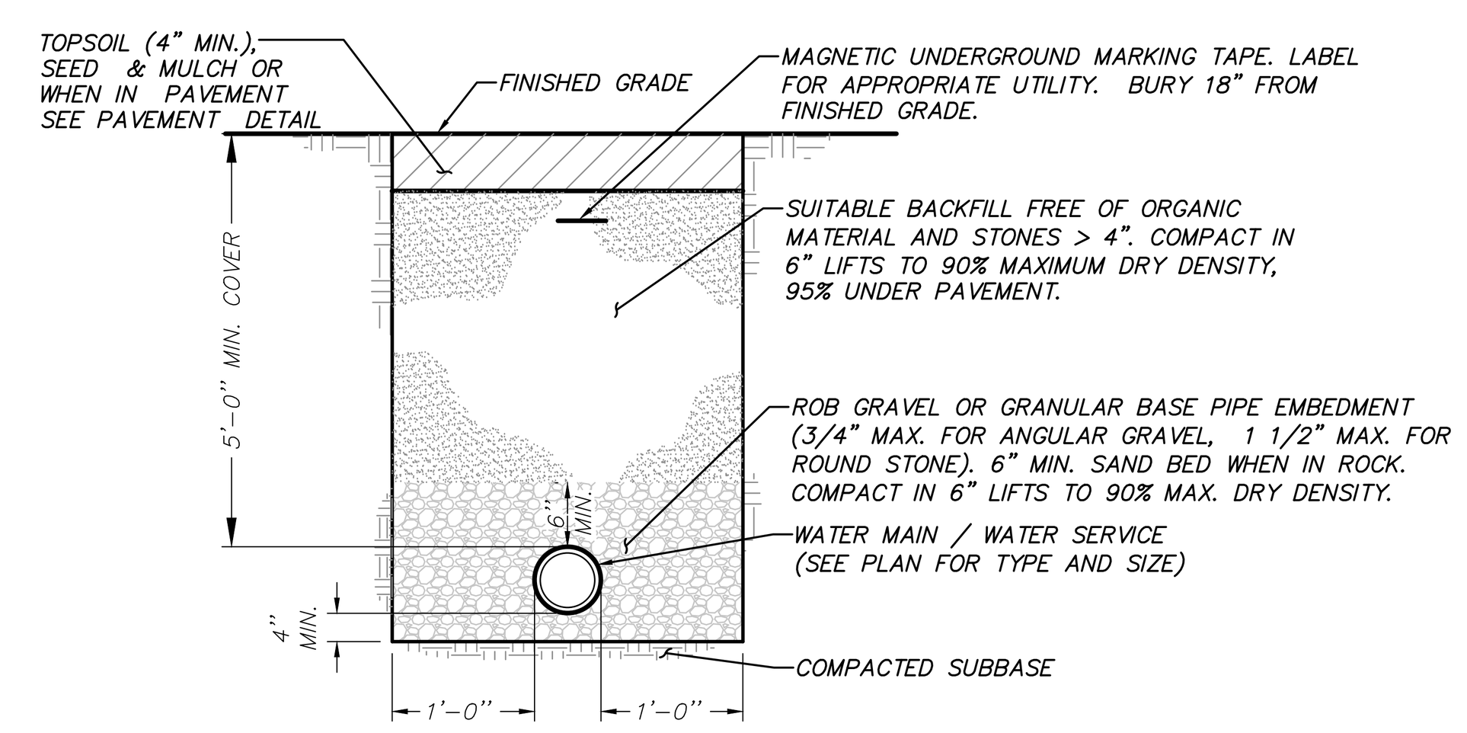
(N.T.S.)



NOTES:
1. WHEN 18" SEPARATION CANNOT BE MAINTAINED, THE WATER LINE SHALL BE ENCASED IN CONCRETE (SEE DETAIL) ONLY WITH PRIOR APPROVAL OF THE DESIGN ENGINEER AND DEPARTMENT OF HEALTH.
2. PROVIDE PIPE AND FITTING RESTRAINT AS REQUIRED.
3. THE 18" SEPARATION APPLIES TO WATER MAINS AND WATER SERVICE CONNECTIONS.

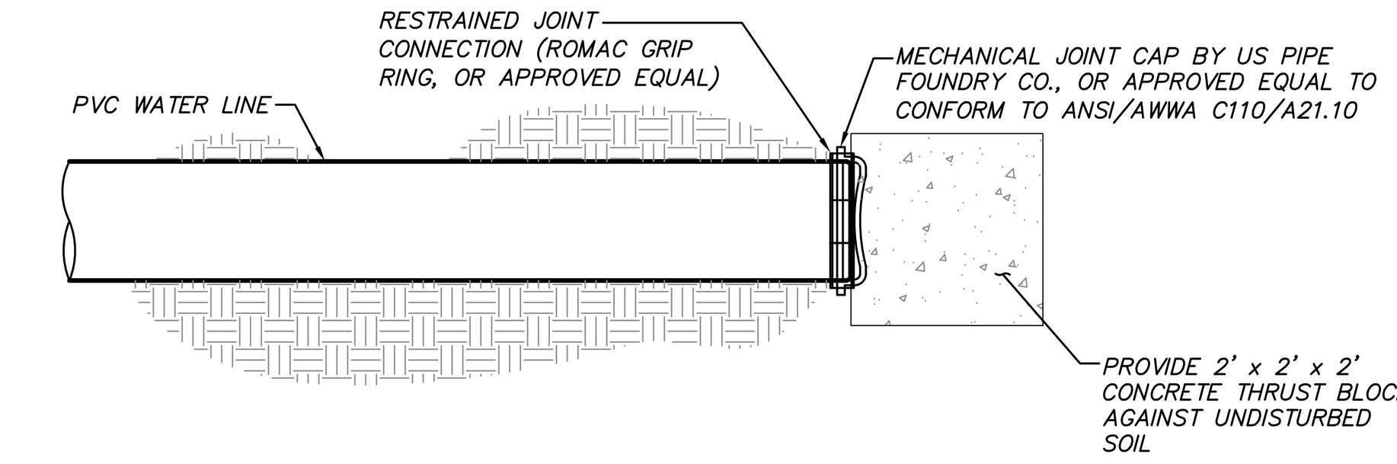
WATER LINE CROSSING DETAIL

(N.T.S.)



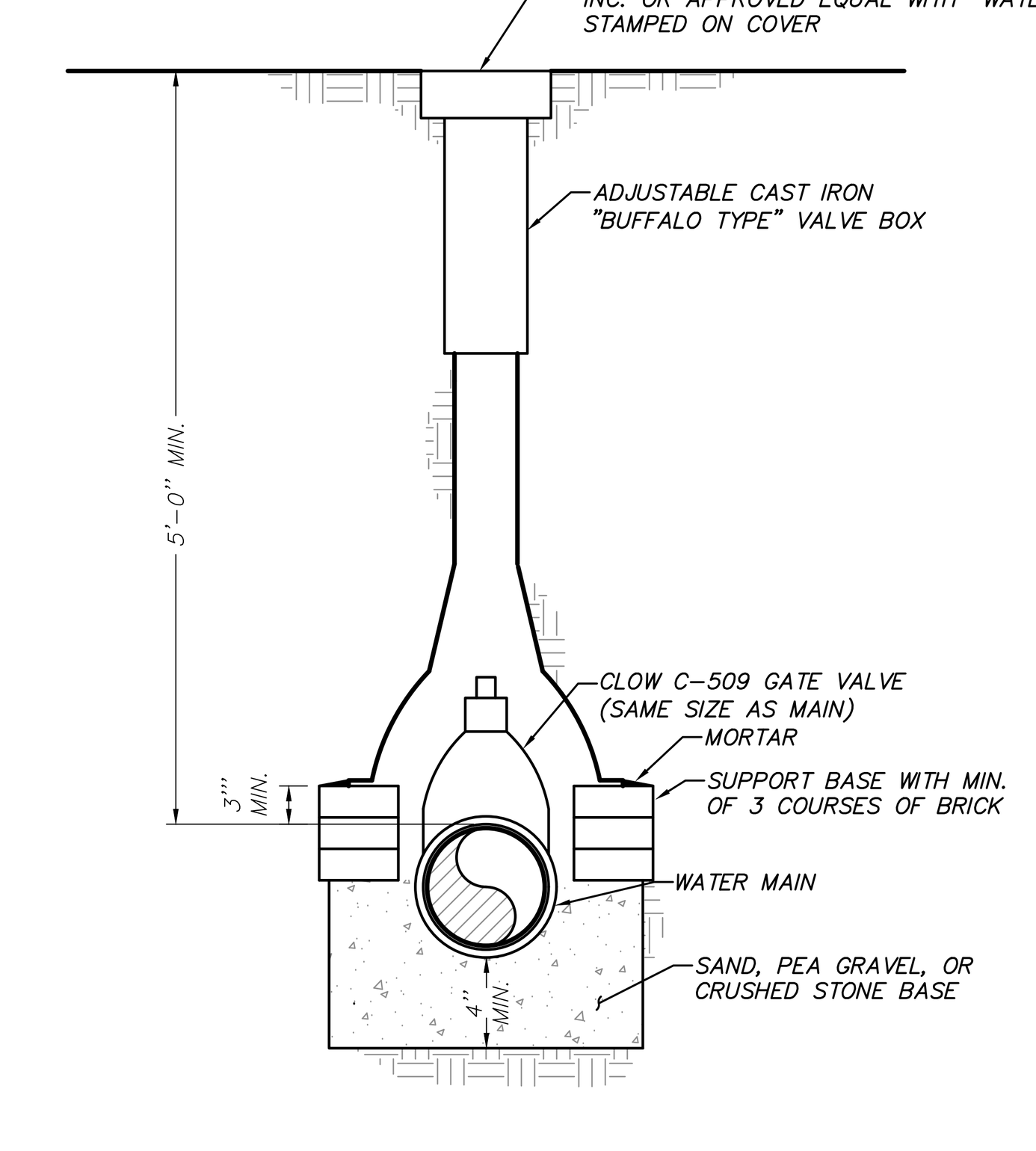
WATER MAIN / WATER SERVICE (GREATER THAN 2") TRENCH DETAIL

(N.T.S)



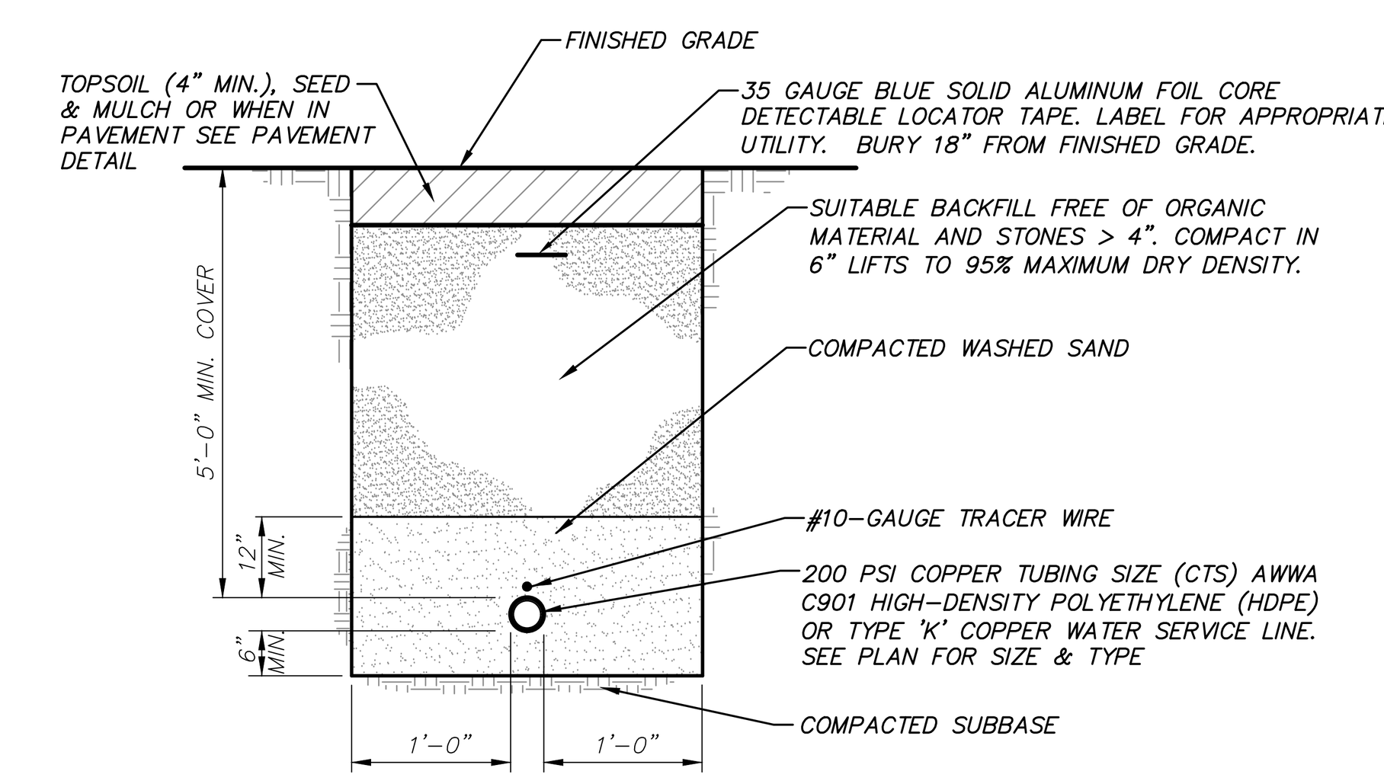
CAPPED END FOR PVC WATERMAIN DETAIL

(N.T.S.)



WATER MAIN GATE VALVE DETAIL

(N.T.S.)



PE WATER SERVICE LINE TRENCH DETAIL

(N.T.S.)

NO.	DATE	REVISION	BY
4	9–13–23	REVISED PER VILLAGE COMMENTS	JWM
3	6–14–23	REVISED PER VILLAGE COMMENTS	SMR
2	5–10–23	REVISED PER VILLAGE COMMENTS	MEU
1	2–1–23	PLANNING BOARD SUBMISSION	DSW

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(845) 225–9690
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PROJECT:
BUCKINGHAM PROPERTY MANAGEMENT
CHANNINGVILLE RD & NELSON AVE, VILLAGE OF WAPPINGERS FALLS, DUTCHESS CO., NY

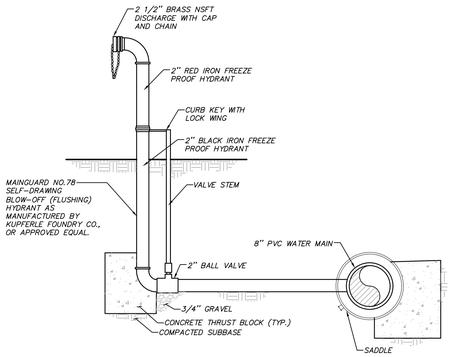
DRAWING:
DETAILS

STATE OF NEW YORK RICHARD D. WILLIAMS JR. 085866 LICENSED PROFESSIONAL ENGINEER

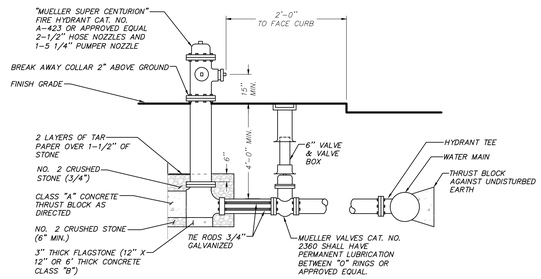
PROJECT NUMBER	22194.100	PROJECT MANAGER	R.D.W.
DATE	12–15–22	DRAWN BY	M.E.U.
SCALE	AS SHOWN	CHECKED BY	E.M.S.

DRAWING NO. D–4

SHEET 13 / 15

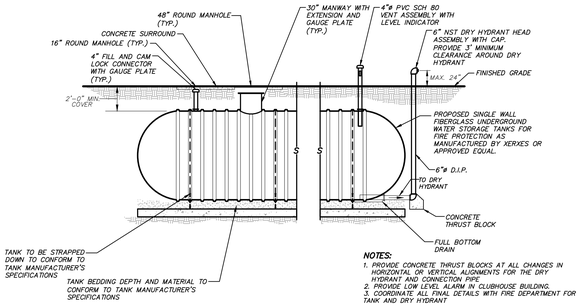


FLUSHING HYDRANT DETAIL
(N.T.S)



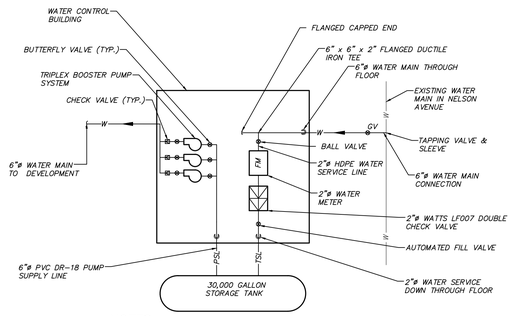
HYDRANT NOTES:
1. PUMPER OUTLET SHALL FACE STREET.
2. HOSE OUTLETS SHALL BE PARALLEL TO STREET.
3. 1-1/2" STONE SHALL BE PLACED AROUND THE HYDRANT FROM THE BOTTOM OF THE TRENCH, BUT AT LEAST 6" BELOW THE BASE OF THE HYDRANT TO 6" ABOVE THE WASTE OPENING AND TO A DISTANCE OF 12" AROUND THE ELBOW.
4. IF GROUND WATER IS ENCOUNTERED WITHIN 7' OF SURFACE, THEN HYDRANT DRAINS SHOULD BE PLUGGED, THE BARRELS MUST BE PUMPED DRY AFTER USE DURING FREEZING WEATHER. WHERE HYDRANT DRAINS ARE NOT PLUGGED, A GRAVEL POCKET OR DRY WELL SHALL BE PROVIDED UNLESS THE NATURAL SOILS WILL PROVIDE ADEQUATE DRAINAGE. HYDRANT DRAINS SHALL NOT BE CONNECTED TO OR LOCATED WITHIN 10 FEET OF SANITARY SEWERS OR STORM DRAINS.

HYDRANT DETAIL
(N.T.S.)



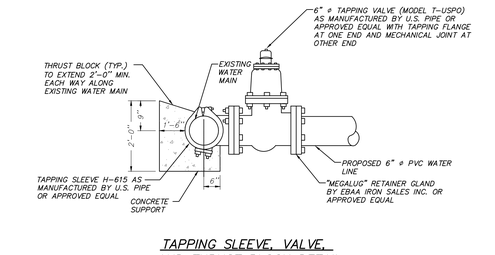
NOTES:
1. PROVIDE CONCRETE THRUST BLOCKS AT ALL CHANGES IN HORIZONTAL OR VERTICAL ALIGNMENTS FOR THE DRY HYDRANT AND CONNECTION PIPE.
2. PROVIDE LOW LEVEL ALARM IN CLUBHOUSE BUILDING.
3. COORDINATE ALL FINAL DETAILS WITH FIRE DEPARTMENT FOR TANK AND DRY HYDRANT

FIRE PROTECTION STORAGE TANK DETAIL
(N.T.S.)

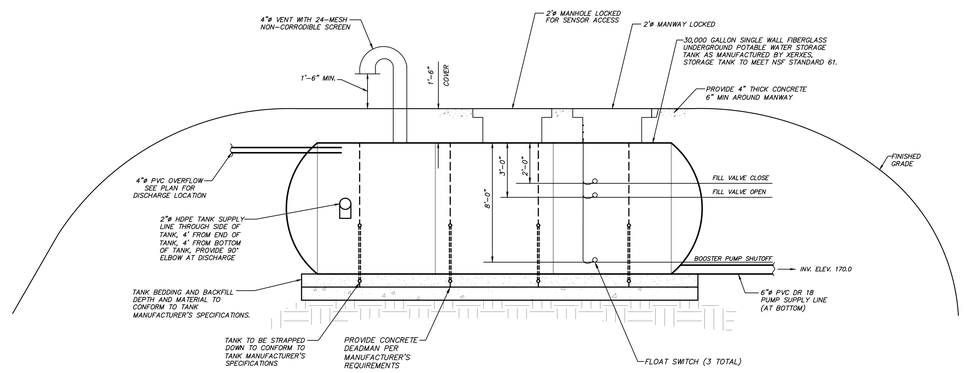


NOTES:
1. AUTOMATED FILL VALVE TO BE CONTROLLED BY TANK WATER LEVELS & FLOW SWITCHES IN TANK.
2. FIRE PROTECTION SYSTEM DESIGNED BY OTHERS TO BE SEPARATE FROM POTABLE WATER SYSTEM AND INCLUDE STORAGE TANKS, BOOSTER PUMPS, AND DISTRIBUTION PIPING TO THE PROPOSED BUILDINGS.
3. AFTER THE FIRE WATER STORAGE TANKS HAVE BEEN INSTALLED AND INITIALLY FILLED, ANY MAKEUP WATER REQUIRED TO MAINTAIN WATER LEVEL IN THE TANKS DUE TO EVAPORATION SHALL BE SUPPLIED BY THE SERVICE LINE CONNECTION FROM THE DOMESTIC WATER SYSTEM. AN APPROVED BACKFLOW PREVENTION DEVICE WILL BE PROVIDED FOR CONNECTION BETWEEN POTABLE WATER & FIRE SYSTEM.

POTABLE WATER SYSTEM FLOW SCHEMATIC
(N.T.S.)

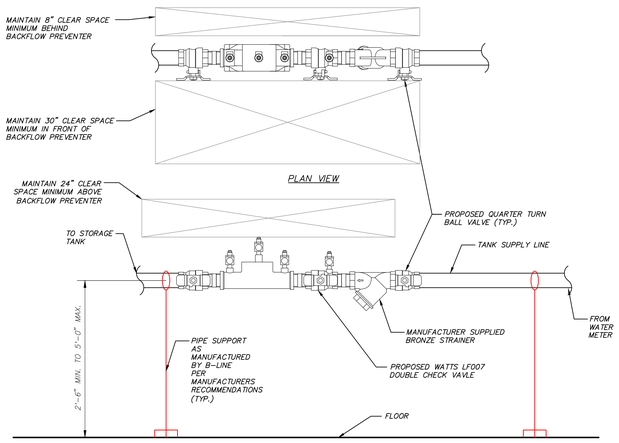


TAPPING SLEEVE, VALVE, AND THRUST BLOCK DETAIL
(N.T.S.)

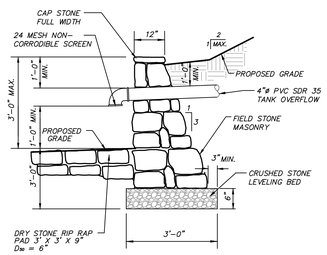


NOTES:
1. STORAGE TANK TO BE DISINFECTED PER AWWA C652 LATEST EDITION.
2. PROVIDE FLEXIBLE CONNECTION AT ALL PIPE CONNECTIONS PER MANUFACTURER'S REQUIREMENTS.

POTABLE WATER STORAGE TANK DETAIL
(NTS)



DOUBLE CHECK VALVE DEVICE DETAIL
(N.T.S.)



WATER STORAGE TANK OVERFLOW SPLASH PAD DETAIL
(N.T.S.)

NO.	DATE	REVISION	BY
4	9-13-23	REVISED PER VILLAGE COMMENTS	JWM
3	6-14-23	REVISED PER VILLAGE COMMENTS	SMR
2	5-10-23	REVISED PER VILLAGE COMMENTS	MEU
1	2-1-23	PLANNING BOARD SUBMISSION	DSW

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www.insite-eng.com

PROJECT:
BUCKINGHAM PROPERTY MANAGEMENT
CHANNINGVILLE RD & NELSON AVE, VILLAGE OF WAPPINGERS FALLS, DUTCHESS CO., NY

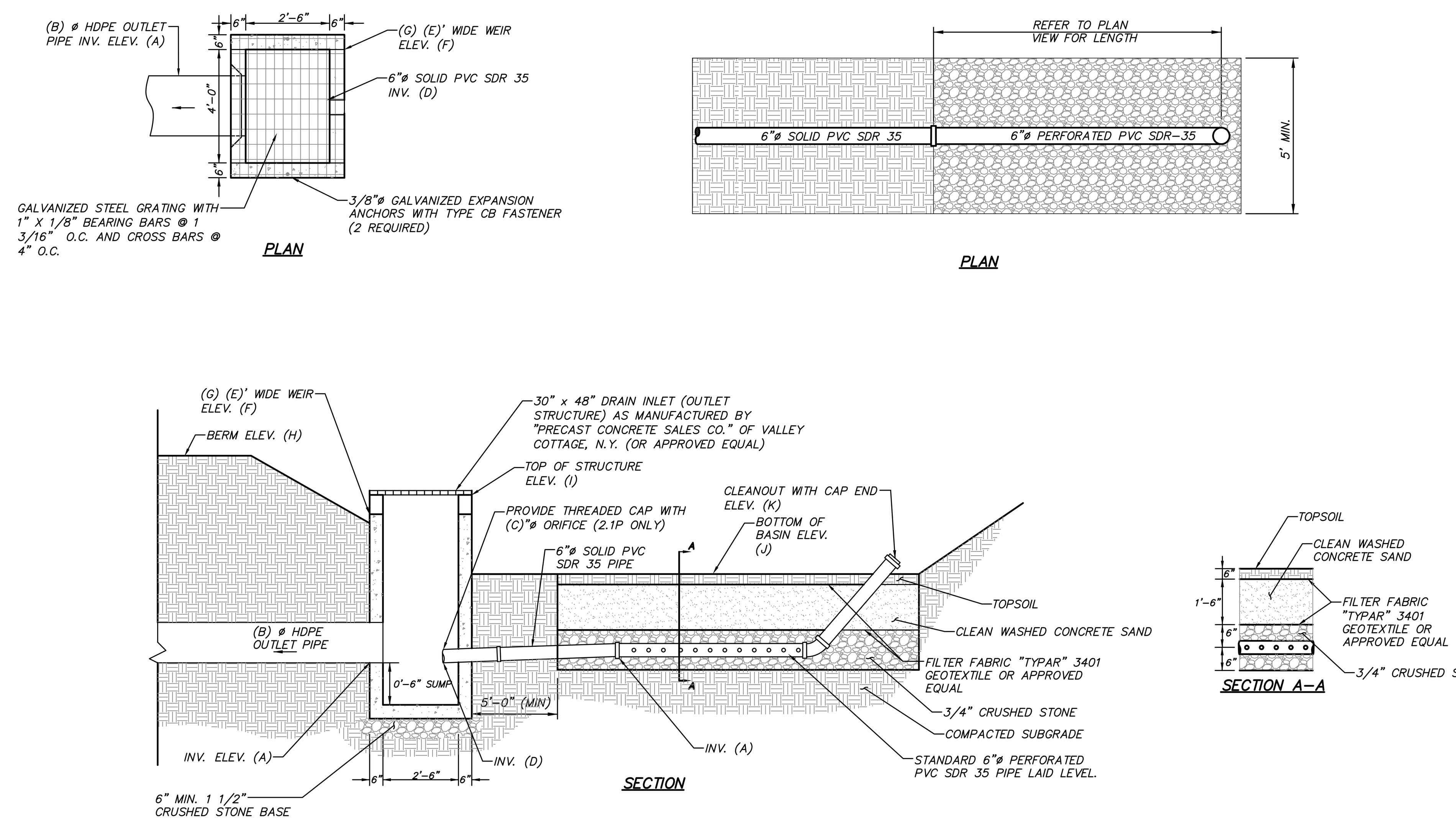
DRAWING:
DETAILS

STATE OF NEW YORK — RICHARD D. WILLIAMS JR. — 095866 — PROFESSIONAL ENGINEER

PROJECT NUMBER	22194.100	PROJECT MANAGER	R.D.W.	DRAWING NO.	SHEET
DATE	12-15-22	DRAWN BY	M.E.U.	D-5	14 / 15
SCALE	AS SHOWN	CHECKED BY	E.M.S.		

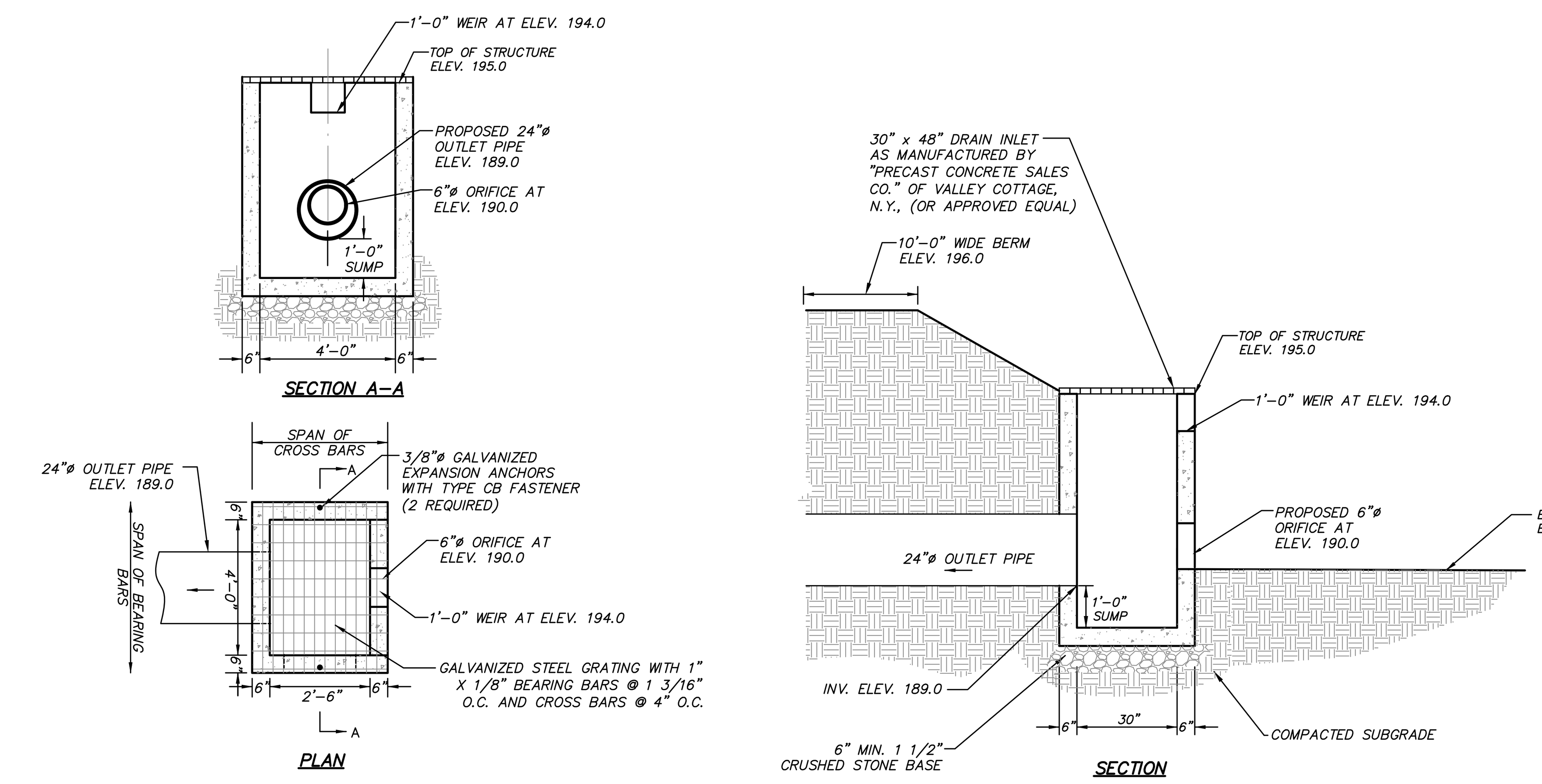
ALTERATION OF THIS DOCUMENT, UNLESS UNDER THE DIRECTION OF A LICENSED PROFESSIONAL ENGINEER, IS A VIOLATION OF SECTION 7209 OF ARTICLE 145 OF THE EDUCATION LAW.

Z:\E\22194100 Buckingham Wappinger\103 1-4.dwg, 9/12/2023 10:21:55 AM, plotdetail, 1:1

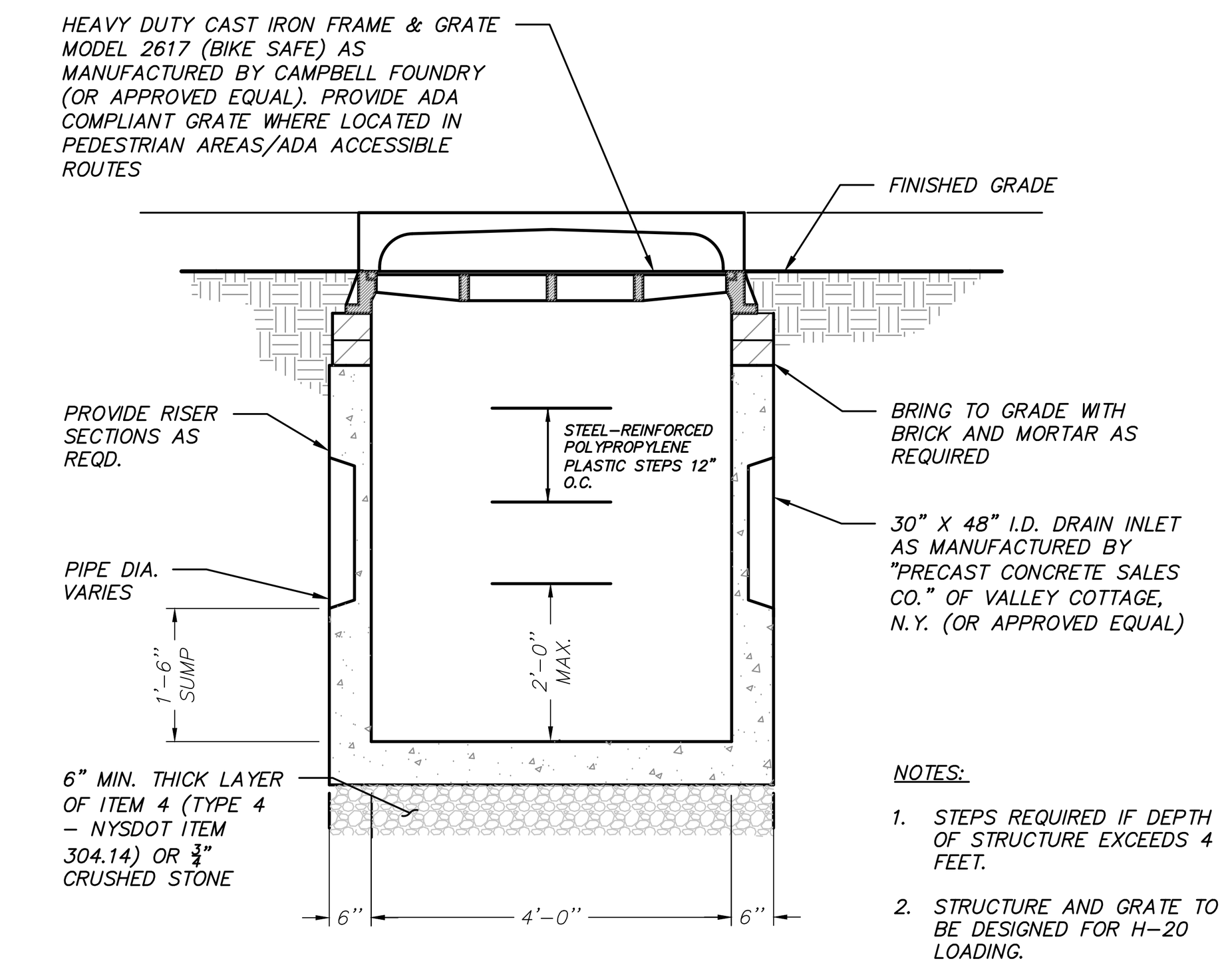


STORMWATER MANAGMENT PRACTICE	OUTLET PIPE ELEVATION (A)	OUTLET PIPE DIAMETER Ø" (B)	LOW FLOW ORIFICE DIAMETER Ø" (C)	LOW FLOW INVERT ELEV. (D)	WIER LENGTH (ft.) (E)	WIER ELEVATION (F)	NUMBER OF WEIRS REQUIRED (G)	TOP OF BERM ELEVATION (H)	TOP OF OUTLET STRUCTURE ELEVATION (I)	BOTTOM OF BASIN ELEVATION (J)	CLEANOUT ELEVATION (K)
1.4P	191.0	12"	–	191.0	0.6	196.5	1	199.0	198.0	194.0	194.5
2.1P	170.0	12"	3.0	170.0	0.5	174.0	1	176.0	175.0	173.0	173.5

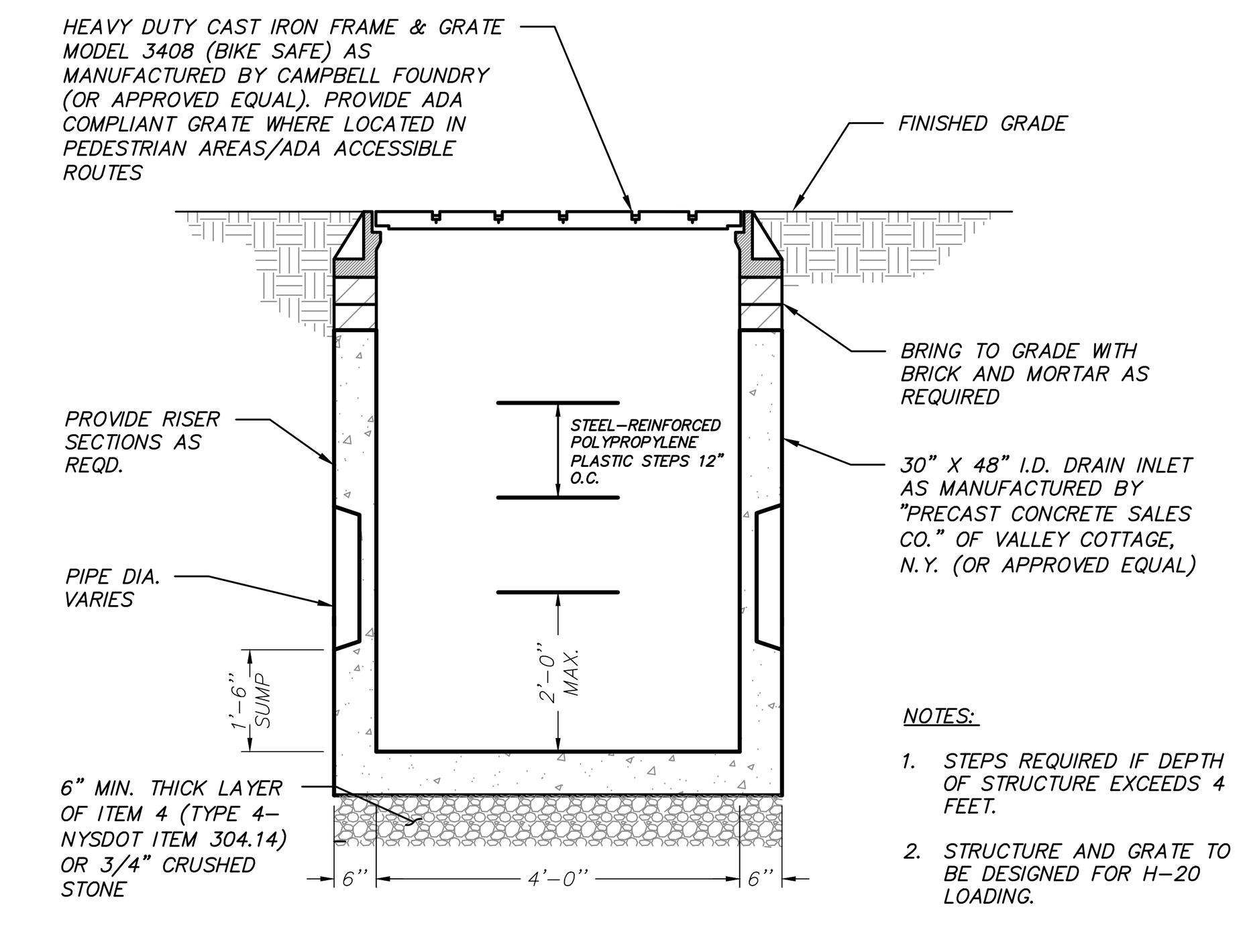
SURFACE SAND FILTER (NYSDEC DESIGN F-1) OUTLET STRUCTURE DETAIL
(N.T.S.)



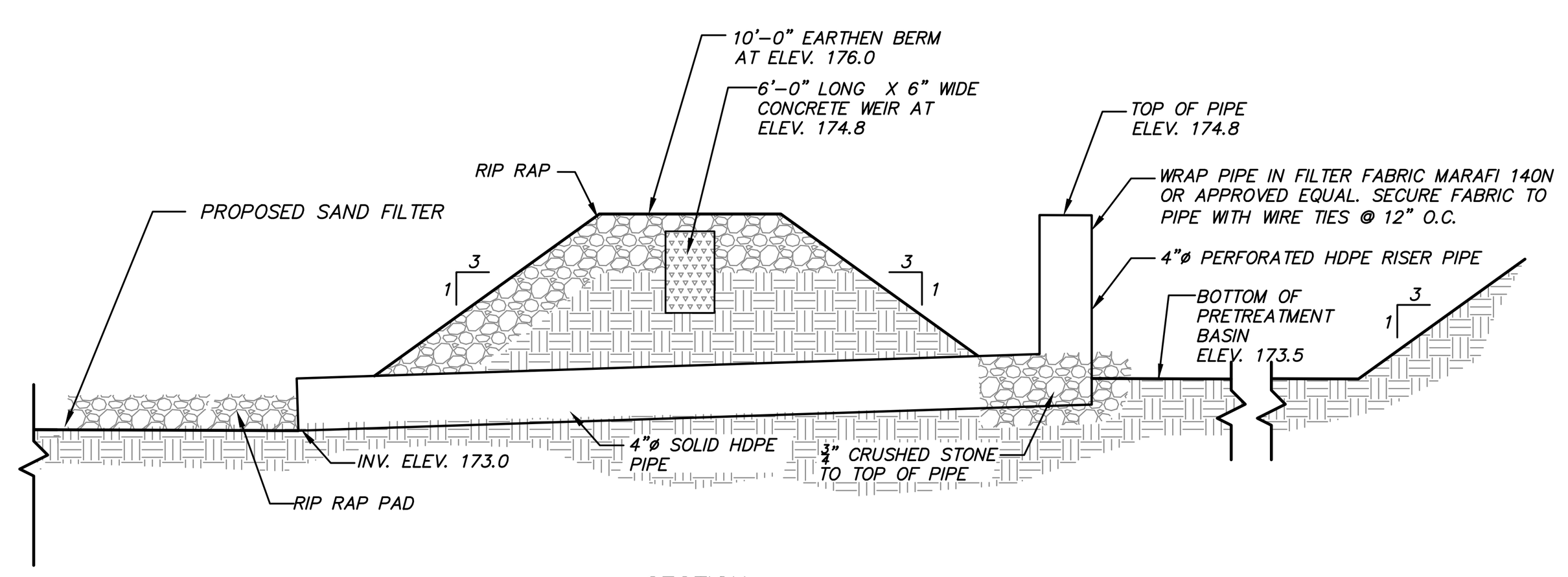
DRY DETENTION BASIN OUTLET STRUCTURE (OS 1.3) DETAIL
(N.T.S.)



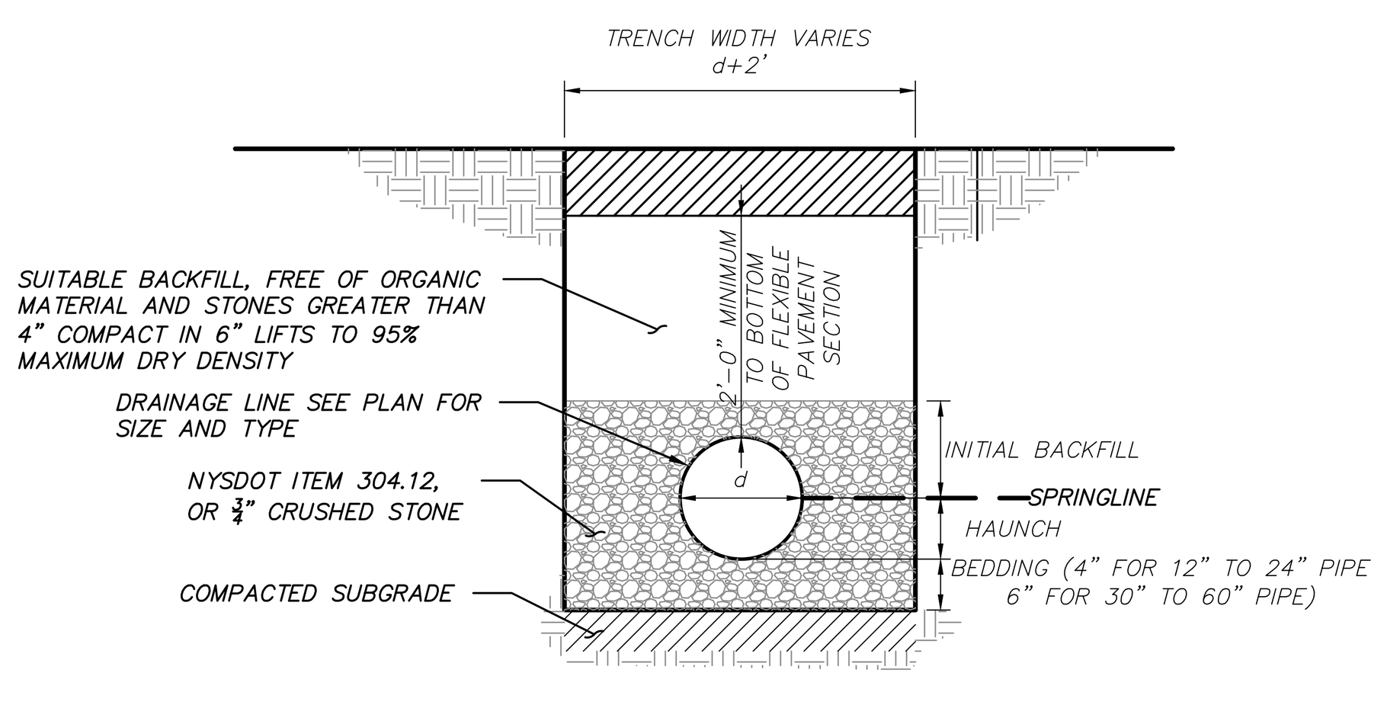
30" X 48" CATCH BASIN DETAIL
(N.T.S.)



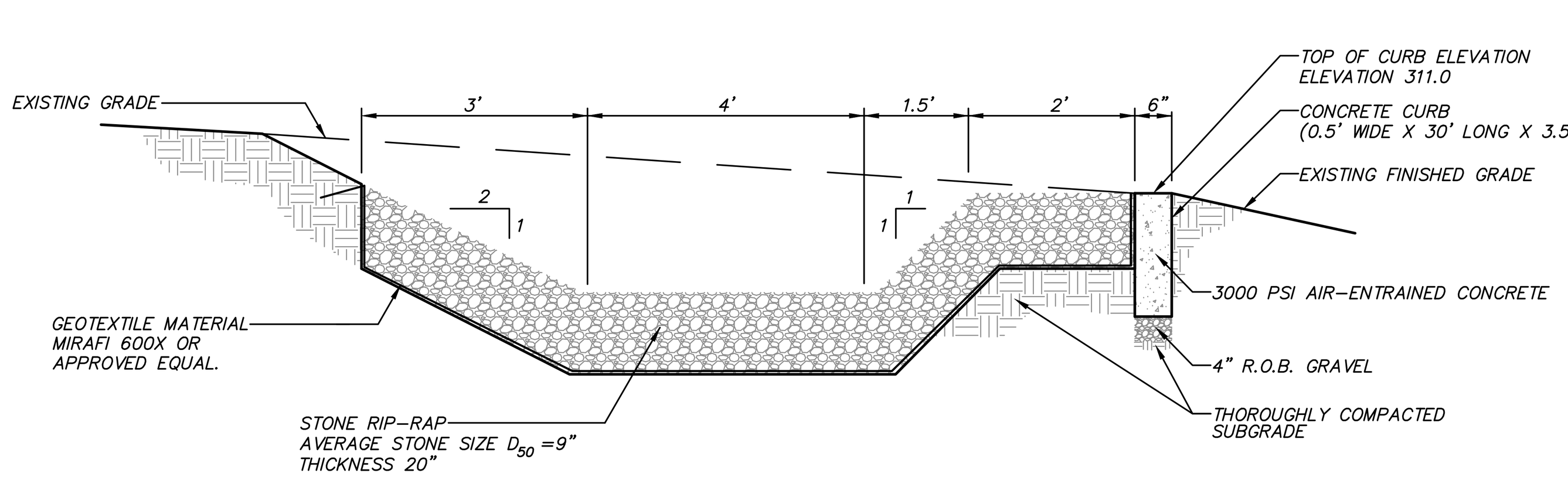
30" X 48" DRAIN INLET DETAIL
(N.T.S.)



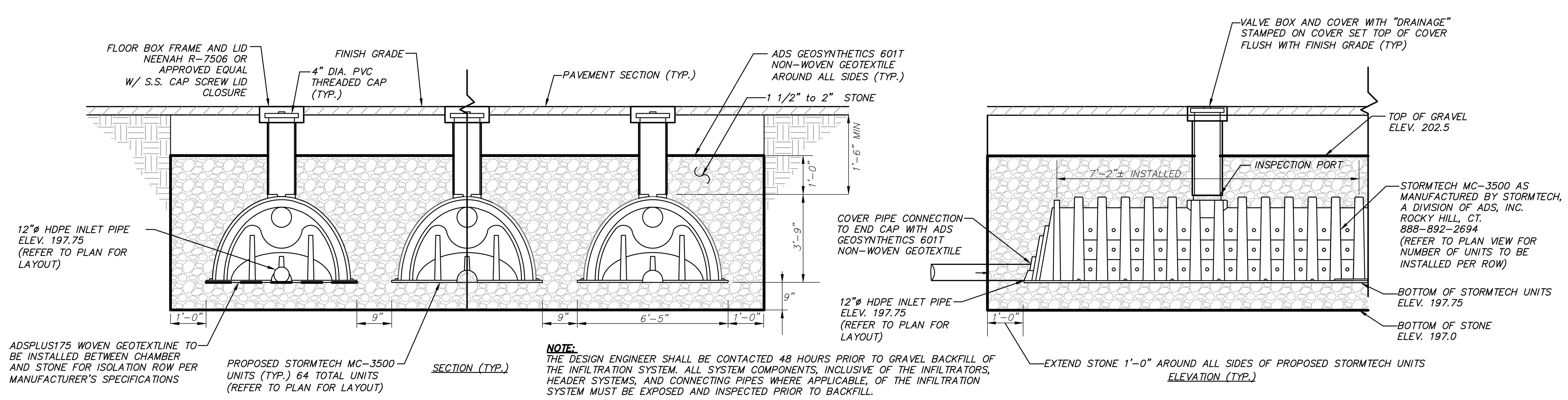
PRETREATMENT BASIN DETAIL
(N.T.S.)



DRAINAGE LINE TRENCH DETAIL
(N.T.S.)

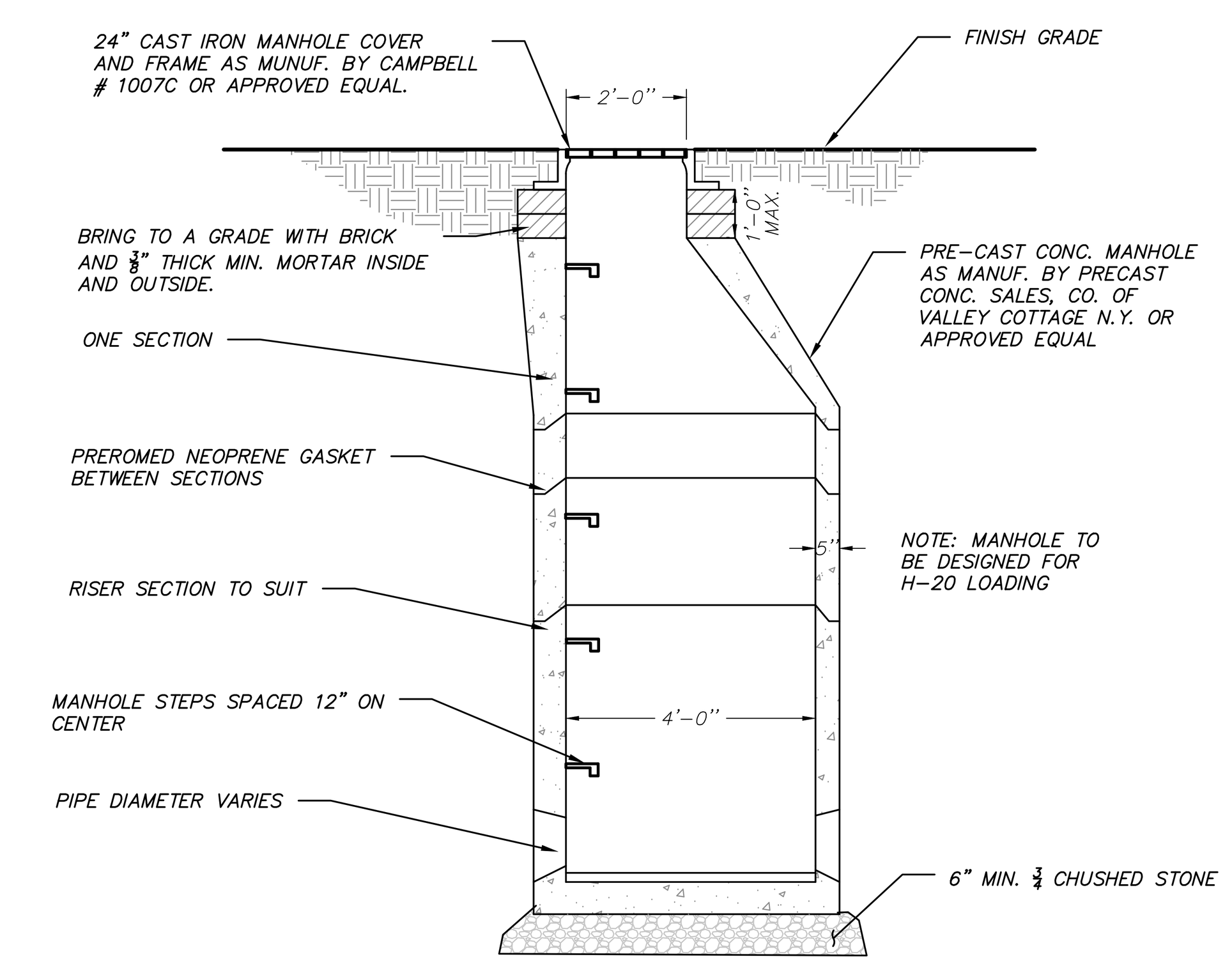


LEVEL SPREADER WITH LEVEL CONCRETE CURB AT OVERFLOW DETAIL
(N.T.S.)

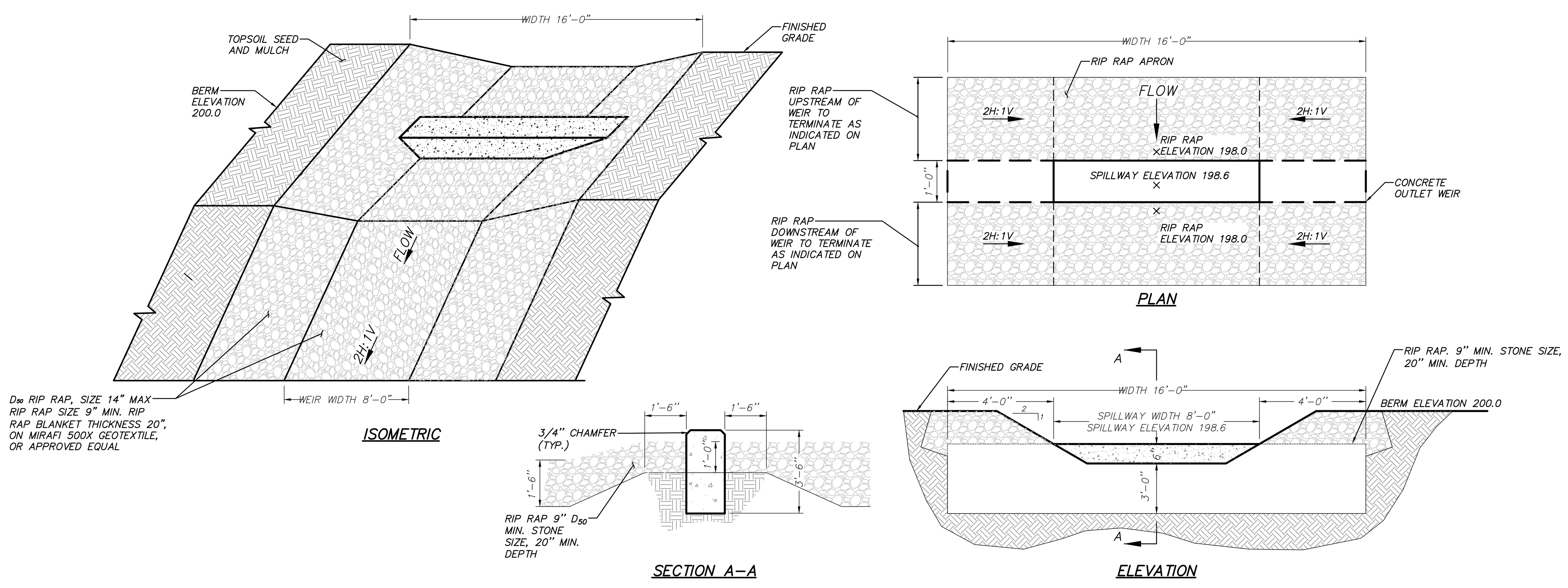


NOTE:
THE DESIGN ENGINEER SHALL BE CONTACTED 48 HOURS PRIOR TO GRAVEL BACKFILL OF THE INFILTRATION SYSTEM. ALL SYSTEM COMPONENTS, INCLUSIVE OF THE INFILTRATORS, HEADER SYSTEMS, AND CONNECTING PIPES WHERE APPLICABLE, OF THE INFILTRATION SYSTEM MUST BE EXPOSED AND INSPECTED PRIOR TO BACKFILL.

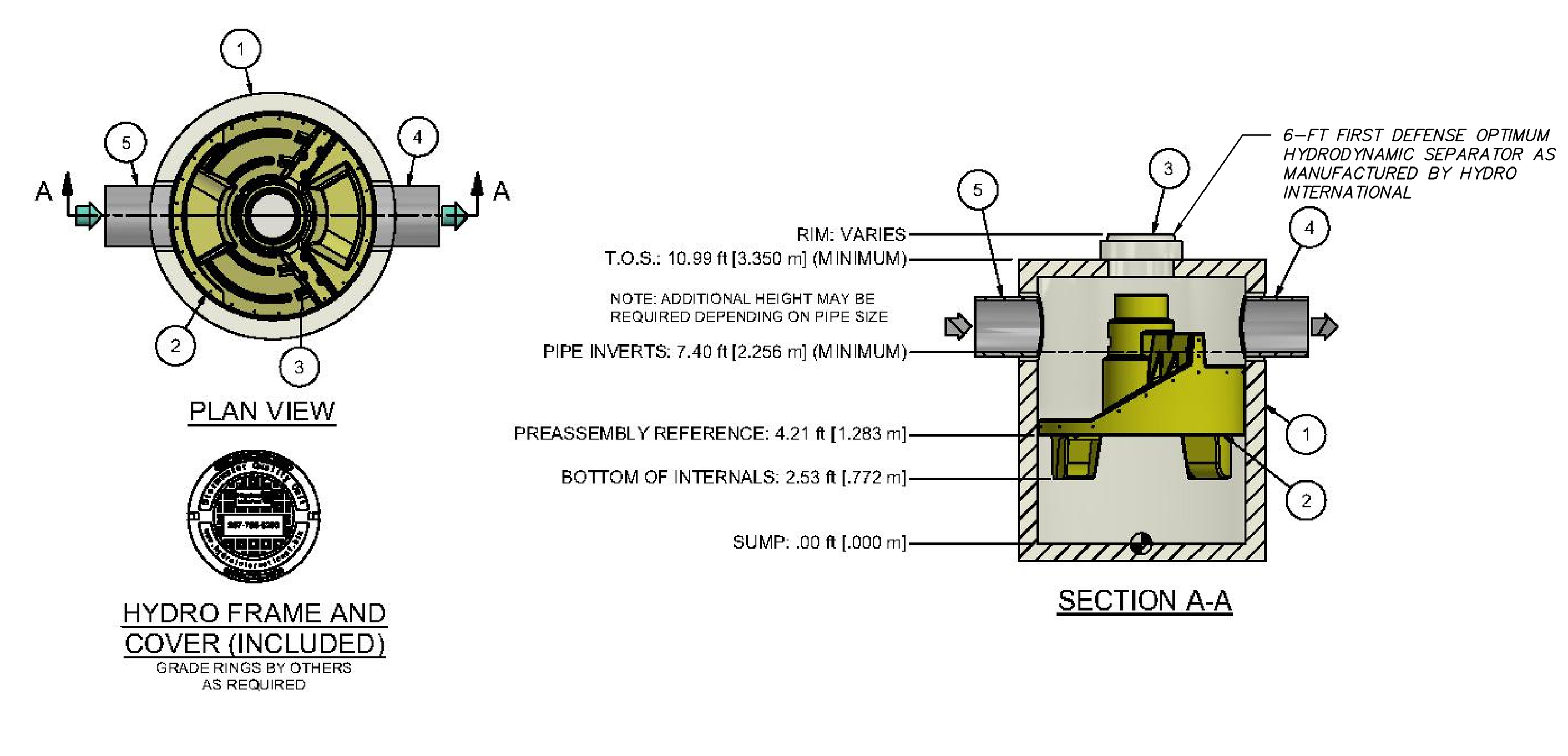
SUBSURFACE INFILTRATION SYSTEM (1.1P) DETAIL
(N.T.S.)



DRAINAGE MANHOLE DETAIL
(N.T.S.)



INFILTRATION BASIN (1.2P) CONCRETE OUTLET WEIR DETAIL
(N.T.S.)



HYDRODYNAMIC SEPARATOR DETAIL
(N.T.S.)

ALTERATION OF THIS DOCUMENT, UNLESS UNDER THE DIRECTION OF A LICENSED PROFESSIONAL ENGINEER, IS A VIOLATION OF SECTION 7209 OF ARTICLE 145 OF THE EDUCATION LAW.

NO.	DATE	REVISION	BY
3	9-13-23	REVISED PER VILLAGE COMMENTS	JWM
2	6-14-23	REVISED PER VILLAGE COMMENTS	SMR
1	5-10-23	REVISED PER VILLAGE COMMENTS	MEU

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PROJECT:
BUCKINGHAM PROPERTY MANAGEMENT
CHANNINGVILLE RD & NELSON AVE, VILLAGE OF WAPPINGERS FALLS, DUTCHESS CO., NY

DRAWING:
DETAILS

STATE OF NEW YORK · RICHARD D. WILLIAMS JR. · 085866 · LICENSED PROFESSIONAL ENGINEER

PROJECT NUMBER	22194.100	PROJECT MANAGER	R.D.W.
DATE	2-1-23	DRAWN BY	M.E.U.
SCALE	AS SHOWN	CHECKED BY	E.M.S.

DRAWING NO. D-6

SHEET 15 / 15

INSITE
ENGINEERING, SURVEYING &
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September 13, 2023

Chairman Thomas Morris
Village of Wappingers Falls Planning Board
2582 South Avenue
Wappingers Falls, New York 12590

RE: Buckingham Properties
Nelson Avenue
Tax Map No. 134601-6158-13-071325

Dear Chairman Morris and Members of the Board:

Enclosed please find the following:

- Project Plans (15 sheets) last revised September 13, 2023 (5 copies).
- Stormwater Pollution Prevention Plan (SWPPP) dated September 13, 2023 (3 copies).

Since previously presented before your Board, and reviewing the Part 2 of the EAF, the project drawings have been revised to provide additional detail with respect to lighting. In addition, the Stormwater Pollution Prevention Plan (SWPPP) has been updated to account for the recently completed witnessed testing.

As we have discussed we believe our next step in the process is to focus on those issues which are SEQRA related so that the Planning Board can proceed towards the issuance of what the applicant believes should be a Negative Declaration. We acknowledge that following a SEQRA determination there is still a site plan review process through which many of the detailed technical comments can be addressed.

Consistent with our previous submission we have provided a comprehensive list of all the outstanding comments (from the latest comment letters / memorandums) and their status.

With respect to the July 5, 2023, comment letter from Michele R. Greig AICP, we offer the following:

1. It is understood that the Planning Board will serve as Lead Agency.
2. We believe there are no outstanding comments relating to the visual analysis following its previous presentation to the Planning Board.
3. The woodland trail to Channingville Road is proposed as a natural connection to the nearby Greenway Trail trailhead. The trail will use the area disturbed for sewer installation to minimize disturbance. It is intended that bicycles will use the main driveway, rather than this path, to travel to the Village and train station. The intent of this plan is to minimize disturbance along Channingville Road and preserve its wooded characteristics as contemplated in the Draft Master Plan.
4. The applicant has agreed to install the sidewalk extension along Nelson Avenue to provide a pedestrian connection to the Village as part of their recreation fee. As indicated

by the project attorney the agreement to construct this sidewalk is based on their being sufficient right-of-way to construct the sidewalk as well the cost to be factored into the recreation fee ultimately required. The extents of the sidewalk have been shown on Drawing OP-1 and included in the limits of disturbance on Drawing SP-4.

5. Parking:

   a. The applicant will submit a legal agreement regarding the land banked parking as part of the detailed site plan review process.

   b. A note has been added to Drawing SP-1 that a 220-volt outlet for electric vehicle charging stations will be provided in the garage of each townhouse.

   c. The applicant will add electric vehicle charging stations at the outset of the project and provide wiring throughout the parking areas for additional stations in the future. As it is an evolving technology, the selection of the chargers will be made at time of construction for general compatibility with different electric vehicle car types. An electric vehicle charging station has been shown for each apartment building on Drawing SP-1.

   d. Sheltered bicycle parking has been provided near the driveway, where bicycles will access Nelson Avenue. It is anticipated that occupants could store their bike in their apartment. Indoor storage is also proposed for Building A.

6. Landscaping:

   a. The Schematic Plant List will be updated as part of the detailed site plan review process to include specific quantities and specific locations for site plan approval. Species and quantities of planting used for perimeter screening have been illustrated on Drawing SP-1.

   b. Drawing SP-1 has been updated to show a denser planting of evergreen trees and shrubs to screen the proposed development from the Scenic Hudson property. It is requested that the detailed landscape plan be reviewed during the detailed site plan approval process.

   c. The Limits of Disturbance has been moved closer to Building B to maintain more of the existing tree line between Building B and Channingville Road. Additional evergreen trees have been added to enhance the proposed plantings in this area.

   d. Future landscaping has been added to the central green area and will screen areas where land banked parking may be constructed in the future. It is understood that the Planning Board will discuss whether the additional landscaping proposed in the central green should be installed now or when the landbanked parking is constructed. The applicant would prefer to install the landscaping in the future to maximize available green space now. As this is internal to the site, we are happy to coordinate this detail during the detailed site plan review process.

7. Lighting:

   a. The building lighting fixtures shown on the architectural renderings have been included for the apartment building entrances and the town home entrance and garage. Please note that the balcony lighting is not shown on the overall lighting plan as these will be low wattage fixtures and are not anticipated to generate significant light at ground level.

b. Manufacturers cut sheets of all proposed lighting fixtures showing BUG rating and color temperature are provided on the lighting plan.

8. Additional lighting details will be provided for the project sign as part of the SEQRA review.

9. The applicant has discussed pickup with the School District to determine the best location for a bus shelter. The school has indicated that pickup will be at the intersection of the project entrance with a public street. The bus shelter is located adjacent to Nelson Avenue.

10. We would request the details pertaining to the color and materials of the refuse enclosure be included in a future submission during the detailed site plan approval process.

11. An ADA space for the clubhouse has been provided on the drawings.

12. It is acknowledged that the Code Enforcement Officer (CEO) should review the floor plans to ensure the apartments meet the required minimum size in the definition of "dwelling unit" in § 151-61 of the Zoning Law. It is noted the June memorandum from the CEO did not raise a comment with respect to the size of the apartments. While we believe we are compliant with the code we will confirm this with the CEO.

13. A playground has been added to the central green. We request the specific playground be selected as part of the detailed site plan approval process.

14. Per discussions with the Village, the need for a theoretical subdivision will be determined when the new Zoning Code is enacted. The new Zoning Code as proposed eliminates this requirement.

15. Emergency access:

    a. Correspondence from Fire Chief Enson regarding the acceptance of the emergency access connection was forwarded to Planning.

    b. It is understood that an amended site plan for the Oak Tree Gardens property may be required for the proposed emergency access through Oak Tree Gardens.

16. The applicant has submitted updated project information on the limits of disturbance to the State Historic Preservation Office and is awaiting a response.

17. Responses to the Dutchess County Department of Planning and Development memo have been provided below.

18. It is our understanding that the project will appear on October 5th for the public hearing.

19. It is understood that notice of the public hearing was sent to the Clerk of the Town of Poughkeepsie on June 26, 2023.

In regards to the July 3, 2023 comment memo from Todd Atkinson, PE, we offer the following:

1. Sizing information regarding the domestic potable water storage tank and piping has been provided in the Water Engineer's Report. Health Department requirements for a project served by a well typically require a storage tank equivalent to the average daily flow. The domestic storage tank is sized based on the maximum daily flow as calculated in the report. Separate tanks totaling 120,000 gallons are proposed for fire water storage. These are sized so 1,000 gpm is available for 120 minutes.

2. A profile of the proposed potable water main will be provided in a future submission as part of the detailed site plan review process.

3. A detailed design of the proposed potable water control building and booster pump system will be provided in a future submission as part of the detailed site plan review process. The proposed components and sizes for the booster pumps are provided on the Potable Water System Flow Schematic on Drawing D-5.

4. Sizing information regarding the domestic potable water storage tank and piping has been provided in the Water Engineer's Report. Health Department requirements for a project served by a well typically require a storage tank equivalent to the average daily flow. The domestic storage tank is sized based on the maximum daily flow as calculated in the report. Separate tanks totaling 120,000 gallons are proposed for fire water storage. These are sized so 1,000 gpm is available for 120 minutes.

5. Based on our appearance before the Water Board, it is our understanding that the connection to the Village water system is the preferred option of the Water Board. The water system design provided herein demonstrates that with the proposed Village improvements to the existing wells and treatment building adequate flow and pressure will be available to serve the project. It is further acknowledged that the project cannot connect to the water system until the Village completes the improvements.

6. It is acknowledged that coordination with the owner of the manhole at the point of connection is required. The project was discussed with the Tri-Municipal Commission at the June 8, 2023 Board meeting.

7. A profile of the proposed sewer main will be provided in a future submission as part of the detailed site plan review process.

8. It is understood that the connection to the sewer in Channingville Road is the preferred connection by the Village Engineer. It is understood that additional study of the existing Village system would be required to connect to the Village sewer main in Nelson Ave.

9. The applicant will add electric vehicle charging stations at the outset of the project and provide wiring throughout the parking areas for additional stations in the future. As it is an evolving technology, the selection of the chargers will be made at time of construction for general compatibility with different electric vehicle car types. Proposed conduits to facilitate future electric vehicle charging stations have been shown on Drawing SP-3. Charging station locations have been shown on Drawing SP-1.

10. 220 Volt electric outlets will be provided in each townhouse garage to allow for charging of electric vehicles. A note has been added to Drawing SP-1 to this effect.

11. Visual Impact Analysis from surrounding locations, including the Bleachery have already been provided to the Board.

12. The area of forest removal has been noted on the Environmental Assessment Form and indicated by a proposed tree line on Drawing SP-1. Per conversation between Todd Atkinson, PE and Eric Schlobohm, PE of our office, this is adequate to address the comment. It was determined that a tree plan is not required.

13. The proposed water, sewer and stormwater systems are shown on Drawing SP-3. Concept Electric, gas and communication utilities have been shown on Drawing SP-3. Final locations will be coordinated with the utility provider.

14. The requirement for coordination of mailbox location with the Post Master is acknowledged and will be provided as part of the detailed site plan.

15. The applicant has agreed to install the sidewalk extension along Nelson Avenue to provide a pedestrian connection to the Village as part of their recreation fee. As indicated by the project attorney the agreement to construct this sidewalk is based on their being sufficient right-of-way to construct the sidewalk as well the cost to be considered for any recreation fee required. The extents of the sidewalk have been shown on Drawing OP-1 and included in the limits of disturbance on Drawing SP-4.

16. Cut and fill calculations have been provided on the drawing.

17. Based on our team's review of Village code, it is not believed blasting is prohibited within the Village. Based on the anticipated rock removal for this project it is envisioned blasting will be more efficient and less impactful to the surrounding community when compared to a longer duration operation such as rock hammering and may be an option pursued by the owner. As part of the SEQRA process our office will confirm if blasting is permitted with the Building Department and provide a general outline of the blasting protocols.

18. Witnessed deep tests were completed on August 1, 2023 with J. Robert Folchetti & Associates. A revised SWPPP plan is enclosed herewith.

19. Floor plans have been provided. The fire sprinkler layout is anticipated to be provided as part of the building permit process.

20. The location of the proposed project sign near Nelson Avenue has been shown on Drawing SP-1. Additional details have been provided on Architectural Drawing AD-1.

21. Fire Truck Maneuvering Plans have been added to the drawings as requested.

22. It is understood that an amended site plan for the Oak Tree Gardens property may be required for the proposed emergency access through Oak Tree Gardens.

23. It is understood that future comments on the SWPPP will be provided based on soil testing results.

24. It is anticipated that the project will have an 18-month construction schedule. A construction sequence has been provided on Drawing SP-4.

In regards to the June 30, 2023 comment memo from Bryan Murphy, we offer the following:

1. Per discussions with the Planning Board, the need for a theoretical subdivision will be evaluated when the new Zoning Code is enacted.

In regard to the June 30, 2023 comment memo from Emily Dozier, AICP, Dutchess County Department of Planning and Development, we offer the following:

Site Design and Architecture:

1. The parking on the site plan was moved to the interior of the site to move lighting and headlight glare away from existing natural areas. In addition, moving the buildings away from the central green creates a more open feel, rather than the green being walled off by buildings in a more urban configuration. Finally, the proposed configuration gives the townhomes the benefit of a backyard that adjoins protected open space. As the Board is aware various layouts have been presented to you discussing many of the above items.

Our discussions resulted in the layout included in the most recent submission and believe best addresses this community's integration in the surrounding locale.

2. A playground has been added to the central green. We request the specific playground be selected as part of the detailed site plan approval process.

3. It is acknowledged that the balconies and use of natural materials create a pleasing building design, as was the design's intent.

Access and Circulation

1. The applicant has agreed to install the sidewalk extension along Nelson Avenue to provide a pedestrian connection to the Village as part of their recreation fee. As indicated by the project attorney the agreement to construct this sidewalk is based on their being sufficient right-of-way to construct the sidewalk as well the cost to be factored into the recreation fee ultimately required. The extents of the sidewalk have been shown on Drawing OP-1 and included in the limits of disturbance on Drawing SP-4.

2. It is requested that the details of the emergency access be coordinated between the two property owners and Planning Board during the detailed site plan review process.

3. The woodland trail to Channingville Road is proposed as a natural connection to the nearby Greenway Trail trailhead. The trail will use the area disturbed for sewer installation to minimize disturbance. It is intended that bicycles will use the main driveway, rather than this path, to travel to the Village and train station. The intent of this plan is to minimize disturbance along Channingville Road and preserve its wooded characteristics as contemplated in the Draft Master Plan. We believe the concept for this trail should be finalized as part of SEQRA.

4. The applicant has discussed pickup with the School District to determine the best location for a bus shelter. The school has indicated that pickup will be at the intersection of the project entrance with a public street. The bus shelter is located adjacent to Nelson Avenue.

Parking

1. The proposed Stormwater Pollution Prevention Plan is proposing to maximize the use of infiltration practices. Based on the shallow depth to ledge rock encountered during preliminary testing it is not believed permeable pavement is viable treatment option. Instead, where areas of useable soil were located, infiltration areas were provided to still provide the same type of treatment through the use of infiltration style practice.

2. The applicant will add electric vehicle charging stations at the outset of the project and provide wiring throughout the parking areas for additional stations in the future. As it is an evolving technology, the selection of the chargers will be made at time of construction for general compatibility with different electric vehicle car types. A note has been added to the Site Plan that a 220-volt outlet for electric vehicle charging stations will be provided in the garage of each townhouse.

3. Sheltered bicycle parking has been provided near the driveway, where bicycles will be accessed.

Signage

1. Proposed project sign details are shown on Architectural Drawing AD-1. Additional site signage will be displayed on a sign table as part of the detailed site plan review process.

Lighting

1. All building lighting will be dark-sky compliant with a color temperature no higher than 3,000K. Additional information will be provided as part of the SEQRA review.

2. Stormwater

   - A Stormwater Pollution Prevention Plan (SWPPP) has been prepared for the project. The SWPPP will meet the requirements of the NYSDEC to mitigate impacts from stormwater runoff.

In regards to the June 30, 2023 letter from Jeffrey Anzevino, AICP of Scenic Hudson. Inc., we offer the following:

Ecological Concerns

1. Regarding Scenic Hudson's concerns about the ecological impacts of the proposed project, a SWPPP has been prepared per the Village of Wappingers Falls and New York Department of Environmental Conservation's requirements, which encompasses permanent stormwater management practices and both temporary and permanent erosion control practices. Additionally, a Threatened and Endangered Species Habitat Suitability Assessment Report was prepared by Ecological Solutions, LLC and submitted to the Village for review on May 10, 2023. The applicant will include the conservation and avoidance measures recommended in this report in order to avoid, minimize or mitigate impacts to wildlife on the site. As such we believe sufficient information has been provided in order to determine that the project will not have a significant adverse environmental ecological impact.

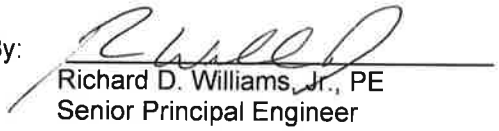
Access to the Site

1. No future phases are proposed for this project. Site plan access is provided from Nelson Avenue rather than Channingville Road as access from Channingville would require significant disturbance and earthwork to the steep slopes in this area.

Should you have any questions or comments regarding this information, please feel free to contact our office.

Very truly yours,

INSITE ENGINEERING, SURVEYING & LANDSCAPE ARCHITECTURE, P.C.

By: 
Richard D. Williams, Jr., PE
Senior Principal Engineer

RDW/ems/kff

Insite File No. 22194.100

INSITE
ENGINEERING, SURVEYING &
LANDSCAPE ARCHITECTURE, P.C.

PRELIMINARY STORMWATER POLLUTION PREVENTION PLAN

Prepared For

BUCKINGHAM PROPERTY MANAGEMENT

Village of Wappingers Falls, New York

September 13, 2023

Applicant Information:

Buckingham Properties
657 E. Main Street
Mt. Kisco, New York 10549

Note: This report in conjunction with the project plans make up the complete Preliminary Stormwater Pollution Prevention Plan.

Prepared by:
Insite Engineering, Surveying & Landscape Architecture, P.C.
3 Garrett Place
Carmel, New York 10512

CONTENTS

1.0 INTRODUCTION

1.1 Project Description

The proposed project is located off of Channingville Road and Nelson Avenue in the Village of Wappingers Falls. The site is approximately 13.4 acres and is identified as Tax Map No. 134601-6158-13-071325. The parcel is located in the RMU - Residential Mixed Use zoning district. The subject parcel and surroundings are shown on Figure 1. The project proposes three (3) multi-family apartment style buildings (176 total apartment units), three (3) multi-family townhouse buildings (12 total townhouse units), a common clubhouse building and associated appurtenances. The primary access to the site will be off Nelson Avenue. An emergency access to the site is proposed from the neighboring Oak Tree Gardens Apartment development. It is proposed to capture and treat the stormwater runoff associated with the proposed improvements.

1.2 Existing Stormwater Runoff Conditions

The subject project is located on one tax parcel with frontage along Channingville Road and Nelson Avenue in the Village of Wappingers Falls. The existing ground cover on the site is characterized as mostly woods. There is an existing easement on the north side of the property off Nelson Avenue that is developed with subsurface utility infrastructure and a common asphalt driveway for the neighboring single family residential properties. The property varies from undulating to hilly topography with localized high points throughout the site that drain outwards in all directions towards the property boundary.

The hydrologic soils groups for the project consists of B/C and C/D soils. The designations of the onsite soils located within the proposed limits of disturbance consist of Galway-Farmington Complex, rocky (GfB, GfC, and GfD), and Farmington-Rock Outcrop Complex (FeE) as identified on the Soil Conservation Service Web Soil Survey. The soils boundaries are shown on Figure 2 and 3 of this report.

As previously stated, the stormwater runoff from the existing property generally drains from the localized high points across the site outwards in all directions towards the property boundary. The analysis included in the project SWPPP utilizes four design lines (Design Line 1-4) to assess the stormwater runoff from the property in the pre and post-development conditions to analyze any potential impacts from development to the surrounding natural resources on the adjacent properties. Design Line 1 is located along the eastern property line. Design Line 2 is located along the northern property line where the project has frontage along Nelson Avenue. Design Line 3 is located along a section of the property line which borders the neighboring Oak Tree Gardens Apartment development. Design Line 4 is located along the western property where the project has frontage along Cahnningville Road. The Pre-Development Drainage Map (Figure 2 of this report) shows the location of each Design Line. The contributing areas to the Design Lines are identified as subcatchment PRE 1, PRE 2, PRE 3, and PRE 4.

1.3 Proposed Stormwater Runoff Conditions

As previously stated, the proposed application includes the construction of three (3) multi-family apartment style buildings, three (3) multi-family townhouse style buildings, a common clubhouse building, asphalt driveways, parking areas and associated appurtenances. Stormwater mitigation for the newly created impervious surfaces will be provided in the form of proposed stormwater management practices (SMP's) discussed further in later sections of this report. The proposed SMP's will be designed to capture and treat runoff from the impervious surfaces associated with the proposed buildings, driveways, parking areas and pedestrian walkways.

It is proposed to maintain the existing drainage patterns on the site to the maximum extent practical in the proposed condition to minimize the impact to the surrounding areas. As previously discussed, the stormwater analysis included in the SWPPP utilizes four design lines (Design Line 1-4). Stormwater treatment for the subject project will be accomplished with several different practices including a subsurface infiltration system, infiltration basin, pretreatment basin, sand filters, hydrodynamic separator and dry extended detention basin. The stormwater management practices have been sized to capture and treat the Water Quality Volume from the developed area. A hydrodynamic separator is proposed upstream of the infiltration basin for pretreatment only to satisfy the requirements of the Design Manual. For the subsurface infiltration system, a isolator row is proposed to provide pretreatment. Finally, pretreatment for the sand filter is proposed utilizing a pretreatment basin.

A flow splitter is proposed upstream of the proposed infiltration practices to discharge the water quality volume to the stormwater practice for treatment and bypass runoff from the larger storm events.

The contributing area to the subsurface infiltration system (1.1P) is shown as subcatchment 1.1S and consists of the western most townhouses and apartment building, clubhouse and portion of the proposed driveway and parking area. Subcatchment 1.2S consists of remaining townhouse and apartment buildings, parking areas and majority of the proposed driveways. The stormwater runoff from subcatchment 1.2S is collected and conveyed to the proposed infiltration basin (1.2P) and downstream sand filter (1.4P). A flow splitter is proposed upstream of the infiltration basin, sending the water quality volume to the infiltration practice, while diverting the runoff from the larger storm events to an extended detention basin to mitigate the peak flows in the larger storms. Finally, a portion of the lower section of the proposed driveway entrance (subcatchment 2.1S) is collected and conveyed to a pretreatment basin (2.2P), then sand filter (2.1P). The subcatchments are shown in Figure 3 of this report.

As shown in the following sections of this report, the stormwater quality and quantity for the proposed development have been mitigated to the maximum extent practicable to minimize the impacts to the existing conditions downstream of the project site. Additionally, an erosion and sediment control plan has been prepared in accordance with the *New York State Standards and Specifications for Erosion and Sediment Control* to protect the existing waterbodies and drainage features during construction activities and in the post development condition.

2.0 STORMWATER MANAGEMENT

The proposed stormwater management systems for the Buckingham Property Management project have been designed to meet the requirements of local, city, and state stormwater ordinances and guidelines, including but not limited to those of the Village of Wappingers Falls and the NYSDEC.

Since the subject project proposes the disturbance of more than one (1) acre, coverage under the New York State Department of Environmental Conservation (NYSDEC) SPDES General Permit No. GP-0-20-001 is required.

In order to meet the requirements, set forth by this permit, the latest edition of the NYSDEC *New York State Stormwater Management Design Manual* (Design Manual) was referenced for the design of the proposed stormwater management system. The Design Manual specifies five design criteria that are discussed in detail below. They are Runoff Reduction Volume, Water Quality Volume, Stream Channel Protection Volume, Overbank Flood Control, and Extreme Flood Control. The first two of the requirements relates to treating water quality, while the later pertain to stormwater quantity (peak flow) attenuation.

To address stormwater quantity requirements of the NYSDEC, the “HydroCAD” Stormwater Modeling System,” by HydroCAD Software Solutions LLC in Tamworth, New Hampshire, was used to model and assess the peak stormwater flows for the subject project. HydroCAD is a computer aided design program for modeling the hydrology and hydraulics of stormwater runoff. It is based primarily on hydrology techniques developed by the United States Department of Agriculture, Soil Conservation Service (USDA,

SCS) TR-20 method combined with standard hydraulic calculations. For details on the input data for the subcatchments and design storms, please refer to Appendices B and C.

The input requirements for the HydroCAD computer program are as follows:

Subcatchments (contributing watershed/sub-watersheds)

- Design storm rainfall in inches
- CN (runoff curve number) values which are based on soil type and land use/ground cover
- Tc (time of concentration) flow path information
- Watershed Area in Acres

Flow Splitters / Stormwater Management Practices

- Surface area at appropriate elevations
- Flood elevation
- Outlet control information

The precipitation values and intensity duration frequency (IDF) curves for the 1-Year, 10-Year, 100-Year 24-hour design storm events and rainfall distribution curves utilized for this report were obtained from the information provided by Northeast Regional Climate Center (NRCC) and the Natural Resources Conservation Service (NRCS) which is available online at *www.precip.eas.cornell.edu.* The values provided for all design storms analyzed have been listed below.

Table 2.0.1 – Precipitation Values for Corresponding Design Storms

Design Storm	24-Hour Rainfall
1-Year	2.61”
10-Year	4.66”
100-Year	8.18”

The CN (runoff curve number) values utilized in this report were referenced from the USDA, SCS publication *Urban Hydrology for Small Watersheds*. The following is a summary of the various land uses/ground covers and their associated CN values utilized in this report.

Table 2.0.2 – Project Ground Cover and Associated Curve Numbers (CN)

Land Use/Ground Cover	CN Value
Woods, D Soil	77
Woods, C Soil	70
>75% Grass Cover, C Soil	74
Impervious Surface	98

2.1 NYSDEC Runoff Reduction Volume, RR_v

The Runoff Reduction Volume (RR_v) criterion is intended to replicate pre-development hydrology by maintaining preconstruction infiltration, peak flow runoff, discharge volume, as well as minimizing concentrated stormwater flow. As stated in Chapter 4 of the Design Manual, RR_v may be treated with standard SMP’s with RR_v capacity sized in accordance with the Chapter 4/6 requirements, or with green infrastructure practices (GIP’s) sized in accordance with the requirements set forth in Chapter 5. Runoff reduction is achieved when runoff from a site is captured, directed to a SMP or a GIP, infiltrated to the ground, reused, or removed by evapotranspiration, so it does not contribute to the stormwater discharge from the site. The goal for each site is to reduce the entire WQ_v (100%) through the implementation of GIP’s and standard SMP’s with RR_v capacity. However, if 100% of the WQ_v cannot be reduced by applying a combination of green infrastructure techniques and standard SMP’s with RR_v capacity, “they must, at a minimum, reduce runoff from a percentage of the impervious area constructed as part of the project using the green infrastructure techniques and standard SMPs with RR_v capacity. In addition, the designer must provide justification in the SWPPP

that evaluates each of the green infrastructure techniques listed in Table 3.2 and identify the specific site limitations that make application of the technique(s) infeasible."

The project proposes an I-4 Subsurface Infiltration System and I-2 Infiltration Basin in areas of the project site where the soil conditions meet the Design Manual requirements for infiltration practices based on the witnessed soil testing performed onsite. The results of the testing are provided on Figure 4 of this report. These stormwater practices, sized in accordance with the Design Manual, will be applied as a GIP/SMP with volume reduction towards meeting the RR_v minimum. Sizing calculations for the infiltration practices are provided in Section 2.2 below.

For a calculation of the Initial WQ_v / RR_v, the RR_v minimum, the RR_v / WQ_v required, and the RR_v provided, refer to Appendix A. In calculating the RR_v minimum, onsite soils belongs to the Hydrologic Soil Groups C. These soil groups have a specific reduction factor of 0.30. The table below summarizes the RR_v requirements for the site, as calculated in Appendix A.

Table 2.1.1 Runoff Reduction Volume Summary

Subcatchment	Initial WQ_v / RR_v (c.f.)[1]	RR_v Minimum (c.f.)[2]	GIP / SMP ID	NYSDEC Practice Designation	Allowable % of WQv provided to be applied towards RRv	Storage Volume Provided Below System Outlet (c.f.)[3]	RR_v Provided (c.f.)
1.1S, 1.2S & 2.1S	23,284	7,294	1.1P	I-4 Subsurface Infiltration System	100%	10,323	17,163
			1.2P	I-2 Infiltration Basin		6,840	

[1] Refer to Appendix A for Initial WQ_v Calculations.
[2] The calculations for RRv minimum in Appendix A includes the new impervious surfaces in subcatchment 2.0S.
[3] See Appendix C for storage volume calculations.

As shown in the table above the project has provided greater than the $RR_{v\ minimum}$. Due to site constraints, 100% of the RRv is not practical. By implementing infiltration practices to the greatest extent practicable, and exceeding the RR_v minimum, the NYSDEC RR_v requirement has been addressed.

2.2 NYSDEC Water Quality Volume, WQ_v

The stormwater management practices have been designed in accordance with the *Performance Criteria* (Chapter 4) of the Design Manual. As outlined in Chapter 4, the WQv is the runoff volume produced during the 90% storm. The proposed stormwater management practices have been designed to treat the WQv in accordance with the Design Manual. The following equation, per Chapter 4, was used to determine the water quality volume for the 90% storm for each of the contributing areas to the treatment practices:

The water quality volume shall be $WQ_v = \frac{(P)(R_v)(A)}{12}$

Where,

WQ_v = water quality volume (in acre-feet)
P = 90% Rainfall Event Number (1.5)
R_v = 0.05 + 0.009(I), where I is percent impervious cover
A = site area in acres

The stormwater management practices have been designed in accordance with the *Performance Criteria* (Chapter 4) of the Design Manual. As outlined in Chapter 4, the WQv is the

runoff volume produced during the 90% storm. The proposed subsurface infiltration system has been designed to treat the WQv from subcatchment 1.1S in accordance with the Design Manual. Two practices in series consisting of an infiltration basin and a surface sand filter have been designed to treat WQv from subcatchment 1.2S. For subcatchment 2.1S, a surface sand filter has been designed to treat the WQv from the tributary area. The equation above, per Chapter 4, was used to determine the water quality volume for the 90% storm for each of the contributing areas to the treatment practices:

Table 2.2.1 - Water Quality Volume Calculation Summary

Subcatchment	WQ_v[1] (cf)
1.1S	10,126
1.2S	12,124
2.1S	1,034

[1] For detailed calculations see Appendix A

As previously stated, there are four stormwater management practices proposed as part of the development of the site to meet the WQv requirements. The subsurface infiltration system and infiltration basin are designed as offline practices with a flow splitter upstream of the practice.

In accordance with the Design Manual, the subsurface infiltration system has been designed with a storage volume greater than the WQv from the contributing subcatchment. The proposed infiltration basin has been sized with a storage volume to treat a portion of the WQv from the contributing subcatchment and a downstream practice is provided to treat the remaining WQv. The storage volume is provided between the bottom elevation of the practice and the overflow elevation, as verified in Appendix C. For the subsurface infiltration system, an overflow is provided in the upstream flow splitter, shown as the secondary outlet pipe in the HydroCAD model. For the infiltration basin, an outlet weir is proposed to send the remaining WQv to the downstream surface sand filter (1.4P).

Table 2.2.2 – Surface Sand Filter 1.4P WQv Calculation Summary

Initial WQ_v (cf)	Storage Volume Provided in Upstream Infiltration Basin (1.2P) (cf)	WQ_v / RR_v Provided Upstream (cf)	Remaining WQ_v (cf)
12,124	6,840	6,840	5,284

The proposed F-1 Surface Sand Filters have been sized in accordance with the Design Manual. Proposed sand filter (2.1P) has been sized to treat the entire WQv from subcatchment 2.1S. Proposed sand filter (1.4P) has been sized to treat the remaining WQv from subcatchment 1.2S downstream of the infiltration basin. See table 2.2.2 above for the remaining WQv to be treated in the surface sand filter. Pretreatment for the sand filter (2.1P) is provided by a pretreatment basin upstream of the sand filter. Sizing calculations for the required surface area and storage volume of the pretreatment basin and sand filter are provided in Appendix H. Pretreatment for the sand filter (1.4P) is provided by a hyrodynamic separator upstream of the infiltration basin as further discussed below.

Soil testing was performed in the location of the proposed stormwater management practices. Based on the test result, provided on Figure 4 of this report, the soils in the areas of the proposed infiltration practices are suitable for infiltration in accordance with the Design Manual.

Pretreatment for the subsurface infiltration system is provided with an isolator row. A primary outlet pipe is proposed in the upstream flow splitter to discharge the low flow stormwater runoff to an isolator row to provide pretreatment. An overflow header system is proposed from the isolator row to connect the isolator row to the rest of the system.

Pretreatment for the infiltration basin is provided in the form of a hydrodynamic separator. The hydrodynamic separator is proposed for pretreatment only and is not designed as a proprietary stormwater management practice to treat the stormwater runoff. The peak flow for the WQv storm event was used to size the hydrodynamic separator used as pretreatment for the infiltration basin. By sizing the hydrodynamic separator for the peak flow from the WQv storm event, pretreatment is provided in accordance with the Design Manual. Calculations for the peak flow from the WQv storm event are provided in Appendix A for subcatchment 1.2S. The data (including capacities) for the hydrodynamic separator is included in Appendix G. The table below summarizes the WQv-year peak flows and hydrodynamic separate flow rates.

Table 2.2.2 – Pretreatment Hydrodynamic Separator Summary

Stormwater Management Practice	WQv[1] Peak Flow (C.F.S)	Hydrodynamic Separator Model	Hydrodynamic Separator Capacity (C.F.S.)
1.2P	3.4	Hydro International 6-ft First Defense HC	4.07 CFS

[1] For detailed calculations see Appendix A.

As noted in the table above the capacity of the hydrodynamic separator exceeds the calculated WQv peak flow. The hydrodynamic separator has an internal bypass capable of passing the flows from the contributing areas from the larger storm events.

2.3 NYSDEC Stream Channel Protection Volume, CP_v

The Stream Channel Protection (CP_v) criterion is intended to protect stream channels from erosion and is accomplished by the 24-hour extended detention of the 1-year, 24-hour storm event or by fully infiltrating the stormwater runoff from the 1-year, 24-hour storm event. The Stream Channel Protection Volume is calculated using the runoff volume from 1-year, 24-hour storm event from the HydroCAD modeling in Appendix C. As shown in Appendix C, the proposed I-4 Subsurface Infiltration System and I-2 Infiltration Basin have been designed to fully infiltrate the stormwater runoff from the 1-year, 24-hour design storm, therefore the CPv criterion has been met for the proposed areas of new development. For the sand filter (2.1P), a 3” diameter orifice is provided on the underdrain pipe to provide detention of the 1-year, 24-hour storm event. In accordance with the Design Manual, the minimum orifice size in order to prevent clogging is 3”. As the minimum orifice size is provided for the sand filter, the CPv criteria has been met for subcatchment 2.1S.

2.4 NYSDEC Overbank Flood Control, Q_p, and Extreme Flood Control, Q_f

The Overbank Flood Control (Q_p) requirement is intended to prevent an increase in the frequency and magnitude of out-of-bank flooding events generated by urban development. Overbank control requires storage to attenuate the post-development 10-year, 24-hour peak discharge to pre-development rates. The Extreme Flood Control (Q_f) requirement is intended to prevent the increased risk of flood damage from large storm events, maintain the boundaries of the pre-development 100-year flood plain, and protect the physical integrity of stormwater management practices. Extreme flood control requires storage to attenuate the post-development 100-year, 24-hour peak discharge to pre-development rates. As shown in Table 2.4.1 attenuation for both the 10-year and 100-year 24-hour storms has been provided thus satisfying the Q_p and Q_f requirements. The following table summarizes the pre and post development peak flows expected for the proposed project.

Table 2.4.1– Pre and Post-Development Peak Flows

24-HOUR DESIGN STORM PEAK FLOWS (c.f.s.)				
	10-YEAR (Overbank Flood Control)		100-YEAR (Extreme Flood Control)	
	Pre	Post	Pre	Post
Design Line 1	9.0	6.3	23.8	19.6
Design Line 2	3.6	3.3	9.4	9.4
Design Line 3	3.9	1.3	10.5	3.1
Design Line 4	3.7	3.7	10.0	9.9

As shown in the above table the peak flows discharging to each design line in the proposed condition have been mitigated to slightly below the existing condition levels. Since the rate of runoff in the proposed condition is less than the existing condition, the proposed onsite stormwater improvements will mitigate the potential impact of the peak flows downstream in the final condition.

3.0 STORMWATER CONVEYANCE SYSTEM

The stormwater collection and conveyance systems for the project will consist of catch basins, drain inlets, drainage manholes, and HDPE pipe. The system will be sized to collect and convey at minimum the 10-year, 1-hour design storm using the Rational Method. The Rational Method is a standard method used by engineers to develop flow rates for sizing collection systems. The Rational Method calculates flows based on a one-hour design storm. Calculations will be provided in future reports.

4.0 EROSION AND SEDIMENT CONTROL

Erosion and sediment control should be accomplished by four basic principles: diversion of clean water, containment of sediment, treatment of dirty water, and stabilization of disturbed areas. Diversion of clean water should be accomplished with swales. This diverted water should be safely conveyed around the construction area as necessary and discharged downstream of the disturbed areas. Sediment should be contained with the use of silt fence at the toe of disturbed slopes and excavation of the temporary sediment basin. Disturbed areas should be permanently stabilized within 14 days of final grading to limit the required length of time that the temporary facilities must be utilized. The owner will be responsible for the maintenance of the temporary erosion control facilities.

4.1 Temporary Erosion and Sediment Control Facilities

Temporary erosion and sediment control facilities should be installed and maintained as required to reduce the impacts to off-site properties. The owner will be required to provide maintenance for the temporary erosion and sediment control facilities. In general, the following temporary methods and materials should be used to control erosion and sedimentation from the project site:

- Stabilized Construction Entrance
- Silt Fence Barriers
- Storm Drain Inlet Protection
- Temporary Soil Stabilization

All temporary erosion control measures shall be maintained in accordance with the Erosion & Sediment Control Maintenance Schedule contained on the Project Drawings, and as discussed below.

A stabilized construction entrance should be installed at the entrance to the site as shown on the plan. The design drawings will include details to guide the contractor in the construction of this

entrance. The intent of the stabilized construction entrance is to prevent the "tracking" of soil from the site. Dust control should be accomplished with water sprinkling trucks if required. During dry periods, sprinkler trucks should wet all exposed earth surfaces as required to prevent the transport of air-borne particles to adjoining areas.

Siltation barriers constructed of geosynthetic filter cloth should be installed at the toe of all disturbed slopes. The intent of these barriers is to contain silt and sediment at the source and inhibit its transport by stormwater runoff. The siltation barriers will also help reduce the rate of runoff by creating filters through which the stormwater must pass.

Storm drain inlet protection in the form of stone drop inlet protection will be installed around all proposed inlets. The stone drop inlet protection will serve to filter stormwater runoff before it enters the collection system. Throughout construction the concrete drainage structures, associated piping and inlet protections shall be inspected weekly and after a rainfall event. These items shall be cleaned, repaired and/or replaced when needed.

When land is exposed during development, the exposure shall be kept to the shortest practical period, but in no case more than 7 days. Temporary grass seed and mulch shall be applied to any construction area idle for two weeks. The temporary seeding and mulching shall be performed in accordance with the seeding notes illustrated on the project drawings. Disturbance shall be minimized in the areas required to perform construction. Upon completion of final grading topsoil, permanent seeding and mulch shall be applied in accordance with the project drawings.

The stormwater runoff will be managed by the temporary erosion and sediment control facilities during construction. As discussed in the construction sequences provided the project plans the stabilized construction entrance shall be installed at the site entrance and silt fence shall be installed along the down hill perimeter of where soil disturbing activities will occur containing sediment laden stormwater runoff on-site.

4.2 Permanent Erosion and Sediment Control Facilities

Permanent erosion and sediment control will be accomplished by diverting stormwater runoff from steep slopes, controlling/reducing stormwater runoff velocities and volumes, and vegetative and structural surface stabilization. All of the permanent facilities are relatively maintenance free and only require periodic inspections. The owner will provide maintenance for all the permanent erosion and sediment control facilities.

Rock outlet protection or a level spreader will be provided at the discharge end of all piped drainage systems, and will be sized in accordance with the Blue Book. The purpose of the rock outlet protection is to reduce the depth, velocity, and energy of water, such that the flow will not erode the receiving downstream reach. The rock outlet protection shall be inspected for evidence of scour beneath the riprap and/or for any dislodged stones. A level spreader is proposed to re-establish non-erosive sheet flow prior to discharging offsite. Inspections of the rock outlet protection and level spreader shall be performed during the inspections of the post-construction SMP's for the project.

Other than the buildings and paved surfaces, disturbed surfaces will be stabilized with vegetation. The vegetation will control stormwater runoff by preventing soil erosion, reducing runoff volume and velocities, and providing a filter medium. Permanent seeding should optimally be undertaken in the spring from March 21st through May 20th and in late summer from August 15th to October 15th.

5.0 IMPLEMENTATION, MAINTENANCE & GENERAL HOUSEKEEPING

5.1 Construction Phase

Details associated with the implementation and maintenance of the proposed stormwater facilities and erosion control measures during construction are shown on the project drawings. A Construction Sequence has been provided on the project plans to guide the contractor in the installation of the erosion control measures as well as the site plan features. In accordance with NYSDEC SPDES General Permit GP-0-20-001 no phase will exceed the maximum of 5 acres of disturbance at any given time as less than 5 acres of disturbance is proposed. The erosion control plan includes associated details and notes to aid the contractor in implementing the plan.

During construction, a Site Log Book, Appendix E, is required to be kept per NYSDEC SPDES General Permit GP-0-20-001. Erosion and sediment control inspections are required to be conducted as necessary under coverage of the permit (minimum once a week) and an updated logbook and a copy of the SWPPP is required to be kept on site for the duration of the construction activities. The Construction Site Log Book is an appendix taken from the *New York Standards and Specifications for Erosion and Sediment Control* (Blue Book).

In addition to the proposed erosion and sediment control facilities, the following good housekeeping best management practices shall be implemented to mitigate potential pollution during the construction phase of the project. The general contractor overseeing the day-to-day site operation shall be responsible for the good housekeeping best management practices included in the following general categories:

- Material Handling and Waste Management
- Establishment of Building Material Staging Areas
- Establishment of Washout Areas
- Proper Equipment Fueling and Maintenance Practices
- Spill Prevention and Control Plan

All construction waste materials shall be collected and removed from the site regularly by the general contractor. The general contractor shall supply waste barrels for proper disposal of waste materials. All personnel working on the site shall be instructed of the proper procedures for construction waste disposal.

Although it is not anticipated any hazardous waste materials will be utilized during construction, any hazardous waste materials shall be disposed of in accordance with federal, state, and local regulations. No hazardous waste shall be disposed of on-site. Hazardous waste materials shall be stored in appropriate and clearly marked containers and segregated from the other non-waste materials. All hazardous waste shall be stored in a structurally sound and sealed shipping containers located in the staging areas. Material safety data sheets, material inventory, and emergency contact numbers will be maintained in the office trailer. All personnel working on the site shall be instructed of the proper procedures for hazardous waste disposal.

Temporary sanitary facilities (portable toilets) shall be provided on site during the entire length of construction. The sanitary facilities shall be in an alternate area away from the construction activities on the site. The portable toilets shall be inspected weekly for evidence of leaking holding tanks.

All recyclables, including wood pallets, cardboard boxes, and all other recyclable construction scraps shall be disposed of in a designated recycling barrel provided by the contractor and removed from the site regularly. All personnel working on the site shall be instructed of the proper procedures for construction waste recycling.

All construction equipment and maintenance materials shall be stored in a designated staging area. Silt fence shall be installed down gradient of the construction staging area. Shipping containers shall be utilized to store hand tools, small parts, and other construction materials, not taken off site daily. Construction

waste barrels, recycling barrels and if necessary hazardous waste containers shall be located within the limits of the construction staging area.

Throughout the construction of the project, several types of vehicles and equipment will be used on-site. Fueling of the equipment shall occur within the limits of the construction staging area. Fuel will be delivered to the site as needed, by the general contractor, or a party chosen by the general contractor. Only minor vehicle equipment maintenance shall occur on-site, all major maintenance shall be performed off-site. All equipment fluids generated from minor maintenance activities shall be disposed of into designated drums and stored in accordance with the hazardous waste storage as previously discussed.

Vehicles and equipment shall be inspected on each day of use. Any leak discovered shall be repaired immediately. All leaking equipment unable to be repaired shall be removed from the site. Ample supplies of absorbent, spill-cleanup materials, and spill kits shall be located in the construction staging area. All spills shall be cleaned up immediately upon discovery. Spent absorbent materials and rags shall be hauled off-site immediately after the spill is cleaned for disposal at a local landfill. All personnel working on the site shall be instructed of the proper procedures for spill prevention and control. Any spill large enough to discharge to surface water will be immediately reported to the local fire / police departments and the National Response Center 1-800-424-8802.

During the initial year of planting, the plants may require watering to germinate and establish. Note that several seedings may be required during the first year to completely establish vegetation on the site.

5.2 Soil Restoration

Soil Restoration is required to be applied across areas of the development site where soils have been disturbed and will be vegetated. The purpose is to recover the original properties and porosity of the soil compacted during construction activity. Soil Restoration is applied in the cleanup, restoration, and landscaping phase of construction followed by the permanent establishment of an appropriate, deep-rooted groundcover to help maintain the restored soil structure. Soil restoration includes mechanical decompaction and compost amendment. The table below describes various soil disturbance activities related to land development, soil types and the requirements for soil restoration for each activity as identified in the Design Manual. Restoration is applied across areas of a development site where soils have been compacted and will be vegetated according to the criteria defined in the table below:

<table>
<tr><th colspan="4">Soil Restoration Requirements[1, 2,4]
(Onsite soils within the limit of disturbance belong to Hydrologic Soil Groups (HSG) C)</th></tr>
<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[3] 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"></td></tr>
<tr><td>Aerate[1] and apply 6 inches of topsoil</td><td>Apply full Soil Restoration [2]</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[6])</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>

1. 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.
2. Per "Deep Ripping and De-compaction, DEC 2008".
3. 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 functions like a mini-subsoiler.
4. During periods of relatively low to moderate subsoil moisture, the disturbed soils are returned to rough grade and the following Soil Restoration steps applied:
   - 5.1. Apply 3 inches of compost over subsoil.
   - 5.2. 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.
   - 5.3. Rock-pick until uplifted stone/rock materials of four inches and larger size area cleaned off the site.
   - 5.4. Apply topsoil to a depth of 6 inches.
   - 5.5. Vegetate as required by seeding notes located on the project drawings.
   - 5.6. Tilling should not be performed within the drip line of any existing trees or over any utility installations that are within 24 inches of the surface.
6. Compost shall be aged, from plant derived materials, free of viable weed seeds, have no visible free water or dust produced when handling, pass through a half inch screen and have a pH suitable to grow desired plants.

After soil restoration is completed an inspector should be able to push a 3/8" metal bar twelve inches into the soil with just body weight. Following decompaction/soil restoration activities, the following maintenance is anticipated during the first year:

- Initial inspections for the first six months (once after each storm greater than a half-inch).
- Reseeding to repair bare or eroding areas to assure grass stabilization.
- Water once every three days for first month, and then provide a half inch of water per week during first year. Irrigation plan may be adjusted according to the rain event.
- Fertilization may be needed in the fall after the first growing season to increase plant vigor.

In order to ensure the soil remains decompacted the following ongoing maintenance is recommended:

- Planting the appropriate ground cover with deep roots to maintain the soil structure.
- Keeping the site free of vehicular and foot traffic or other weight loads. Consider pedestrian footpaths (sometimes it may be necessary to de-thatch the turf every few years).

5.3 Long Term Maintenance Plan

Each spring the paved areas should be cleaned to remove the winter's accumulation of traction sand. After this is completed, all drain inlets sumps and the stormwater basins should be cleaned. All pipes should be checked for debris and blockages and cleaned as required. During the cleaning process, the drain inlets, catch basins, and pipes should be inspected for structural integrity and overall condition; repairs and/or replacement will be made as required.

The stormwater facilities for the subject project have been designed to minimize the required maintenance. This section discusses the minimum maintenance requirements to insure long-term performance of the stormwater facilities. Initially the stormwater facilities will require an increased maintenance and inspection schedule until all portions of the site are stable. Generally, the stormwater facilities consist of either collection and conveyance components or treatment components.

The stormwater collection and conveyance system is composed of HDPE, drainage pipe and precast concrete drainage structures. The owner will assume the maintenance responsibilities for the drainage system. Minimal maintenance is typically required for these facilities. All pipes should be checked for debris and blockages and cleaned as required. All drain inlet sumps, including the sumps within the hydrodynamic separators, shall be inspected bi-annually and cleaned to removed deposited sediment. During the cleaning process, the pipes should be inspected for structural integrity and overall condition; repairs and/or replacement should be made as required. Additionally, the detention systems shall be checked for deposited sediment as well. Visual inspection of system through the inspection ports shall take place yearly, and the system shall be cleaned / jetted as necessary to remove deposited sediment.

The stormwater facilities have been designed to limit the routine maintenance requirements. Initially the filter will require regular maintenance until the permanent vegetation is established. Permanent vegetation is considered established when 80% of the final plant density is established. Vegetation should be inspected weekly as part of coverage under NYSDEC SPDES General Permit GP-0-20-001 during construction and in the permanent condition. Damaged areas should be immediately re-seeded and re-mulched. The floor of the filter will be planted with a seed mixture that contains plants that are tolerant of occasional flooding. The seed mixtures contain several plant species that vary slightly in their needs for survival. It is expected that not all of the species will survive within the basin due to variations such as water, nutrients, and light. During the initial year of planting, the plants may require watering to germinate and become established. Note that several seedings may be required during the first year to completely establish vegetation within the basin. After the initial year of establishment, the filter does not need to be fertilized or watered. A natural selection process will occur over the first few years, such that the species within the seed mixture most suitable to the conditions will survive.

Refer to the NYSDEC Stormwater Management Practice Inspection & Maintenance checklist found in Appendix F of this report for the requirements to insure long-term performance of all stormwater facilities

Refer to the hydrodynamic separator Operations & Maintenance Manual in Appendix G of this report for the manufacture maintenance requirements for the proposed hydrodynamic separator.

APPENDIX A

NYSDEC Water Quality Volume and Runoff Reduction Calculations

RRv Calculation Worksheet (For Entire Site)

Project: Buckingham Wappingers
Project #: 22194.100
Date: 9/13/2023

INSITE ENGINEERING, SURVEYING & LANDSCAPE ARCHITECTURE, P.C.

1. RRv Initial = Water Quality Volume (WQv) *0.535 ac-ft* = *23,284 c.f.*
(refer to Water Quality Volume Calculations in Appendix A for Subcatchment 1.1S, 1.2S and 2.1S)

2. *RRv Minimum* = [(P) (Rv) (S) (Aic)] /12 where…

P = Rainfall (in.)	=	1.50	in.
Rv = 0.05 + 0.009 (100%)	=	0.95	
S = Hydrologic Soil Group Specific Reduction Factor	=	0.30	
[HSG A = 0.55] [HSG B = 0.40] [HSG C = 0.30] [HSG D = 0.20]			
Aic = Total area of new impervious cover	=	4.7	Acres
RRv Minimum	=	*7,294*	*c.f.*

3. *RRv Required* = RRv Initial - Green Infrastructure Practice (GIP) with Area Reduction

GIP with Area Reduction Applied in Project		
5.3.1 Conservation of Natural Area	N/A	
5.3.2 Sheet Flow to Riparian Buffers or Filter Strips	N/A	
5.3.4 Tree Planting / Tree Box		c.f.
5.3.5 Disconnection of Rooftop Runoff	-	
5.3.6 Stream Daylighting	N/A	
RRv Required(=WQv-RRV by area)(Refer to HydroCAD output in this Appendix)	= 23,284	c.f.

4. *RRv Provided*

GIP with Volume Reduction Applied in Project	WQv Treated (c.f.)	% of WQv Applied to *RRv Provided*	*RRv Provided (c.f.)*
5.3.3 Vegetated Open Swales		20%	0
[HSG A / B = 20%] [HSG C / D = 10%] {Modified HSG C - D = 15% - 12%]		10%	0
5.3.7 Rain Garden		40%	0
[No underdrains / Good Soils = 100%] [With underdrains / Poor Soils = 40%]			
5.3.8 Green Roof		100%	0
[RRv provided equals volume provided in Green Roof]			
5.3.9 Stormwater Planters		45%	0
[Infiltration Planters = 100%] [Flow Through HSG C = 45%] [Flow Though HSG D = 30%]			
5.3.10 Rain Tank / Cisterns		100%	0
5.3.11 Porous Pavement		100%	0
Infiltration Practice (Standard SMP)	17163	100%	17,163
Bioretention Practice (Standard SMP)		40%	0
[Without Underdrains HSG A/B = 80%] [With Underdrain HSG C\D = 40%]			
Dry Swale (Open Channel Practice) (Standard SMP)		20%	0
[HSG A/B = 40%] [HSG C/D = 20%]			
RRv Provided =			*17,163*

5. Summary

RRv Initial	=	23,284	c.f.
RRv Required	=	23,284	c.f.
RRv Minimum	=	7,294	c.f.
RRv Provided	=	17,163	c.f.
WQv Required for Downstream SMP	=	6,121	c.f. (= RRv Required - RRv Provided)

Is RRv Provided greater than or equal to RRv Minimum? Yes

WQv Flow Calculation Worksheet

Project: Buckingham Wappingers
Project #: 22194.100
Date: 9/13/2023

INSITE ENGINEERING, SURVEYING & LANDSCAPE ARCHITECTURE, P.C.

The following calculation determines the water quality flow rate for the 90% Water Quality Event using the Small Storm Hydrology Method specified in Appendix B of the New York State Stormwater Management Design Manual.

Subcatchment ID: 1.1S

1.Water Quality Volume $= WQ_v = \frac{P * R_v * A}{12}$

P = WQv 24-hour Rainfall Amount	=	1.5	in.
A = Subcatchment Area	=	95300	SF
Ai= Impervious Area within Subcatchment Area	=	85000	
I = Ai/A	=	89.2	%
Rv = 0.05 + 0.009 (I%)	=	0.85	
WQv = Water Quality Volume	=	10,126	CF

Subcatchment ID: 1.2S

1.Water Quality Volume $= WQ_v = \frac{P * R_v * A}{12}$

P = WQv 24-hour Rainfall Amount	=	1.5	in.
A = Subcatchment Area	=	159000	SF
Ai= Impervious Area within Subcatchment Area	=	98600	
I = Ai/A	=	62.0	%
Rv = 0.05 + 0.009 (I%)	=	0.61	
WQv = Water Quality Volume	=	12,124	CF

2.Peak Discharge (Qp) = qu * A * WQV where…

Qa= Water Quality Volume, in watershed in. = WQv/A	=	0.92	in.
CN= curve number = 1000/[10+5P+10Q-10(Q^2+1.25*Q*P)^1/2]	=	94	
S = potential maximum retention after runoff begins = 1000/CN -10	=	0.67	in.
Ia = intial abstraction = 0.2*S	=	0.134	in.
Ia/P	=	0.09	
qu, From TR-55 Chapter 4	=	650	cfs/mi^2/in
Qp = Peak Discharge	=	3.4	cfs

Subcatchment ID: 2.1S

1.Water Quality Volume $= WQ_v = \frac{P * R_v * A}{12}$

P = WQv 24-hour Rainfall Amount	=	1.5	in.
A = Subcatchment Area	=	15600	SF
Ai= Impervious Area within Subcatchment Area	=	8400	
I = Ai/A	=	53.8	%
Rv = 0.05 + 0.009 (I%)	=	0.53	
WQv = Water Quality Volume	=	1,034	CF

APPENDIX B

Pre-Development Computer Data

Subcat Reach Pond Link

Routing Diagram for Pre-Development

Prepared by Insite Engineering, Surveying & Landscape Architecture, P.C., Printed 1/31/2023

HydroCAD® 10.00-15 s/n 02171 © 2015 HydroCAD Software Solutions LLC

Summary for Subcatchment PRE 1:

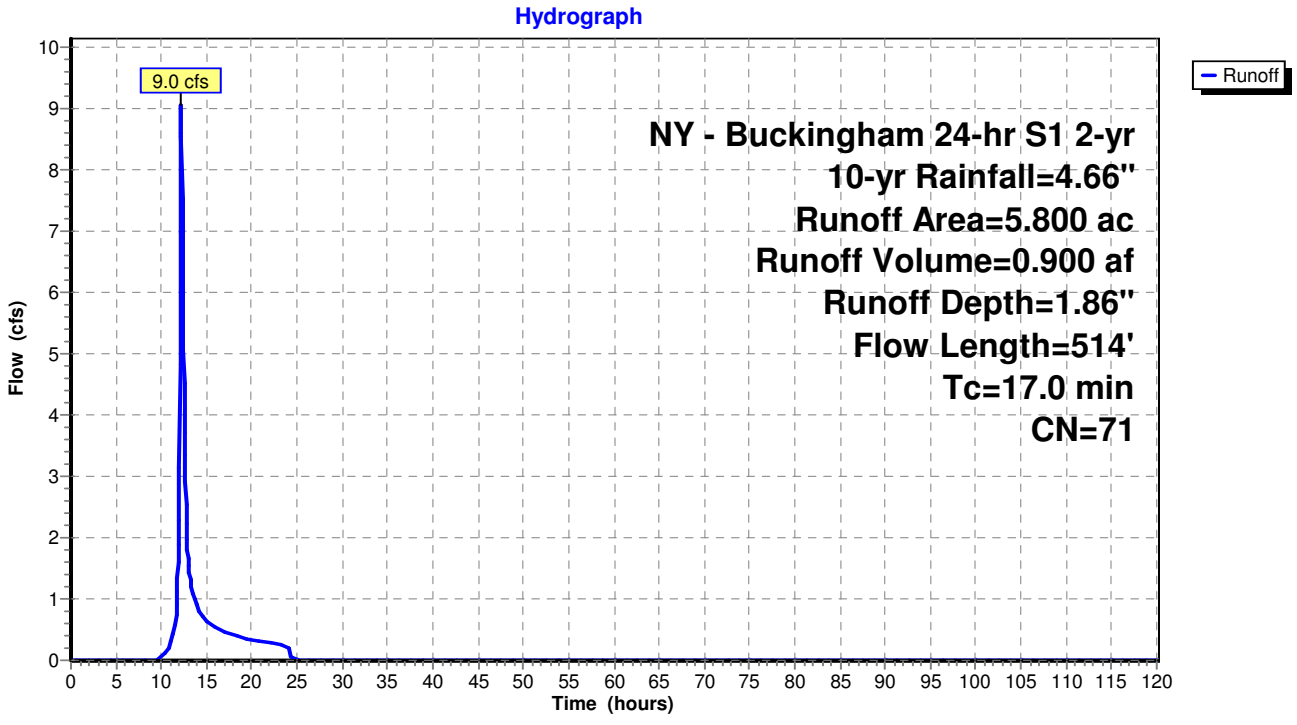
Runoff = 9.0 cfs @ 12.20 hrs, Volume= 0.900 af, Depth= 1.86"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
NY - Buckingham 24-hr S1 2-yr 10-yr Rainfall=4.66"

Area (ac)	CN	Description
4.600	70	Woods, Good, HSG C
1.200	77	Woods, Good, HSG D
5.800	71	Weighted Average
5.800		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.4	100	0.1000	0.15		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.15"
3.6	151	0.0200	0.71		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
2.0	263	0.2000	2.24		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
17.0	514	Total			

Subcatchment PRE 1:



Summary for Subcatchment PRE 2:

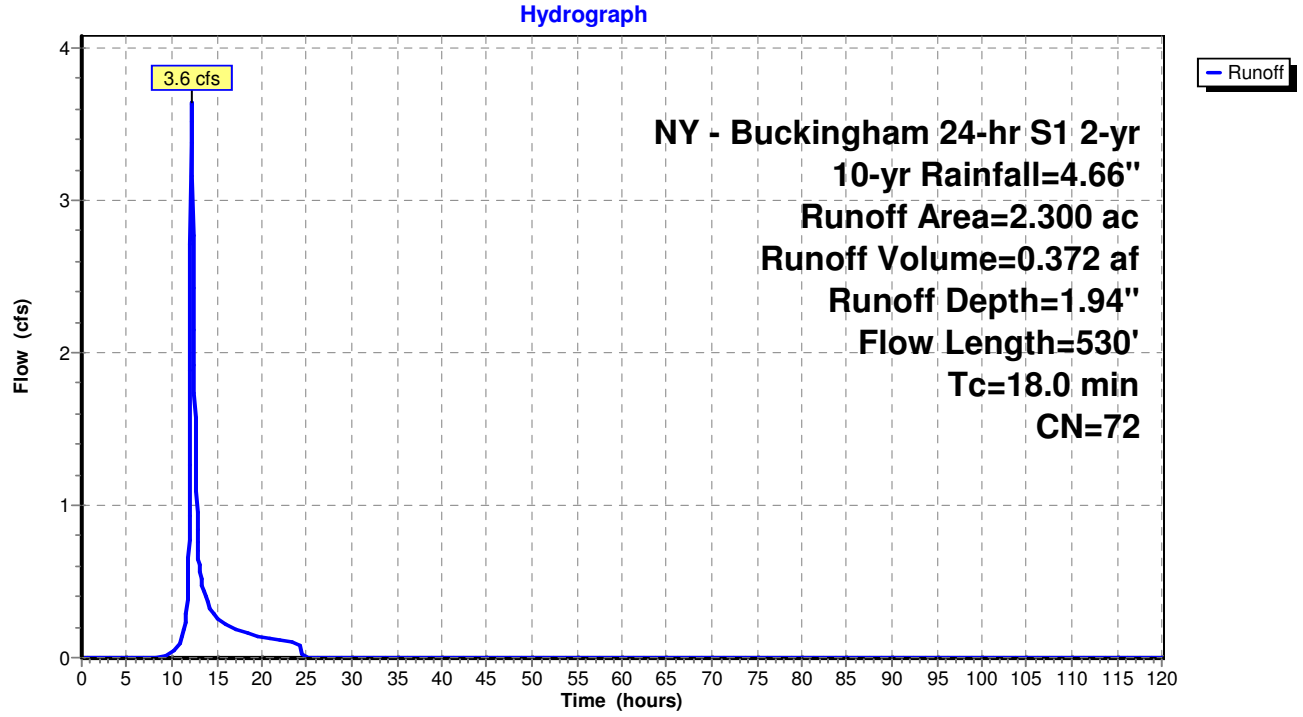
Runoff = 3.6 cfs @ 12.21 hrs, Volume= 0.372 af, Depth= 1.94"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
NY - Buckingham 24-hr S1 2-yr 10-yr Rainfall=4.66"

Area (ac)	CN	Description
0.200	98	Paved parking, HSG C
2.100	70	Woods, Good, HSG C
2.300	72	Weighted Average
2.100		91.30% Pervious Area
0.200		8.70% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.0	100	0.0500	0.11		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.15"
1.5	120	0.0700	1.32		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.3	50	0.2400	2.45		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
1.2	260	0.0300	3.52		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
18.0	530	Total			

Subcatchment PRE 2:



Summary for Subcatchment PRE 3:

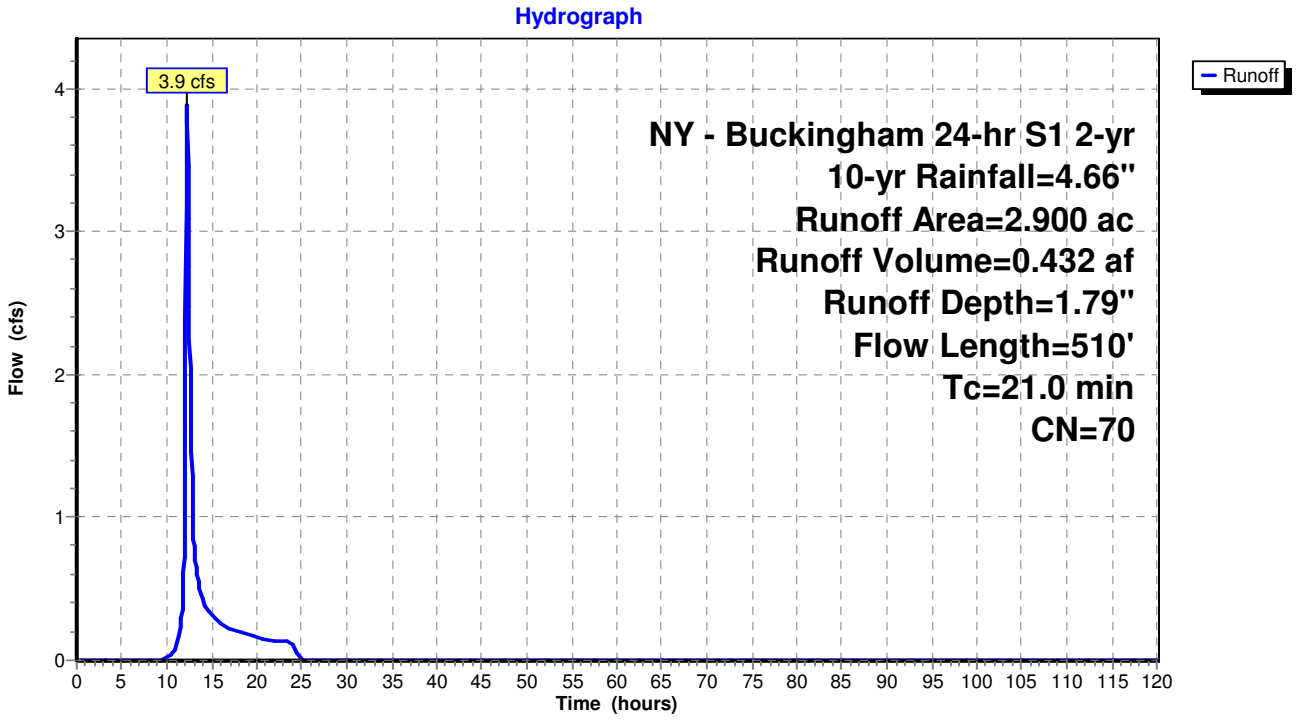
Runoff = 3.9 cfs @ 12.26 hrs, Volume= 0.432 af, Depth= 1.79"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
NY - Buckingham 24-hr S1 2-yr 10-yr Rainfall=4.66"

Area (ac)	CN	Description
2.900	70	Woods, Good, HSG C
2.900		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.9	70	0.0700	0.12		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.15"
0.3	50	0.2400	2.45		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
9.3	280	0.0100	0.50		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
1.5	110	0.0600	1.22		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
21.0	510	Total			

Subcatchment PRE 3:



Summary for Subcatchment PRE 4:

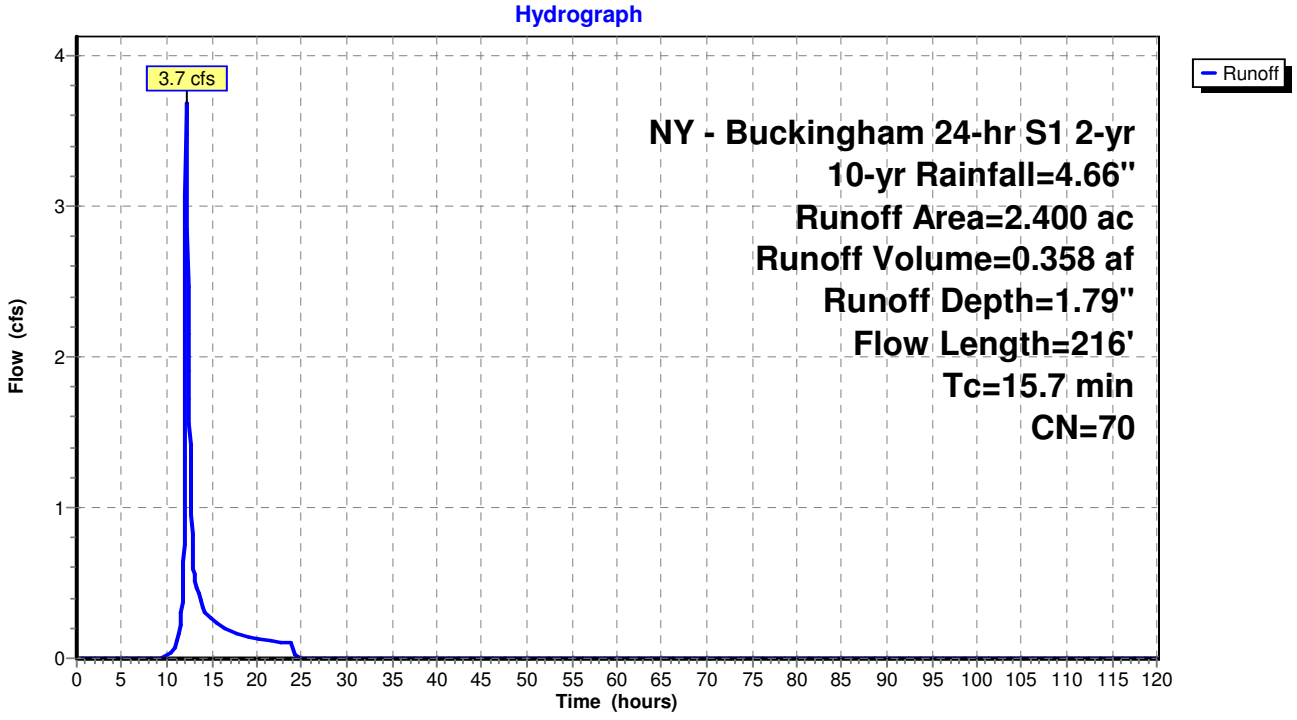
Runoff = 3.7 cfs @ 12.18 hrs, Volume= 0.358 af, Depth= 1.79"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
NY - Buckingham 24-hr S1 2-yr 10-yr Rainfall=4.66"

Area (ac)	CN	Description
2.400	70	Woods, Good, HSG C
2.400		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.0	100	0.0500	0.11		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.15"
0.4	36	0.1100	1.66		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.3	80	0.6000	3.87		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
15.7	216	Total			

Subcatchment PRE 4:



Summary for Subcatchment PRE 1:

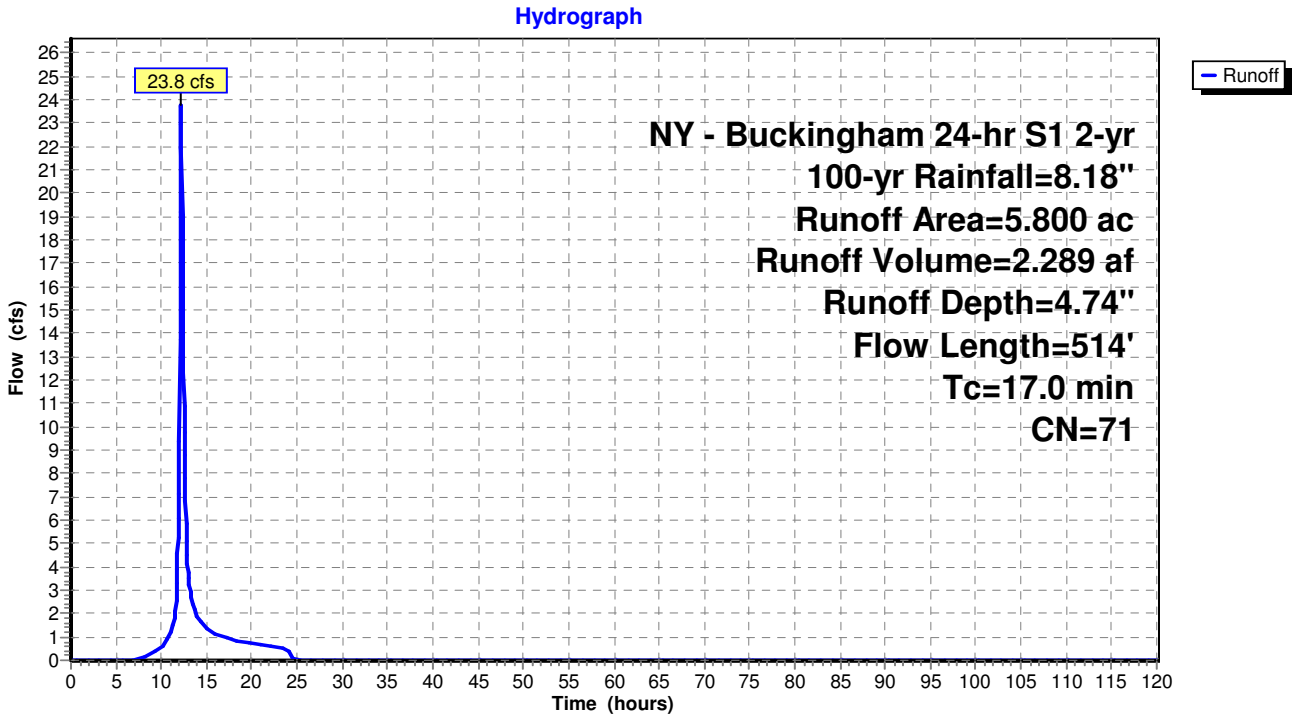
Runoff = 23.8 cfs @ 12.19 hrs, Volume= 2.289 af, Depth= 4.74"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
NY - Buckingham 24-hr S1 2-yr 100-yr Rainfall=8.18"

Area (ac)	CN	Description
4.600	70	Woods, Good, HSG C
1.200	77	Woods, Good, HSG D
5.800	71	Weighted Average
5.800		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.4	100	0.1000	0.15		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.15"
3.6	151	0.0200	0.71		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
2.0	263	0.2000	2.24		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
17.0	514	Total			

Subcatchment PRE 1:



Summary for Subcatchment PRE 2:

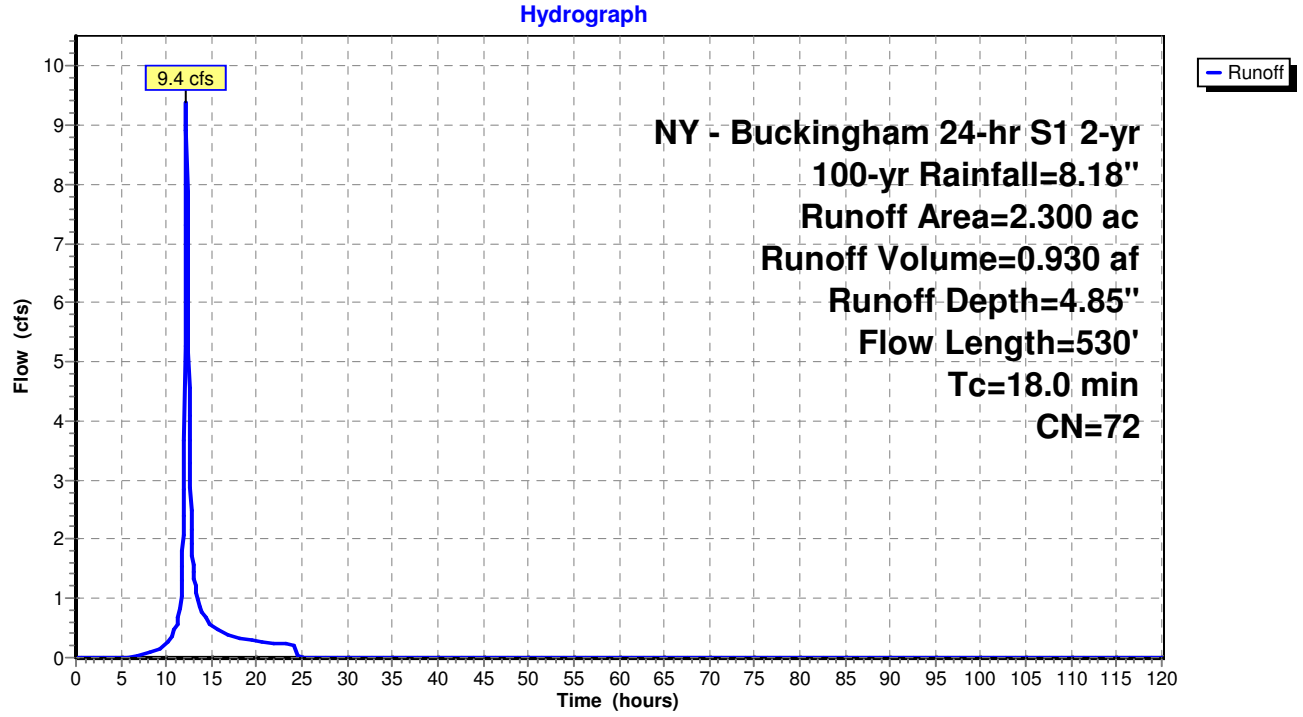
Runoff = 9.4 cfs @ 12.20 hrs, Volume= 0.930 af, Depth= 4.85"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
NY - Buckingham 24-hr S1 2-yr 100-yr Rainfall=8.18"

Area (ac)	CN	Description
0.200	98	Paved parking, HSG C
2.100	70	Woods, Good, HSG C
2.300	72	Weighted Average
2.100		91.30% Pervious Area
0.200		8.70% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.0	100	0.0500	0.11		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.15"
1.5	120	0.0700	1.32		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.3	50	0.2400	2.45		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
1.2	260	0.0300	3.52		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
18.0	530	Total			

Subcatchment PRE 2:



Summary for Subcatchment PRE 3:

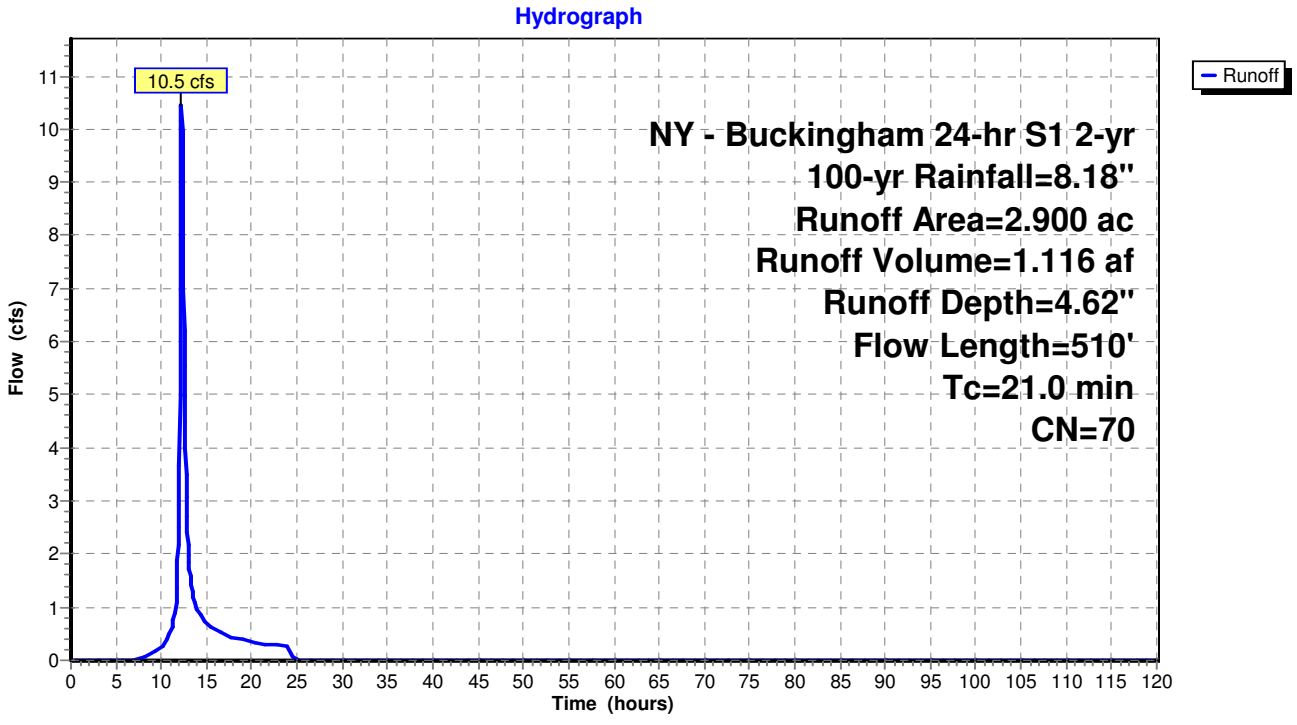
Runoff = 10.5 cfs @ 12.24 hrs, Volume= 1.116 af, Depth= 4.62"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
NY - Buckingham 24-hr S1 2-yr 100-yr Rainfall=8.18"

Area (ac)	CN	Description
2.900	70	Woods, Good, HSG C
2.900		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.9	70	0.0700	0.12		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.15"
0.3	50	0.2400	2.45		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
9.3	280	0.0100	0.50		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
1.5	110	0.0600	1.22		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
21.0	510	Total			

Subcatchment PRE 3:



Summary for Subcatchment PRE 4:

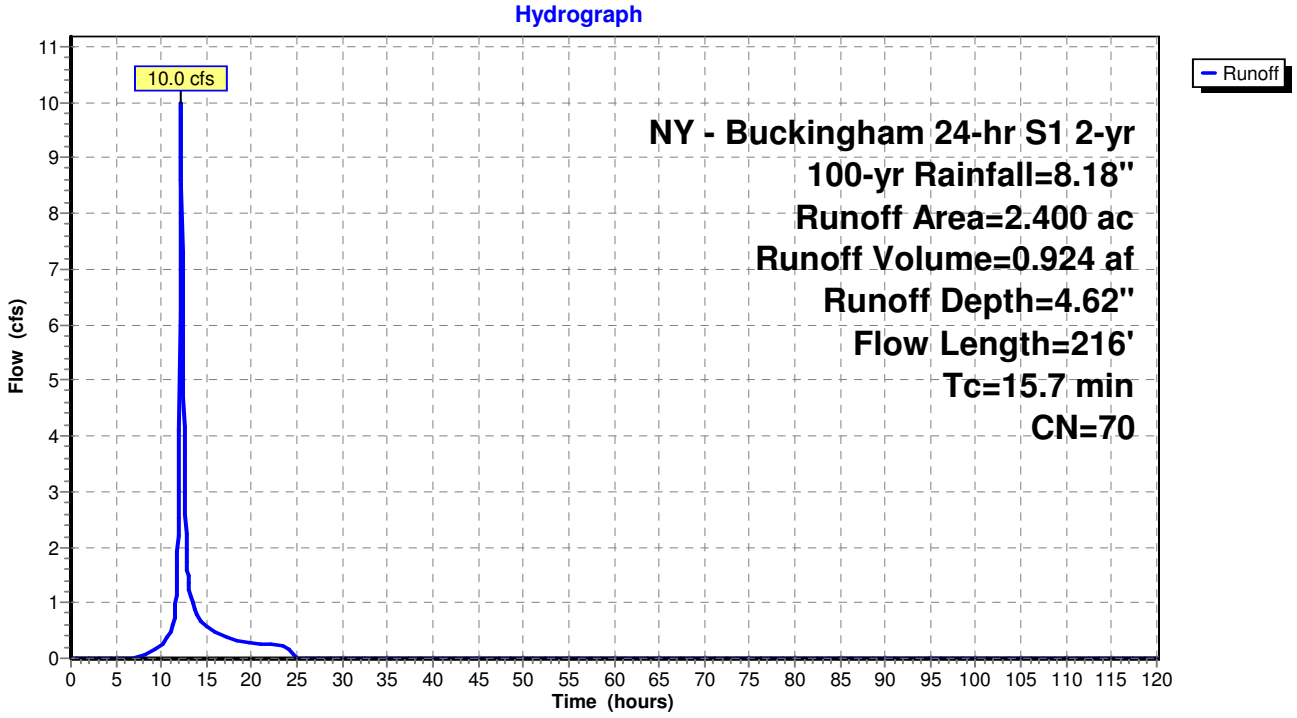
Runoff = 10.0 cfs @ 12.17 hrs, Volume= 0.924 af, Depth= 4.62"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
NY - Buckingham 24-hr S1 2-yr 100-yr Rainfall=8.18"

Area (ac)	CN	Description
2.400	70	Woods, Good, HSG C
2.400		100.00% Pervious Area

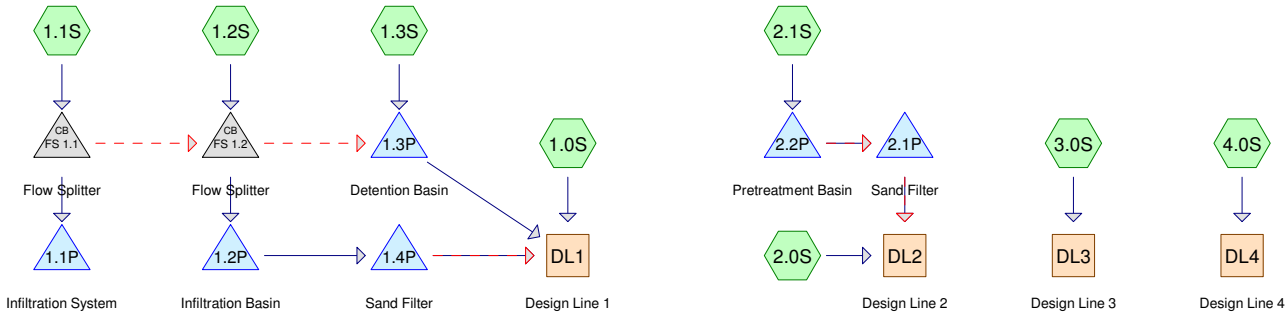
Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.0	100	0.0500	0.11		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.15"
0.4	36	0.1100	1.66		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.3	80	0.6000	3.87		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
15.7	216	Total			

Subcatchment PRE 4:



APPENDIX C

Post-Development Computer Data



Subcat Reach Pond Link

Routing Diagram for Post-Development

Prepared by Insite Engineering, Surveying & Landscape Architecture, P.C., Printed 9/11/2023

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Summary for Subcatchment 1.0S:

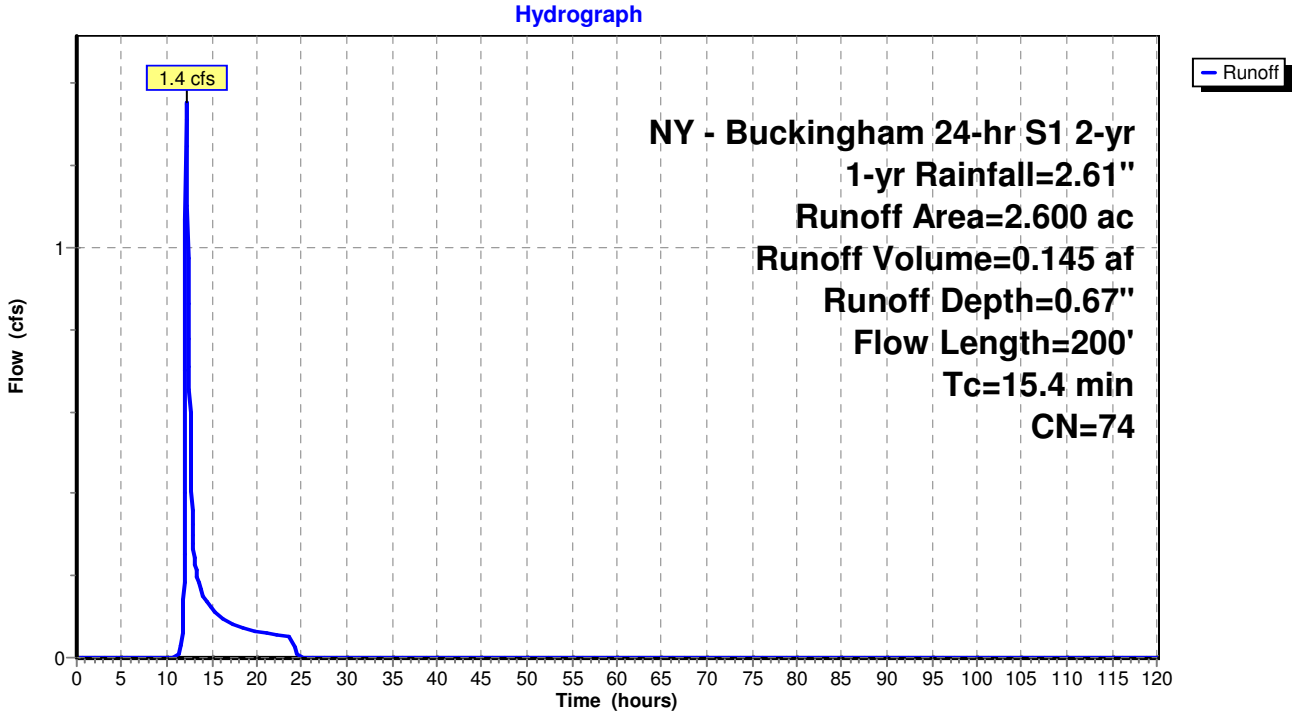
Runoff = 1.4 cfs @ 12.19 hrs, Volume= 0.145 af, Depth= 0.67"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
NY - Buckingham 24-hr S1 2-yr 1-yr Rainfall=2.61"

Area (ac)	CN	Description
0.800	74	>75% Grass cover, Good, HSG C
0.600	70	Woods, Good, HSG C
1.200	77	Woods, Good, HSG D
2.600	74	Weighted Average
2.600		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.5	25	0.3500	0.28		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.15"
11.9	75	0.0500	0.10		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.15"
1.7	50	0.0100	0.50		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.3	50	0.4000	3.16		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
15.4	200	Total			

Subcatchment 1.0S:



Summary for Subcatchment 1.1S:

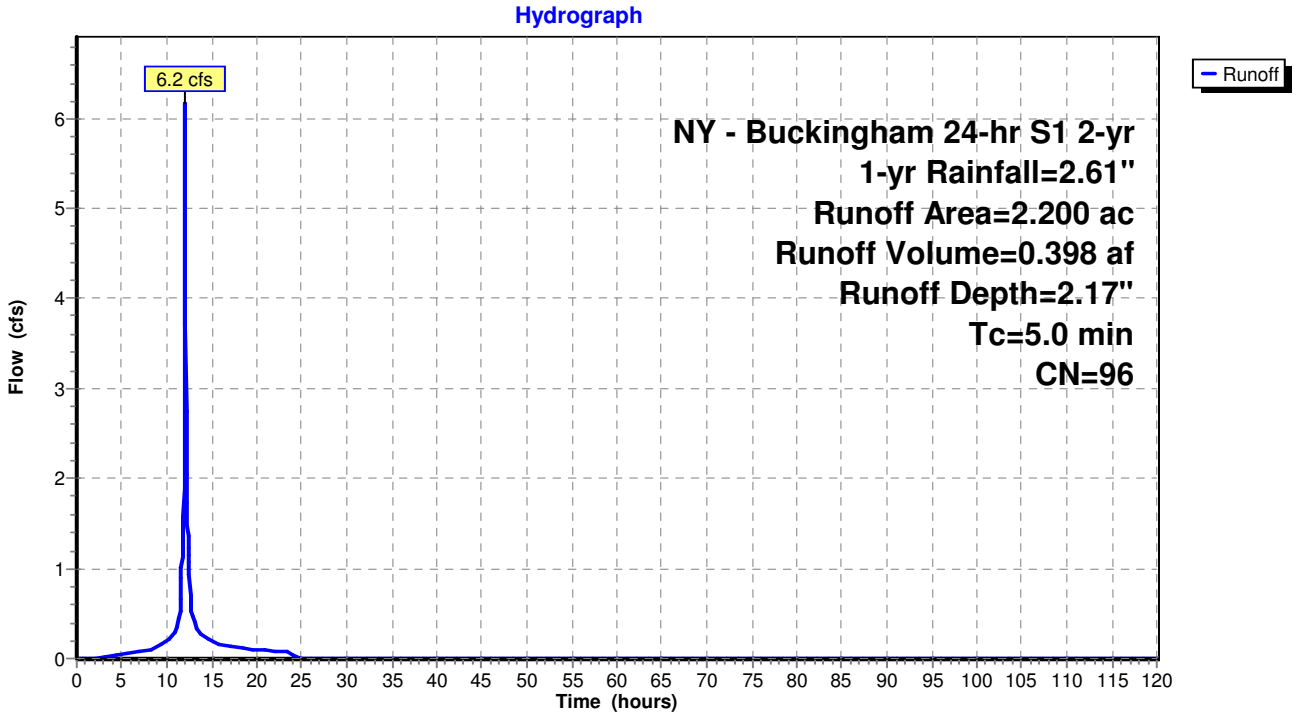
Runoff = 6.2 cfs @ 12.02 hrs, Volume= 0.398 af, Depth= 2.17"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
NY - Buckingham 24-hr S1 2-yr 1-yr Rainfall=2.61"

Area (ac)	CN	Description
0.200	74	>75% Grass cover, Good, HSG C
2.000	98	Paved parking, HSG C
2.200	96	Weighted Average
0.200		9.09% Pervious Area
2.000		90.91% Impervious Area

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

Subcatchment 1.1S:



Summary for Subcatchment 1.2S:

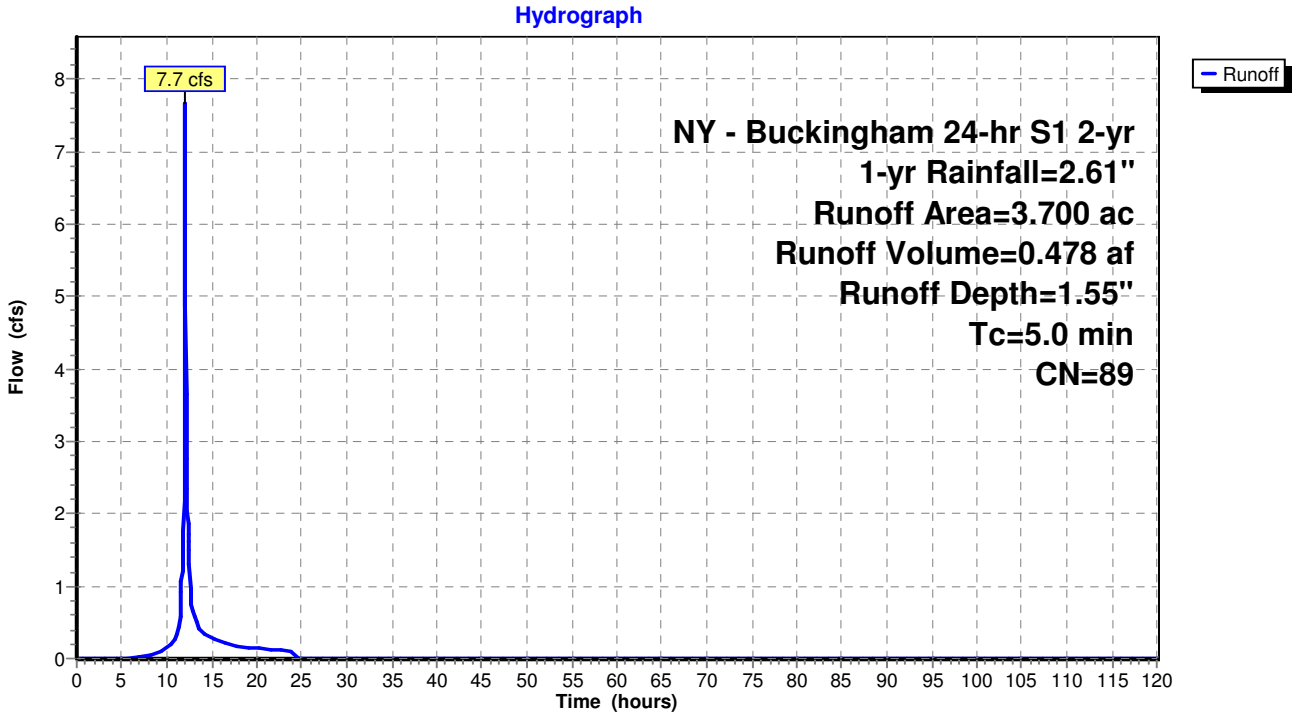
Runoff = 7.7 cfs @ 12.03 hrs, Volume= 0.478 af, Depth= 1.55"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
NY - Buckingham 24-hr S1 2-yr 1-yr Rainfall=2.61"

Area (ac)	CN	Description
1.400	74	>75% Grass cover, Good, HSG C
2.300	98	Paved parking, HSG C
3.700	89	Weighted Average
1.400		37.84% Pervious Area
2.300		62.16% Impervious Area

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

Subcatchment 1.2S:



Summary for Subcatchment 1.3S:

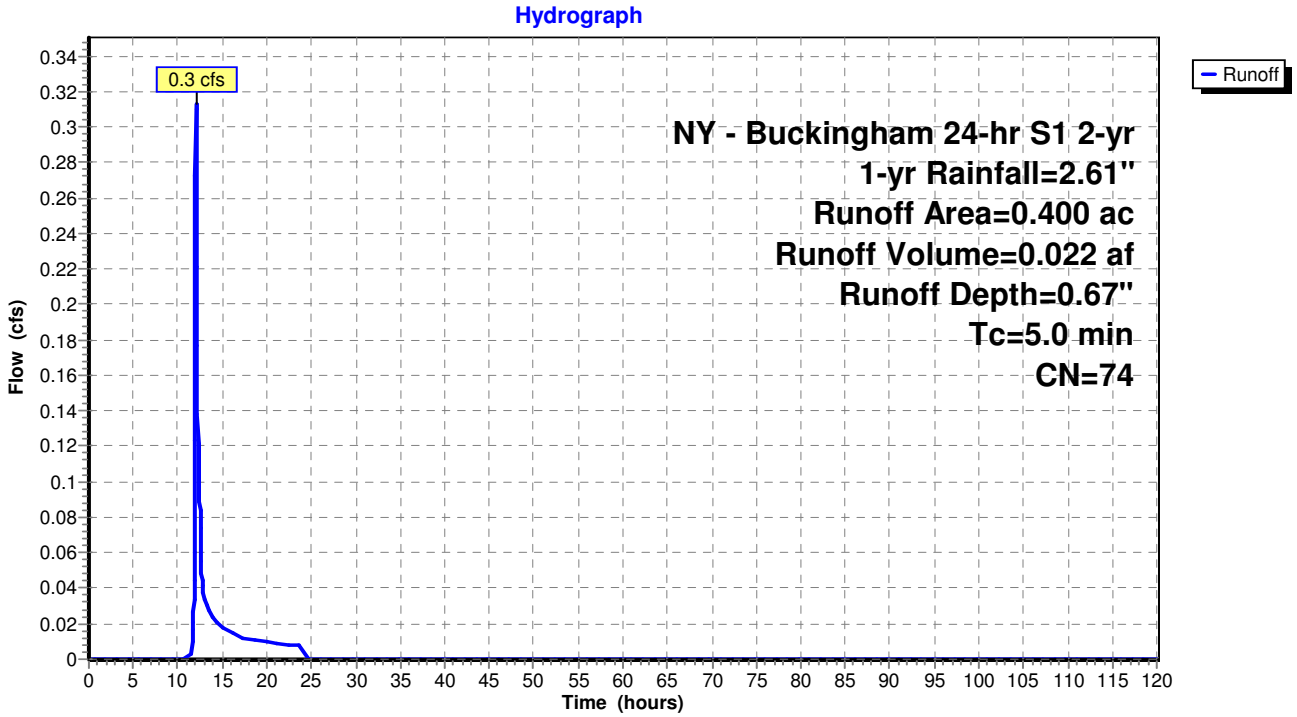
Runoff = 0.3 cfs @ 12.04 hrs, Volume= 0.022 af, Depth= 0.67"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
NY - Buckingham 24-hr S1 2-yr 1-yr Rainfall=2.61"

Area (ac)	CN	Description
0.400	74	>75% Grass cover, Good, HSG C
0.400		100.00% Pervious Area

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

Subcatchment 1.3S:



Summary for Subcatchment 2.0S:

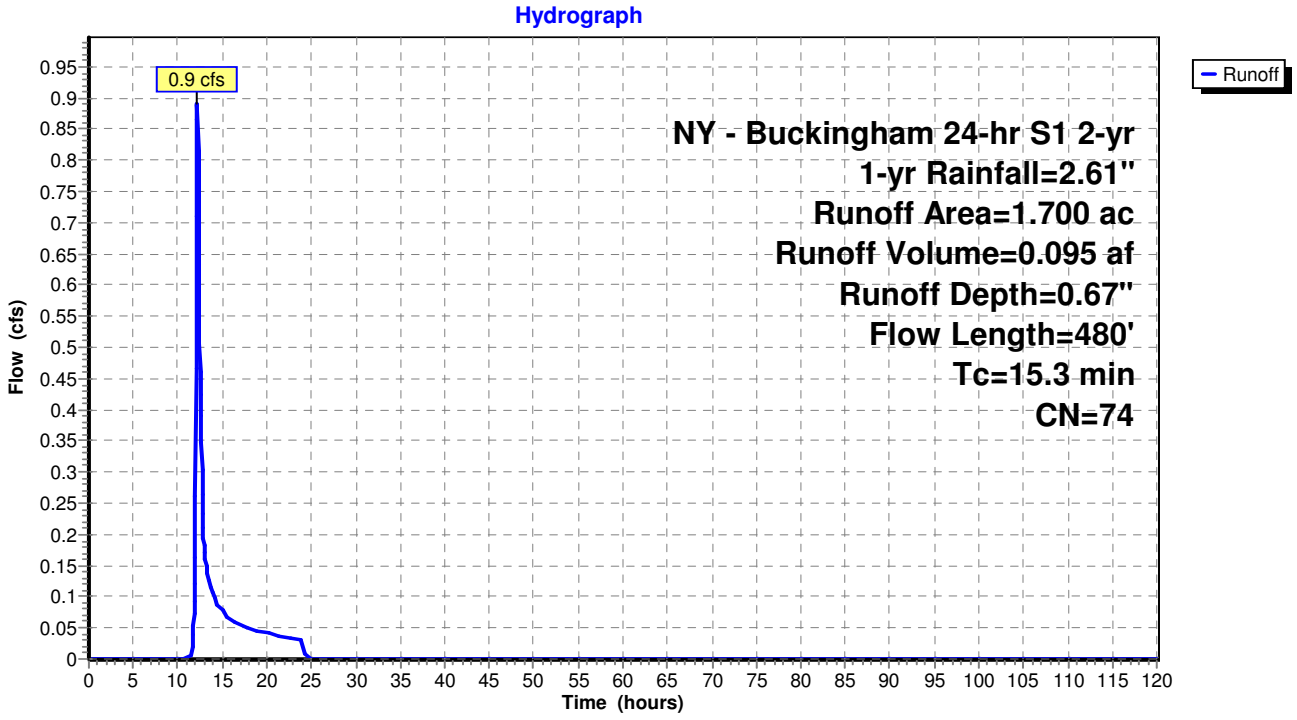
Runoff = 0.9 cfs @ 12.19 hrs, Volume= 0.095 af, Depth= 0.67"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
NY - Buckingham 24-hr S1 2-yr 1-yr Rainfall=2.61"

Area (ac)	CN	Description
0.400	70	Woods, Good, HSG C
0.900	65	Brush, Good, HSG C
0.400	98	Paved parking, HSG C
1.700	74	Weighted Average
1.300		76.47% Pervious Area
0.400		23.53% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.3	30	0.0700	0.15		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.15"
9.9	70	0.0700	0.12		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.15"
0.6	70	0.1700	2.06		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
1.5	310	0.0300	3.52		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
15.3	480	Total			

Subcatchment 2.0S:



Summary for Subcatchment 2.1S:

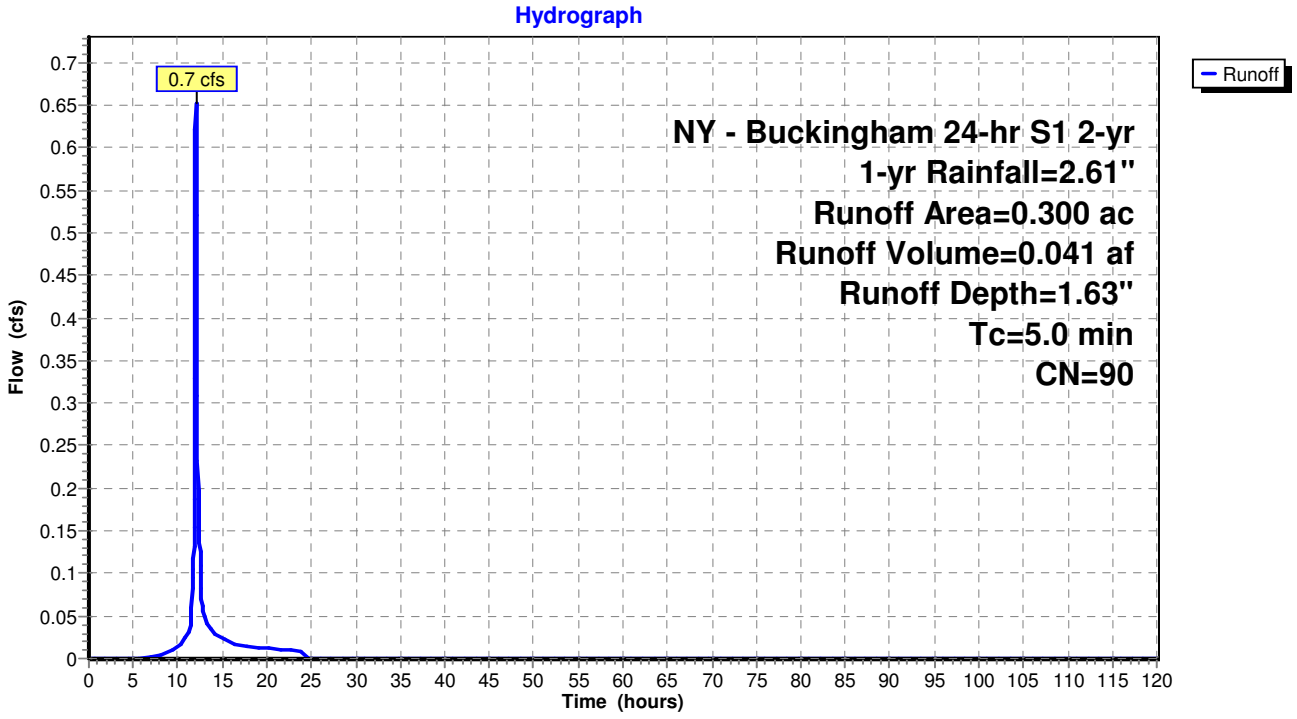
Runoff = 0.7 cfs @ 12.03 hrs, Volume= 0.041 af, Depth= 1.63"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
NY - Buckingham 24-hr S1 2-yr 1-yr Rainfall=2.61"

Area (ac)	CN	Description
0.100	74	>75% Grass cover, Good, HSG C
0.200	98	Paved parking, HSG C
0.300	90	Weighted Average
0.100		33.33% Pervious Area
0.200		66.67% Impervious Area

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

Subcatchment 2.1S:



Summary for Subcatchment 3.0S:

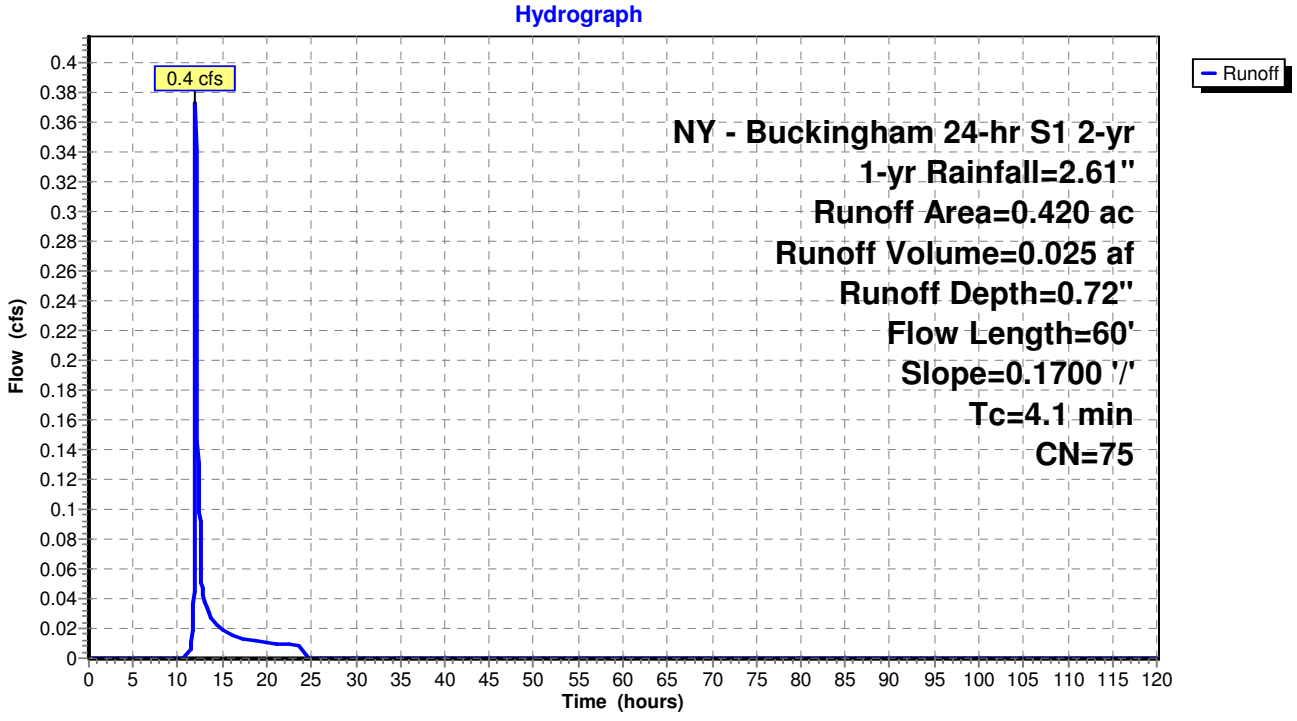
Runoff = 0.4 cfs @ 12.02 hrs, Volume= 0.025 af, Depth= 0.72"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
NY - Buckingham 24-hr S1 2-yr 1-yr Rainfall=2.61"

Area (ac)	CN	Description
0.400	74	>75% Grass cover, Good, HSG C
0.020	98	Paved parking, HSG C
0.420	75	Weighted Average
0.400		95.24% Pervious Area
0.020		4.76% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.1	60	0.1700	0.25		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.15"

Subcatchment 3.0S:



Summary for Subcatchment 4.0S:

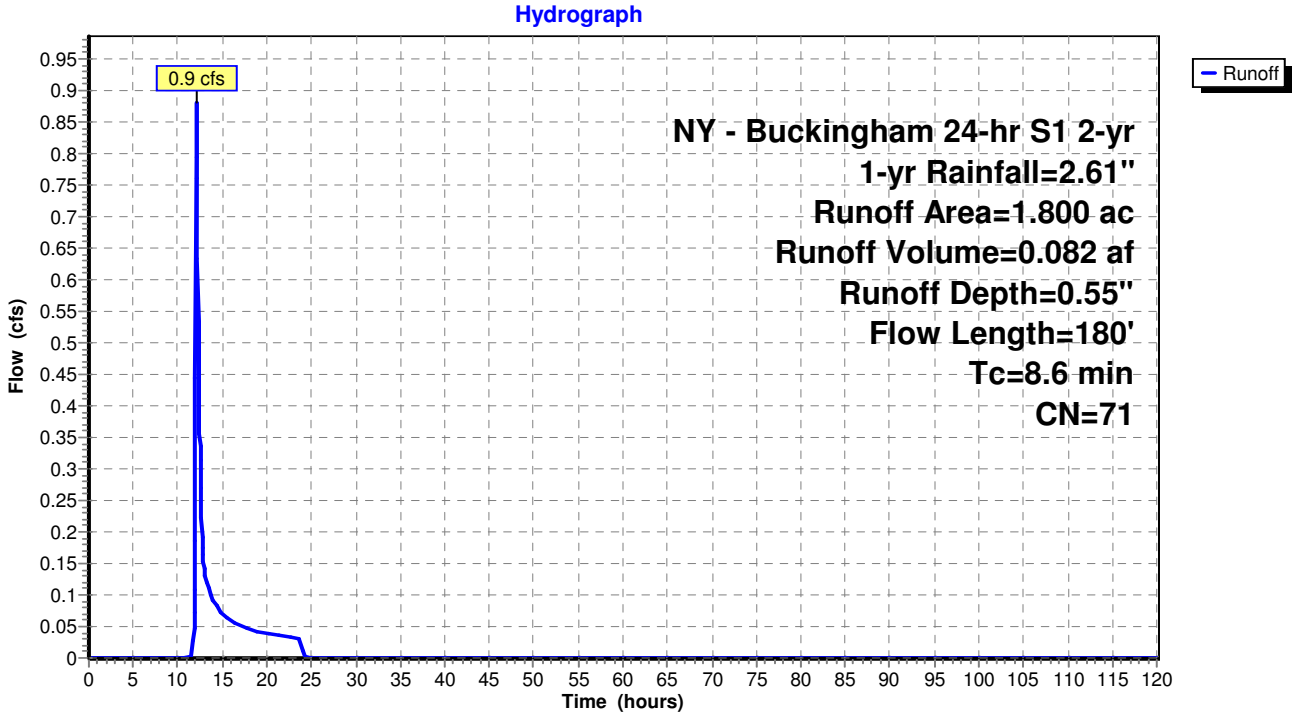
Runoff = 0.9 cfs @ 12.10 hrs, Volume= 0.082 af, Depth= 0.55"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
NY - Buckingham 24-hr S1 2-yr 1-yr Rainfall=2.61"

Area (ac)	CN	Description
1.380	70	Woods, Good, HSG C
0.400	74	>75% Grass cover, Good, HSG C
0.020	98	Paved parking, HSG C
1.800	71	Weighted Average
1.780		98.89% Pervious Area
0.020		1.11% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.1	100	0.0850	0.21		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.15"
0.3	30	0.0900	1.50		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.2	50	0.4500	3.35		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
8.6	180	Total			

Subcatchment 4.0S:

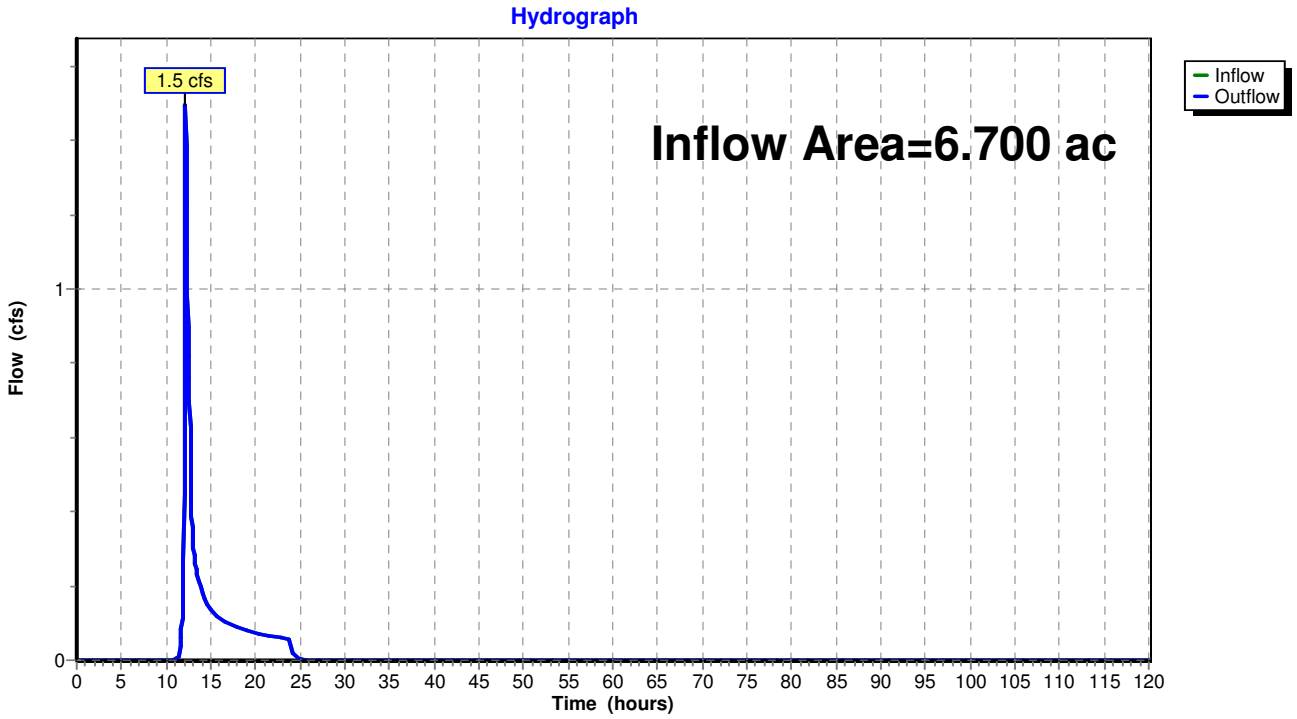


Summary for Reach DL1: Design Line 1

Inflow Area = 6.700 ac, 34.33% Impervious, Inflow Depth = 0.30" for 1-yr event
Inflow = 1.5 cfs @ 12.19 hrs, Volume= 0.168 af
Outflow = 1.5 cfs @ 12.19 hrs, Volume= 0.168 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs

Reach DL1: Design Line 1

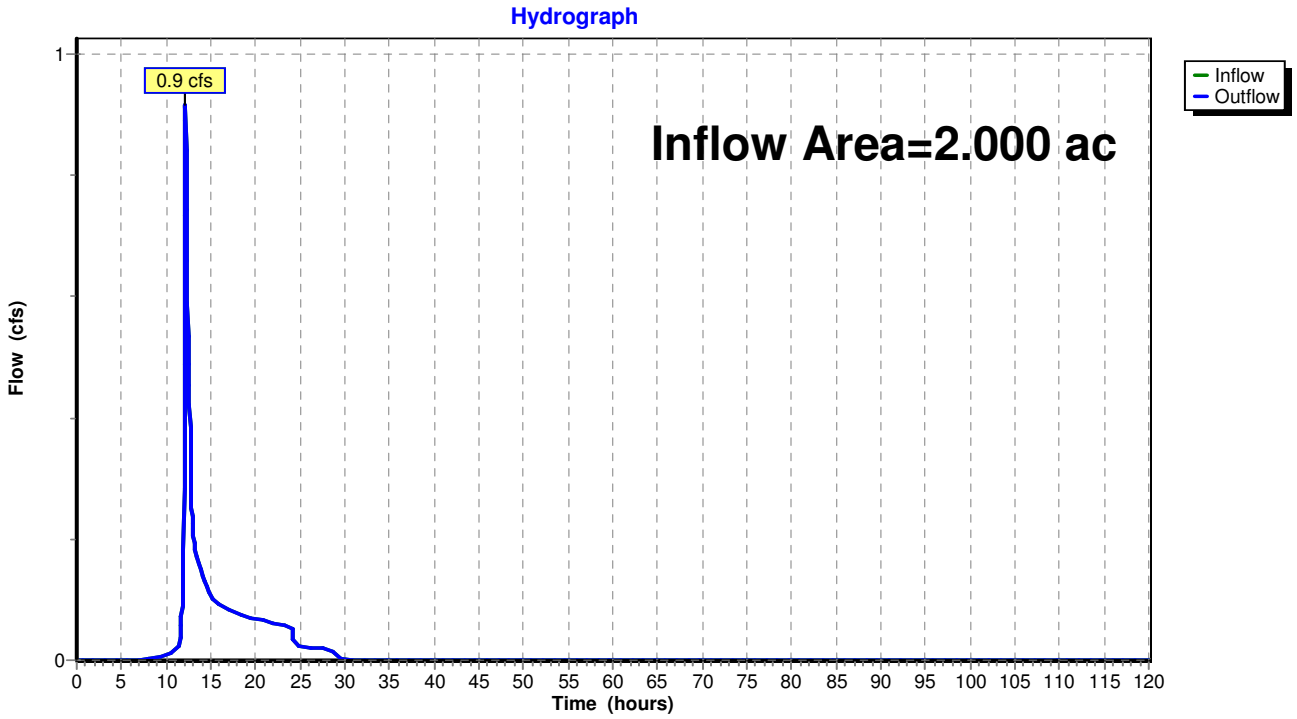


Summary for Reach DL2: Design Line 2

Inflow Area = 2.000 ac, 30.00% Impervious, Inflow Depth = 0.81" for 1-yr event
Inflow = 0.9 cfs @ 12.19 hrs, Volume= 0.136 af
Outflow = 0.9 cfs @ 12.19 hrs, Volume= 0.136 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs

Reach DL2: Design Line 2

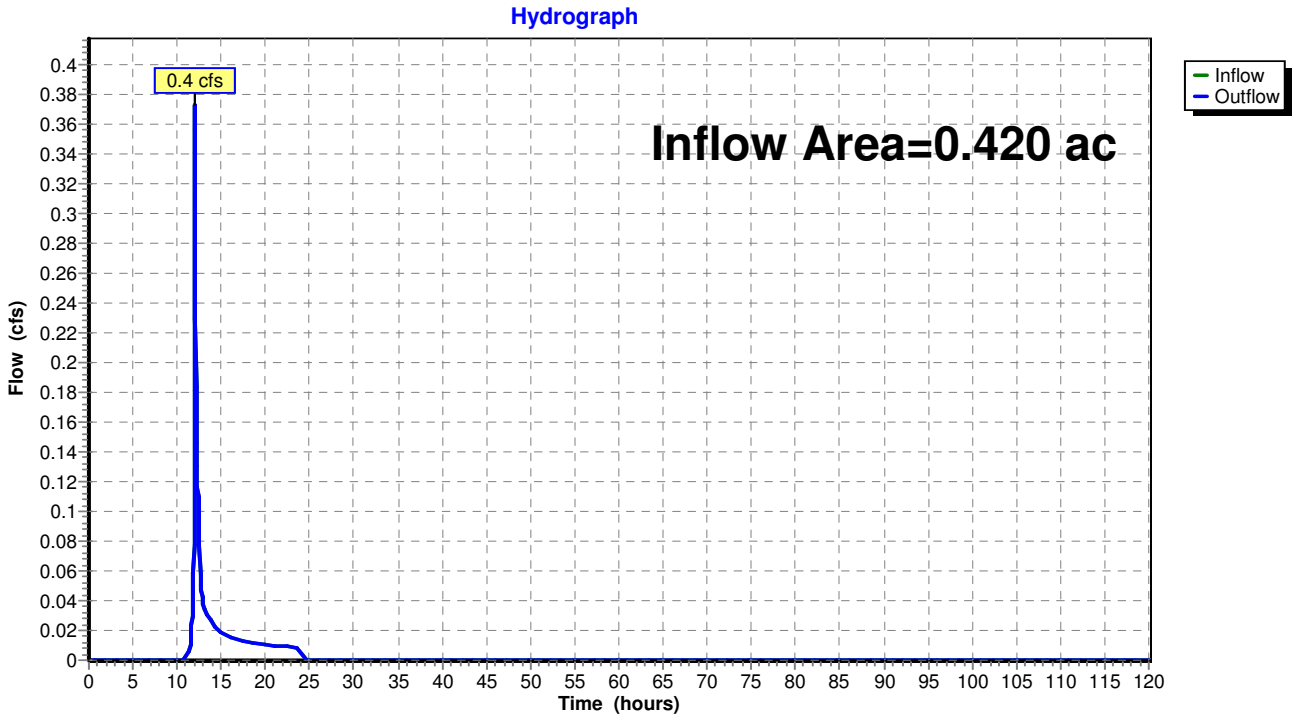


Summary for Reach DL3: Design Line 3

Inflow Area = 0.420 ac, 4.76% Impervious, Inflow Depth = 0.72" for 1-yr event
Inflow = 0.4 cfs @ 12.02 hrs, Volume= 0.025 af
Outflow = 0.4 cfs @ 12.02 hrs, Volume= 0.025 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs

Reach DL3: Design Line 3

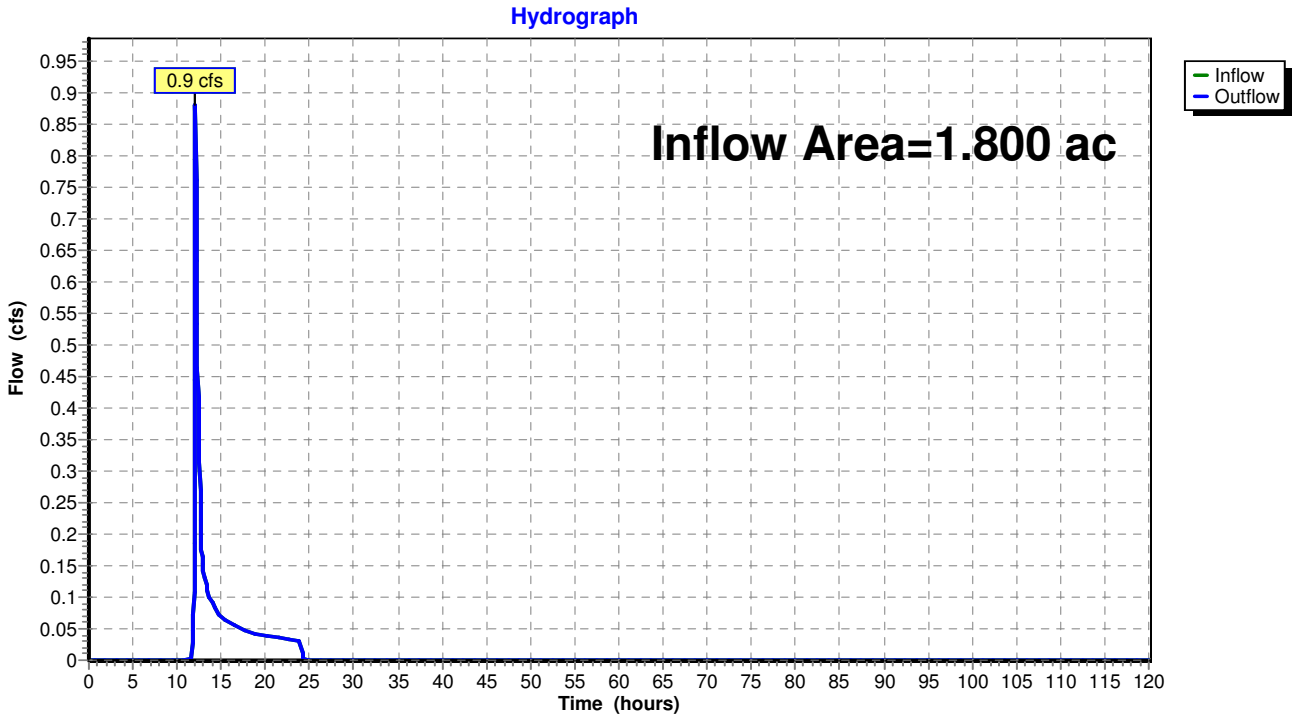


Summary for Reach DL4: Design Line 4

Inflow Area = 1.800 ac, 1.11% Impervious, Inflow Depth = 0.55" for 1-yr event
Inflow = 0.9 cfs @ 12.10 hrs, Volume= 0.082 af
Outflow = 0.9 cfs @ 12.10 hrs, Volume= 0.082 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs

Reach DL4: Design Line 4



Summary for Pond 1.1P: Infiltration System

Inflow Area = 2.200 ac, 90.91% Impervious, Inflow Depth = 2.17" for 1-yr event
Inflow = 6.2 cfs @ 12.02 hrs, Volume= 0.398 af
Outflow = 1.6 cfs @ 11.90 hrs, Volume= 0.398 af, Atten= 74%, Lag= 0.0 min
Discarded = 1.6 cfs @ 11.90 hrs, Volume= 0.398 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
Peak Elev= 198.26' @ 12.28 hrs Surf.Area= 0.083 ac Storage= 0.061 af

Plug-Flow detention time= 7.5 min calculated for 0.397 af (100% of inflow)
Center-of-Mass det. time= 7.5 min (791.9 - 784.4)

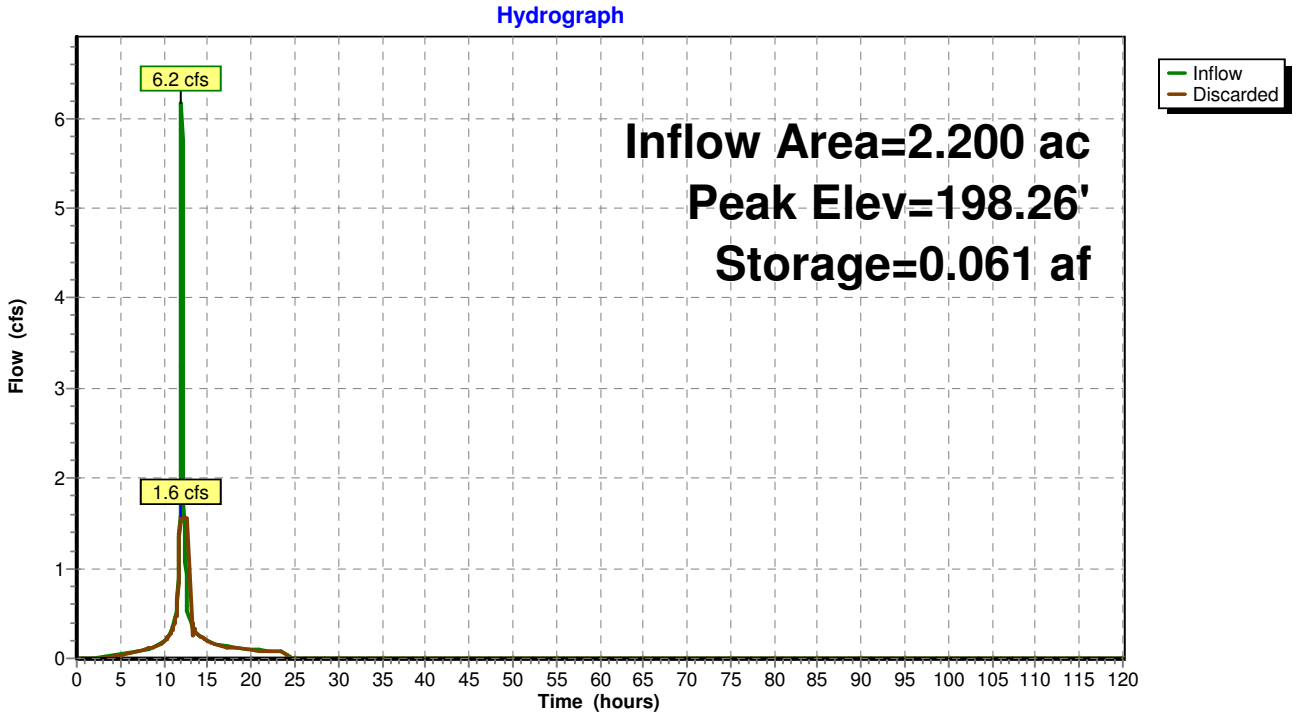
Volume	Invert	Avail.Storage	Storage Description
#1B	197.00'	0.116 af	**29.92'W x 120.42'L x 5.50'H Field B** 0.455 af Overall - 0.164 af Embedded = 0.291 af x 40.0% Voids
#2B	197.75'	0.164 af	**ADS_StormTech MC-3500 d +Cap** x 64 Inside #1 Effective Size= 70.4"W x 45.0"H => 15.33 sf x 7.17'L = 110.0 cf Overall Size= 77.0"W x 45.0"H x 7.50'L with 0.33' Overlap 4 Rows of 16 Chambers Cap Storage= +14.9 cf x 2 x 4 rows = 119.2 cf
		0.281 af	Total Available Storage

Storage Group B created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	197.00'	**19.000 in/hr Exfiltration over Horizontal area** Phase-In= 0.05'

Discarded OutFlow Max=1.6 cfs @ 11.90 hrs HW=197.07' (Free Discharge)
↑**1=Exfiltration** (Exfiltration Controls 1.6 cfs)

Pond 1.1P: Infiltration System



Summary for Pond 1.2P: Infiltration Basin

Inflow Area = 3.700 ac, 62.16% Impervious, Inflow Depth = 1.55" for 1-yr event
Inflow = 7.6 cfs @ 12.03 hrs, Volume= 0.478 af
Outflow = 1.1 cfs @ 12.59 hrs, Volume= 0.478 af, Atten= 86%, Lag= 33.6 min
Discarded = 1.1 cfs @ 12.59 hrs, Volume= 0.478 af
Primary = 0.0 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
Peak Elev= 198.53' @ 12.59 hrs Surf.Area= 2,765 sf Storage= 6,646 cf

Plug-Flow detention time= 49.6 min calculated for 0.478 af (100% of inflow)
Center-of-Mass det. time= 49.6 min (880.5 - 830.9)

Volume	Invert	Avail.Storage	Storage Description
#1	195.00'	11,250 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

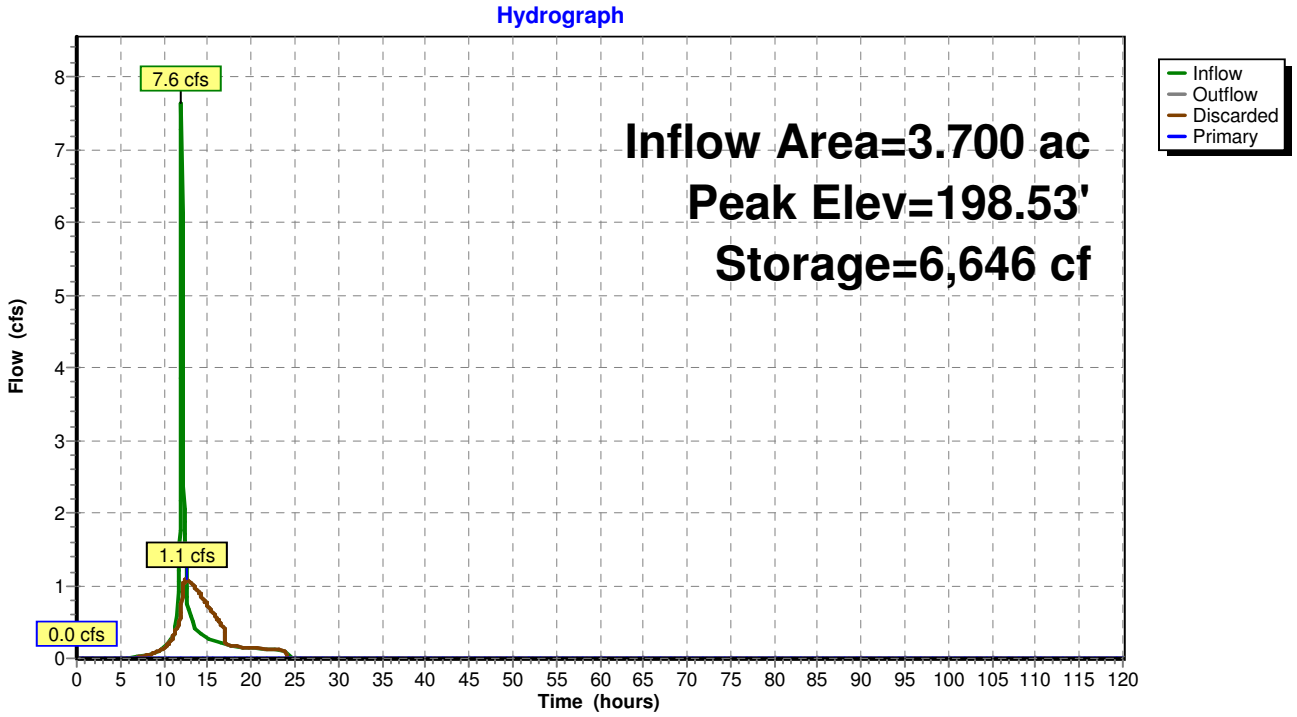
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
195.00	1,000	0	0
200.00	3,500	11,250	11,250

Device	Routing	Invert	Outlet Devices
#1	Primary	198.60'	**8.0' long x 1.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 Coef. (English) 2.69 2.72 2.75 2.85 2.98 3.08 3.20 3.28 3.31 3.30 3.31 3.32
#2	Discarded	195.00'	**17.000 in/hr Exfiltration over Horizontal area** Phase-In= 0.05'

Discarded OutFlow Max=1.1 cfs @ 12.59 hrs HW=198.53' (Free Discharge)
↑—**2=Exfiltration** (Exfiltration Controls 1.1 cfs)

Primary OutFlow Max=0.0 cfs @ 0.00 hrs HW=195.00' TW=194.00' (Dynamic Tailwater)
↑—**1=Broad-Crested Rectangular Weir** (Controls 0.0 cfs)

Pond 1.2P: Infiltration Basin



Summary for Pond 1.3P: Detention Basin

Inflow Area = 0.400 ac, 0.00% Impervious, Inflow Depth = 0.68" for 1-yr event
Inflow = 0.3 cfs @ 12.04 hrs, Volume= 0.023 af
Outflow = 0.1 cfs @ 12.21 hrs, Volume= 0.023 af, Atten= 59%, Lag= 9.8 min
Primary = 0.1 cfs @ 12.21 hrs, Volume= 0.023 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
Peak Elev= 190.23' @ 12.21 hrs Surf.Area= 978 sf Storage= 168 cf

Plug-Flow detention time= 38.8 min calculated for 0.022 af (100% of inflow)
Center-of-Mass det. time= 40.0 min (935.2 - 895.2)

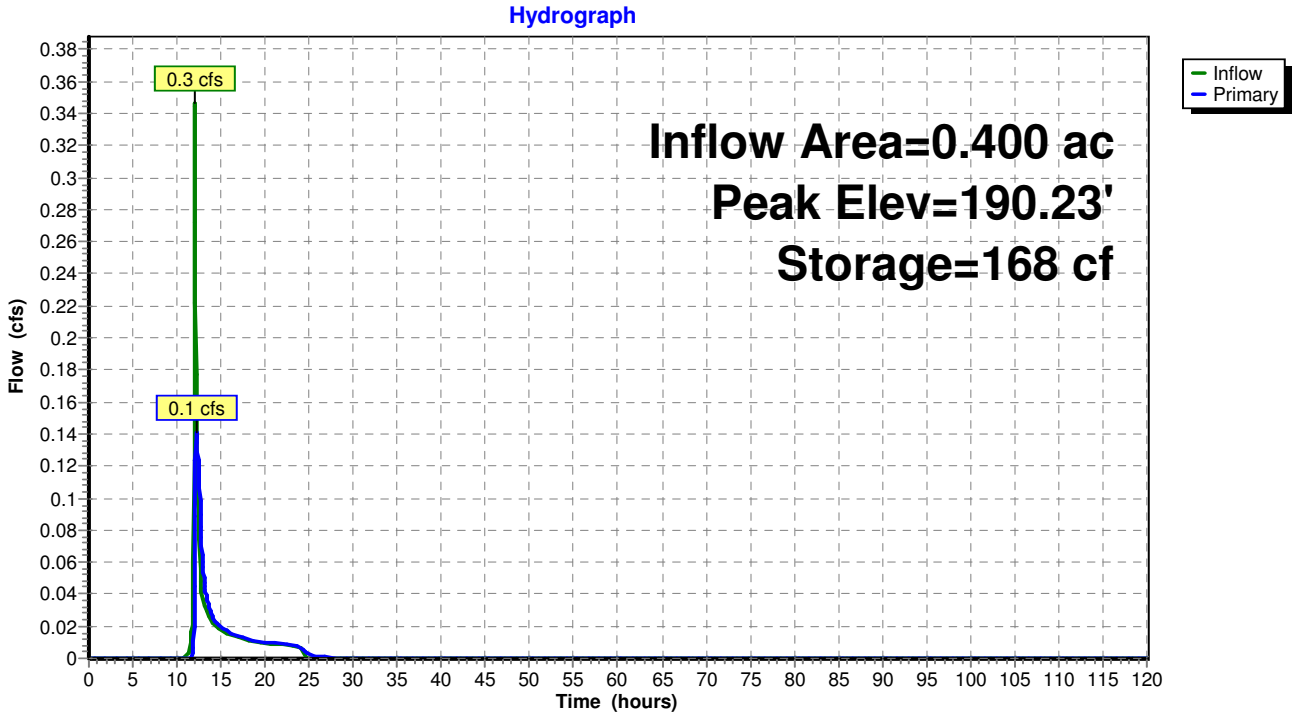
Volume	Invert	Avail.Storage	Storage Description
#1	190.00'	31,800 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
190.00	500	0	0
191.00	2,600	1,550	1,550
196.00	9,500	30,250	31,800

Device	Routing	Invert	Outlet Devices
#1	Primary	189.00'	**24.0" Round Culvert** L= 40.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 189.00' / 188.00' S= 0.0250 '/' Cc= 0.900 n= 0.012, Flow Area= 3.14 sf
#2	Device 1	190.00'	**6.0" Vert. Orifice/Grate** C= 0.600
#3	Device 1	194.00'	**1.0' long x 0.5' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32

Primary OutFlow Max=0.1 cfs @ 12.21 hrs HW=190.23' TW=0.00' (Dynamic Tailwater)
└**1=Culvert** (Passes 0.1 cfs of 7.6 cfs potential flow)
└**2=Orifice/Grate** (Orifice Controls 0.1 cfs @ 1.62 fps)
└**3=Broad-Crested Rectangular Weir** (Controls 0.0 cfs)

Pond 1.3P: Detention Basin



Summary for Pond 1.4P: Sand Filter

Inflow Area = 3.700 ac, 62.16% Impervious, Inflow Depth = 0.00" for 1-yr event
Inflow = 0.0 cfs @ 0.00 hrs, Volume= 0.000 af
Outflow = 0.0 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min
Primary = 0.0 cfs @ 0.00 hrs, Volume= 0.000 af
Secondary = 0.0 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
Peak Elev= 194.00' @ 0.00 hrs Surf.Area= 1,000 sf Storage= 0 cf

Plug-Flow detention time= (not calculated: initial storage exceeds outflow)
Center-of-Mass det. time= (not calculated: no inflow)

Volume	Invert	Avail.Storage	Storage Description
#1	194.00'	12,500 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

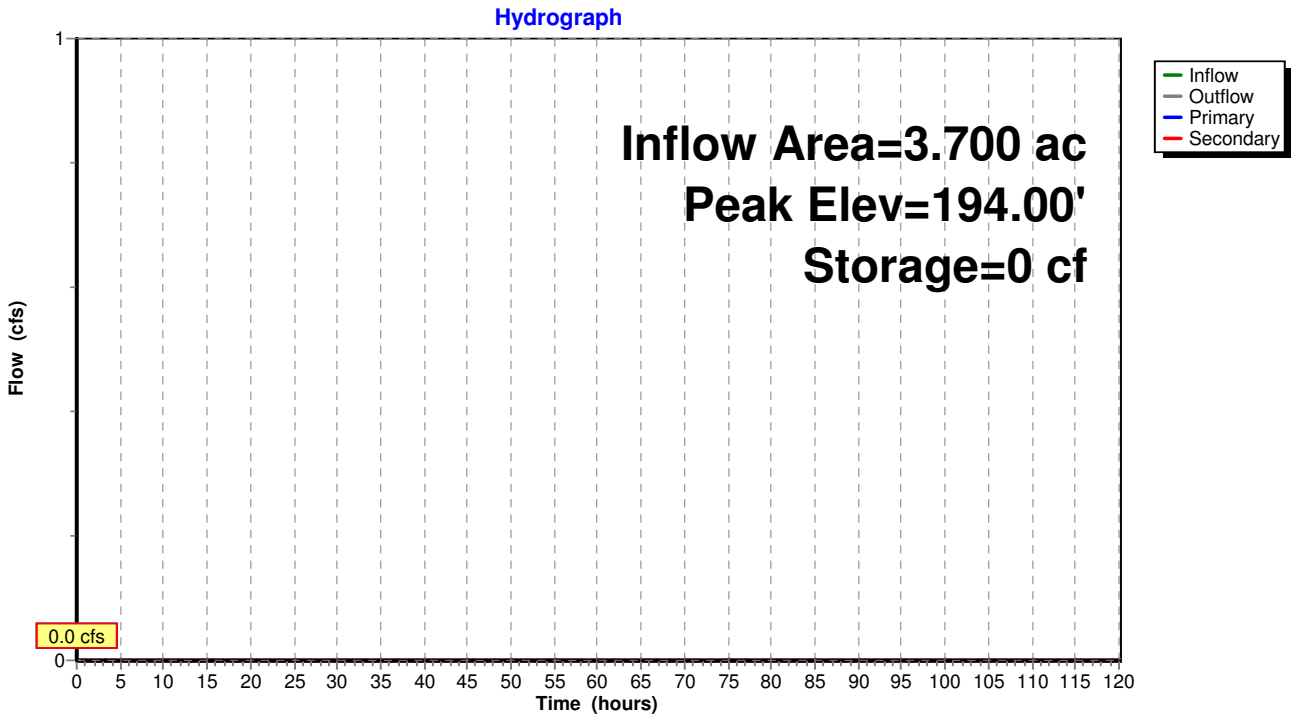
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
194.00	1,000	0	0
199.00	4,000	12,500	12,500

Device	Routing	Invert	Outlet Devices
#1	Primary	194.00'	**1.750 in/hr Exfiltration over Horizontal area** Phase-In= 0.10'
#2	Secondary	196.50'	**0.6' long x 0.5' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32

Primary OutFlow Max=0.0 cfs @ 0.00 hrs HW=194.00' TW=0.00' (Dynamic Tailwater)
↑—**1=Exfiltration** (Controls 0.0 cfs)

Secondary OutFlow Max=0.0 cfs @ 0.00 hrs HW=194.00' TW=0.00' (Dynamic Tailwater)
↑—**2=Broad-Crested Rectangular Weir** (Controls 0.0 cfs)

Pond 1.4P: Sand Filter



Summary for Pond 2.1P: Sand Filter

Inflow Area = 0.300 ac, 66.67% Impervious, Inflow Depth = 1.63" for 1-yr event
Inflow = 0.3 cfs @ 12.17 hrs, Volume= 0.041 af
Outflow = 0.0 cfs @ 13.19 hrs, Volume= 0.041 af, Atten= 84%, Lag= 61.1 min
Primary = 0.0 cfs @ 13.19 hrs, Volume= 0.039 af
Secondary = 0.0 cfs @ 13.19 hrs, Volume= 0.002 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
Peak Elev= 174.05' @ 13.19 hrs Surf.Area= 722 sf Storage= 584 cf

Plug-Flow detention time= 226.0 min calculated for 0.041 af (100% of inflow)
Center-of-Mass det. time= 226.0 min (1,141.9 - 915.9)

Volume	Invert	Avail.Storage	Storage Description
#1	173.00'	2,850 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

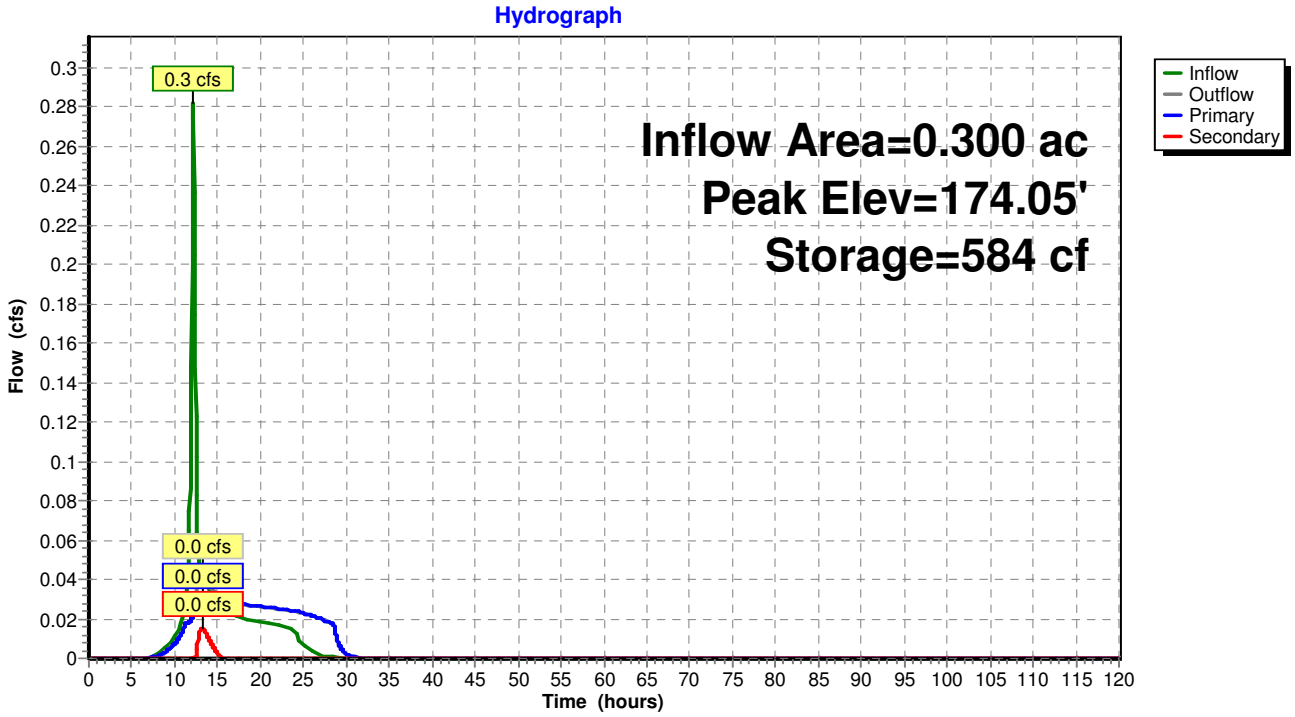
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
173.00	400	0	0
174.00	700	550	550
176.00	1,600	2,300	2,850

Device	Routing	Invert	Outlet Devices
#1	Device 3	173.00'	**1.750 in/hr Exfiltration over Horizontal area** Phase-In= 0.10'
#2	Secondary	174.00'	**0.5' long x 0.5' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32
#3	Primary	170.00'	**3.0" Vert. Orifice/Grate** C= 0.600

Primary OutFlow Max=0.0 cfs @ 13.19 hrs HW=174.05' TW=0.00' (Dynamic Tailwater)
↑└**3=Orifice/Grate** (Passes 0.0 cfs of 0.5 cfs potential flow)
↑└**1=Exfiltration** (Exfiltration Controls 0.0 cfs)

Secondary OutFlow Max=0.0 cfs @ 13.19 hrs HW=174.05' TW=0.00' (Dynamic Tailwater)
↑└**2=Broad-Crested Rectangular Weir** (Weir Controls 0.0 cfs @ 0.62 fps)

Pond 2.1P: Sand Filter



Summary for Pond 2.2P: Pretreatment Basin

Inflow Area = 0.300 ac, 66.67% Impervious, Inflow Depth = 1.63" for 1-yr event
Inflow = 0.7 cfs @ 12.03 hrs, Volume= 0.041 af
Outflow = 0.3 cfs @ 12.17 hrs, Volume= 0.041 af, Atten= 57%, Lag= 8.6 min
Primary = 0.3 cfs @ 12.17 hrs, Volume= 0.041 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
Peak Elev= 174.12' @ 12.17 hrs Surf.Area= 641 sf Storage= 322 cf

Plug-Flow detention time= 90.8 min calculated for 0.041 af (100% of inflow)
Center-of-Mass det. time= 90.2 min (915.9 - 825.6)

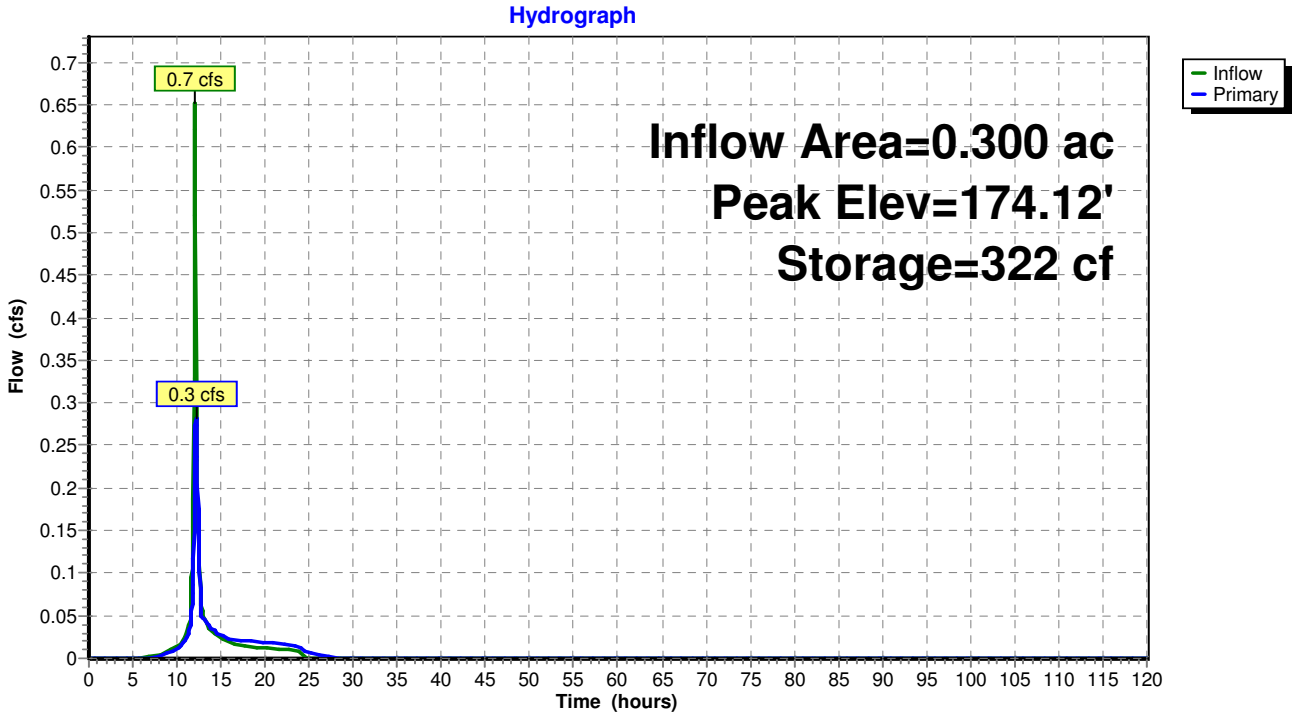
Volume	Invert	Avail.Storage	Storage Description
#1	173.50'	2,150 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
173.50	400	0	0
174.00	600	250	250
176.00	1,300	1,900	2,150

Device	Routing	Invert	Outlet Devices
#1	Primary	173.50'	**4.0" Round Culvert** L= 10.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 173.50' / 173.00' S= 0.0500 '/' Cc= 0.900 n= 0.012, Flow Area= 0.09 sf
#2	Primary	174.80'	**6.0' long x 0.5' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32

Primary OutFlow Max=0.3 cfs @ 12.17 hrs HW=174.11' TW=173.64' (Dynamic Tailwater)
└─**1=Culvert** (Inlet Controls 0.3 cfs @ 3.22 fps)
└─**2=Broad-Crested Rectangular Weir** (Controls 0.0 cfs)

Pond 2.2P: Pretreatment Basin



Summary for Pond FS 1.1: Flow Splitter

Inflow Area = 2.200 ac, 90.91% Impervious, Inflow Depth = 2.17" for 1-yr event
Inflow = 6.2 cfs @ 12.02 hrs, Volume= 0.398 af
Outflow = 6.2 cfs @ 12.02 hrs, Volume= 0.398 af, Atten= 0%, Lag= 0.0 min
Primary = 6.2 cfs @ 12.02 hrs, Volume= 0.398 af
Secondary = 0.0 cfs @ 0.00 hrs, Volume= 0.000 af

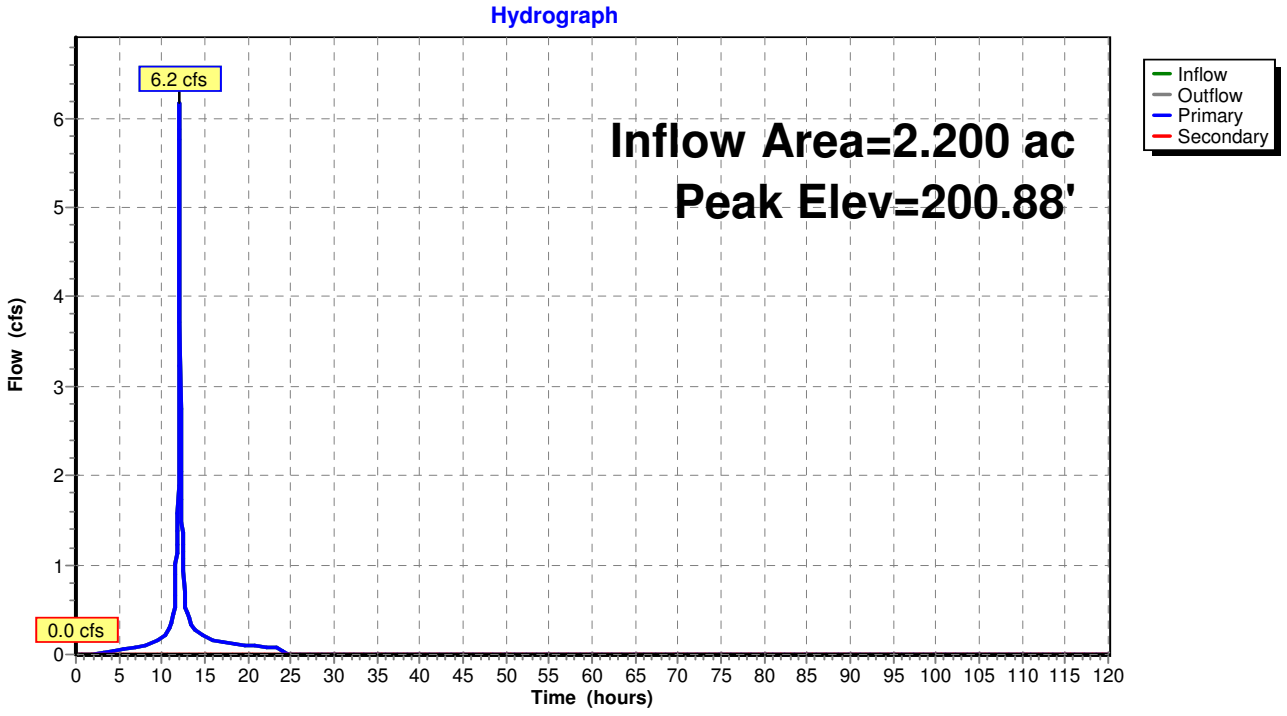
Routing by Dyn-Stor-Ind method, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
Peak Elev= 200.88' @ 12.02 hrs
Flood Elev= 205.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	197.80'	**12.0" Round Culvert** L= 5.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 197.80' / 197.75' S= 0.0100 '/' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf
#2	Secondary	201.20'	**18.0" Round Culvert** L= 110.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 201.20' / 198.60' S= 0.0236 '/' Cc= 0.900 n= 0.012, Flow Area= 1.77 sf

Primary OutFlow Max=5.8 cfs @ 12.02 hrs HW=200.67' TW=197.72' (Dynamic Tailwater)
└**1=Culvert** (Inlet Controls 5.8 cfs @ 7.42 fps)

Secondary OutFlow Max=0.0 cfs @ 0.00 hrs HW=197.80' TW=195.50' (Dynamic Tailwater)
└**2=Culvert** (Controls 0.0 cfs)

Pond FS 1.1: Flow Splitter



Summary for Pond FS 1.2: Flow Splitter

Inflow Area = 3.700 ac, 62.16% Impervious, Inflow Depth = 1.55" for 1-yr event
Inflow = 7.7 cfs @ 12.03 hrs, Volume= 0.478 af
Outflow = 7.7 cfs @ 12.03 hrs, Volume= 0.478 af, Atten= 0%, Lag= 0.0 min
Primary = 7.6 cfs @ 12.03 hrs, Volume= 0.478 af
Secondary = 0.0 cfs @ 12.05 hrs, Volume= 0.000 af

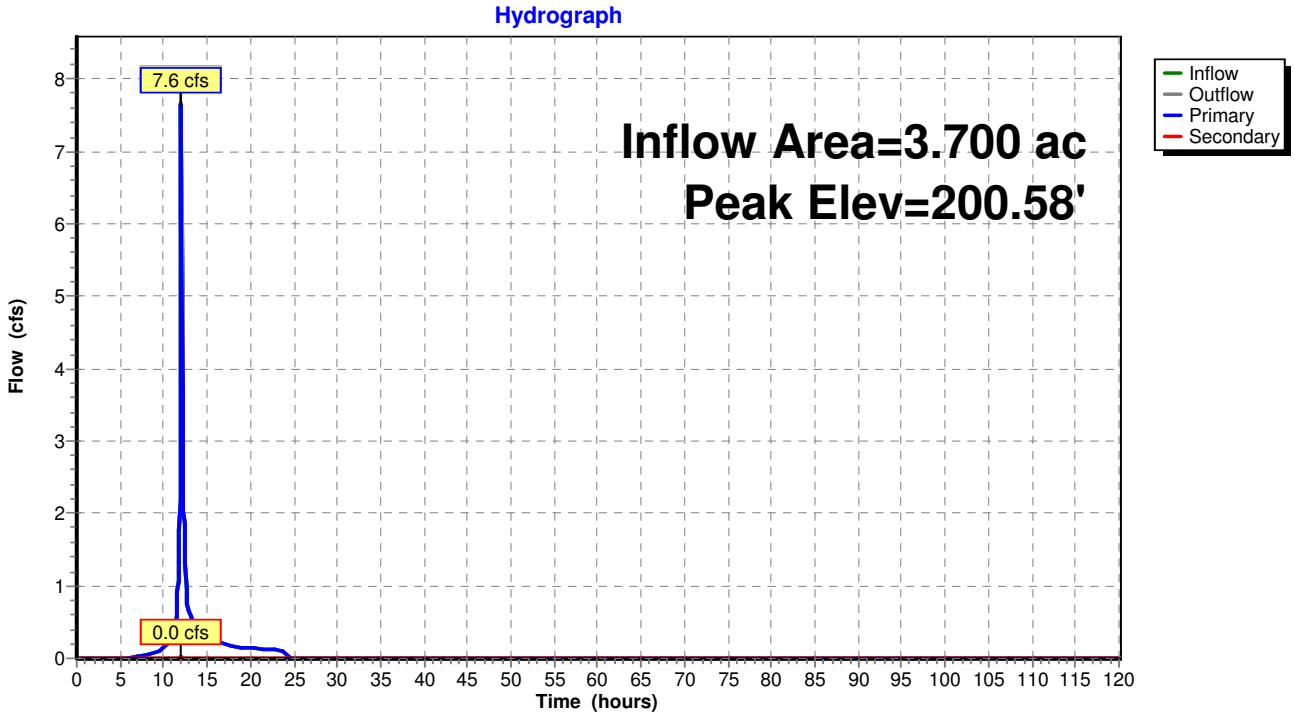
Routing by Dyn-Stor-Ind method, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
Peak Elev= 200.58' @ 12.04 hrs
Flood Elev= 202.60'

Device	Routing	Invert	Outlet Devices
#1	Primary	195.50'	**12.0" Round Culvert** L= 45.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 195.50' / 195.00' S= 0.0111 '/' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf
#2	Device 3	200.50'	**4.0' long x 0.5' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32
#3	Secondary	195.50'	**24.0" Round Culvert** L= 280.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 195.50' / 191.00' S= 0.0161 '/' Cc= 0.900 n= 0.012, Flow Area= 3.14 sf

Primary OutFlow Max=6.8 cfs @ 12.03 hrs HW=200.25' TW=197.05' (Dynamic Tailwater)
└**1=Culvert** (Inlet Controls 6.8 cfs @ 8.62 fps)

Secondary OutFlow Max=0.0 cfs @ 12.05 hrs HW=200.52' TW=190.18' (Dynamic Tailwater)
└**3=Culvert** (Passes 0.0 cfs of 30.3 cfs potential flow)
└**2=Broad-Crested Rectangular Weir** (Weir Controls 0.0 cfs @ 0.41 fps)

Pond FS 1.2: Flow Splitter



Summary for Subcatchment 1.0S:

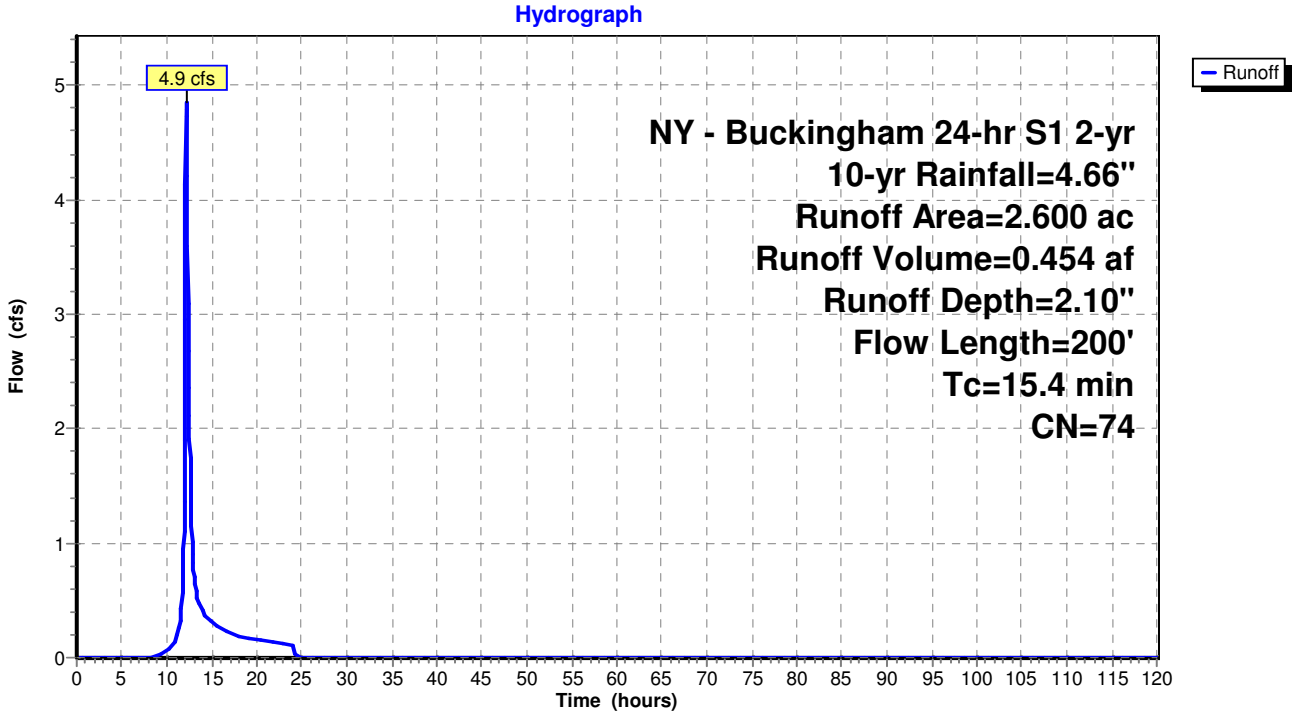
Runoff = 4.9 cfs @ 12.17 hrs, Volume= 0.454 af, Depth= 2.10"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
NY - Buckingham 24-hr S1 2-yr 10-yr Rainfall=4.66"

Area (ac)	CN	Description
0.800	74	>75% Grass cover, Good, HSG C
0.600	70	Woods, Good, HSG C
1.200	77	Woods, Good, HSG D
2.600	74	Weighted Average
2.600		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.5	25	0.3500	0.28		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.15"
11.9	75	0.0500	0.10		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.15"
1.7	50	0.0100	0.50		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.3	50	0.4000	3.16		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
15.4	200	Total			

Subcatchment 1.0S:



Summary for Subcatchment 1.1S:

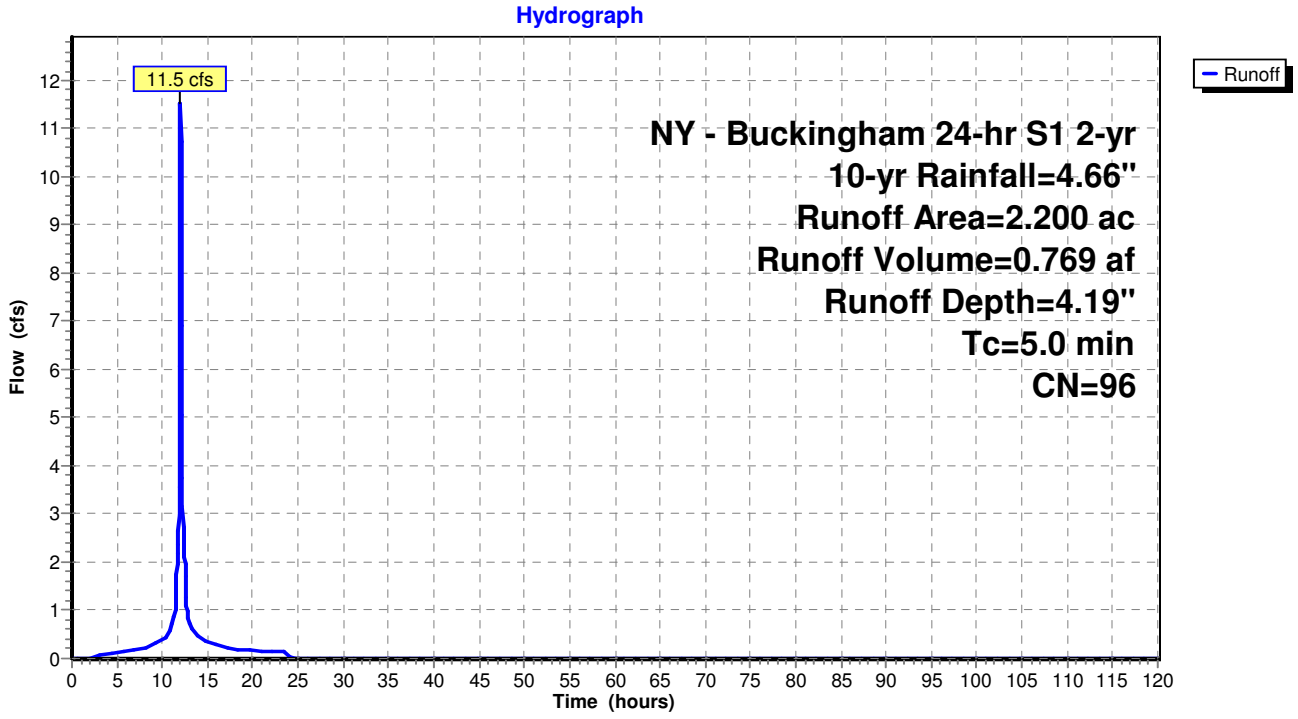
Runoff = 11.5 cfs @ 12.02 hrs, Volume= 0.769 af, Depth= 4.19"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
NY - Buckingham 24-hr S1 2-yr 10-yr Rainfall=4.66"

Area (ac)	CN	Description
0.200	74	>75% Grass cover, Good, HSG C
2.000	98	Paved parking, HSG C
2.200	96	Weighted Average
0.200		9.09% Pervious Area
2.000		90.91% Impervious Area

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

Subcatchment 1.1S:



Summary for Subcatchment 1.2S:

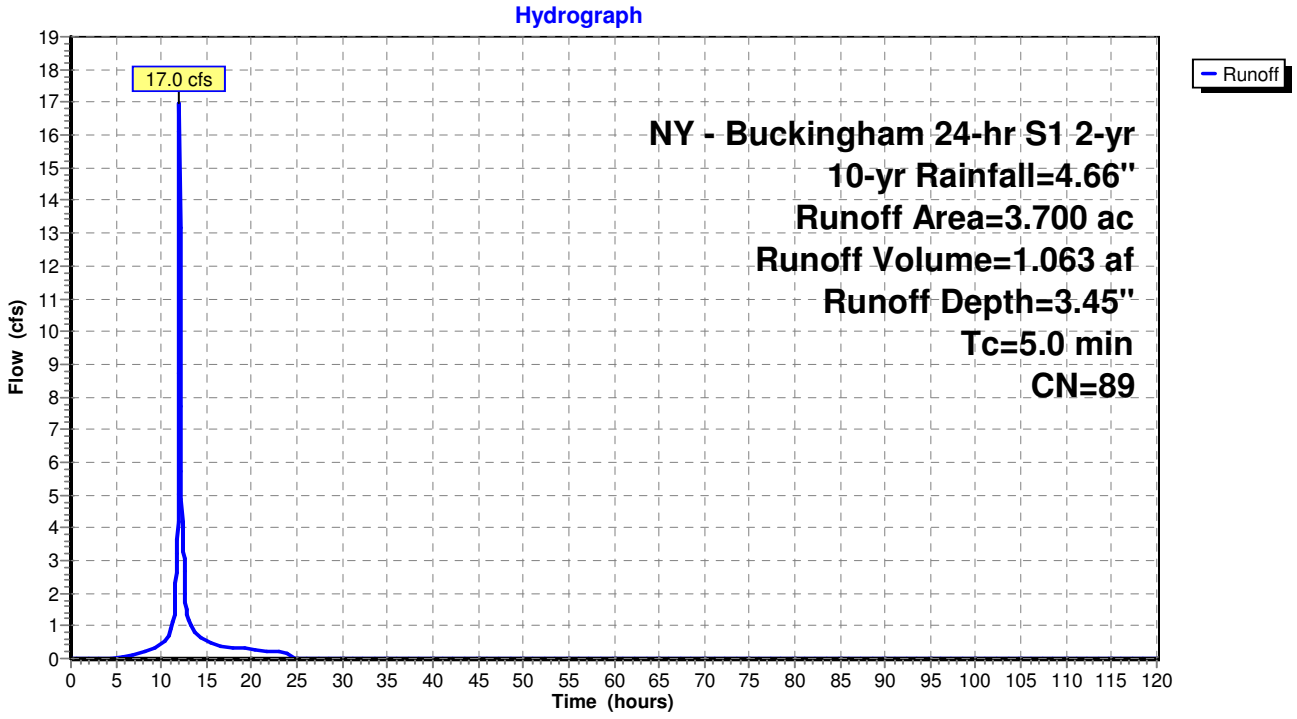
Runoff = 17.0 cfs @ 12.02 hrs, Volume= 1.063 af, Depth= 3.45"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
NY - Buckingham 24-hr S1 2-yr 10-yr Rainfall=4.66"

Area (ac)	CN	Description
1.400	74	>75% Grass cover, Good, HSG C
2.300	98	Paved parking, HSG C
3.700	89	Weighted Average
1.400		37.84% Pervious Area
2.300		62.16% Impervious Area

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

Subcatchment 1.2S:



Summary for Subcatchment 1.3S:

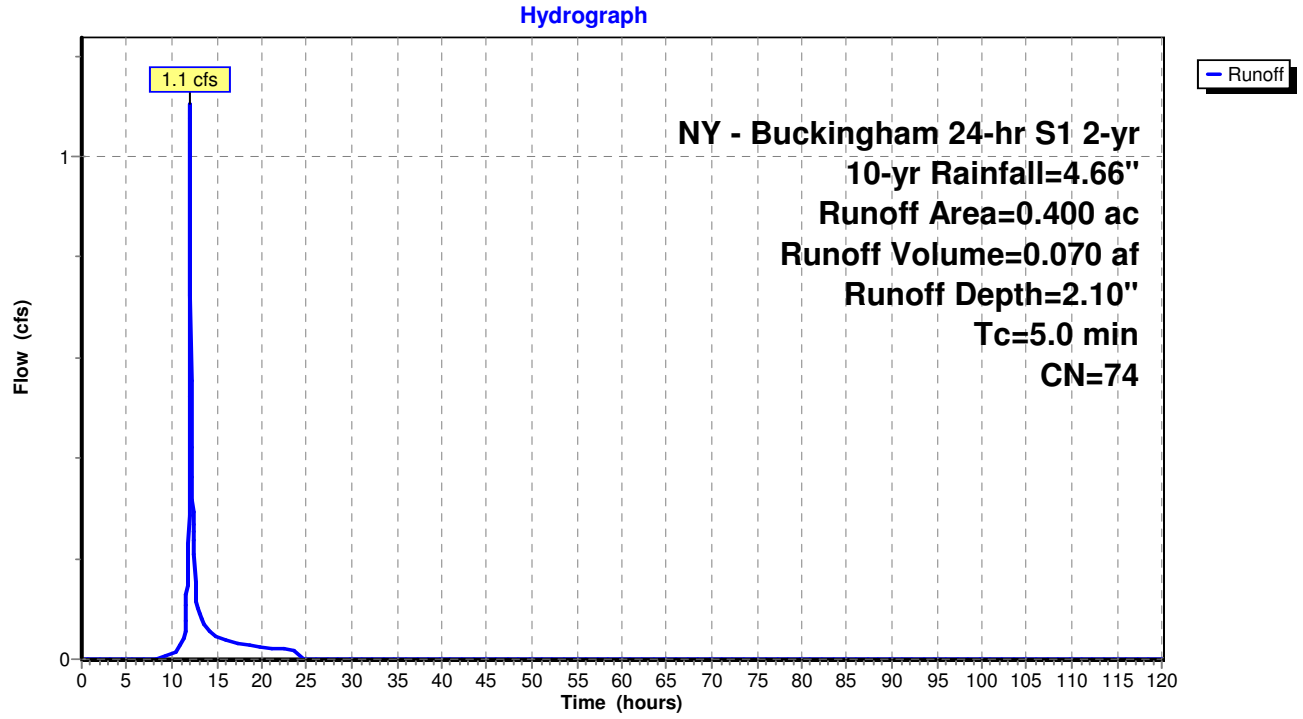
Runoff = 1.1 cfs @ 12.03 hrs, Volume= 0.070 af, Depth= 2.10"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
NY - Buckingham 24-hr S1 2-yr 10-yr Rainfall=4.66"

Area (ac)	CN	Description
0.400	74	>75% Grass cover, Good, HSG C
0.400		100.00% Pervious Area

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

Subcatchment 1.3S:



Summary for Subcatchment 2.0S:

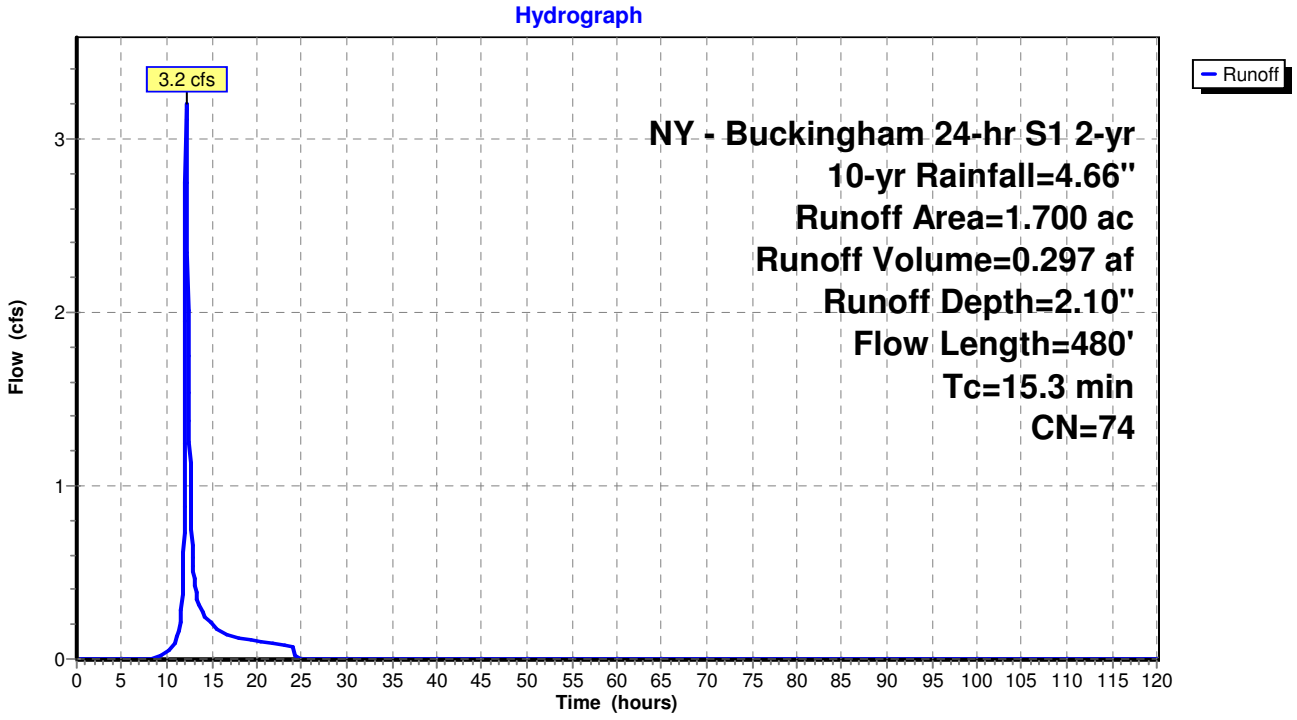
Runoff = 3.2 cfs @ 12.17 hrs, Volume= 0.297 af, Depth= 2.10"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
NY - Buckingham 24-hr S1 2-yr 10-yr Rainfall=4.66"

Area (ac)	CN	Description
0.400	70	Woods, Good, HSG C
0.900	65	Brush, Good, HSG C
0.400	98	Paved parking, HSG C
1.700	74	Weighted Average
1.300		76.47% Pervious Area
0.400		23.53% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.3	30	0.0700	0.15		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.15"
9.9	70	0.0700	0.12		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.15"
0.6	70	0.1700	2.06		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
1.5	310	0.0300	3.52		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
15.3	480	Total			

Subcatchment 2.0S:



Summary for Subcatchment 2.1S:

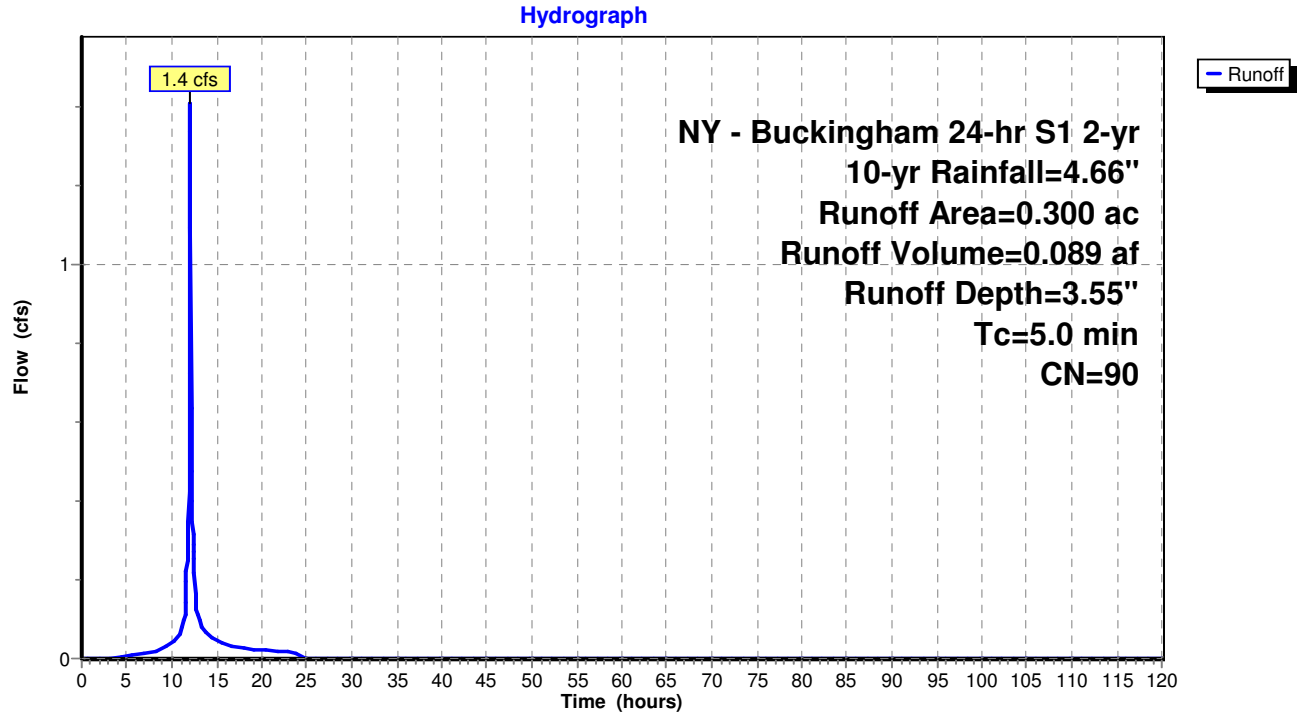
Runoff = 1.4 cfs @ 12.02 hrs, Volume= 0.089 af, Depth= 3.55"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
NY - Buckingham 24-hr S1 2-yr 10-yr Rainfall=4.66"

Area (ac)	CN	Description
0.100	74	>75% Grass cover, Good, HSG C
0.200	98	Paved parking, HSG C
0.300	90	Weighted Average
0.100		33.33% Pervious Area
0.200		66.67% Impervious Area

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

Subcatchment 2.1S:



Summary for Subcatchment 3.0S:

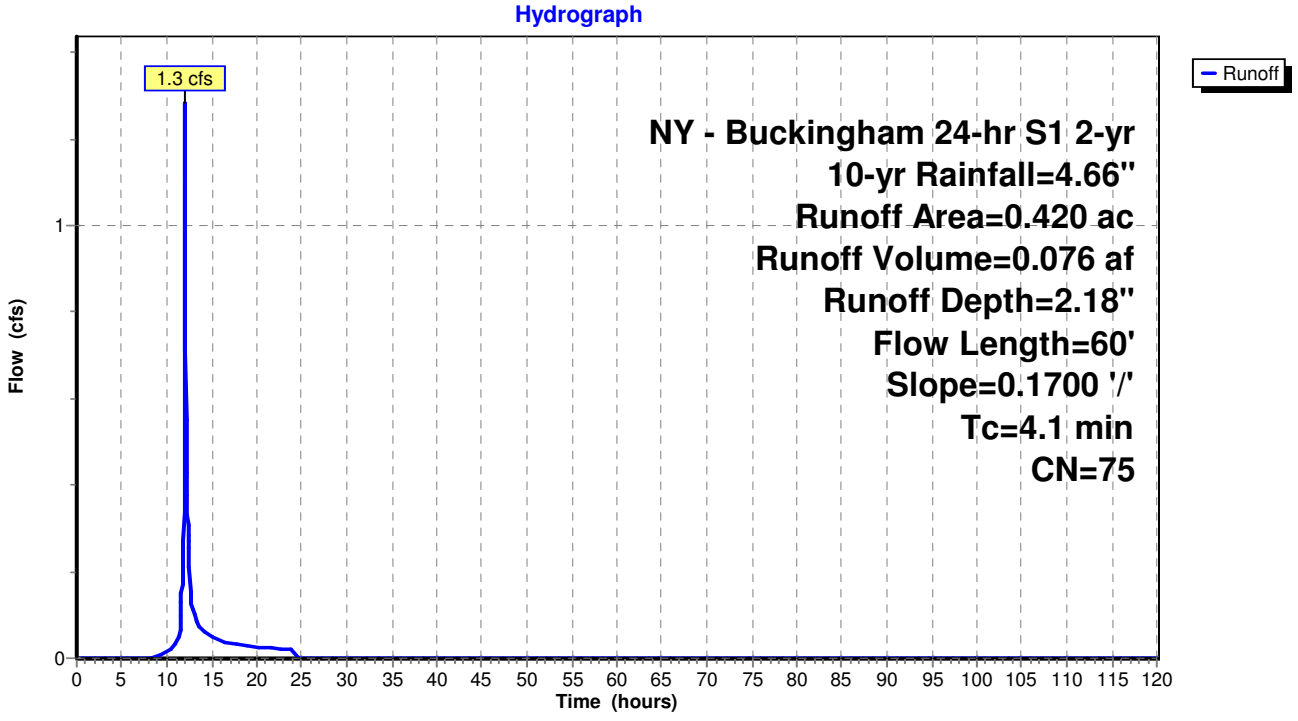
Runoff = 1.3 cfs @ 12.01 hrs, Volume= 0.076 af, Depth= 2.18"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
NY - Buckingham 24-hr S1 2-yr 10-yr Rainfall=4.66"

Area (ac)	CN	Description
0.400	74	>75% Grass cover, Good, HSG C
0.020	98	Paved parking, HSG C
0.420	75	Weighted Average
0.400		95.24% Pervious Area
0.020		4.76% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.1	60	0.1700	0.25		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.15"

Subcatchment 3.0S:



Summary for Subcatchment 4.0S:

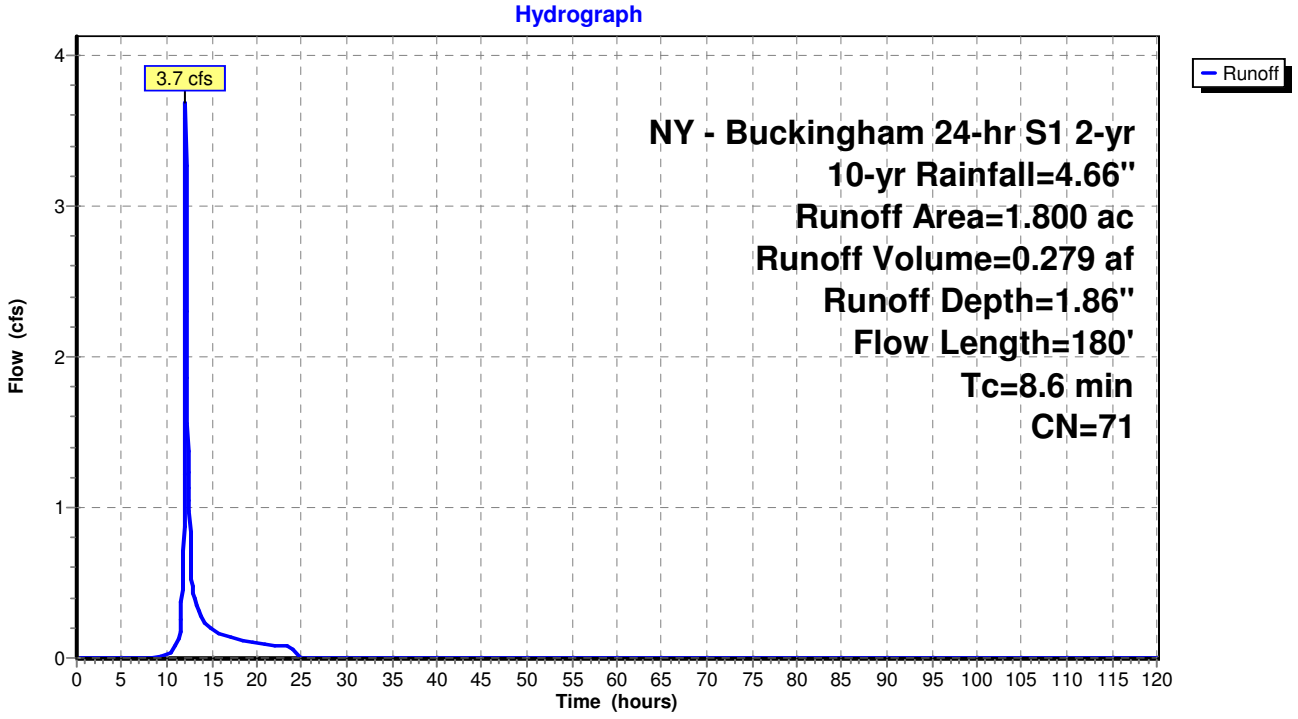
Runoff = 3.7 cfs @ 12.08 hrs, Volume= 0.279 af, Depth= 1.86"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
NY - Buckingham 24-hr S1 2-yr 10-yr Rainfall=4.66"

Area (ac)	CN	Description
1.380	70	Woods, Good, HSG C
0.400	74	>75% Grass cover, Good, HSG C
0.020	98	Paved parking, HSG C
1.800	71	Weighted Average
1.780		98.89% Pervious Area
0.020		1.11% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.1	100	0.0850	0.21		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.15"
0.3	30	0.0900	1.50		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.2	50	0.4500	3.35		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
8.6	180	Total			

Subcatchment 4.0S:

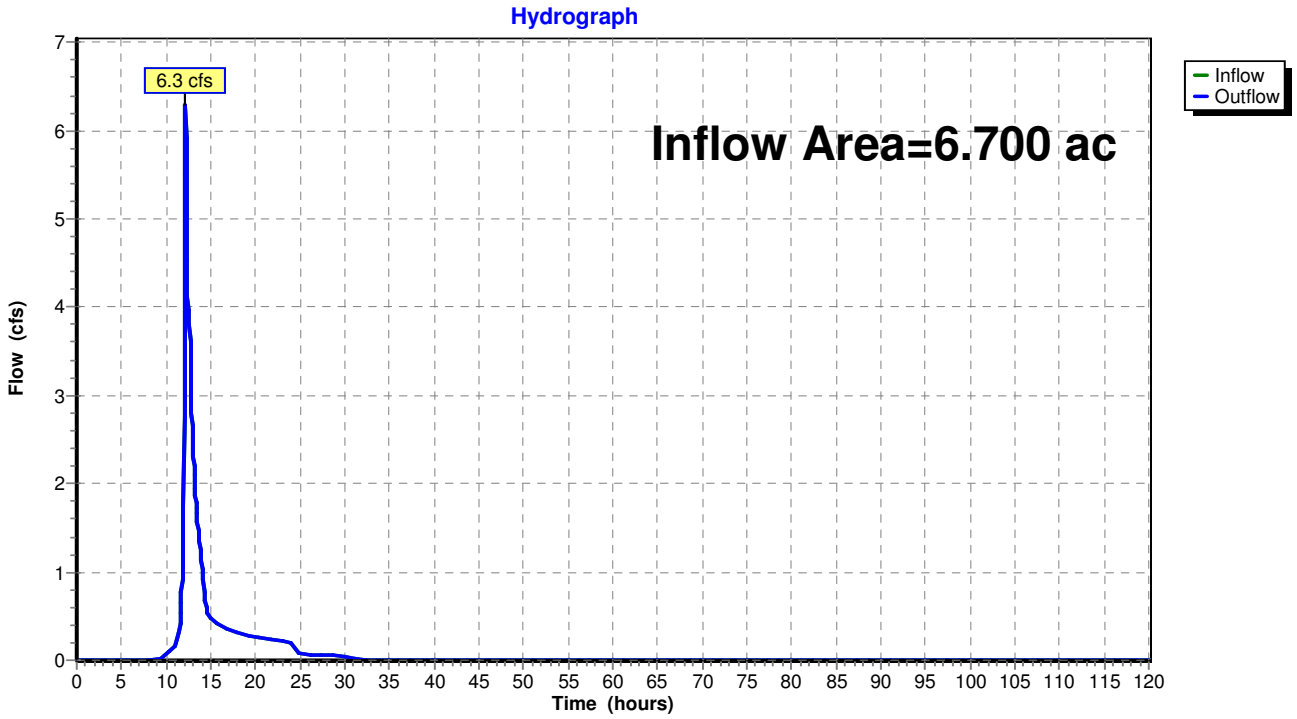


Summary for Reach DL1: Design Line 1

Inflow Area = 6.700 ac, 34.33% Impervious, Inflow Depth = 1.50" for 10-yr event
Inflow = 6.3 cfs @ 12.17 hrs, Volume= 0.836 af
Outflow = 6.3 cfs @ 12.17 hrs, Volume= 0.836 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs

Reach DL1: Design Line 1

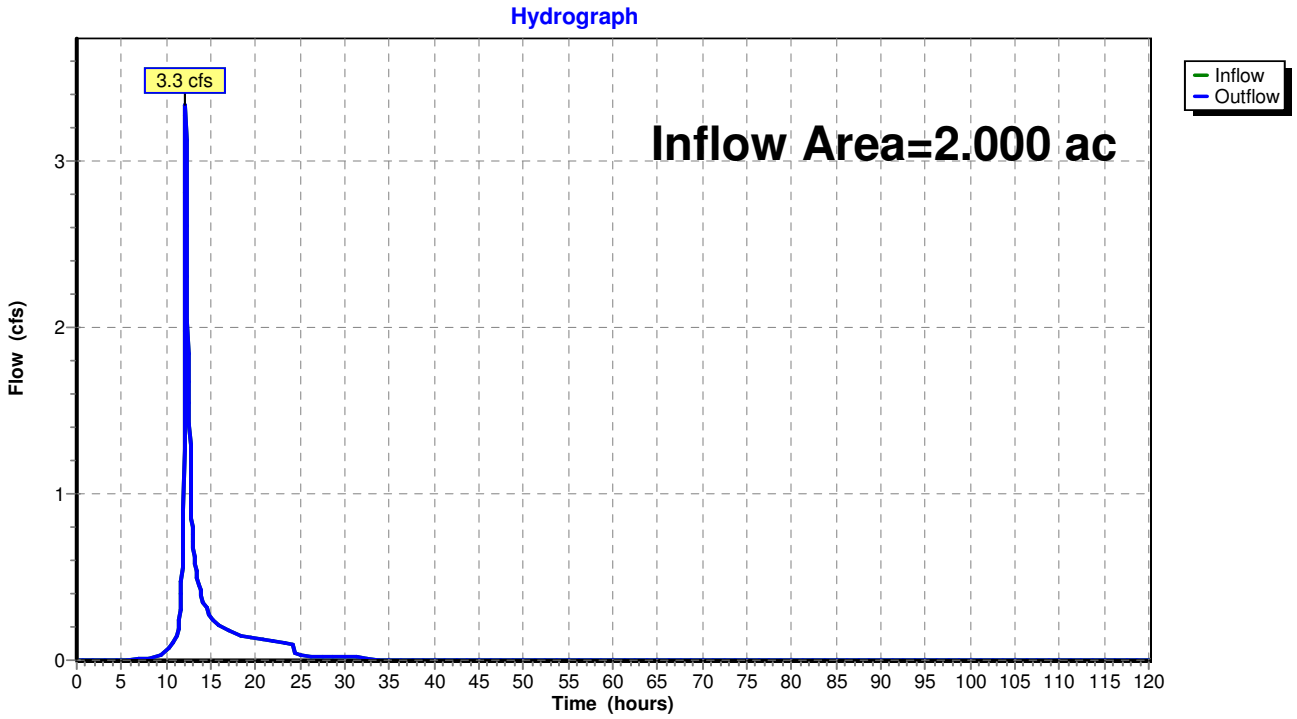


Summary for Reach DL2: Design Line 2

Inflow Area = 2.000 ac, 30.00% Impervious, Inflow Depth = 2.31" for 10-yr event
Inflow = 3.3 cfs @ 12.17 hrs, Volume= 0.386 af
Outflow = 3.3 cfs @ 12.17 hrs, Volume= 0.386 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs

Reach DL2: Design Line 2

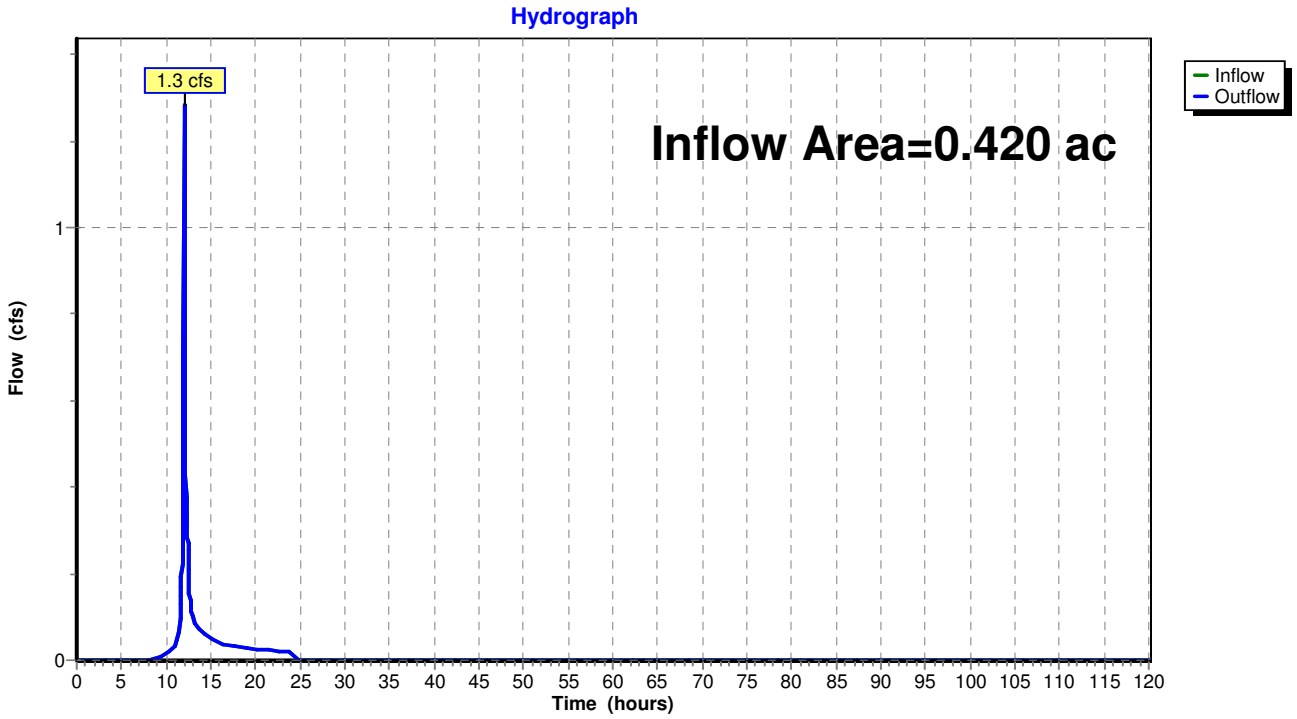


Summary for Reach DL3: Design Line 3

Inflow Area = 0.420 ac, 4.76% Impervious, Inflow Depth = 2.18" for 10-yr event
Inflow = 1.3 cfs @ 12.01 hrs, Volume= 0.076 af
Outflow = 1.3 cfs @ 12.01 hrs, Volume= 0.076 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs

Reach DL3: Design Line 3

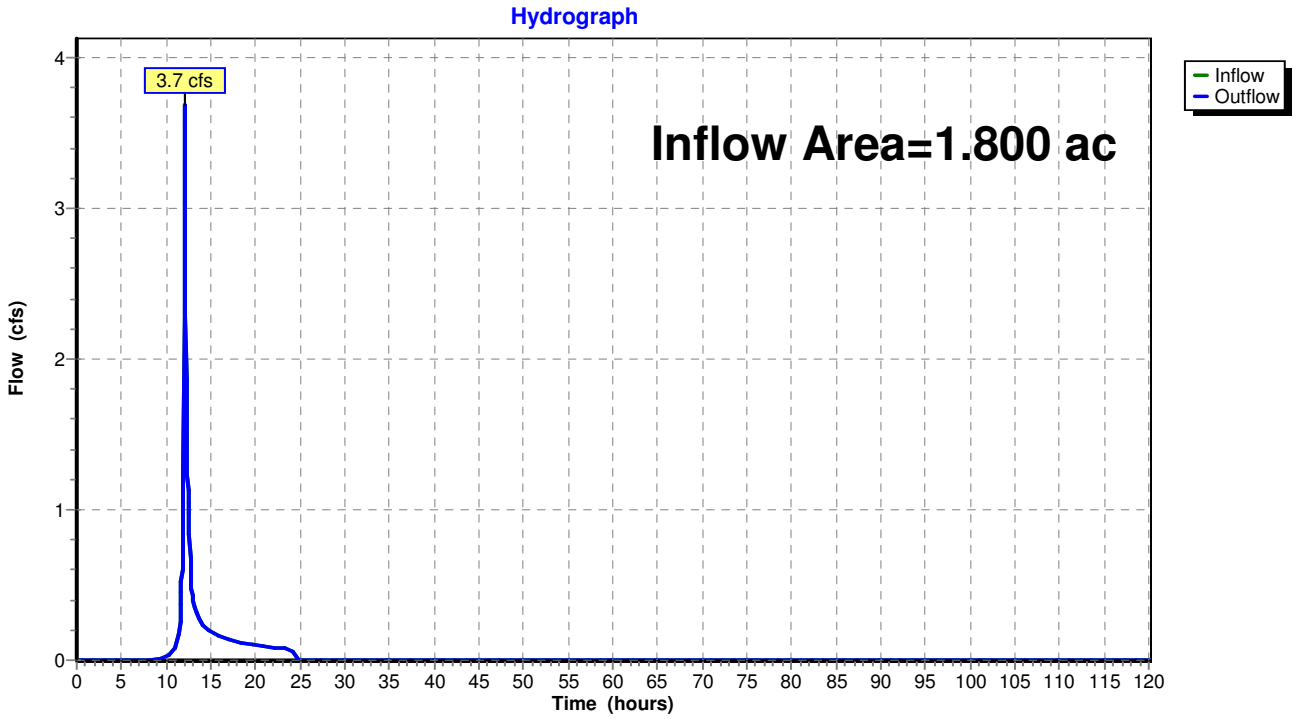


Summary for Reach DL4: Design Line 4

Inflow Area = 1.800 ac, 1.11% Impervious, Inflow Depth = 1.86" for 10-yr event
Inflow = 3.7 cfs @ 12.08 hrs, Volume= 0.279 af
Outflow = 3.7 cfs @ 12.08 hrs, Volume= 0.279 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs

Reach DL4: Design Line 4



Summary for Pond 1.1P: Infiltration System

Inflow Area = 2.200 ac, 90.91% Impervious, Inflow Depth = 4.03" for 10-yr event
Inflow = 7.5 cfs @ 12.03 hrs, Volume= 0.739 af
Outflow = 1.6 cfs @ 11.65 hrs, Volume= 0.739 af, Atten= 79%, Lag= 0.0 min
Discarded = 1.6 cfs @ 11.65 hrs, Volume= 0.739 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
Peak Elev= 199.77' @ 12.56 hrs Surf.Area= 0.083 ac Storage= 0.160 af

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 21.6 min (789.3 - 767.6)

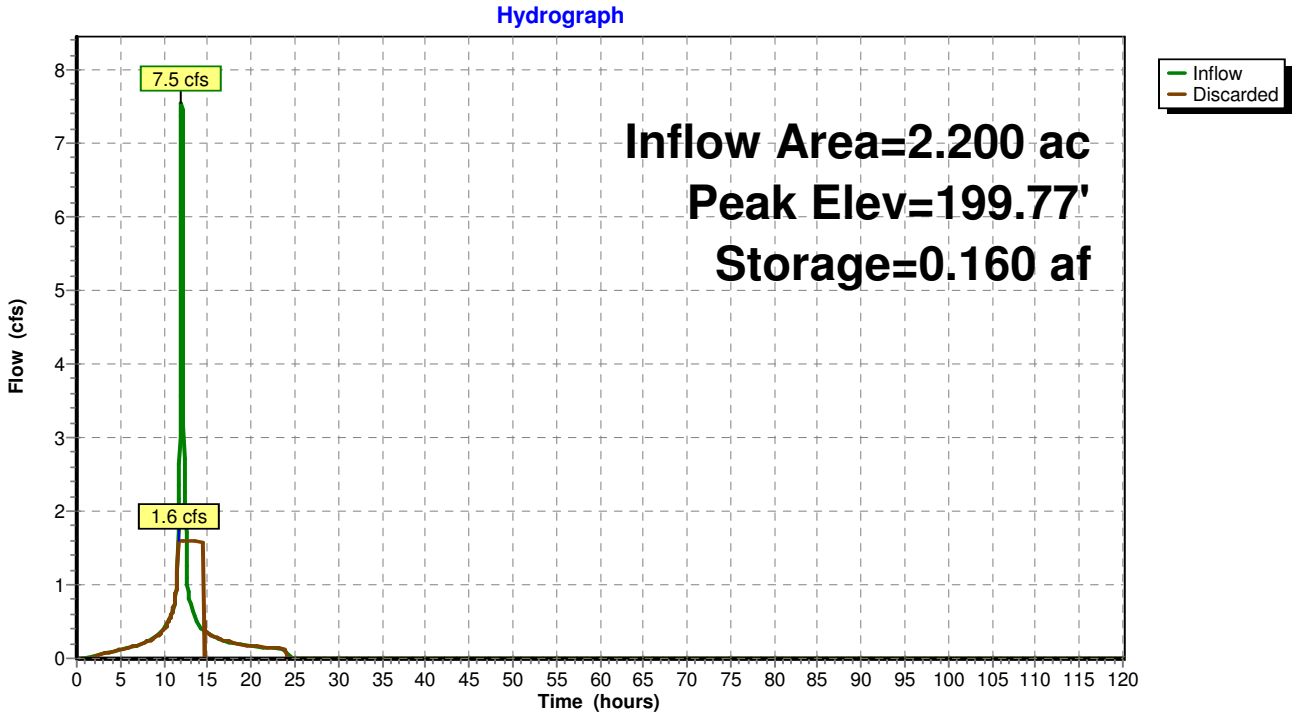
Volume	Invert	Avail.Storage	Storage Description
#1B	197.00'	0.116 af	**29.92'W x 120.42'L x 5.50'H Field B** 0.455 af Overall - 0.164 af Embedded = 0.291 af x 40.0% Voids
#2B	197.75'	0.164 af	**ADS_StormTech MC-3500 d +Cap** x 64 Inside #1 Effective Size= 70.4"W x 45.0"H => 15.33 sf x 7.17'L = 110.0 cf Overall Size= 77.0"W x 45.0"H x 7.50'L with 0.33' Overlap 4 Rows of 16 Chambers Cap Storage= +14.9 cf x 2 x 4 rows = 119.2 cf
		0.281 af	Total Available Storage

Storage Group B created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	197.00'	**19.000 in/hr Exfiltration over Horizontal area** Phase-In= 0.05'

Discarded OutFlow Max=1.6 cfs @ 11.65 hrs HW=197.09' (Free Discharge)
↑**1=Exfiltration** (Exfiltration Controls 1.6 cfs)

Pond 1.1P: Infiltration System



Summary for Pond 1.2P: Infiltration Basin

Inflow Area = 3.700 ac, 62.16% Impervious, Inflow Depth = 3.06" for 10-yr event
Inflow = 6.9 cfs @ 12.00 hrs, Volume= 0.944 af
Outflow = 5.4 cfs @ 12.15 hrs, Volume= 0.944 af, Atten= 22%, Lag= 9.3 min
Discarded = 1.2 cfs @ 12.15 hrs, Volume= 0.781 af
Primary = 4.2 cfs @ 12.15 hrs, Volume= 0.163 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
Peak Elev= 198.94' @ 12.15 hrs Surf.Area= 2,968 sf Storage= 7,808 cf

Plug-Flow detention time= 46.1 min calculated for 0.944 af (100% of inflow)
Center-of-Mass det. time= 46.1 min (860.5 - 814.4)

Volume	Invert	Avail.Storage	Storage Description
#1	195.00'	11,250 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

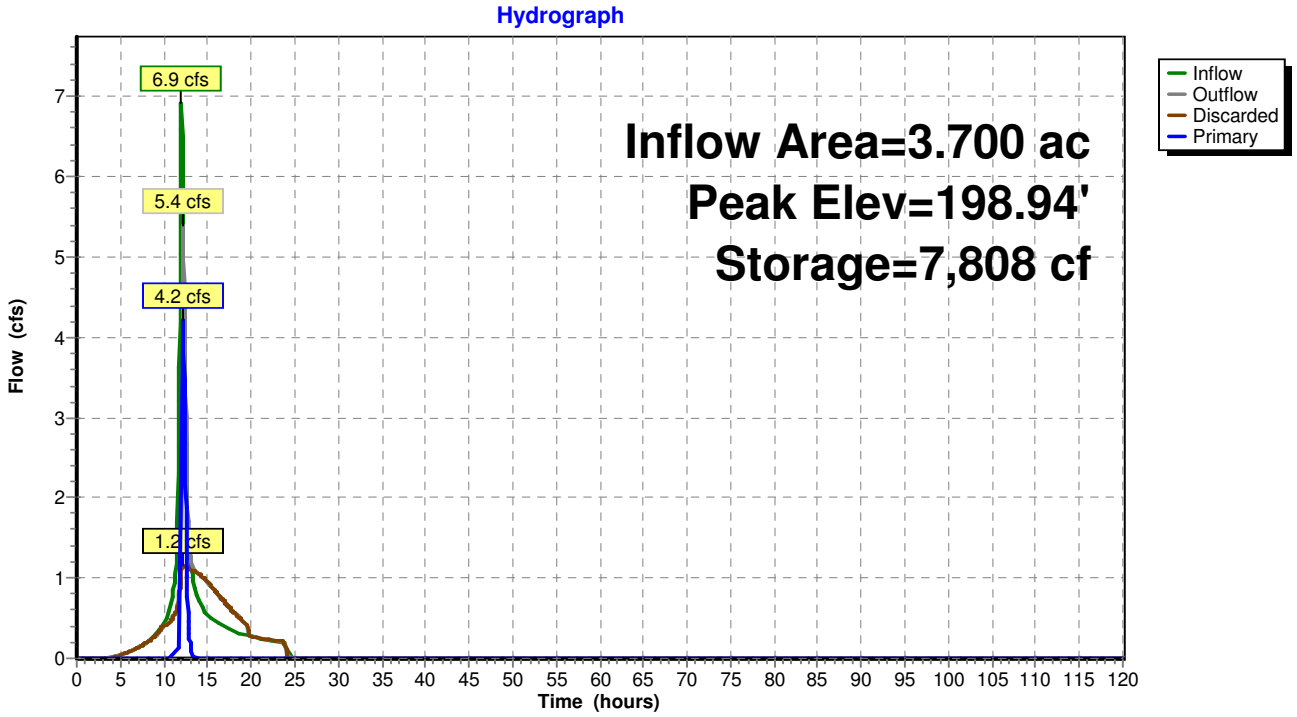
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
195.00	1,000	0	0
200.00	3,500	11,250	11,250

Device	Routing	Invert	Outlet Devices
#1	Primary	198.60'	**8.0' long x 1.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 Coef. (English) 2.69 2.72 2.75 2.85 2.98 3.08 3.20 3.28 3.31 3.30 3.31 3.32
#2	Discarded	195.00'	**17.000 in/hr Exfiltration over Horizontal area** Phase-In= 0.05'

Discarded OutFlow Max=1.2 cfs @ 12.15 hrs HW=198.94' (Free Discharge)
↑—**2=Exfiltration** (Exfiltration Controls 1.2 cfs)

Primary OutFlow Max=4.2 cfs @ 12.15 hrs HW=198.94' TW=195.09' (Dynamic Tailwater)
↑—**1=Broad-Crested Rectangular Weir** (Weir Controls 4.2 cfs @ 1.57 fps)

Pond 1.2P: Infiltration Basin



Summary for Pond 1.3P: Detention Basin

Inflow Area = 0.400 ac, 0.00% Impervious, Inflow Depth = 6.55" for 10-yr event
Inflow = 15.2 cfs @ 12.02 hrs, Volume= 0.218 af
Outflow = 1.4 cfs @ 12.20 hrs, Volume= 0.218 af, Atten= 91%, Lag= 10.7 min
Primary = 1.4 cfs @ 12.20 hrs, Volume= 0.218 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
Peak Elev= 192.34' @ 12.20 hrs Surf.Area= 4,451 sf Storage= 6,279 cf

Plug-Flow detention time= 49.4 min calculated for 0.218 af (100% of inflow)
Center-of-Mass det. time= 48.5 min (813.8 - 765.3)

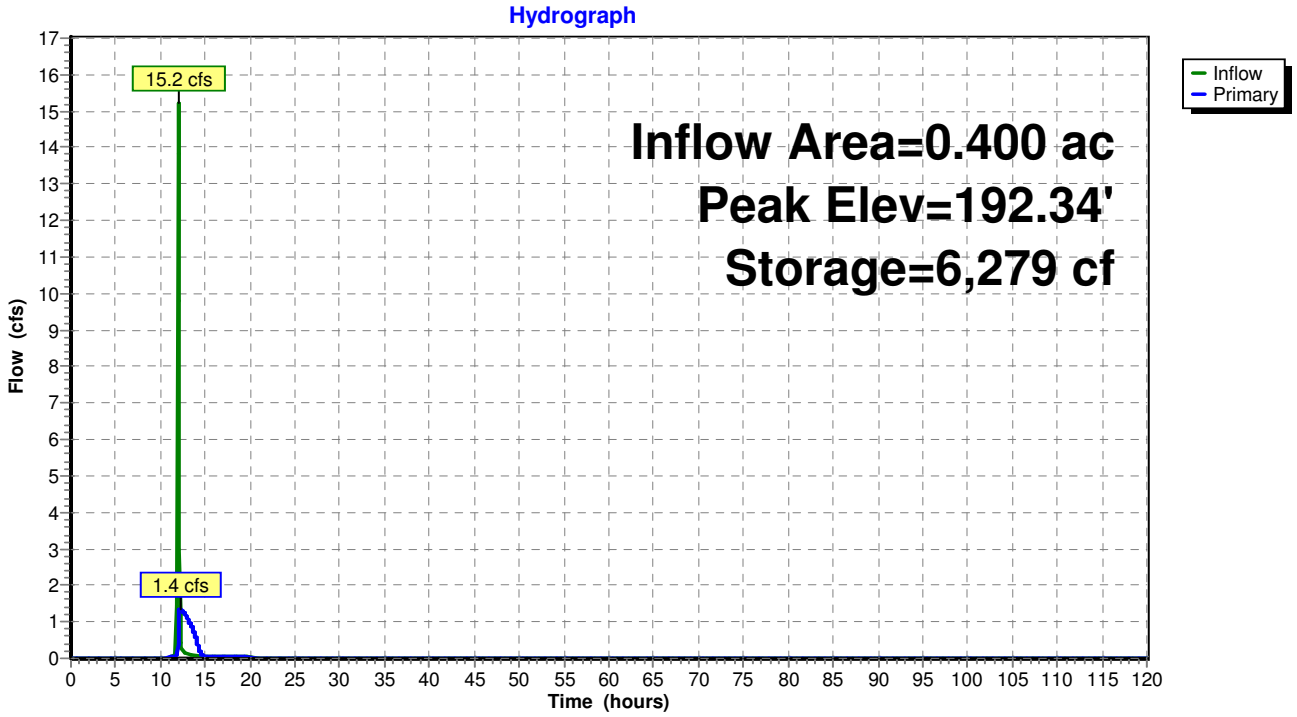
Volume	Invert	Avail.Storage	Storage Description
#1	190.00'	31,800 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
190.00	500	0	0
191.00	2,600	1,550	1,550
196.00	9,500	30,250	31,800

Device	Routing	Invert	Outlet Devices
#1	Primary	189.00'	**24.0" Round Culvert** L= 40.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 189.00' / 188.00' S= 0.0250 '/' Cc= 0.900 n= 0.012, Flow Area= 3.14 sf
#2	Device 1	190.00'	**6.0" Vert. Orifice/Grate** C= 0.600
#3	Device 1	194.00'	**1.0' long x 0.5' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32

Primary OutFlow Max=1.4 cfs @ 12.20 hrs HW=192.34' TW=0.00' (Dynamic Tailwater)
↑**1=Culvert** (Passes 1.4 cfs of 23.1 cfs potential flow)
↑**2=Orifice/Grate** (Orifice Controls 1.4 cfs @ 6.96 fps)
3=Broad-Crested Rectangular Weir (Controls 0.0 cfs)

Pond 1.3P: Detention Basin



Summary for Pond 1.4P: Sand Filter

Inflow Area = 3.700 ac, 62.16% Impervious, Inflow Depth = 0.53" for 10-yr event
Inflow = 4.2 cfs @ 12.15 hrs, Volume= 0.163 af
Outflow = 0.9 cfs @ 12.69 hrs, Volume= 0.163 af, Atten= 80%, Lag= 32.0 min
Primary = 0.1 cfs @ 12.69 hrs, Volume= 0.121 af
Secondary = 0.7 cfs @ 12.69 hrs, Volume= 0.042 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
Peak Elev= 197.05' @ 12.69 hrs Surf.Area= 2,829 sf Storage= 5,836 cf

Plug-Flow detention time= 363.6 min calculated for 0.163 af (100% of inflow)
Center-of-Mass det. time= 364.0 min (1,104.6 - 740.6)

Volume	Invert	Avail.Storage	Storage Description
#1	194.00'	12,500 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

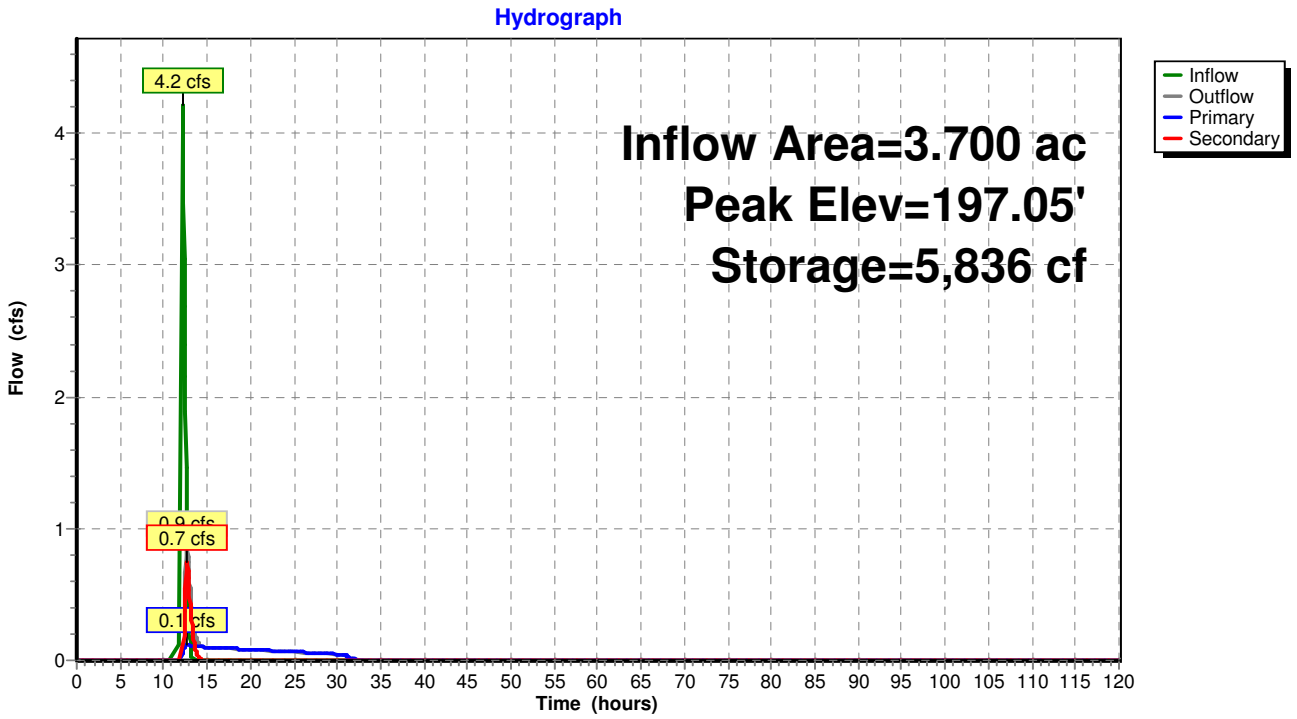
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
194.00	1,000	0	0
199.00	4,000	12,500	12,500

Device	Routing	Invert	Outlet Devices
#1	Primary	194.00'	**1.750 in/hr Exfiltration over Horizontal area** Phase-In= 0.10'
#2	Secondary	196.50'	**0.6' long x 0.5' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32

Primary OutFlow Max=0.1 cfs @ 12.69 hrs HW=197.05' TW=0.00' (Dynamic Tailwater)
↑—**1=Exfiltration** (Exfiltration Controls 0.1 cfs)

Secondary OutFlow Max=0.7 cfs @ 12.69 hrs HW=197.05' TW=0.00' (Dynamic Tailwater)
↑—**2=Broad-Crested Rectangular Weir** (Weir Controls 0.7 cfs @ 2.25 fps)

Pond 1.4P: Sand Filter



Summary for Pond 2.1P: Sand Filter

Inflow Area = 0.300 ac, 66.67% Impervious, Inflow Depth = 3.55" for 10-yr event
Inflow = 0.5 cfs @ 12.21 hrs, Volume= 0.089 af
Outflow = 0.3 cfs @ 12.44 hrs, Volume= 0.089 af, Atten= 34%, Lag= 13.4 min
Primary = 0.0 cfs @ 12.44 hrs, Volume= 0.052 af
Secondary = 0.3 cfs @ 12.44 hrs, Volume= 0.036 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
Peak Elev= 174.33' @ 12.44 hrs Surf.Area= 848 sf Storage= 805 cf

Plug-Flow detention time= 150.3 min calculated for 0.089 af (100% of inflow)
Center-of-Mass det. time= 150.3 min (1,023.7 - 873.4)

Volume	Invert	Avail.Storage	Storage Description
#1	173.00'	2,850 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

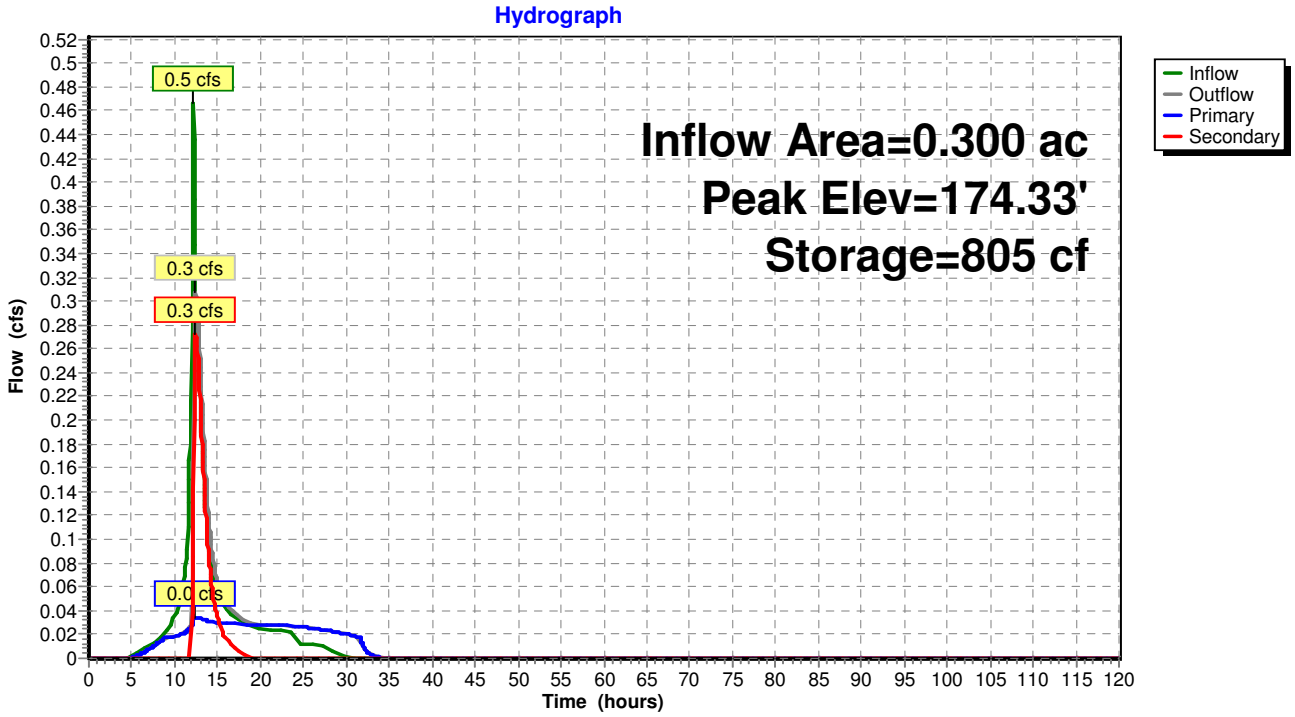
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
173.00	400	0	0
174.00	700	550	550
176.00	1,600	2,300	2,850

Device	Routing	Invert	Outlet Devices
#1	Device 3	173.00'	**1.750 in/hr Exfiltration over Horizontal area** Phase-In= 0.10'
#2	Secondary	174.00'	**0.5' long x 0.5' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32
#3	Primary	170.00'	**3.0" Vert. Orifice/Grate** C= 0.600

Primary OutFlow Max=0.0 cfs @ 12.44 hrs HW=174.33' TW=0.00' (Dynamic Tailwater)
↑└**3=Orifice/Grate** (Passes 0.0 cfs of 0.5 cfs potential flow)
↑└**1=Exfiltration** (Exfiltration Controls 0.0 cfs)

Secondary OutFlow Max=0.3 cfs @ 12.44 hrs HW=174.33' TW=0.00' (Dynamic Tailwater)
↑└**2=Broad-Crested Rectangular Weir** (Weir Controls 0.3 cfs @ 1.65 fps)

Pond 2.1P: Sand Filter



Summary for Pond 2.2P: Pretreatment Basin

Inflow Area = 0.300 ac, 66.67% Impervious, Inflow Depth = 3.55" for 10-yr event
Inflow = 1.4 cfs @ 12.02 hrs, Volume= 0.089 af
Outflow = 0.5 cfs @ 12.21 hrs, Volume= 0.089 af, Atten= 67%, Lag= 11.4 min
Primary = 0.5 cfs @ 12.21 hrs, Volume= 0.089 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
Peak Elev= 174.84' @ 12.22 hrs Surf.Area= 894 sf Storage= 876 cf

Plug-Flow detention time= 74.3 min calculated for 0.089 af (100% of inflow)
Center-of-Mass det. time= 73.6 min (873.4 - 799.8)

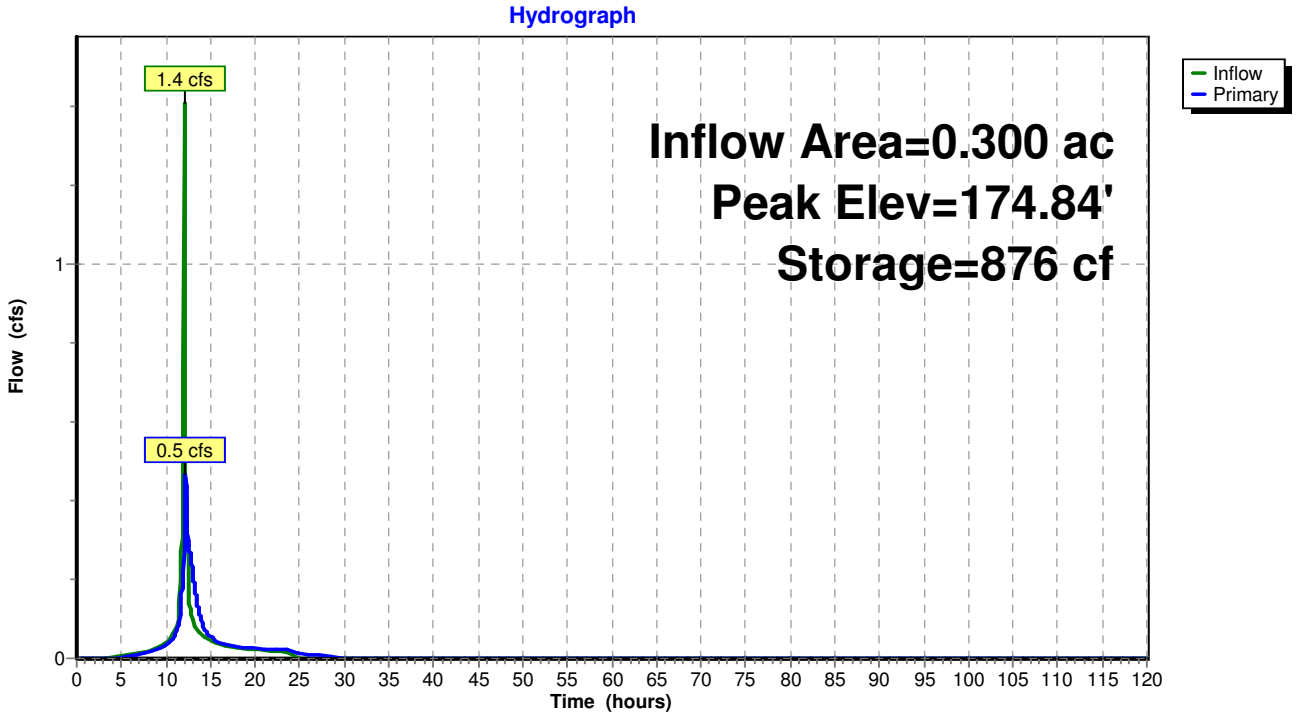
Volume	Invert	Avail.Storage	Storage Description
#1	173.50'	2,150 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
173.50	400	0	0
174.00	600	250	250
176.00	1,300	1,900	2,150

Device	Routing	Invert	Outlet Devices
#1	Primary	173.50'	**4.0" Round Culvert** L= 10.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 173.50' / 173.00' S= 0.0500 '/' Cc= 0.900 n= 0.012, Flow Area= 0.09 sf
#2	Primary	174.80'	**6.0' long x 0.5' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32

Primary OutFlow Max=0.4 cfs @ 12.21 hrs HW=174.84' TW=174.23' (Dynamic Tailwater)
└─**1=Culvert** (Inlet Controls 0.3 cfs @ 3.74 fps)
└─**2=Broad-Crested Rectangular Weir** (Weir Controls 0.1 cfs @ 0.53 fps)

Pond 2.2P: Pretreatment Basin



Summary for Pond FS 1.1: Flow Splitter

Inflow Area = 2.200 ac, 90.91% Impervious, Inflow Depth = 4.19" for 10-yr event
Inflow = 11.5 cfs @ 12.02 hrs, Volume= 0.769 af
Outflow = 11.5 cfs @ 12.02 hrs, Volume= 0.769 af, Atten= 0%, Lag= 0.0 min
Primary = 7.5 cfs @ 12.03 hrs, Volume= 0.739 af
Secondary = 4.0 cfs @ 12.02 hrs, Volume= 0.030 af

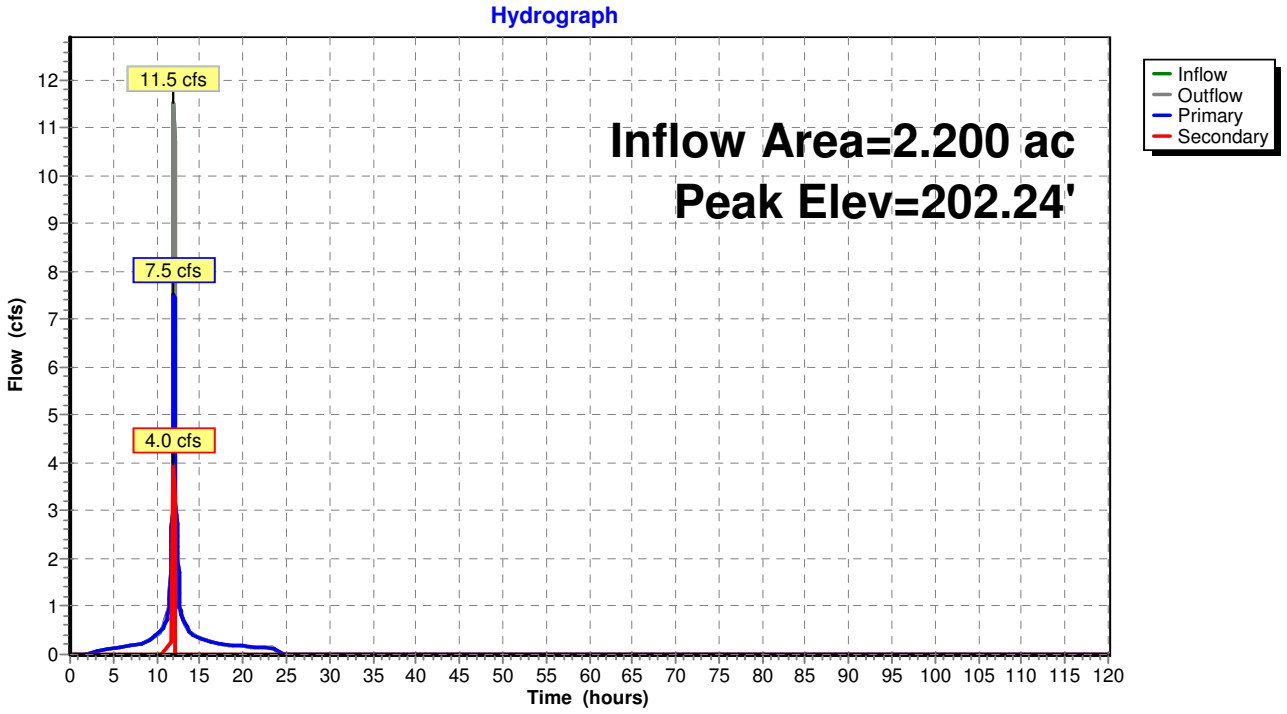
Routing by Dyn-Stor-Ind method, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
Peak Elev= 202.24' @ 12.03 hrs
Flood Elev= 205.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	197.80'	**12.0" Round Culvert** L= 5.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 197.80' / 197.75' S= 0.0100 '/' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf
#2	Secondary	201.20'	**18.0" Round Culvert** L= 110.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 201.20' / 198.60' S= 0.0236 '/' Cc= 0.900 n= 0.012, Flow Area= 1.77 sf

Primary OutFlow Max=7.3 cfs @ 12.03 hrs HW=202.15' TW=198.43' (Dynamic Tailwater)
└**1=Culvert** (Inlet Controls 7.3 cfs @ 9.29 fps)

Secondary OutFlow Max=2.9 cfs @ 12.02 hrs HW=202.14' TW=201.47' (Dynamic Tailwater)
└**2=Culvert** (Outlet Controls 2.9 cfs @ 3.60 fps)

Pond FS 1.1: Flow Splitter



Summary for Pond FS 1.2: Flow Splitter

Inflow Area = 3.700 ac, 62.16% Impervious, Inflow Depth = 3.54" for 10-yr event
Inflow = 20.9 cfs @ 12.02 hrs, Volume= 1.093 af
Outflow = 20.9 cfs @ 12.02 hrs, Volume= 1.093 af, Atten= 0%, Lag= 0.0 min
Primary = 6.9 cfs @ 12.00 hrs, Volume= 0.944 af
Secondary = 14.1 cfs @ 12.02 hrs, Volume= 0.149 af

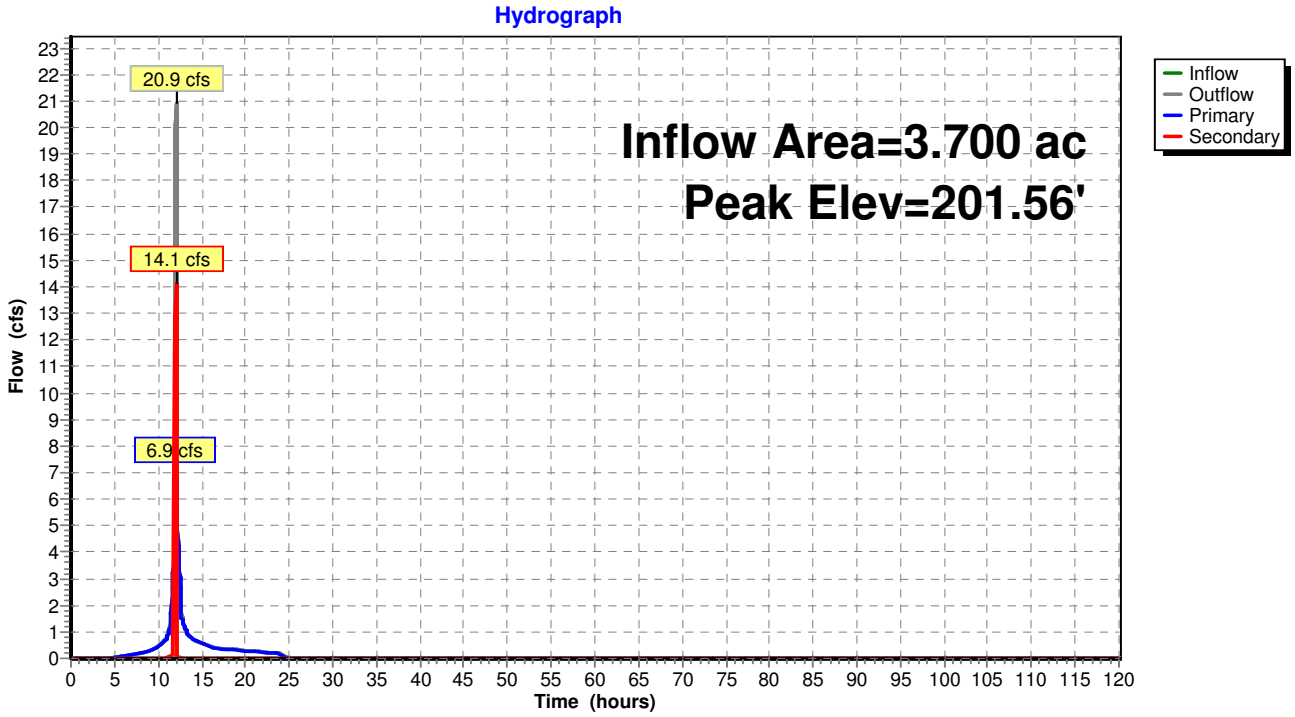
Routing by Dyn-Stor-Ind method, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
Peak Elev= 201.56' @ 12.02 hrs
Flood Elev= 202.60'

Device	Routing	Invert	Outlet Devices
#1	Primary	195.50'	**12.0" Round Culvert** L= 45.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 195.50' / 195.00' S= 0.0111 '/' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf
#2	Device 3	200.50'	**4.0' long x 0.5' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32
#3	Secondary	195.50'	**24.0" Round Culvert** L= 280.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 195.50' / 191.00' S= 0.0161 '/' Cc= 0.900 n= 0.012, Flow Area= 3.14 sf

Primary OutFlow Max=6.5 cfs @ 12.00 hrs HW=201.43' TW=198.49' (Dynamic Tailwater)
└**1=Culvert** (Inlet Controls 6.5 cfs @ 8.26 fps)

Secondary OutFlow Max=12.8 cfs @ 12.02 hrs HW=201.47' TW=191.43' (Dynamic Tailwater)
└**3=Culvert** (Passes 12.8 cfs of 33.7 cfs potential flow)
└**2=Broad-Crested Rectangular Weir** (Weir Controls 12.8 cfs @ 3.28 fps)

Pond FS 1.2: Flow Splitter



Summary for Subcatchment 1.0S:

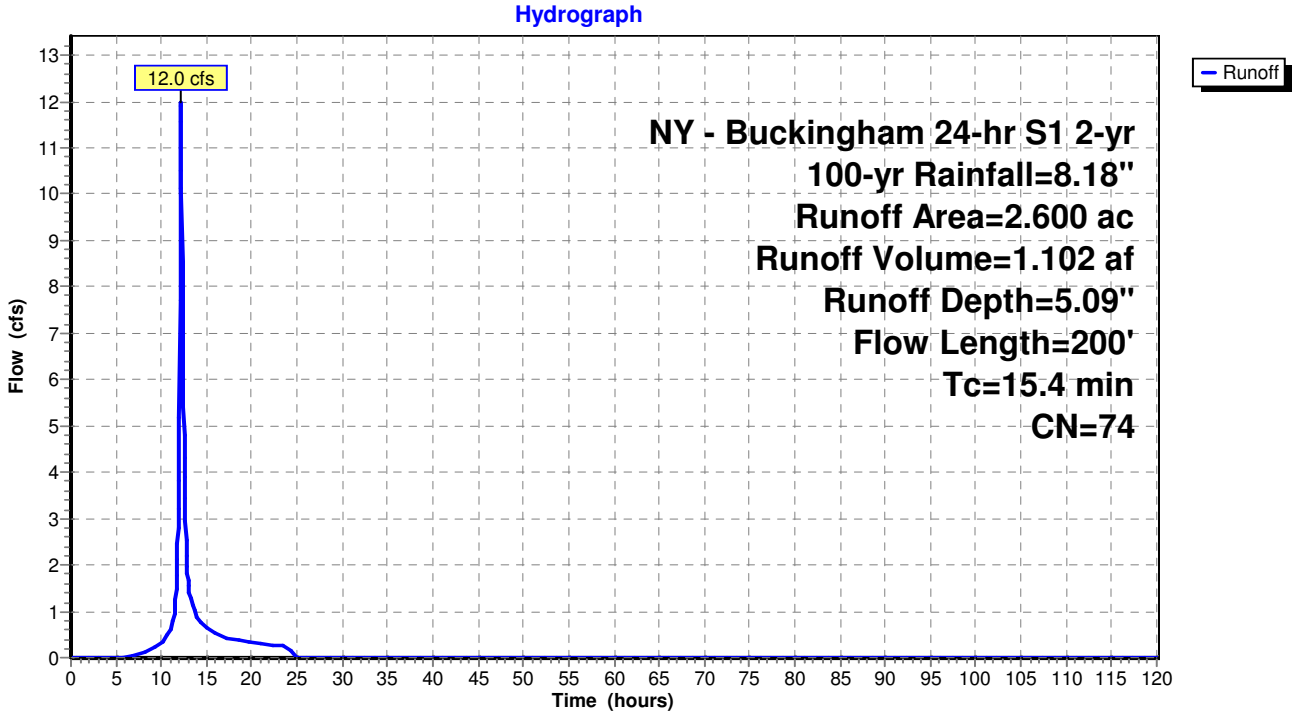
Runoff = 12.0 cfs @ 12.16 hrs, Volume= 1.102 af, Depth= 5.09"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
NY - Buckingham 24-hr S1 2-yr 100-yr Rainfall=8.18"

Area (ac)	CN	Description
0.800	74	>75% Grass cover, Good, HSG C
0.600	70	Woods, Good, HSG C
1.200	77	Woods, Good, HSG D
2.600	74	Weighted Average
2.600		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.5	25	0.3500	0.28		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.15"
11.9	75	0.0500	0.10		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.15"
1.7	50	0.0100	0.50		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.3	50	0.4000	3.16		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
15.4	200	Total			

Subcatchment 1.0S:



Summary for Subcatchment 1.1S:

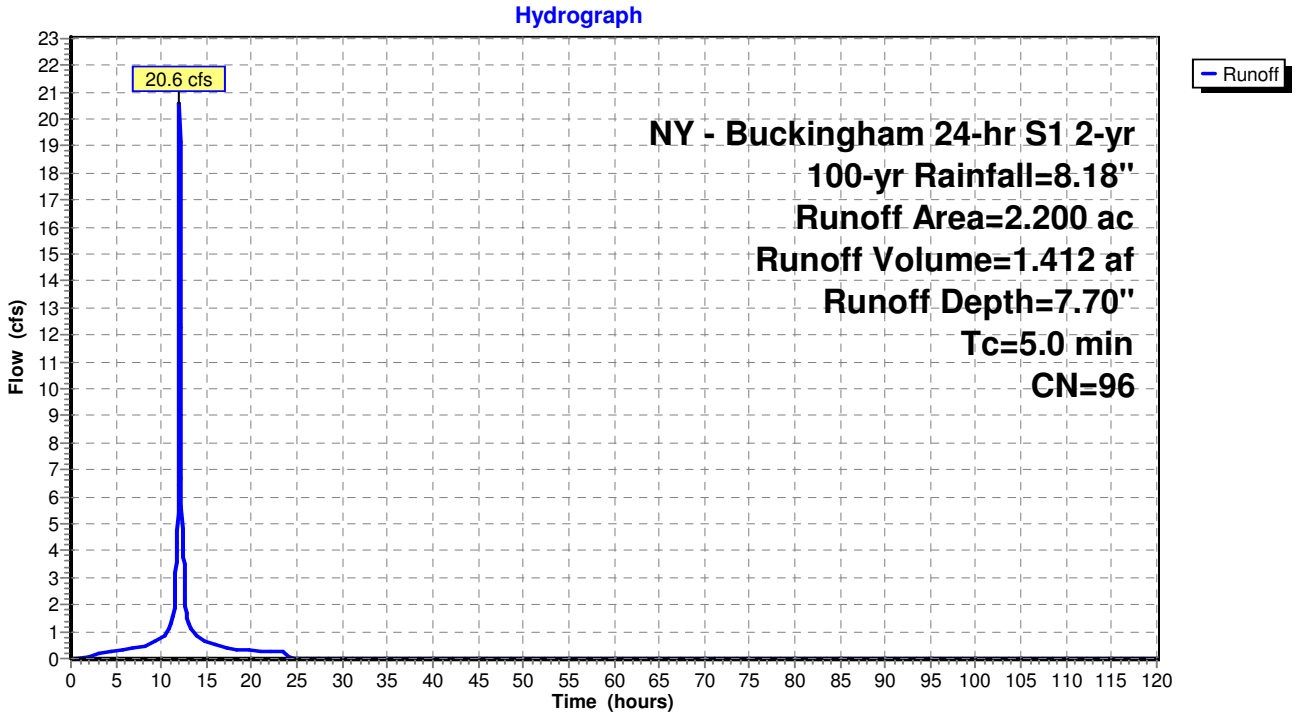
Runoff = 20.6 cfs @ 12.02 hrs, Volume= 1.412 af, Depth= 7.70"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
NY - Buckingham 24-hr S1 2-yr 100-yr Rainfall=8.18"

Area (ac)	CN	Description
0.200	74	>75% Grass cover, Good, HSG C
2.000	98	Paved parking, HSG C
2.200	96	Weighted Average
0.200		9.09% Pervious Area
2.000		90.91% Impervious Area

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

Subcatchment 1.1S:



Summary for Subcatchment 1.2S:

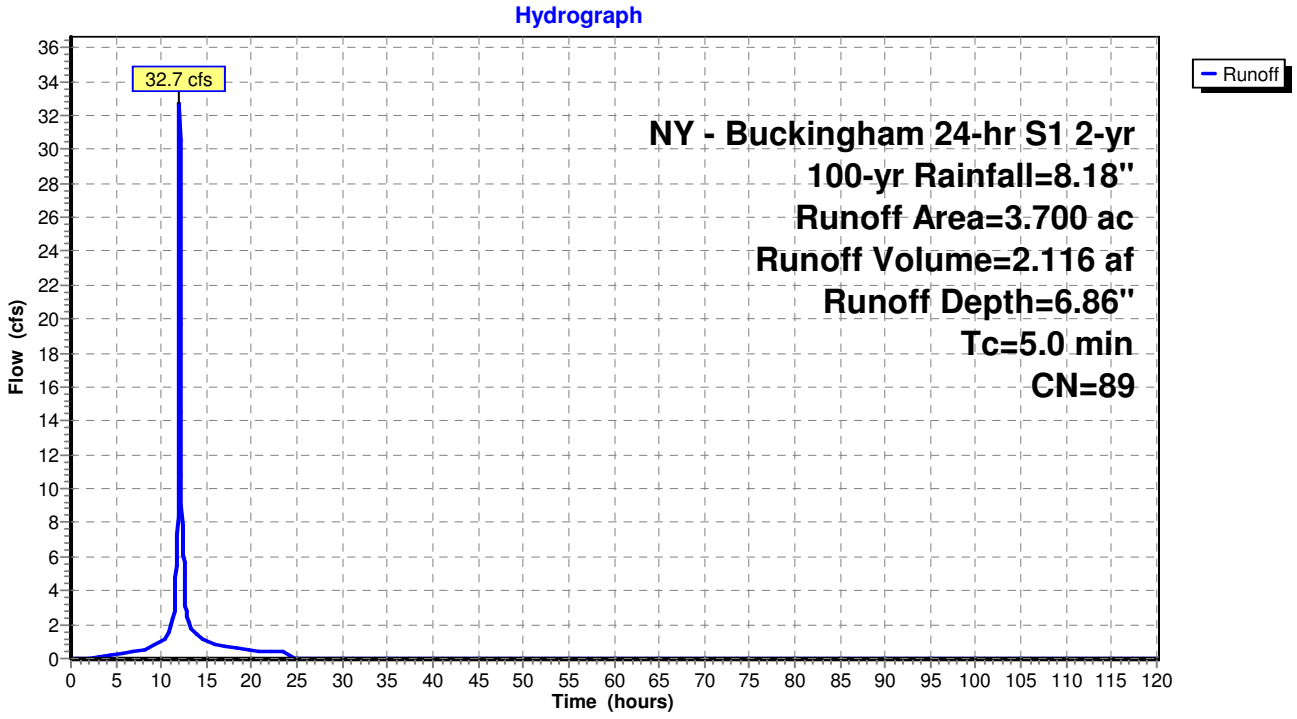
Runoff = 32.7 cfs @ 12.02 hrs, Volume= 2.116 af, Depth= 6.86"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
NY - Buckingham 24-hr S1 2-yr 100-yr Rainfall=8.18"

Area (ac)	CN	Description
1.400	74	>75% Grass cover, Good, HSG C
2.300	98	Paved parking, HSG C
3.700	89	Weighted Average
1.400		37.84% Pervious Area
2.300		62.16% Impervious Area

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

Subcatchment 1.2S:



Summary for Subcatchment 1.3S:

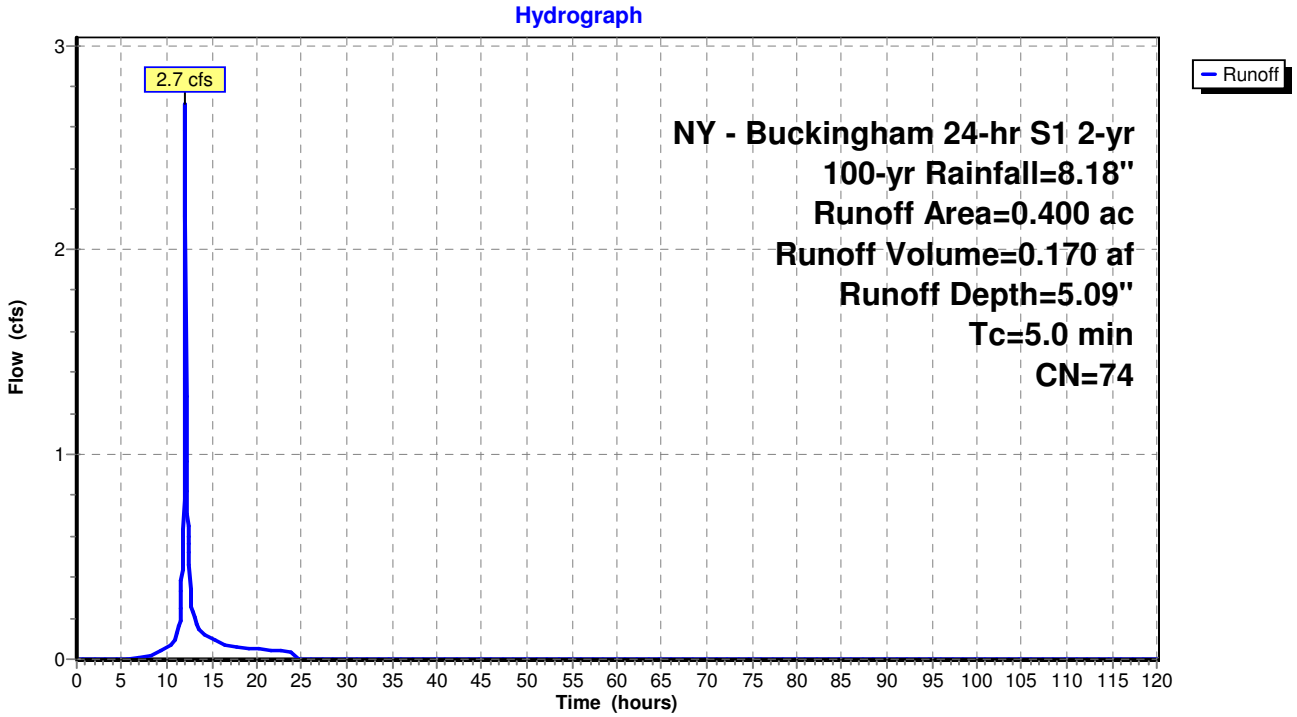
Runoff = 2.7 cfs @ 12.03 hrs, Volume= 0.170 af, Depth= 5.09"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
NY - Buckingham 24-hr S1 2-yr 100-yr Rainfall=8.18"

Area (ac)	CN	Description
0.400	74	>75% Grass cover, Good, HSG C
0.400		100.00% Pervious Area

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

Subcatchment 1.3S:



Summary for Subcatchment 2.0S:

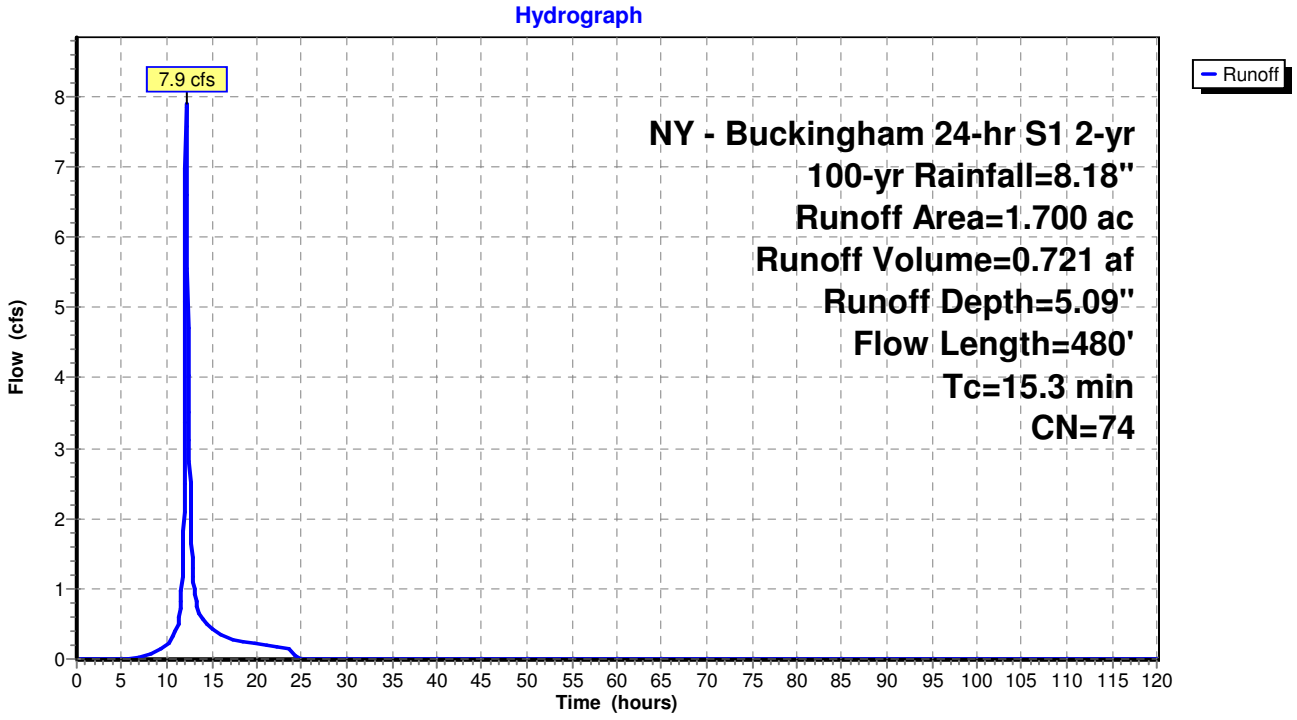
Runoff = 7.9 cfs @ 12.16 hrs, Volume= 0.721 af, Depth= 5.09"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
NY - Buckingham 24-hr S1 2-yr 100-yr Rainfall=8.18"

Area (ac)	CN	Description
0.400	70	Woods, Good, HSG C
0.900	65	Brush, Good, HSG C
0.400	98	Paved parking, HSG C
1.700	74	Weighted Average
1.300		76.47% Pervious Area
0.400		23.53% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.3	30	0.0700	0.15		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.15"
9.9	70	0.0700	0.12		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.15"
0.6	70	0.1700	2.06		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
1.5	310	0.0300	3.52		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
15.3	480	Total			

Subcatchment 2.0S:



Summary for Subcatchment 2.1S:

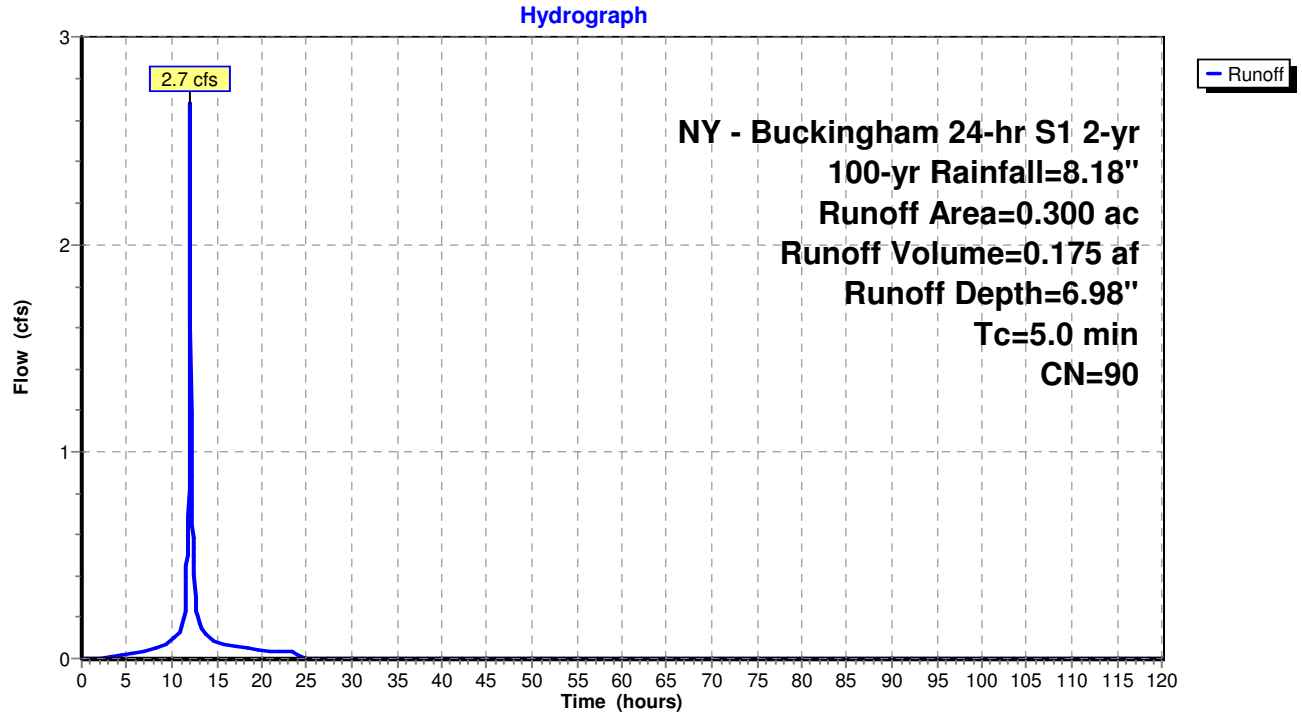
Runoff = 2.7 cfs @ 12.02 hrs, Volume= 0.175 af, Depth= 6.98"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
NY - Buckingham 24-hr S1 2-yr 100-yr Rainfall=8.18"

Area (ac)	CN	Description
0.100	74	>75% Grass cover, Good, HSG C
0.200	98	Paved parking, HSG C
0.300	90	Weighted Average
0.100		33.33% Pervious Area
0.200		66.67% Impervious Area

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

Subcatchment 2.1S:



Summary for Subcatchment 3.0S:

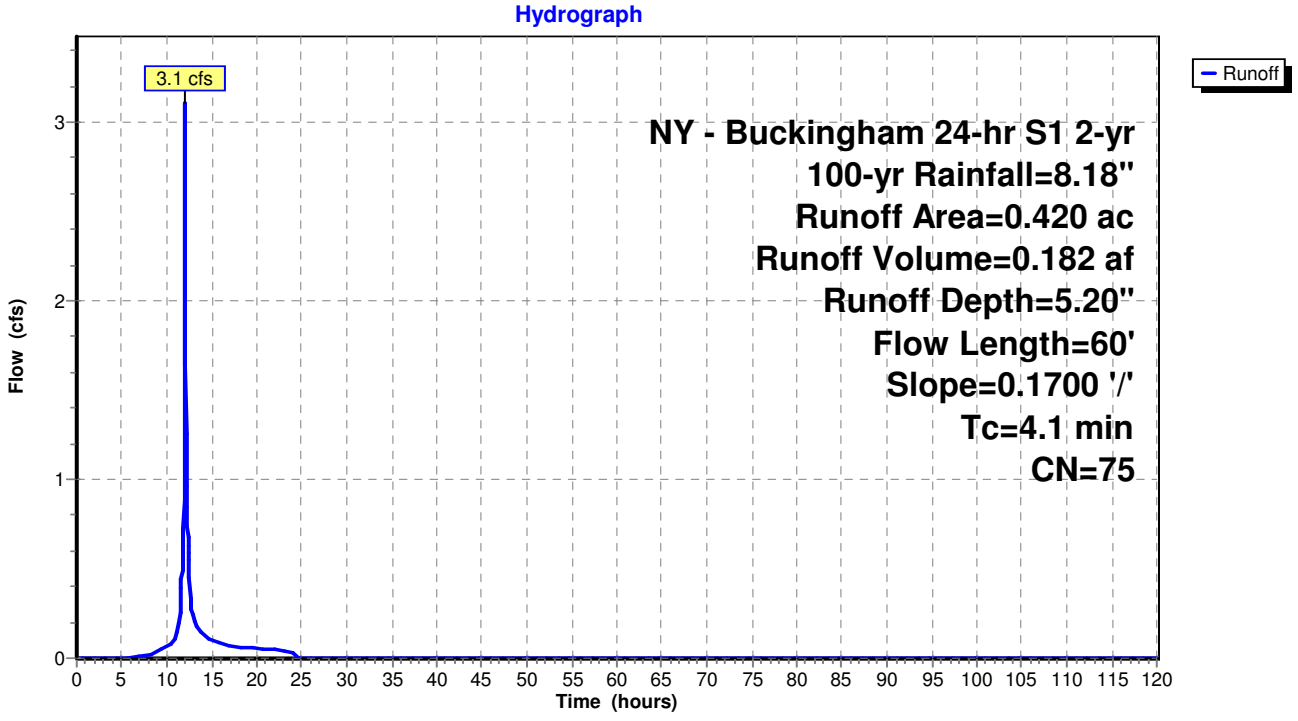
Runoff = 3.1 cfs @ 12.01 hrs, Volume= 0.182 af, Depth= 5.20"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
NY - Buckingham 24-hr S1 2-yr 100-yr Rainfall=8.18"

Area (ac)	CN	Description
0.400	74	>75% Grass cover, Good, HSG C
0.020	98	Paved parking, HSG C
0.420	75	Weighted Average
0.400		95.24% Pervious Area
0.020		4.76% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.1	60	0.1700	0.25		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.15"

Subcatchment 3.0S:



Summary for Subcatchment 4.0S:

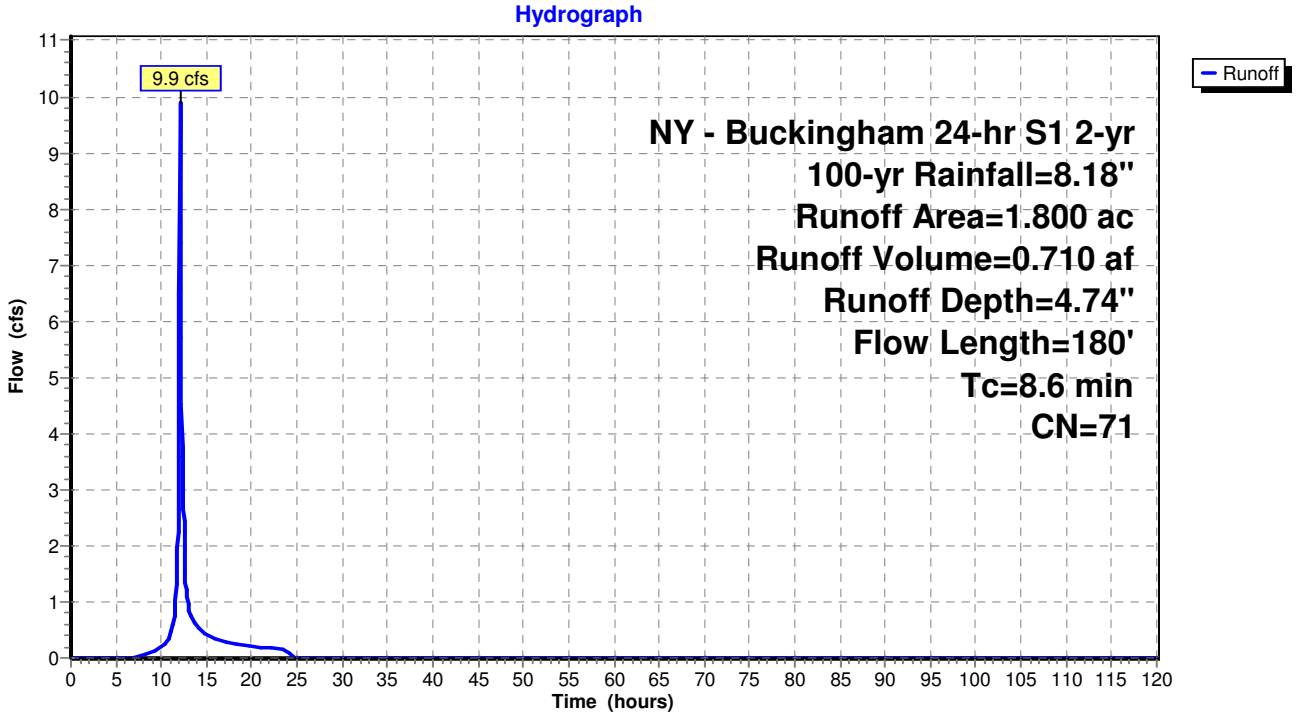
Runoff = 9.9 cfs @ 12.07 hrs, Volume= 0.710 af, Depth= 4.74"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
NY - Buckingham 24-hr S1 2-yr 100-yr Rainfall=8.18"

Area (ac)	CN	Description
1.380	70	Woods, Good, HSG C
0.400	74	>75% Grass cover, Good, HSG C
0.020	98	Paved parking, HSG C
1.800	71	Weighted Average
1.780		98.89% Pervious Area
0.020		1.11% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.1	100	0.0850	0.21		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.15"
0.3	30	0.0900	1.50		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.2	50	0.4500	3.35		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
8.6	180	Total			

Subcatchment 4.0S:

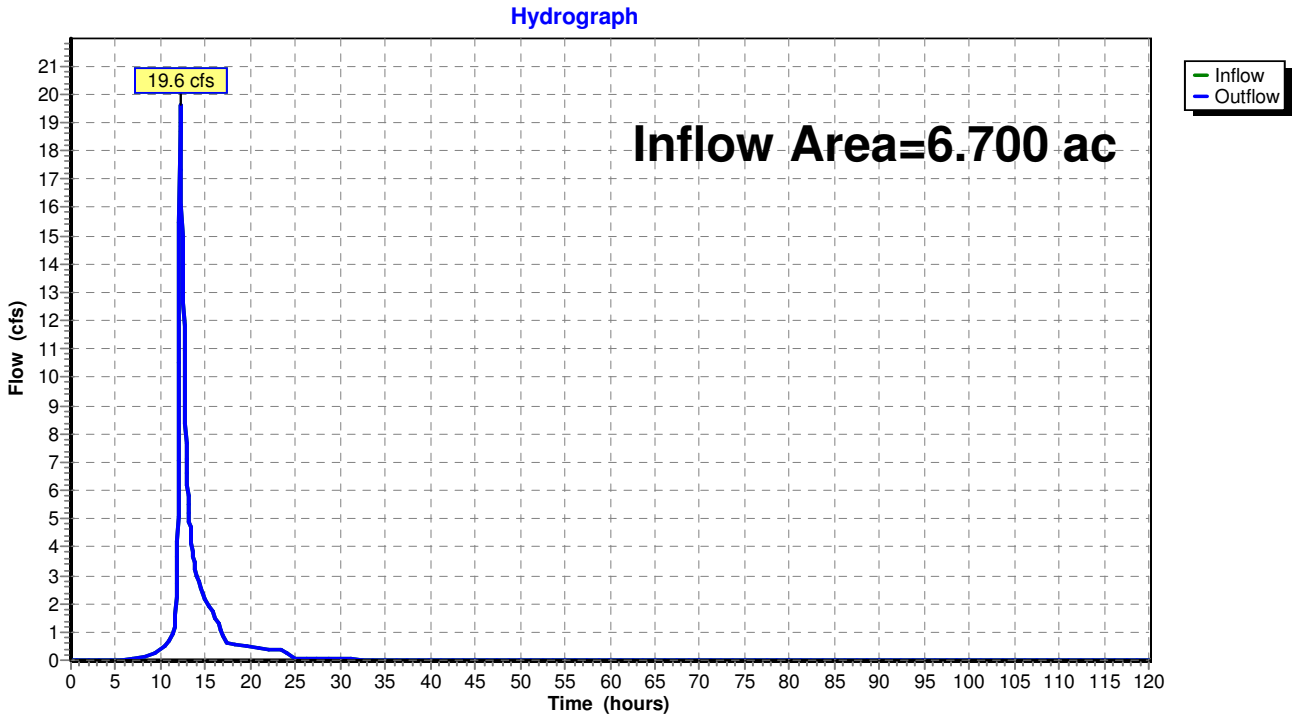


Summary for Reach DL1: Design Line 1

Inflow Area = 6.700 ac, 34.33% Impervious, Inflow Depth = 4.30" for 100-yr event
Inflow = 19.6 cfs @ 12.20 hrs, Volume= 2.401 af
Outflow = 19.6 cfs @ 12.20 hrs, Volume= 2.401 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs

Reach DL1: Design Line 1

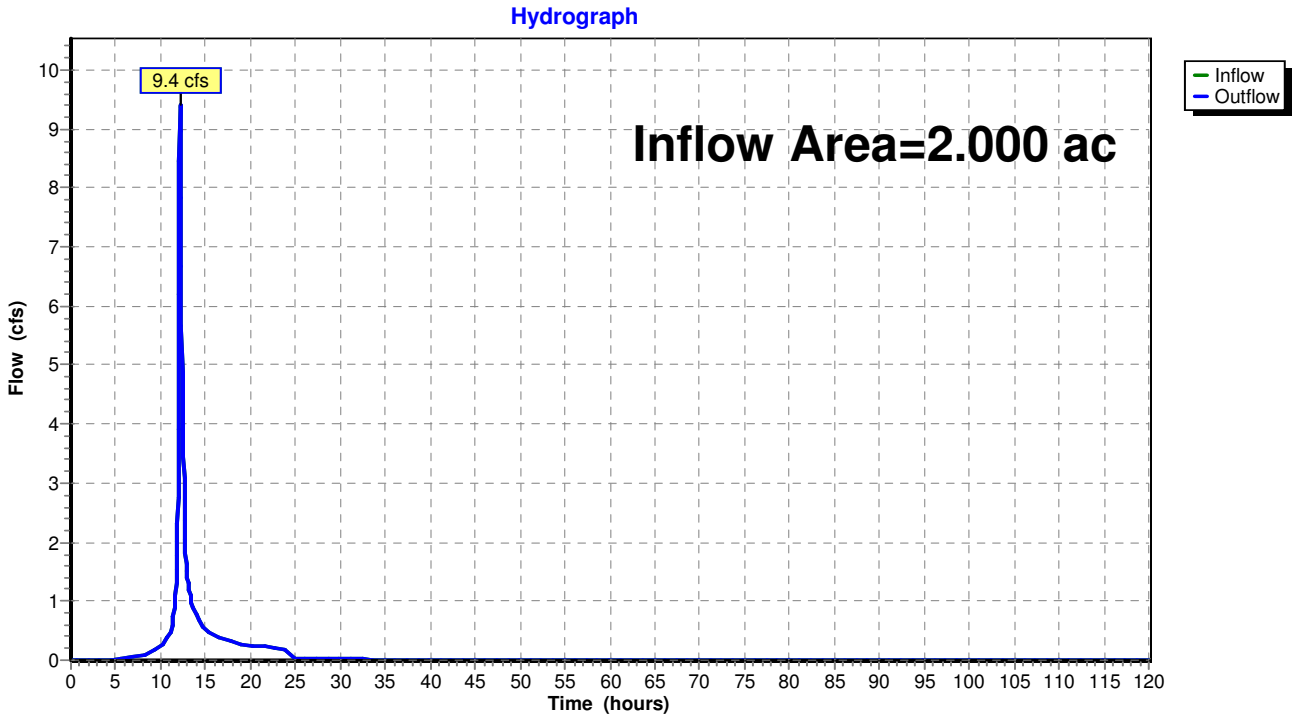


Summary for Reach DL2: Design Line 2

Inflow Area = 2.000 ac, 30.00% Impervious, Inflow Depth = 5.37" for 100-yr event
Inflow = 9.4 cfs @ 12.16 hrs, Volume= 0.895 af
Outflow = 9.4 cfs @ 12.16 hrs, Volume= 0.895 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs

Reach DL2: Design Line 2

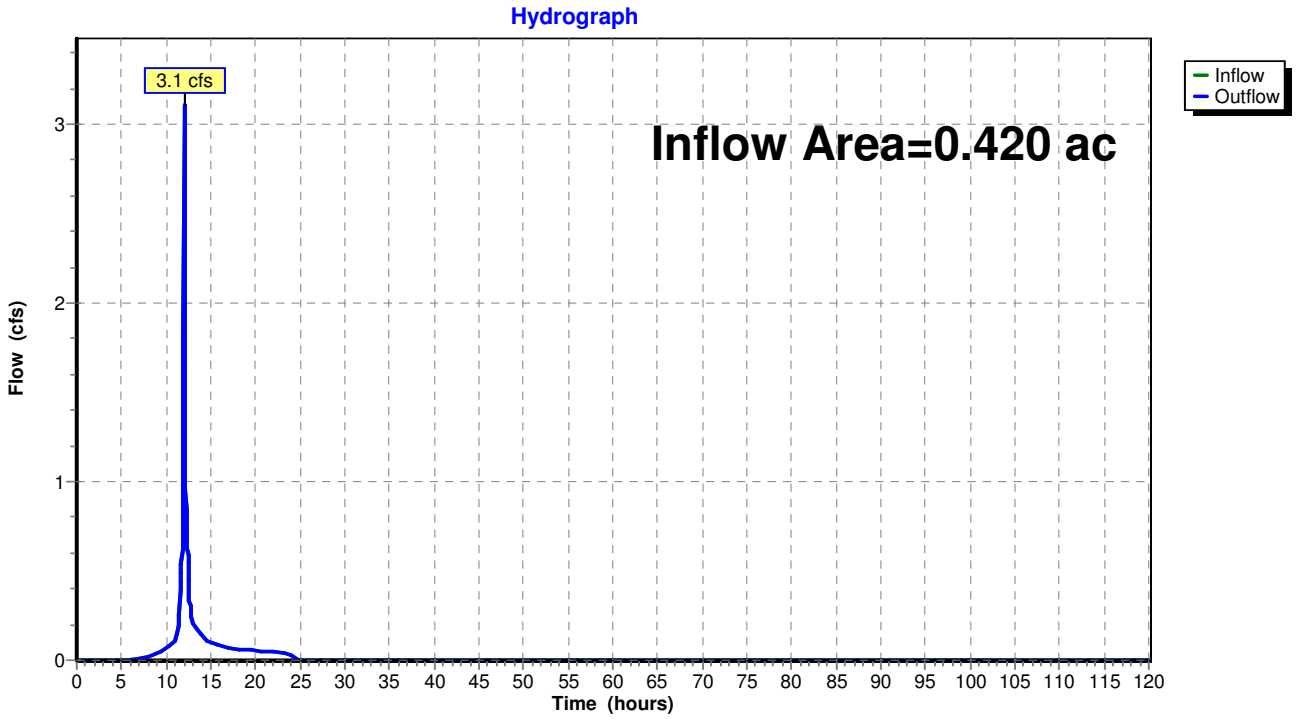


Summary for Reach DL3: Design Line 3

Inflow Area = 0.420 ac, 4.76% Impervious, Inflow Depth = 5.20" for 100-yr event
Inflow = 3.1 cfs @ 12.01 hrs, Volume= 0.182 af
Outflow = 3.1 cfs @ 12.01 hrs, Volume= 0.182 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs

Reach DL3: Design Line 3

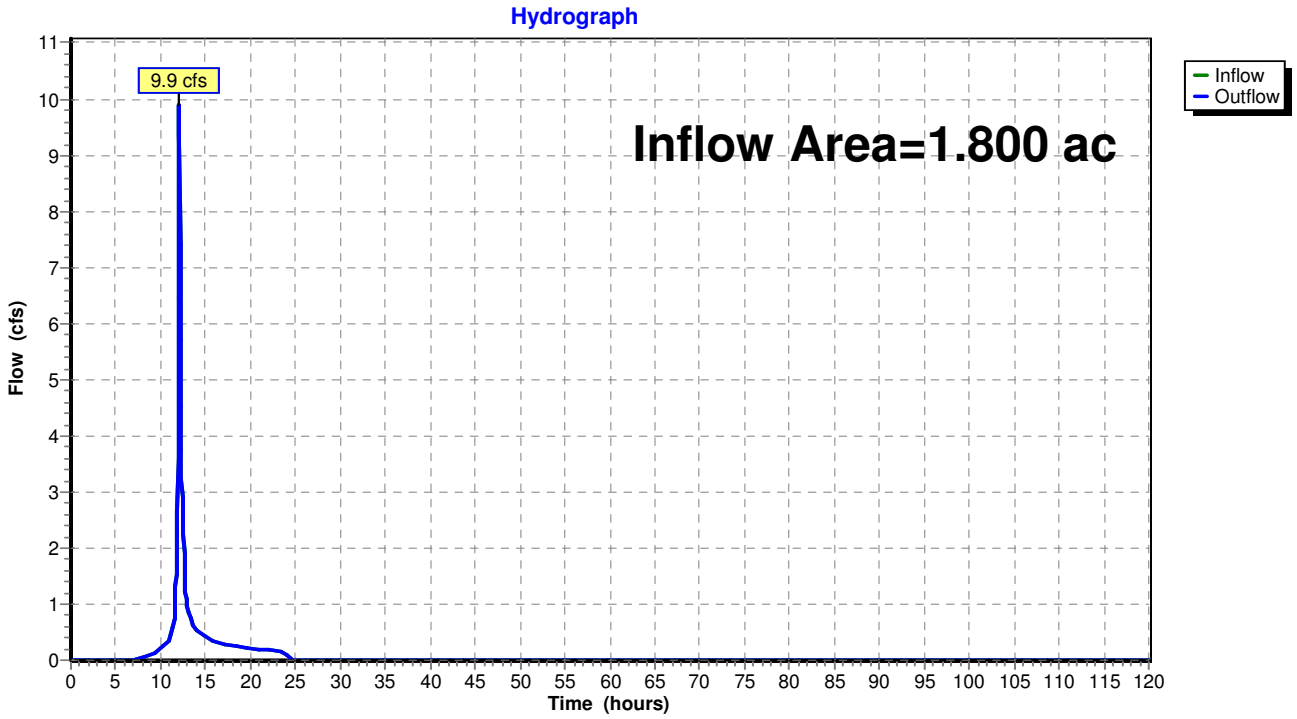


Summary for Reach DL4: Design Line 4

Inflow Area = 1.800 ac, 1.11% Impervious, Inflow Depth = 4.74" for 100-yr event
Inflow = 9.9 cfs @ 12.07 hrs, Volume= 0.710 af
Outflow = 9.9 cfs @ 12.07 hrs, Volume= 0.710 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs

Reach DL4: Design Line 4



Summary for Pond 1.1P: Infiltration System

Inflow Area = 2.200 ac, 90.91% Impervious, Inflow Depth = 6.52" for 100-yr event
Inflow = 8.6 cfs @ 12.03 hrs, Volume= 1.196 af
Outflow = 1.6 cfs @ 11.40 hrs, Volume= 1.196 af, Atten= 82%, Lag= 0.0 min
Discarded = 1.6 cfs @ 11.40 hrs, Volume= 1.196 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
Peak Elev= 201.63' @ 12.53 hrs Surf.Area= 0.083 ac Storage= 0.252 af

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 35.4 min (791.2 - 755.9)

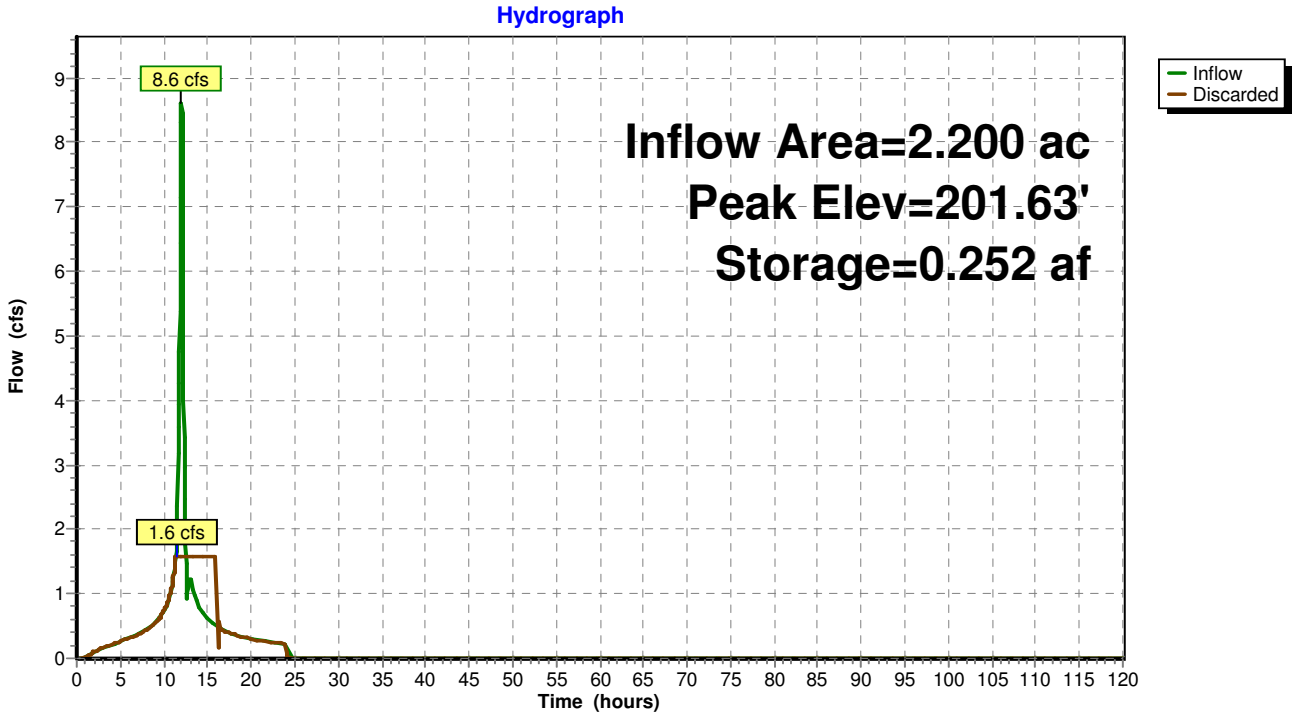
Volume	Invert	Avail.Storage	Storage Description
#1B	197.00'	0.116 af	**29.92'W x 120.42'L x 5.50'H Field B** 0.455 af Overall - 0.164 af Embedded = 0.291 af x 40.0% Voids
#2B	197.75'	0.164 af	**ADS_StormTech MC-3500 d +Cap** x 64 Inside #1 Effective Size= 70.4"W x 45.0"H => 15.33 sf x 7.17'L = 110.0 cf Overall Size= 77.0"W x 45.0"H x 7.50'L with 0.33' Overlap 4 Rows of 16 Chambers Cap Storage= +14.9 cf x 2 x 4 rows = 119.2 cf
		0.281 af	Total Available Storage

Storage Group B created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	197.00'	**19.000 in/hr Exfiltration over Horizontal area** Phase-In= 0.05'

Discarded OutFlow Max=1.6 cfs @ 11.40 hrs HW=197.06' (Free Discharge)
↑**1=Exfiltration** (Exfiltration Controls 1.6 cfs)

Pond 1.1P: Infiltration System



Summary for Pond 1.2P: Infiltration Basin

Inflow Area = 3.700 ac, 62.16% Impervious, Inflow Depth = 5.47" for 100-yr event
Inflow = 7.1 cfs @ 12.02 hrs, Volume= 1.687 af
Outflow = 6.9 cfs @ 12.06 hrs, Volume= 1.687 af, Atten= 4%, Lag= 2.4 min
Discarded = 1.2 cfs @ 12.06 hrs, Volume= 1.203 af
Primary = 5.7 cfs @ 12.06 hrs, Volume= 0.484 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
Peak Elev= 199.01' @ 12.06 hrs Surf.Area= 3,005 sf Storage= 8,028 cf

Plug-Flow detention time= 49.0 min calculated for 1.686 af (100% of inflow)
Center-of-Mass det. time= 49.0 min (847.0 - 798.0)

Volume	Invert	Avail.Storage	Storage Description
#1	195.00'	11,250 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

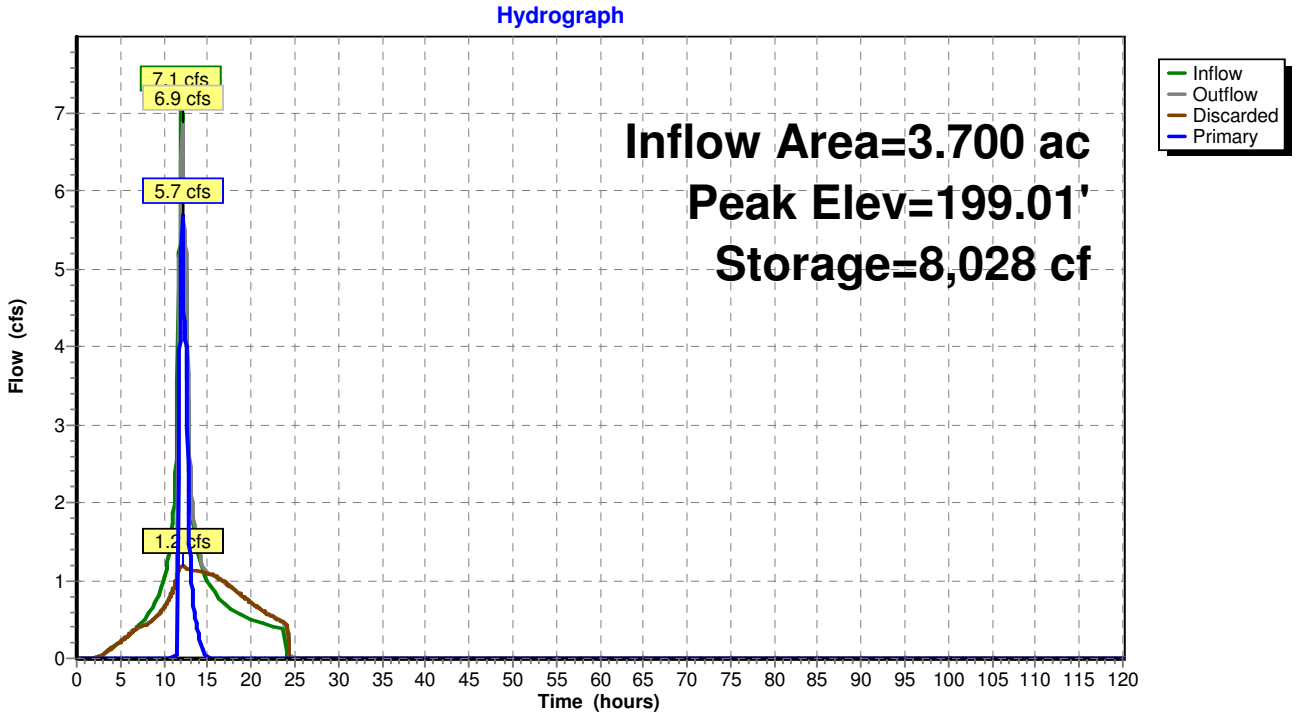
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
195.00	1,000	0	0
200.00	3,500	11,250	11,250

Device	Routing	Invert	Outlet Devices
#1	Primary	198.60'	**8.0' long x 1.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 Coef. (English) 2.69 2.72 2.75 2.85 2.98 3.08 3.20 3.28 3.31 3.30 3.31 3.32
#2	Discarded	195.00'	**17.000 in/hr Exfiltration over Horizontal area** Phase-In= 0.05'

Discarded OutFlow Max=1.2 cfs @ 12.06 hrs HW=199.01' (Free Discharge)
↑—**2=Exfiltration** (Exfiltration Controls 1.2 cfs)

Primary OutFlow Max=5.6 cfs @ 12.06 hrs HW=199.01' TW=197.17' (Dynamic Tailwater)
↑—**1=Broad-Crested Rectangular Weir** (Weir Controls 5.6 cfs @ 1.73 fps)

Pond 1.2P: Infiltration Basin



Summary for Pond 1.3P: Detention Basin

Inflow Area = 0.400 ac, 0.00% Impervious, Inflow Depth = 24.44" for 100-yr event
Inflow = 40.4 cfs @ 12.02 hrs, Volume= 0.815 af
Outflow = 5.5 cfs @ 12.27 hrs, Volume= 0.815 af, Atten= 86%, Lag= 14.9 min
Primary = 5.5 cfs @ 12.27 hrs, Volume= 0.815 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
Peak Elev= 195.03' @ 12.27 hrs Surf.Area= 8,164 sf Storage= 23,251 cf

Plug-Flow detention time= 85.1 min calculated for 0.815 af (100% of inflow)
Center-of-Mass det. time= 84.0 min (829.7 - 745.7)

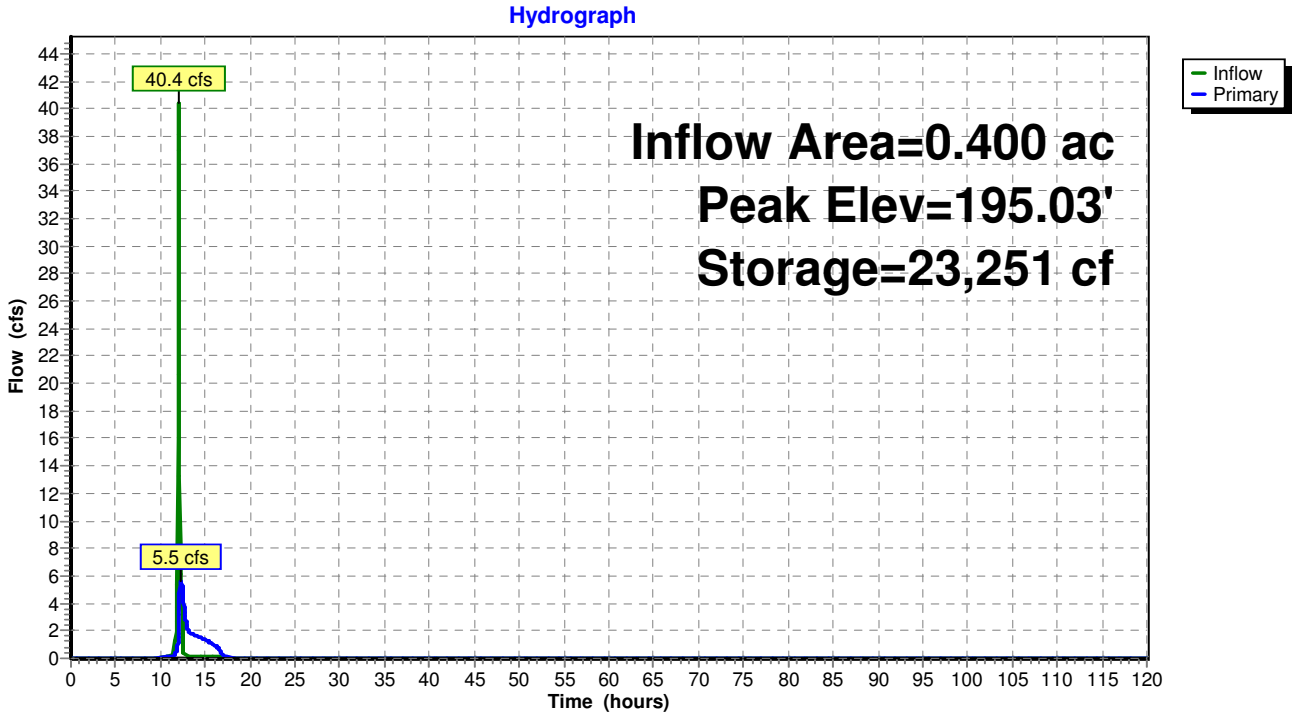
Volume	Invert	Avail.Storage	Storage Description
#1	190.00'	31,800 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
190.00	500	0	0
191.00	2,600	1,550	1,550
196.00	9,500	30,250	31,800

Device	Routing	Invert	Outlet Devices
#1	Primary	189.00'	**24.0" Round Culvert** L= 40.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 189.00' / 188.00' S= 0.0250 '/' Cc= 0.900 n= 0.012, Flow Area= 3.14 sf
#2	Device 1	190.00'	**6.0" Vert. Orifice/Grate** C= 0.600
#3	Device 1	194.00'	**1.0' long x 0.5' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32

Primary OutFlow Max=5.5 cfs @ 12.27 hrs HW=195.03' TW=0.00' (Dynamic Tailwater)
↑**1=Culvert** (Passes 5.5 cfs of 33.9 cfs potential flow)
↑**2=Orifice/Grate** (Orifice Controls 2.1 cfs @ 10.52 fps)
3=Broad-Crested Rectangular Weir (Weir Controls 3.5 cfs @ 3.36 fps)

Pond 1.3P: Detention Basin



Summary for Pond 1.4P: Sand Filter

Inflow Area = 3.700 ac, 62.16% Impervious, Inflow Depth = 1.57" for 100-yr event
Inflow = 5.7 cfs @ 12.06 hrs, Volume= 0.484 af
Outflow = 3.8 cfs @ 12.60 hrs, Volume= 0.484 af, Atten= 33%, Lag= 32.1 min
Primary = 0.1 cfs @ 12.60 hrs, Volume= 0.137 af
Secondary = 3.7 cfs @ 12.60 hrs, Volume= 0.347 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
Peak Elev= 198.01' @ 12.60 hrs Surf.Area= 3,405 sf Storage= 8,826 cf

Plug-Flow detention time= 155.3 min calculated for 0.484 af (100% of inflow)
Center-of-Mass det. time= 155.8 min (899.2 - 743.5)

Volume	Invert	Avail.Storage	Storage Description
#1	194.00'	12,500 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

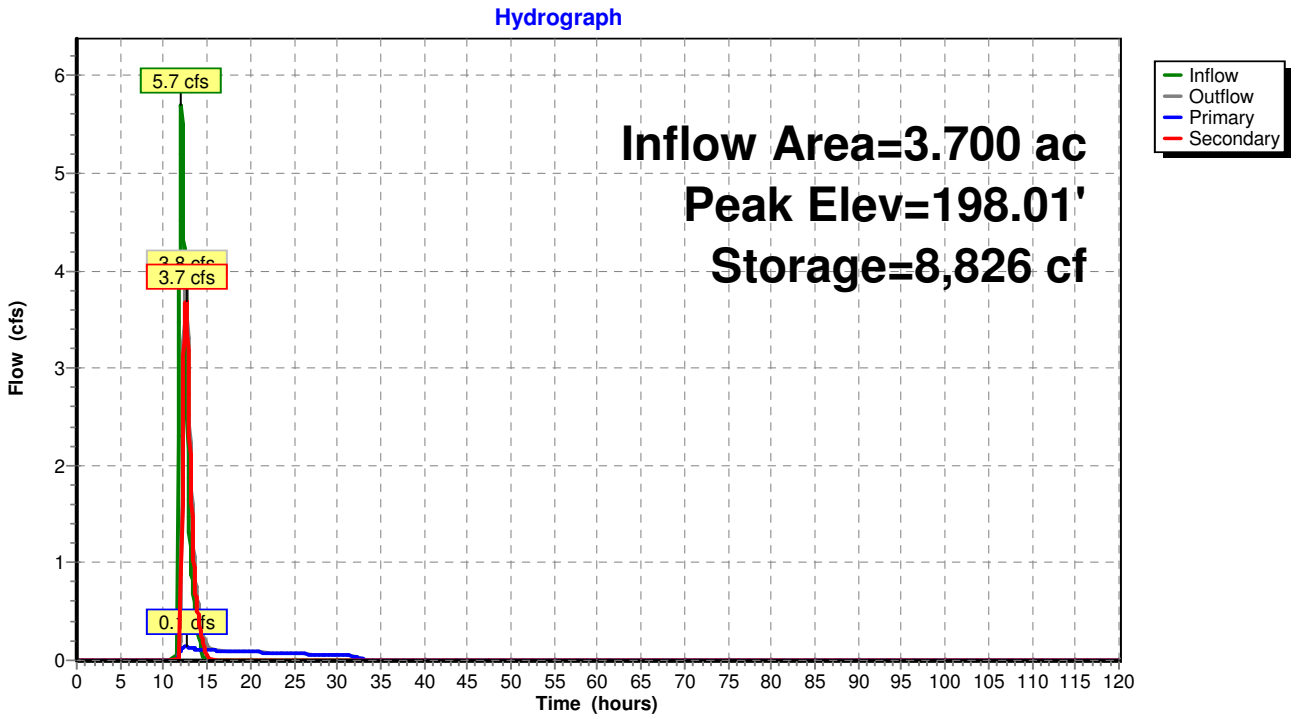
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
194.00	1,000	0	0
199.00	4,000	12,500	12,500

Device	Routing	Invert	Outlet Devices
#1	Primary	194.00'	**1.750 in/hr Exfiltration over Horizontal area** Phase-In= 0.10'
#2	Secondary	196.50'	**0.6' long x 0.5' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32

Primary OutFlow Max=0.1 cfs @ 12.60 hrs HW=198.01' TW=0.00' (Dynamic Tailwater)
↑**1=Exfiltration** (Exfiltration Controls 0.1 cfs)

Secondary OutFlow Max=3.7 cfs @ 12.60 hrs HW=198.01' TW=0.00' (Dynamic Tailwater)
↑**2=Broad-Crested Rectangular Weir** (Weir Controls 3.7 cfs @ 4.08 fps)

Pond 1.4P: Sand Filter



Summary for Pond 2.1P: Sand Filter

Inflow Area = 0.300 ac, 66.67% Impervious, Inflow Depth = 6.98" for 100-yr event
Inflow = 2.6 cfs @ 12.05 hrs, Volume= 0.175 af
Outflow = 1.5 cfs @ 12.13 hrs, Volume= 0.175 af, Atten= 40%, Lag= 4.9 min
Primary = 0.0 cfs @ 12.13 hrs, Volume= 0.063 af
Secondary = 1.5 cfs @ 12.13 hrs, Volume= 0.111 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
Peak Elev= 174.93' @ 12.13 hrs Surf.Area= 1,119 sf Storage= 1,396 cf

Plug-Flow detention time= 99.9 min calculated for 0.174 af (100% of inflow)
Center-of-Mass det. time= 99.9 min (930.5 - 830.6)

Volume	Invert	Avail.Storage	Storage Description
#1	173.00'	2,850 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

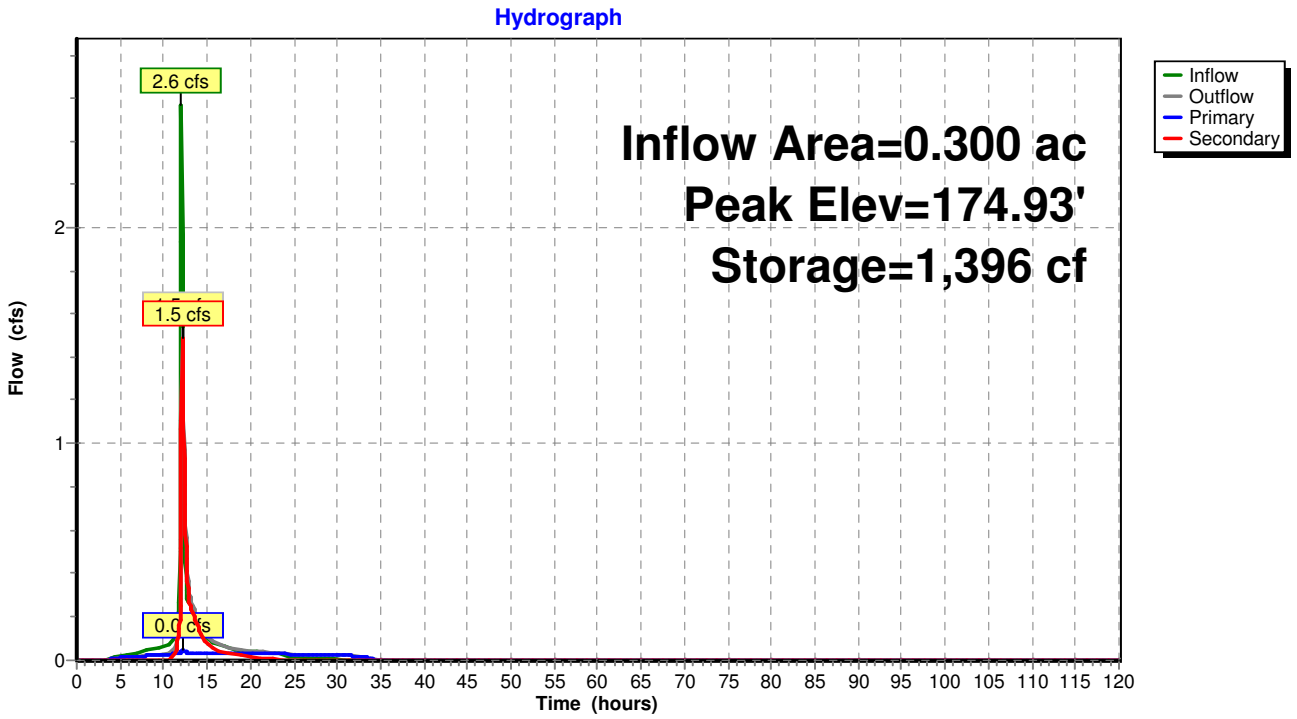
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
173.00	400	0	0
174.00	700	550	550
176.00	1,600	2,300	2,850

Device	Routing	Invert	Outlet Devices
#1	Device 3	173.00'	**1.750 in/hr Exfiltration over Horizontal area** Phase-In= 0.10'
#2	Secondary	174.00'	**0.5' long x 0.5' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32
#3	Primary	170.00'	**3.0" Vert. Orifice/Grate** C= 0.600

Primary OutFlow Max=0.0 cfs @ 12.13 hrs HW=174.92' TW=0.00' (Dynamic Tailwater)
↑└**3=Orifice/Grate** (Passes 0.0 cfs of 0.5 cfs potential flow)
↑└**1=Exfiltration** (Exfiltration Controls 0.0 cfs)

Secondary OutFlow Max=1.5 cfs @ 12.13 hrs HW=174.92' TW=0.00' (Dynamic Tailwater)
↑└**2=Broad-Crested Rectangular Weir** (Weir Controls 1.5 cfs @ 3.18 fps)

Pond 2.1P: Sand Filter



Summary for Pond 2.2P: Pretreatment Basin

Inflow Area = 0.300 ac, 66.67% Impervious, Inflow Depth = 6.98" for 100-yr event
Inflow = 2.7 cfs @ 12.02 hrs, Volume= 0.175 af
Outflow = 2.6 cfs @ 12.05 hrs, Volume= 0.175 af, Atten= 4%, Lag= 1.7 min
Primary = 2.6 cfs @ 12.05 hrs, Volume= 0.175 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
Peak Elev= 175.06' @ 12.05 hrs Surf.Area= 971 sf Storage= 1,082 cf

Plug-Flow detention time= 51.3 min calculated for 0.174 af (100% of inflow)
Center-of-Mass det. time= 51.8 min (830.6 - 778.8)

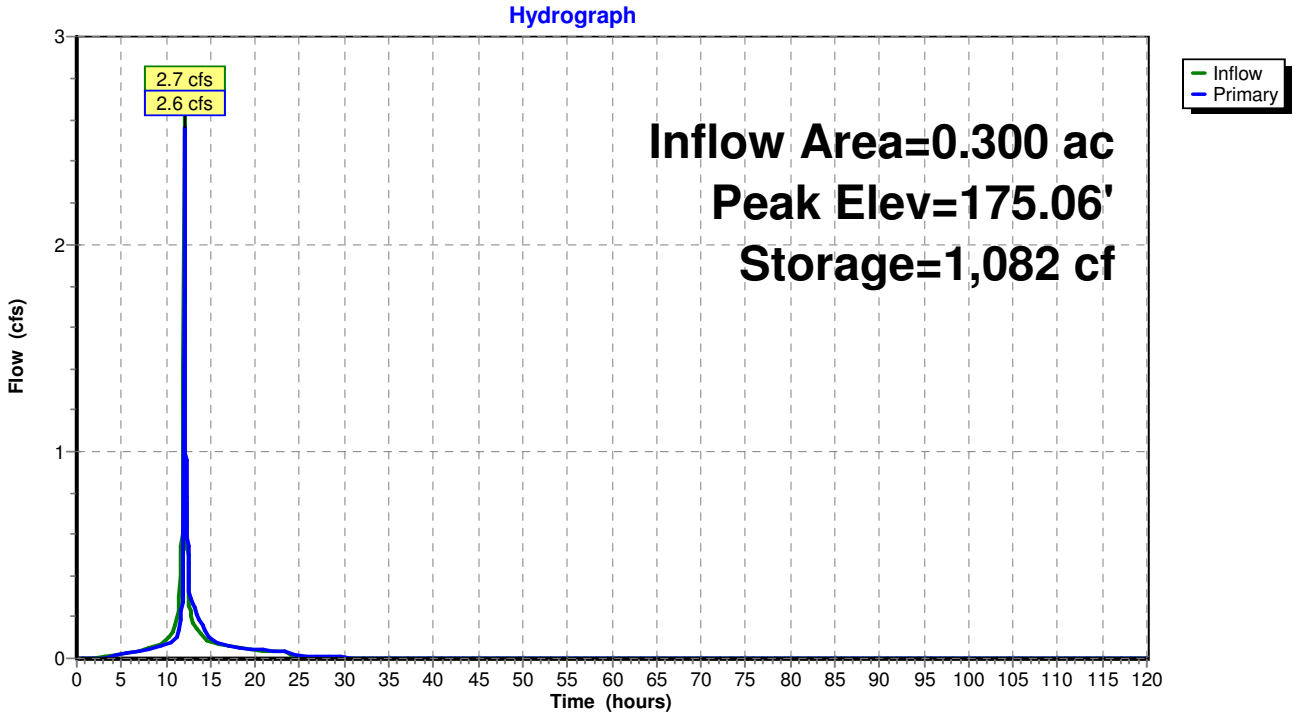
Volume	Invert	Avail.Storage	Storage Description
#1	173.50'	2,150 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
173.50	400	0	0
174.00	600	250	250
176.00	1,300	1,900	2,150

Device	Routing	Invert	Outlet Devices
#1	Primary	173.50'	**4.0" Round Culvert** L= 10.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 173.50' / 173.00' S= 0.0500 '/' Cc= 0.900 n= 0.012, Flow Area= 0.09 sf
#2	Primary	174.80'	**6.0' long x 0.5' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32

Primary OutFlow Max=2.5 cfs @ 12.05 hrs HW=175.06' TW=174.76' (Dynamic Tailwater)
└─**1=Culvert** (Inlet Controls 0.2 cfs @ 2.65 fps)
└─**2=Broad-Crested Rectangular Weir** (Weir Controls 2.2 cfs @ 1.44 fps)

Pond 2.2P: Pretreatment Basin



Summary for Pond FS 1.1: Flow Splitter

Inflow Area = 2.200 ac, 90.91% Impervious, Inflow Depth = 7.70" for 100-yr event
Inflow = 20.6 cfs @ 12.02 hrs, Volume= 1.412 af
Outflow = 20.6 cfs @ 12.02 hrs, Volume= 1.412 af, Atten= 0%, Lag= 0.0 min
Primary = 8.6 cfs @ 12.03 hrs, Volume= 1.196 af
Secondary = 12.1 cfs @ 12.02 hrs, Volume= 0.216 af

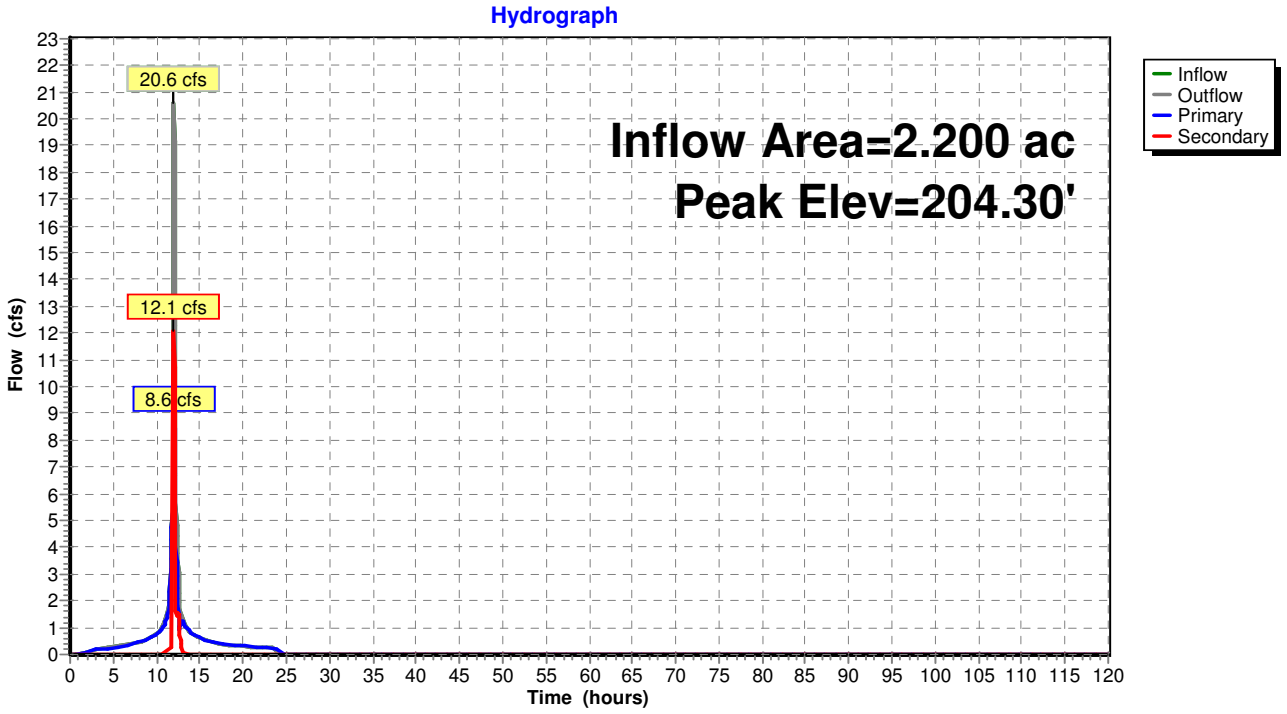
Routing by Dyn-Stor-Ind method, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
Peak Elev= 204.30' @ 12.04 hrs
Flood Elev= 205.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	197.80'	**12.0" Round Culvert** L= 5.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 197.80' / 197.75' S= 0.0100 '/' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf
#2	Secondary	201.20'	**18.0" Round Culvert** L= 110.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 201.20' / 198.60' S= 0.0236 '/' Cc= 0.900 n= 0.012, Flow Area= 1.77 sf

Primary OutFlow Max=8.0 cfs @ 12.03 hrs HW=204.03' TW=199.52' (Dynamic Tailwater)
└**1=Culvert** (Inlet Controls 8.0 cfs @ 10.22 fps)

Secondary OutFlow Max=9.8 cfs @ 12.02 hrs HW=203.95' TW=202.41' (Dynamic Tailwater)
└**2=Culvert** (Outlet Controls 9.8 cfs @ 5.56 fps)

Pond FS 1.1: Flow Splitter



Summary for Pond FS 1.2: Flow Splitter

Inflow Area = 3.700 ac, 62.16% Impervious, Inflow Depth = 7.56" for 100-yr event
Inflow = 44.8 cfs @ 12.02 hrs, Volume= 2.332 af
Outflow = 44.8 cfs @ 12.02 hrs, Volume= 2.332 af, Atten= 0%, Lag= 0.0 min
Primary = 7.1 cfs @ 12.02 hrs, Volume= 1.687 af
Secondary = 37.7 cfs @ 12.02 hrs, Volume= 0.645 af

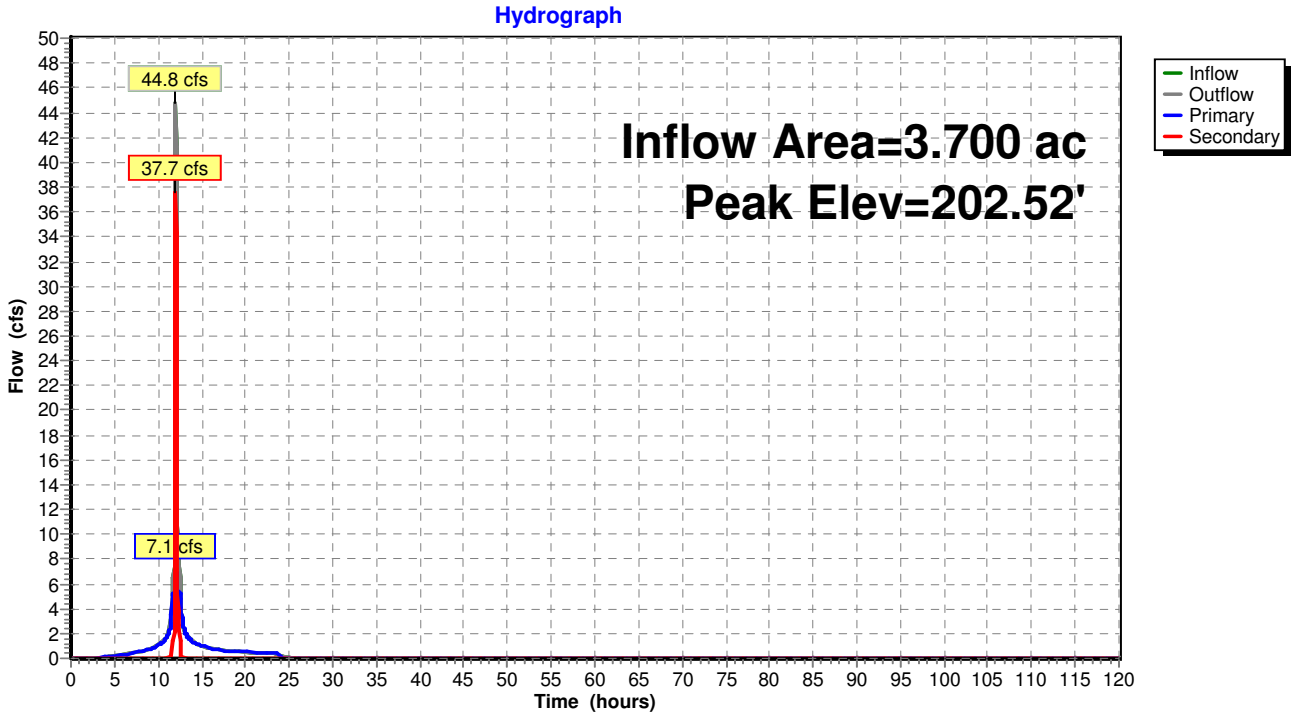
Routing by Dyn-Stor-Ind method, Time Span= 0.00-120.00 hrs, dt= 0.05 hrs
Peak Elev= 202.52' @ 12.02 hrs
Flood Elev= 202.60'

Device	Routing	Invert	Outlet Devices
#1	Primary	195.50'	**12.0" Round Culvert** L= 45.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 195.50' / 195.00' S= 0.0111 '/' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf
#2	Device 3	200.50'	**4.0' long x 0.5' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32
#3	Secondary	195.50'	**24.0" Round Culvert** L= 280.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 195.50' / 191.00' S= 0.0161 '/' Cc= 0.900 n= 0.012, Flow Area= 3.14 sf

Primary OutFlow Max=7.0 cfs @ 12.02 hrs HW=202.41' TW=199.00' (Dynamic Tailwater)
└**1=Culvert** (Inlet Controls 7.0 cfs @ 8.89 fps)

Secondary OutFlow Max=34.9 cfs @ 12.02 hrs HW=202.41' TW=193.27' (Dynamic Tailwater)
└**3=Culvert** (Passes 34.9 cfs of 36.0 cfs potential flow)
└**2=Broad-Crested Rectangular Weir** (Weir Controls 34.9 cfs @ 4.58 fps)

Pond FS 1.2: Flow Splitter



APPENDIX D

Project and Owner information

Site Data:

Buckingham Property Management
Channingville Road & Nelson Avenue
Village of Wappingers Falls
Dutchess County, New York
Tax Map No.: 134601-6158-13-071325
Area: 13.42 acres ±

Owner/Applicant Information:

Mr. Edward Cohen
Buckingham Properties
657 E. Main Street
Mt. Kisco, New York 10549
(914) 666-7700

Party Responsible for Implementation of the Stormwater Pollution Prevention Plan (Including Maintenance During and After Construction):

Buckingham Properties
657 E. Main Street
Mt. Kisco, New York 10549

Qualified Professional Responsible for Inspection of the Stormwater Pollution Prevention Plan:

Inspector to be determined at time of construction

APPENDIX E

NYSDEC SPDES for Construction Activities Construction Site Log Book

APPENDIX F
CONSTRUCTION SITE INSPECTION AND MAINTENANCE LOG BOOK

STATE POLLUTANT DISCHARGE ELIMINATION SYSTEM FOR CONSTRUCTION ACTIVITIES

SAMPLE CONSTRUCTION SITE LOG BOOK

Table of Contents

I. **PRE-CONSTRUCTION MEETING DOCUMENTS**

Project Name _____

Permit No. _____ **Date of Authorization** _____

Name of Operator _____

Prime Contractor _____

a. **Preamble to Site Assessment and Inspections**

The Following Information To Be Read By All Person's Involved in The Construction of Stormwater Related Activities:

The Operator agrees to have a qualified inspector[1] conduct an assessment of the site prior to the commencement of construction[2] and certify in this inspection report that the appropriate erosion and sediment controls described in the SWPPP have been adequately installed or implemented to ensure overall preparedness of the site for the commencement of construction.

Prior to the commencement of construction, the Operator shall certify in this site logbook that the SWPPP has been prepared in accordance with the State's standards and meets all Federal, State and local erosion and sediment control requirements. A preconstruction meeting should be held to review all of the SWPPP requirements with construction personnel.

When construction starts, site inspections shall be conducted by the qualified inspector at least every 7 calendar days. The Operator shall maintain a record of all inspection reports in this site logbook. The site logbook shall be maintained on site and be made available to the permitting authorities upon request.

Prior to filing the Notice of Termination or the end of permit term, the Operator shall have a qualified inspector perform a final site inspection. The qualified inspector shall certify that the site has undergone final stabilization[3] using either vegetative or structural stabilization methods and that all temporary erosion and sediment controls (such as silt fencing) not needed for long-term erosion control have been removed. In addition, the Operator must identify and certify that all permanent structures described in the SWPPP have been constructed and provide the owner(s) with an operation and maintenance plan that ensures the structure(s) continuously functions as designed.

1 Refer to "Qualified Inspector" inspection requirements in the current SPDES General Permit for Stormwater Discharges from Construction Activity for complete list of inspection requirements.
2 "Commencement of construction" means the initial removal of vegetation and disturbance of soils associated with clearing, grading or excavating activities or other construction activities.
3 "Final stabilization" means that all soil-disturbing activities at the site have been completed and a uniform, perennial vegetative cover with a density of eighty (80) percent has been established or equivalent stabilization measures (such as the use of mulches or geotextiles) have been employed on all unpaved areas and areas not covered by permanent structures.

b. Pre-construction Site Assessment Checklist
(NOTE: Provide comments below as necessary)

1. Notice of Intent, SWPPP, and Contractors Certification:

Yes No NA

[ ] [ ] [ ] Has a Notice of Intent been filed with the NYS Department of Conservation?
[ ] [ ] [ ] Is the SWPPP on-site? Where?_____
[ ] [ ] [ ] Is the Plan current? What is the latest revision date?_____
[ ] [ ] [ ] Is a copy of the NOI (with brief description) onsite? Where?_____
[ ] [ ] [ ] Have all contractors involved with stormwater related activities signed a contractor's certification?

2. Resource Protection

Yes No NA

[ ] [ ] [ ] Are construction limits clearly flagged or fenced?
[ ] [ ] [ ] Important trees and associated rooting zones, on-site septic system absorption fields, existing vegetated areas suitable for filter strips, especially in perimeter areas, have been flagged for protection.
[ ] [ ] [ ] Creek crossings installed prior to land-disturbing activity, including clearing and blasting.

3. Surface Water Protection

Yes No NA

[ ] [ ] [ ] Clean stormwater runoff has been diverted from areas to be disturbed.
[ ] [ ] [ ] Bodies of water located either on site or in the vicinity of the site have been identified and protected.
[ ] [ ] [ ] Appropriate practices to protect on-site or downstream surface water are installed.
[ ] [ ] [ ] Are clearing and grading operations divided into areas <5 acres?

4. Stabilized Construction Access

Yes No NA

[ ] [ ] [ ] A temporary construction entrance to capture mud and debris from construction vehicles before they enter the public highway has been installed.
[ ] [ ] [ ] Other access areas (entrances, construction routes, equipment parking areas) are stabilized immediately as work takes place with gravel or other cover.
[ ] [ ] [ ] Sediment tracked onto public streets is removed or cleaned on a regular basis.

5. Sediment Controls

Yes No NA

[ ] [ ] [ ] Silt fence material and installation comply with the standard drawing and specifications.
[ ] [ ] [ ] Silt fences are installed at appropriate spacing intervals
[ ] [ ] [ ] Sediment/detention basin was installed as first land disturbing activity.
[ ] [ ] [ ] Sediment traps and barriers are installed.

6. Pollution Prevention for Waste and Hazardous Materials

Yes No NA

[ ] [ ] [ ] The Operator or designated representative has been assigned to implement the spill prevention avoidance and response plan.
[ ] [ ] [ ] The plan is contained in the SWPPP on page _____
[ ] [ ] [ ] Appropriate materials to control spills are onsite. Where? _____

II. CONSTRUCTION DURATION INSPECTIONS

a. Directions:

Inspection Forms will be filled out during the entire construction phase of the project.

Required Elements:

1) On a site map, indicate the extent of all disturbed site areas and drainage pathways. Indicate site areas that are expected to undergo initial disturbance or significant site work within the next 14-day period;

2) Indicate on a site map all areas of the site that have undergone temporary or permanent stabilization;

3) Indicate all disturbed site areas that have not undergone active site work during the previous 14-day period;

4) Inspect all sediment control practices and record the approximate degree of sediment accumulation as a percentage of sediment storage volume (for example, 10 percent, 20 percent, 50 percent);

5) Inspect all erosion and sediment control practices and record all maintenance requirements such as verifying the integrity of barrier or diversion systems (earthen berms or silt fencing) and containment systems (sediment basins and sediment traps). Identify any evidence of rill or gully erosion occurring on slopes and any loss of stabilizing vegetation or seeding/mulching. Document any excessive deposition of sediment or ponding water along barrier or diversion systems. Record the depth of sediment within containment structures, any erosion near outlet and overflow structures, and verify the ability of rock filters around perforated riser pipes to pass water; and

6) Immediately report to the Operator any deficiencies that are identified with the implementation of the SWPPP.

SITE PLAN/SKETCH

Inspector (print name)	**Date of Inspection**
Qualified Inspector (print name)	**Qualified Inspector Signature**

The above signed acknowledges that, to the best of his/her knowledge, all information provided on the forms is accurate and complete.

Maintaining Water Quality

Yes No NA

[ ] [ ] [ ] Is there an increase in turbidity causing a substantial visible contrast to natural conditions at the outfalls?
[ ] [ ] [ ] Is there residue from oil and floating substances, visible oil film, or globules or grease at the outfalls?
[ ] [ ] [ ] All disturbance is within the limits of the approved plans.
[ ] [ ] [ ] Have receiving lake/bay, stream, and/or wetland been impacted by silt from project?

Housekeeping

1. General Site Conditions

Yes No NA

[ ] [ ] [ ] Is construction site litter, debris and spoils appropriately managed?
[ ] [ ] [ ] Are facilities and equipment necessary for implementation of erosion and sediment control in working order and/or properly maintained?
[ ] [ ] [ ] Is construction impacting the adjacent property?
[ ] [ ] [ ] Is dust adequately controlled?

2. Temporary Stream Crossing

Yes No NA

[ ] [ ] [ ] Maximum diameter pipes necessary to span creek without dredging are installed.
[ ] [ ] [ ] Installed non-woven geotextile fabric beneath approaches.
[ ] [ ] [ ] Is fill composed of aggregate (no earth or soil)?
[ ] [ ] [ ] Rock on approaches is clean enough to remove mud from vehicles & prevent sediment from entering stream during high flow.

3. Stabilized Construction Access

Yes No NA

[ ] [ ] [ ] Stone is clean enough to effectively remove mud from vehicles.
[ ] [ ] [ ] Installed per standards and specifications?
[ ] [ ] [ ] Does all traffic use the stabilized entrance to enter and leave site?
[ ] [ ] [ ] Is adequate drainage provided to prevent ponding at entrance?

Runoff Control Practices

1. Excavation Dewatering

Yes No NA

[ ] [ ] [ ] Upstream and downstream berms (sandbags, inflatable dams, etc.) are installed per plan.
[ ] [ ] [ ] Clean water from upstream pool is being pumped to the downstream pool.
[ ] [ ] [ ] Sediment laden water from work area is being discharged to a silt-trapping device.
[ ] [ ] [ ] Constructed upstream berm with one-foot minimum freeboard.

Runoff Control Practices (continued)

2. Flow Spreader

Yes No NA

[ ] [ ] [ ] Installed per plan.
[ ] [ ] [ ] Constructed on undisturbed soil, not on fill, receiving only clear, non-sediment laden flow.
[ ] [ ] [ ] Flow sheets out of level spreader without erosion on downstream edge.

3. Interceptor Dikes and Swales

Yes No NA

[ ] [ ] [ ] Installed per plan with minimum side slopes 2H:1V or flatter.
[ ] [ ] [ ] Stabilized by geotextile fabric, seed, or mulch with no erosion occurring.
[ ] [ ] [ ] Sediment-laden runoff directed to sediment trapping structure

4. Stone Check Dam

Yes No NA

[ ] [ ] [ ] Is channel stable? (flow is not eroding soil underneath or around the structure).
[ ] [ ] [ ] Check is in good condition (rocks in place and no permanent pools behind the structure).
[ ] [ ] [ ] Has accumulated sediment been removed?.

5. Rock Outlet Protection

Yes No NA

[ ] [ ] [ ] Installed per plan.
[ ] [ ] [ ] Installed concurrently with pipe installation.

Soil Stabilization

1. Topsoil and Spoil Stockpiles

Yes No NA

[ ] [ ] [ ] Stockpiles are stabilized with vegetation and/or mulch.
[ ] [ ] [ ] Sediment control is installed at the toe of the slope.

2. Revegetation

Yes No NA

[ ] [ ] [ ] Temporary seedings and mulch have been applied to idle areas.
[ ] [ ] [ ] 4 inches minimum of topsoil has been applied under permanent seedings

Sediment Control Practices

1. Silt Fence and Linear Barriers

Yes No NA

[ ] [ ] [ ] Installed on Contour, 10 feet from toe of slope (not across conveyance channels).
[ ] [ ] [ ] Joints constructed by wrapping the two ends together for continuous support.
[ ] [ ] [ ] Fabric buried 6 inches minimum.
[ ] [ ] [ ] Posts are stable, fabric is tight and without rips or frayed areas.
Sediment accumulation is ___% of design capacity.

Sediment Control Practices (continued)

2. Storm Drain Inlet Protection (Use for Stone & Block; Filter Fabric; Curb; or, Excavated; Filter Sock or Manufactured practices)

Yes No NA

[ ] [ ] [ ] Installed concrete blocks lengthwise so open ends face outward, not upward.
[ ] [ ] [ ] Placed wire screen between No. 3 crushed stone and concrete blocks.
[ ] [ ] [ ] Drainage area is 1acre or less.
[ ] [ ] [ ] Excavated area is 900 cubic feet.
[ ] [ ] [ ] Excavated side slopes should be 2:1.
[ ] [ ] [ ] 2" x 4" frame is constructed and structurally sound.
[ ] [ ] [ ] Posts 3-foot maximum spacing between posts.
[ ] [ ] [ ] Fabric is embedded 1 to 1.5 feet below ground and secured to frame/posts with staples at max 8-inch spacing.
[ ] [ ] [ ] Posts are stable, fabric is tight and without rips or frayed areas.
[ ] [ ] [ ] Manufactured insert fabric is free of tears and punctures.
[ ] [ ] [ ] Filter Sock is not torn or flattened and fill material is contained within the mesh sock.

Sediment accumulation ___% of design capacity.

3. Temporary Sediment Trap

Yes No NA

[ ] [ ] [ ] Outlet structure is constructed per the approved plan or drawing.
[ ] [ ] [ ] Geotextile fabric has been placed beneath rock fill.
[ ] [ ] [ ] Sediment trap slopes and disturbed areas are stabilized.

Sediment accumulation is ___% of design capacity.

4. Temporary Sediment Basin

Yes No NA

[ ] [ ] [ ] Basin and outlet structure constructed per the approved plan.
[ ] [ ] [ ] Basin side slopes are stabilized with seed/mulch.
[ ] [ ] [ ] Drainage structure flushed and basin surface restored upon removal of sediment basin facility.
[ ] [ ] [ ] Sediment basin dewatering pool is dewatering at appropriate rate.

Sediment accumulation is ___% of design capacity.

Note: Not all erosion and sediment control practices are included in this listing. Add additional pages to this list as required by site specific design. All practices shall be maintained in accordance with their respective standards.

Construction inspection checklists for post-development stormwater management practices can be found in Appendix F of the New York Stormwater Management Design Manual.

CONSTRUCTION DURATION INSPECTIONS

b. Modifications to the SWPPP (To be completed as described below)

The Operator shall amend the SWPPP whenever:

1. There is a significant change in design, construction, operation, or maintenance which may have a significant effect on the potential for the discharge of pollutants to the waters of the United States and which has not otherwise been addressed in the SWPPP; or
2. The SWPPP proves to be ineffective in:
   a. Eliminating or significantly minimizing pollutants from sources identified in the SWPPP and as required by this permit; or
   b. Achieving the general objectives of controlling pollutants in stormwater discharges from permitted construction activity; and
3. Additionally, the SWPPP shall be amended to identify any new contractor or subcontractor that will implement any measure of the SWPPP.

Modification & Reason:

APPENDIX F

NYSDEC Stormwater Management Practice Construction and Maintenance Inspection Checklist

Stormwater/Wetland Pond Construction Inspection Checklist

Project:
Location:
Site Status:

Date:

Time:

Inspector:

CONSTRUCTION SEQUENCE	SATISFACTORY/ UNSATISFACTORY	COMMENTS
Pre-Construction/Materials and Equipment		
Pre-construction meeting		
Pipe and appurtenances on-site prior to construction and dimensions checked		
1. Material (including protective coating, if specified)		
2. Diameter		
3. Dimensions of metal riser or pre-cast concrete outlet structure		
4. Required dimensions between water control structures (orifices, weirs, etc.) are in accordance with approved plans		
5. Barrel stub for prefabricated pipe structures at proper angle for design barrel slope		
6. Number and dimensions of prefabricated anti-seep collars		
7. Watertight connectors and gaskets		
8. Outlet drain valve		
Project benchmark near pond site		
Equipment for temporary de-watering		

CONSTRUCTION SEQUENCE	SATISFACTORY/ UNSATISFACTORY	COMMENTS
2. Subgrade Preparation		
Area beneath embankment stripped of all vegetation, topsoil, and organic matter		
3. Pipe Spillway Installation		
Method of installation detailed on plans		
A. Bed preparation		
Installation trench excavated with specified side slopes		
Stable, uniform, dry subgrade of relatively impervious material (If subgrade is wet, contractor shall have defined steps before proceeding with installation)		
Invert at proper elevation and grade		
B. Pipe placement		
Metal / plastic pipe		
1. Watertight connectors and gaskets properly installed		
2. Anti-seep collars properly spaced and having watertight connections to pipe		
3. Backfill placed and tamped by hand under “haunches” of pipe		
4. Remaining backfill placed in max. 8 inch lifts using small power tamping equipment until 2 feet cover over pipe is reached		

CONSTRUCTION SEQUENCE	SATISFACTORY/ UNSATISFACTORY	COMMENTS
3. Pipe Spillway Installation		
Concrete pipe		
1. Pipe set on blocks or concrete slab for pouring of low cradle		
2. Pipe installed with rubber gasket joints with no spalling in gasket interface area		
3. Excavation for lower half of anti-seep collar(s) with reinforcing steel set		
4. Entire area where anti-seep collar(s) will come in contact with pipe coated with mastic or other approved waterproof sealant		
5. Low cradle and bottom half of anti-seep collar installed as monolithic pour and of an approved mix		
6. Upper half of anti-seep collar(s) formed with reinforcing steel set		
7. Concrete for collar of an approved mix and vibrated into place (protected from freezing while curing, if necessary)		
8. Forms stripped and collar inspected for honeycomb prior to backfilling. Parge if necessary.		
C. Backfilling		
Fill placed in maximum 8 inch lifts		
Backfill taken minimum 2 feet above top of anti-seep collar elevation before traversing with heavy equipment		

CONSTRUCTION SEQUENCE	SATISFACTORY/ UNSATISFACTORY	COMMENTS
4. Riser / Outlet Structure Installation		
Riser located within embankment		
A. Metal riser		
Riser base excavated or formed on stable subgrade to design dimensions		
Set on blocks to design elevations and plumbed		
Reinforcing bars placed at right angles and projecting into sides of riser		
Concrete poured so as to fill inside of riser to invert of barrel		
B. Pre-cast concrete structure		
Dry and stable subgrade		
Riser base set to design elevation		
If more than one section, no spalling in gasket interface area; gasket or approved caulking material placed securely		
Watertight and structurally sound collar or gasket joint where structure connects to pipe spillway		
C. Poured concrete structure		
Footing excavated or formed on stable subgrade, to design dimensions with reinforcing steel set		
Structure formed to design dimensions, with reinforcing steel set as per plan		
Concrete of an approved mix and vibrated into place (protected from freezing while curing, if necessary)		
Forms stripped & inspected for “honeycomb” prior to backfilling; parge if necessary		

CONSTRUCTION SEQUENCE	SATISFACTORY/ UNSATISFACTORY	COMMENTS
5. Embankment Construction		
Fill material		
Compaction		
Embankment		
1. Fill placed in specified lifts and compacted with appropriate equipment		
2. Constructed to design cross-section, side slopes and top width		
3. Constructed to design elevation plus allowance for settlement		
6. Impounded Area Construction		
Excavated / graded to design contours and side slopes		
Inlet pipes have adequate outfall protection		
Forebay(s)		
Pond benches		
7. Earth Emergency Spillway Construction		
Spillway located in cut or structurally stabilized with riprap, gabions, concrete, etc.		
Excavated to proper cross-section, side slopes and bottom width		
Entrance channel, crest, and exit channel constructed to design grades and elevations		

CONSTRUCTION SEQUENCE	SATISFACTORY / UNSATISFACTORY	COMMENTS
8. Outlet Protection		
A. End section		
Securely in place and properly backfilled		
B. Endwall		
Footing excavated or formed on stable subgrade, to design dimensions and reinforcing steel set, if specified		
Endwall formed to design dimensions with reinforcing steel set as per plan		
Concrete of an approved mix and vibrated into place (protected from freezing, if necessary)		
Forms stripped and structure inspected for "honeycomb" prior to backfilling; parge if necessary		
C. Riprap apron / channel		
Apron / channel excavated to design cross-section with proper transition to existing ground		
Filter fabric in place		
Stone sized as per plan and uniformly place at the thickness specified		
9. Vegetative Stabilization		
Approved seed mixture or sod		
Proper surface preparation and required soil amendments		
Excelsior mat or other stabilization, as per plan		

CONSTRUCTION SEQUENCE	SATISFACTORY/ UNSATISFACTORY	COMMENTS
10. Miscellaneous		
Drain for ponds having a permanent pool		
Trash rack / anti-vortex device secured to outlet structure		
Trash protection for low flow pipes, orifices, etc.		
Fencing (when required)		
Access road		
Set aside for clean-out maintenance		
11. Stormwater Wetlands		
Adequate water balance		
Variety of depth zones present		
Approved pondscaping plan in place Reinforcement budget for additional plantings		
Plants and materials ordered 6 months prior to construction		
Construction planned to allow for adequate planting and establishment of plant community (April-June planting window)		
Wetland buffer area preserved to maximum extent possible		

Comments:

Actions to be Taken:

Infiltration Trench Construction Inspection Checklist

Project:
Location:
Site Status:

Date:

Time:

Inspector:

CONSTRUCTION SEQUENCE	SATISFACTORY/ UNSATISFACTORY	COMMENTS
1. Pre-Construction		
Pre-construction meeting		
Runoff diverted		
Soil permeability tested		
Groundwater / bedrock sufficient at depth		
2. Excavation		
Size and location		
Side slopes stable		
Excavation does not compact subsoils		
3. Filter Fabric Placement		
Fabric specifications		
Placed on bottom, sides, and top		

CONSTRUCTION SEQUENCE	SATISFACTORY / UNSATISFACTORY	COMMENTS
4. Aggregate Material		
Size as specified		
Clean / washed material		
Placed properly		
5. Observation Well		
Pipe size		
Removable cap / footplate		
Initial depth =_____feet		
6. Final Inspection		
Pretreatment facility in place		
Contributing watershed stabilized prior to flow diversion		
Outlet		

Comments:

Actions to be Taken:

Infiltration Basin Construction Inspection Checklist

Project:
Location:
Site Status:

Date:

Time:

Inspector:

CONSTRUCTION SEQUENCE	SATISFACTORY/ UNSATISFACTORY	COMMENTS
1. Pre-Construction		
Runoff diverted		
Soil permeability tested		
Groundwater / bedrock depth		
2. Excavation		
Size and location		
Side slopes stable		
Excavation does not compact subsoils		
3. Embankment		
Barrel		
Anti-seep collar or Filter diaphragm		
Fill material		

CONSTRUCTION SEQUENCE	SATISFACTORY/ UNSATISFACTORY	COMMENTS
4. Final Excavation		
Drainage area stabilized		
Sediment removed from facility		
Basin floor tilled		
Facility stabilized		
5. Final Inspection		
Pretreatment facility in place		
Inlets / outlets		
Contributing watershed stabilized before flow is routed to the factility		

Comments:

Actions to be Taken:

Sand/Organic Filter System Construction Inspection Checklist

Project:
Location:
Site Status:

Date:

Time:

Inspector:

CONSTRUCTION SEQUENCE	SATISFACTORY / UNSATISFACTORY	COMMENTS
1. Pre-construction		
Pre-construction meeting		
Runoff diverted		
Facility area cleared		
Facility location staked out		
2. Excavation		
Size and location		
Side slopes stable		
Foundation cleared of debris		
If designed as exfilter, excavation does not compact subsoils		
Foundation area compacted		
3. Structural Components		
Dimensions and materials		
Forms adequately sized		
Concrete meets standards		
Prefabricated joints sealed		
Underdrains (size, materials)		

CONSTRUCTION SEQUENCE	SATISFACTORY / UNSATISFACTORY	COMMENTS
4. Completed Facility Components		
24 hour water filled test		
Contributing area stabilized		
Filter material per specification		
Underdrains installed to grade		
Flow diversion structure properly installed		
Pretreatment devices properly installed		
Level overflow weirs, multiple orifices, distribution slots		
5. Final Inspection		
Dimensions		
Surface completely level		
Structural components		
Proper outlet		
Ensure that site is properly stabilized before flow is directed to the structure.		

Comments:

Actions to be Taken:

Stormwater Pond/Wetland Operation, Maintenance and Management Inspection Checklist

Project _____
Location: _____
Site Status: _____

Date: _____
Time: _____

Inspector: _____

Maintenance Item	Satisfactory/ Unsatisfactory	Comments
1. Embankment and emergency spillway (Annual, After Major Storms)		
1. Vegetation and ground cover adequate		
2. Embankment erosion		
3. Animal burrows		
4. Unauthorized planting		
5. Cracking, bulging, or sliding of dam		
a. Upstream face		
b. Downstream face		
c. At or beyond toe		
downstream		
upstream		
d. Emergency spillway		
6.Pond, toe & chimney drains clear and functioning		
7.Seeps/leaks on downstream face		
8.Slope protection or riprap failure		
9. Vertical/horizontal alignment of top of dam “As-Built”		

Maintenance Item	Satisfactory/ Unsatisfactory	Comments
10. Emergency spillway clear of obstructions and debris		
11. Other (specify)		
2. Riser and principal spillway (Annual)		
Type: Reinforced concrete _____ Corrugated pipe _____ Masonry _____ 1. Low flow orifice obstructed		
2. Low flow trash rack. a. Debris removal necessary		
b. Corrosion control		
3. Weir trash rack maintenance a. Debris removal necessary		
b. corrosion control		
4. Excessive sediment accumulation insider riser		
5. Concrete/masonry condition riser and barrels a. cracks or displacement		
b. Minor spalling (<1")		
c. Major spalling (rebars exposed)		
d. Joint failures		
e. Water tightness		
6. Metal pipe condition		
7. Control valve a. Operational/exercised		
b. Chained and locked		
8. Pond drain valve a. Operational/exercised		
b. Chained and locked		
9. Outfall channels functioning		
10. Other (specify)		

Maintenance Item	Satisfactory/ Unsatisfactory	Comments
3. Permanent Pool (Wet Ponds) (monthly)		
1. Undesirable vegetative growth		
2. Floating or floatable debris removal required		
3. Visible pollution		
4. Shoreline problem		
5. Other (specify)		
4. Sediment Forebays		
1.Sedimentation noted		
2. Sediment cleanout when depth < 50% design depth		
5. Dry Pond Areas		
1. Vegetation adequate		
2. Undesirable vegetative growth		
3. Undesirable woody vegetation		
4. Low flow channels clear of obstructions		
5. Standing water or wet spots		
6. Sediment and / or trash accumulation		
7. Other (specify)		
6. Condition of Outfalls (Annual , After Major Storms)		
1. Riprap failures		
2. Slope erosion		
3. Storm drain pipes		
4.Endwalls / Headwalls		
5. Other (specify)		
7. Other (Monthly)		
1. Encroachment on pond, wetland or easement area		

Maintenance Item	Satisfactory/ Unsatisfactory	Comments
2. Complaints from residents		
3.Aesthetics a. Grass growing required		
b. Graffiti removal needed		
c. Other (specify)		
4. Conditions of maintenance access routes.		
5. Signs of hydrocarbon build-up		
6. Any public hazards (specify)		
8. Wetland Vegetation (Annual)		
1. Vegetation healthy and growing Wetland maintaining 50% surface area coverage of wetland plants after the second growing season. (If unsatisfactory, reinforcement plantings needed)		
2. Dominant wetland plants: Survival of desired wetland plant species Distribution according to landscaping plan?		
3. Evidence of invasive species		
4. Maintenance of adequate water depths for desired wetland plant species		
5. Harvesting of emergent plantings needed		
6. Have sediment accumulations reduced pool volume significantly or are plants “choked” with sediment		
7. Eutrophication level of the wetland.		
8. Other (specify)		

Comments:

Actions to be Taken:

Infiltration Trench Operation, Maintenance, and Management Inspection Checklist

Project:
Location:
Site Status:

Date:

Time:

Inspector:

MAINTENANCE ITEM	SATISFACTORY / UNSATISFACTORY	COMMENTS
1. Debris Cleanout (Monthly)		
Trench surface clear of debris		
Inflow pipes clear of debris		
Overflow spillway clear of debris		
Inlet area clear of debris		
2. Sediment Traps or Forebays (Annual)		
Obviously trapping sediment		
Greater than 50% of storage volume remaining		
3. Dewatering (Monthly)		
Trench dewaters between storms		
4. Sediment Cleanout of Trench (Annual)		
No evidence of sedimentation in trench		
Sediment accumulation doesn't yet require cleanout		
5. Inlets (Annual)		

MAINTENANCE ITEM	SATISFACTORY / UNSATISFACTORY	COMMENTS
Good condition		
No evidence of erosion		
6. Outlet/Overflow Spillway (Annual)		
Good condition, no need for repair		
No evidence of erosion		
7. Aggregate Repairs (Annual)		
Surface of aggregate clean		
Top layer of stone does not need replacement		
Trench does not need rehabilitation		

Comments:

Actions to be Taken:

Sand/Organic Filter Operation, Maintenance and Management Inspection Checklist

Project:
Location:
Site Status:

Date:

Time:

Inspector:

MAINTENANCE ITEM	SATISFACTORY / UNSATISFACTORY	COMMENTS
1. Debris Cleanout (Monthly)		
Contributing areas clean of debris		
Filtration facility clean of debris		
Inlet and outlets clear of debris		
2. Oil and Grease (Monthly)		
No evidence of filter surface clogging		
Activities in drainage area minimize oil and grease entry		
3. Vegetation (Monthly)		
Contributing drainage area stabilized		
No evidence of erosion		
Area mowed and clipping removed		
4. Water Retention Where Required (Monthly)		
Water holding chambers at normal pool		
No evidence of leakage		
5. Sediment Deposition (Annual)		

MAINTENANCE ITEM	SATISFACTORY / UNSATISFACTORY	COMMENTS
Filter chamber free of sediments		
Sedimentation chamber not more than half full of sediments		
6. Structural Components (Annual)		
No evidence of structural deterioration		
Any grates are in good condition		
No evidence of spalling or cracking of structural parts		
7. Outlet/Overflow Spillway (Annual)		
Good condition, no need for repairs		
No evidence of erosion (if draining into a natural channel)		
8. Overall Function of Facility (Annual)		
Evidence of flow bypassing facility		
No noticeable odors outside of facility		

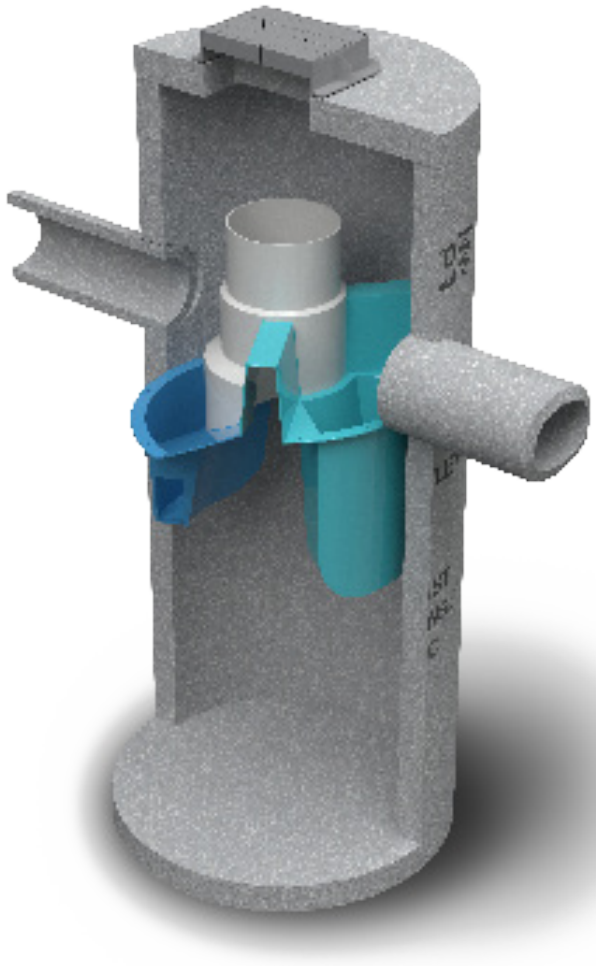
Comments:

Actions to be Taken:

APPENDIX G

Hydrodynamic Separator Sizing and Maintenance Manual

Hydro International



Operation and Maintenance Manual

First Defense® High Capacity and First Defense®Optimum

Vortex Separator for Stormwater Treatment

Table of Contents

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DISCLAIMER: Information and data contained in this manual is exclusively for the purpose of assisting in the operation and maintenance of Hydro International plc's First Defense®. No warranty is given nor can liability be accepted for use of this information for any other purpose. Hydro International plc has a policy of continuous product development and reserves the right to amend specifications without notice.

Hydro International (Stormwater), 94 Hutchins Drive, Portland ME 04102
Tel: (207) 756-6200 Fax: (207) 756-6212 Web: www.hydro-int.com

I. First Defense® by Hydro International

Introduction

The First Defense® is an enhanced vortex separator that combines an effective and economical stormwater treatment chamber with an integral peak flow bypass. It efficiently removes total suspended solids (TSS), trash and hydrocarbons from stormwater runoff without washing out previously captured pollutants. The First Defense® is available in several model configurations to accommodate a wide range of pipe sizes, peak flows and depth constraints.

The two product models described in this guide are the First Defense® High Capacity and the First Defense® Optimum; they are inspected and maintained identically.

Operation

The First Defense® operates on simple fluid hydraulics. It is self-activating, has no moving parts, no external power requirement and is fabricated with durable non-corrosive components. No manual procedures are required to operate the unit and maintenance is limited to monitoring accumulations of stored pollutants and periodic clean-outs. The First Defense® has been designed to allow for easy and safe access for inspection, monitoring and clean-out procedures. Neither entry into the unit nor removal of the internal components is necessary for maintenance, thus safety concerns related to confined-space-entry are avoided.

Pollutant Capture and Retention

The internal components of the First Defense® have been designed to optimize pollutant capture. Sediment is captured and retained in the base of the unit, while oil and floatables are stored on the water surface in the inner volume (Fig.1).

The pollutant storage volumes are isolated from the built-in bypass chamber to prevent washout during high-flow storm events. The sump of the First Defense® retains a standing water level between storm events. This ensures a quiescent flow regime at the onset of a storm, preventing resuspension and washout of pollutants captured during previous events.

Accessories such as oil absorbent pads are available for enhanced oil removal and storage. Due to the separation of the oil and floatable storage volume from the outlet, the potential for washout of stored pollutants between clean-outs is minimized.

Applications

- Stormwater treatment at the point of entry into the drainage line
- Sites constrained by space, topography or drainage profiles with limited slope and depth of cover
- Retrofit installations where stormwater treatment is placed on or tied into an existing storm drain line
- Pretreatment for filters, infiltration and storage

Advantages

- Inlet options include surface grate or multiple inlet pipes
- Integral high capacity bypass conveys large peak flows without the need for “offline” arrangements using separate junction manholes
- Long flow path through the device ensures a long residence time within the treatment chamber, enhancing pollutant settling
- Delivered to site pre-assembled and ready for installation

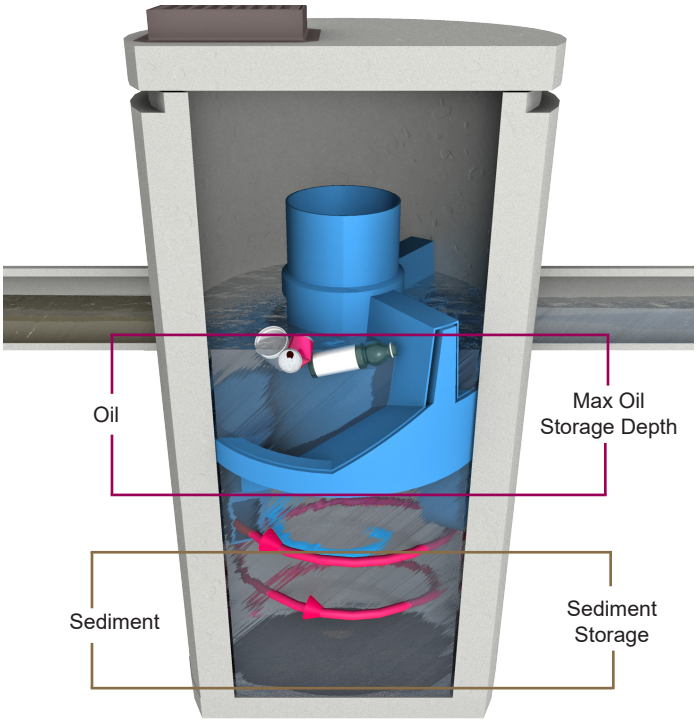

Fig.1 Pollutant storage volumes in the First Defense®.

II. Model Sizes & Configurations

The First Defense® inlet and internal bypass arrangements are available in several model sizes and configurations. The components have modified geometries allowing greater design flexibility to accommodate various site constraints.

All First Defense® models include the internal components that are designed to remove and retain total suspended solids (TSS), gross solids, floatable trash and hydrocarbons (Fig.2). First Defense® model sizes (diameter) are shown in Table 1.

III. Maintenance

First Defense® Components

1. **Built-In Bypass**
2. **Inlet Pipe**
3. **Inlet Chute**
4. **Floatables Draw-off Port**
5. **Outlet Pipe**
6. **Floatables Storage**
7. **Sediment Storage**
8. **Inlet Grate or Cover**

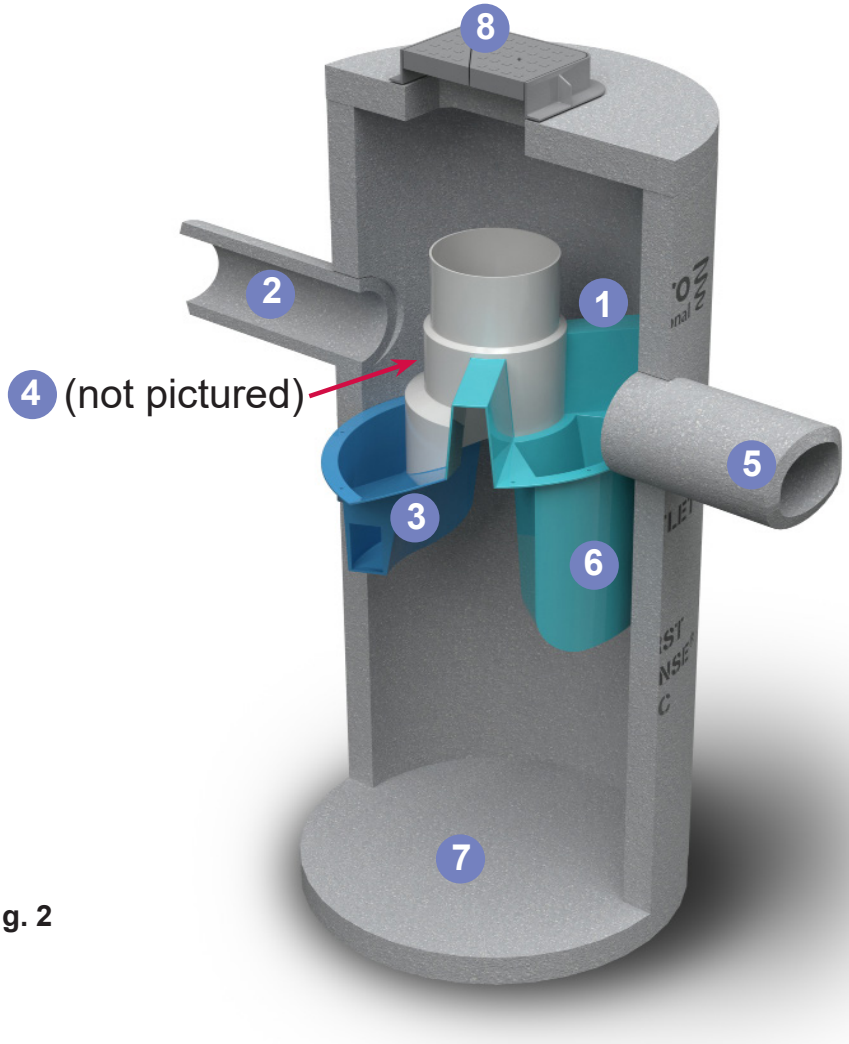

Fig. 2

Table 1

First Defense® Model Sizes
(ft / m) diameter
3 / 0.9
4 / 1.2
5 / 1.5
6 / 1.8
7 / 2.1
8 / 2.4
10 / 3.0

Overview

The First Defense® protects the environment by removing a wide range of pollutants from stormwater runoff. Periodic removal of these captured pollutants is essential to the continuous, long-term functioning of the First Defense®. The First Defense® will capture and retain sediment and oil until the sediment and oil storage volumes are full to capacity. When sediment and oil storage capacities are reached, the First Defense® will no longer be able to store removed sediment and oil.

The First Defense® allows for easy and safe inspection, monitoring and clean-out procedures. A commercially or municipally owned sump-vac is used to remove captured sediment and floatables. Access ports are located in the top of the manhole.

Maintenance events may include Inspection, Oil & Floatables Removal, and Sediment Removal. Maintenance events do not require entry into the First Defense®, nor do they require the internal components of the First Defense® to be removed. In the case of inspection and floatables removal, a vactor truck is not required. However, a vactor truck is required if the maintenance event is to include oil removal and/or sediment removal.

Maintenance Equipment Considerations

The internal components of the First Defense® have a centrally located circular shaft through which the sediment storage sump can be accessed with a sump vac hose. The open diameter of this access shaft is 15 inches in diameter (Fig.3). Therefore, the nozzle fitting of any vactor hose used for maintenance should be less than 15 inches in diameter.

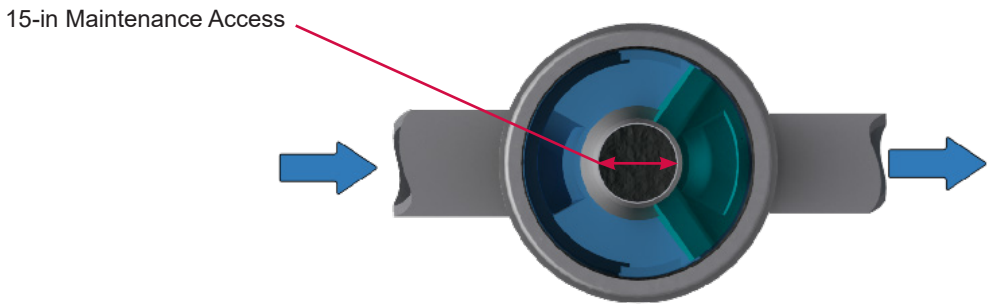

Fig.3 The central opening to the sump of the First Defense®is 15 inches in diameter.

Determining Your Maintenance Schedule

The frequency of clean out is determined in the field after installation. During the first year of operation, the unit should be inspected every six months to determine the rate of sediment and floatables accumulation. A simple probe such as a Sludge-Judge® can be used to determine the level of accumulated solids stored in the sump. This information can be recorded in the maintenance log (see page 9) to establish a routine maintenance schedule.

The vactor procedure, including both sediment and oil / flotables removal, for First Defense® typically takes less than 30 minutes and removes a combined water/oil volume of about 765 gallons.

Inspection Procedures

1. Set up any necessary safety equipment around the access port or grate of the First Defense® as stipulated by local ordinances. Safety equipment should notify passing pedestrian and road traffic that work is being done.

2. Remove the grate or lid to the manhole.

3. Without entering the vessel, look down into the chamber to inspect the inside. Make note of any irregularities. Fig.4 shows the standing water level that should be observed.

4. Without entering the vessel, use the pole with the skimmer net to remove floatables and loose debris from the components and water surface.

5. Using a sediment probe such as a Sludge Judge®, measure the depth of sediment that has collected in the sump of the vessel.

6. On the Maintenance Log (see page 9), record the date, unit location, estimated volume of floatables and gross debris removed, and the depth of sediment measured. Also note any apparent irregularities such as damaged components or blockages.

7. Securely replace the grate or lid.

8. Take down safety equipment.

9. Notify Hydro International of any irregularities noted during inspection.

Floatables and Sediment Clean Out

Floatables clean out is typically done in conjunction with sediment removal. A commercially or municipally owned sump-vac is used to remove captured sediment and floatables (Fig.4).

Floatables and loose debris can also be netted with a skimmer and pole. The access port located at the top of the manhole provides unobstructed access for a vactor hose to be lowered to the base of the sump.

Scheduling

- Floatables and sump clean out are typically conducted once a year during any season.

- Floatables and sump clean out should occur as soon as possible following a spill in the contributing drainage area.

Fig.4 Floatables are removed with a vactor hose

Recommended Equipment

- Safety Equipment (traffic cones, etc)
- Crow bar or other tool to remove grate or lid
- Pole with skimmer or net (if only floatables are being removed)
- Sediment probe (such as a Sludge Judge®)
- Vactor truck (flexible hose recommended)
- First Defense® Maintenance Log

Floatables and Sediment Clean Out Procedures

1. Set up any necessary safety equipment around the access port or grate of the First Defense® as stipulated by local ordinances. Safety equipment should notify passing pedestrian and road traffic that work is being done.

2. Remove the grate or lid to the manhole.

3. Without entering the vessel, look down into the chamber to inspect the inside. Make note of any irregularities.

4. Remove oil and floatables stored on the surface of the water with the vactor hose or with the skimmer or net

5. Using a sediment probe such as a Sludge Judge®, measure the depth of sediment that has collected in the sump of the vessel and record it in the Maintenance Log (page 9).

6. Once all floatables have been removed, drop the vactor hose to the base of the sump. Vactor out the sediment and gross debris off the sump floor

7. Retract the vactor hose from the vessel.

8. On the Maintenance Log provided by Hydro International, record the date, unit location, estimated volume of floatables and gross debris removed, and the depth of sediment measured. Also note any apparent irregularities such as damaged components, blockages, or irregularly high or low water levels.

9. Securely replace the grate or lid.

Maintenance at a Glance

Inspection	- Regularly during first year of installation - Every 6 months after the first year of installation
Oil and Floatables Removal	- Once per year, with sediment removal - Following a spill in the drainage area
Sediment Removal	- Once per year or as needed - Following a spill in the drainage area
NOTE: For most clean outs the entire volume of liquid does not need to be removed from the manhole. Only remove the first few inches of oils and floatables from the water surface to reduce the total volume of liquid removed during a clean out.	

First Defense® Installation Log

HYDRO INTERNATIONAL REFERENCE NUMBER:	
SITE NAME:	
SITE LOCATION:	
OWNER:	CONTRACTOR:
CONTACT NAME:	CONTACT NAME:
COMPANY NAME:	COMPANY NAME:
ADDRESS:	ADDRESS:
TELEPHONE:	TELEPHONE:
FAX:	FAX:

INSTALLATION DATE: / /

MODEL SIZE (CIRCLE ONE): [3-FT] [4-FT] [5-FT] [6-FT] [7-FT] [8-FT] [10-FT]

INLET (CIRCLE ALL THAT APPLY): GRATED INLET (CATCH BASIN) INLET PIPE (FLOW THROUGH)

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First Defense® Inspection and Maintenance Log

Date	Initials	Depth of Floatables and Oils	Sediment Depth Measured	Volume of Sediment Removed	Site Activity and Comments

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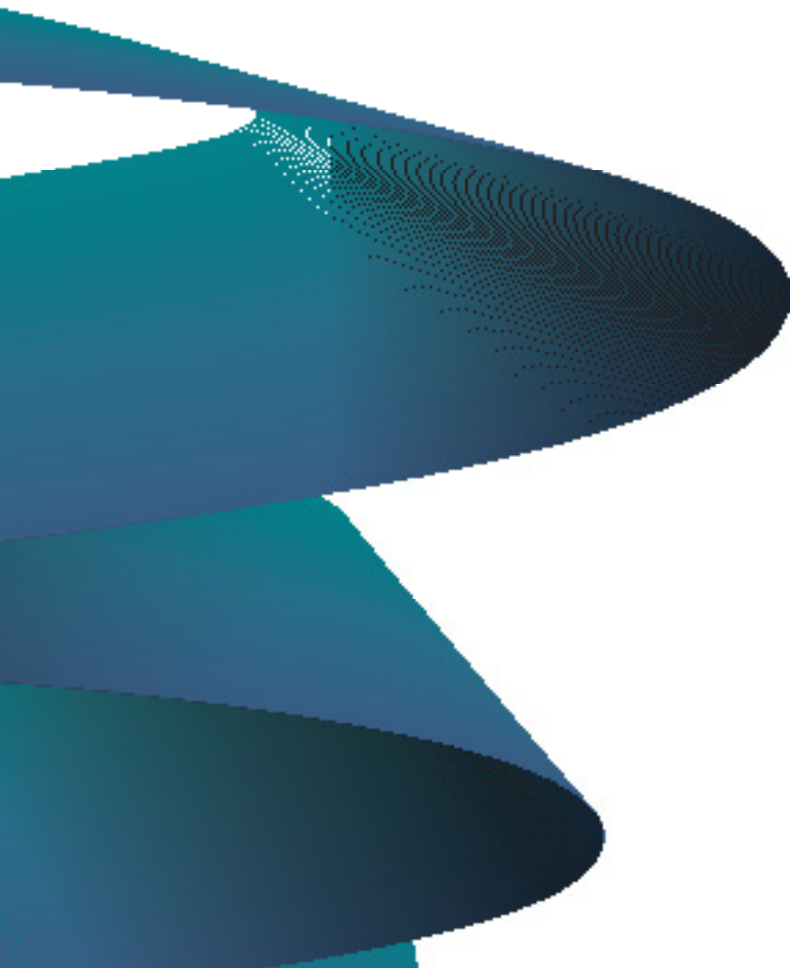
Hydro International



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Turning Water Around...®

FD_O+M_K_2105

NJCAT TECHNOLOGY VERIFICATION

First Defense® Optimum
Vortex Separator

Hydro International

July 2021

TABLE OF CONTENTS

List of Figures

Page

List of Tables

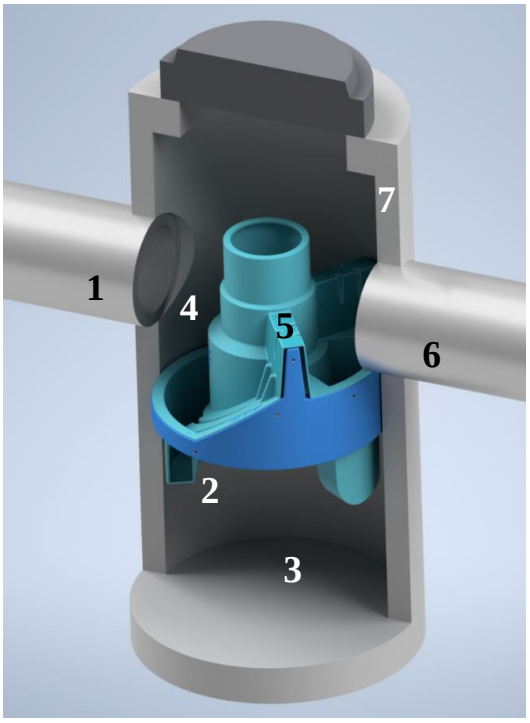
Page

1. Description of Technology

The First Defense® Optimum vortex separator (FD Optimum) is designed and supplied by Hydro International **(Figure 1)**. The FD Optimum is installed as part of typical drainage network systems to capture particulate pollutants that have entered the system from surface runoff. The FD Optimum has patented flow-modifying internal components that create a swirling flow path within the treatment chamber. This rotational motion supplements gravitational settling forces with additional vortex forces for enhanced settling performance. The internal components include an internal bypass weir to divert flows over the treatment chamber to prevent captured particles from being resuspended and washed out.

The FD Optimum chamber is a precast concrete manhole. The internal components are rotationally molded plastic. Stormwater enters the FD Optimum through an inlet pipe. Stormwater is conveyed through a submerged inlet chute designed to initiate a spiraling flow path within the vortex treatment chamber. Suspended solids are captured in the sediment storage sump. Treated water exits the vortex treatment chamber via an outlet chute and exits the FD Optimum via an outlet pipe.

The FD Optimum differs from the First Defense® High Capacity (FDHC) Stormwater Treatment Device verified by NJCAT in February 2016 by optimizing the orifice sizes within the system.



1. Inlet Pipe
2. Vortex Treatment Chamber
3. Sediment Storage Sump
4. Internal Bypass Chamber
5. Internal Bypass Weir
6. Outlet Pipe
7. Manhole

Figure 1 Rendering of the FD Optimum Showing System Components

2. Laboratory Testing

The New Jersey Department of Environmental Protection (NJDEP) maintains a list of certified stormwater manufactured treatment devices (MTDs) that can be installed on newly developed or redeveloped sites to achieve stormwater treatment requirements for Total Suspended Solids (TSS).

Manufactured treatment devices are evaluated for certification according to the *New Jersey Department of Environmental Protection Process for Approval of Use for Manufactured Treatment Devices (NJDEP 2013a*) (hereafter referred to as "NJDEP Approval Process"). The NJDEP Approval Process requires that TSS treatment devices operating on hydrodynamic principles be tested according to the *New Jersey Department of Environmental Protection Laboratory Protocol to Assess Total Suspended Solids Removal by a Hydrodynamic Sedimentation Treatment Device (NJDEP 2013b)* (hereafter referred to as "NJDEP Protocol"). In addition, the NJDEP Approval Process requires submittal of a Quality Assurance Project Plan (QAPP) to the New Jersey Corporation for Advanced Technology (NJCAT) for review and approval prior to testing to ensure that all laboratory procedures will be conducted in strict accordance with the Procedure for Obtaining Verification of a Stormwater Manufactured Treatment Device from New Jersey Corporation for Advanced Technology *(NJDEP 2013).* The QAPP was submitted and approved by NJCAT in January 2020 prior to commencement of testing.

Testing was conducted with a full-scale, 3-ft FD Optimum in April-May 2021 by Hydro International ("Hydro") at the company's full-scale hydraulic testing facility in Portland, Maine. Since testing was carried out in-house, Hydro contracted with FB Environmental Associates of Portland, Maine to provide NJDEP Protocol required third party oversight. FB Environmental Associates representatives were present during all testing procedures. The test program was conducted in accordance with the NJDEP Protocol in two phases: removal efficiency testing and scour testing.

2.1 Test Setup

A schematic drawing of the laboratory setup is shown in **Figure 2** and key dimensions of the test vessel are shown in **Figure 3**. Operating as a recirculating closed loop system, water from a 10,000-gallon supply tank was pumped to the system through an 8-inch line via a Flygt submersible pump. The flow rate of the pump was controlled by a GE Fuji Electric AF300 P11 Adjustable Frequency Drive and measured by an EMCO Flow Systems 4411e Electromagnetic Flow Transmitter. The water temperature within the tank was regulated by a Hayward 350FD pool heater.

A three-way valve was located between the Flygt pump and the FD Optimum which would allow flow to bypass the FD Optimum if fully opened. This valve was installed as part of the piping network to direct flow to other manufactured stormwater and wastewater treatment systems installed at the test facility along the same piping network. This valve was fully closed throughout the entire period when the FD Optimum testing was conducted. A background sampling port was installed about 20 feet upstream of the FD Optimum. The effluent discharged freely from the effluent pipework, where grab samples were taken. The free discharge flowed through a filter box fitted with 1-micron filter bags in order to remove the majority of fine sediment that remained in the flow stream. The filter box was located in a separate Discharge Tank in order to keep the background concentration from surpassing the maximum allowable limit over the duration of the removal efficiency tests.

During performance testing, test sediment was injected through an Auger Feeder Model VF-2 volumetric screw feeder at a steady state upstream of the FD Optimum. The auger was calibrated prior to each test.

Water temperature was measured in the supply tank with a LASCAR EL-USB-TP-LCD sensor and logger. The sensor was placed near the 8-inch pump to provide a representative measurement of the water entering the test system. Maximum temperature remained below 80° F for the duration of each test run. Temperature was recorded every 30 seconds. The original thermocouple calibration was confirmed by the independent observer as part of the observation process.

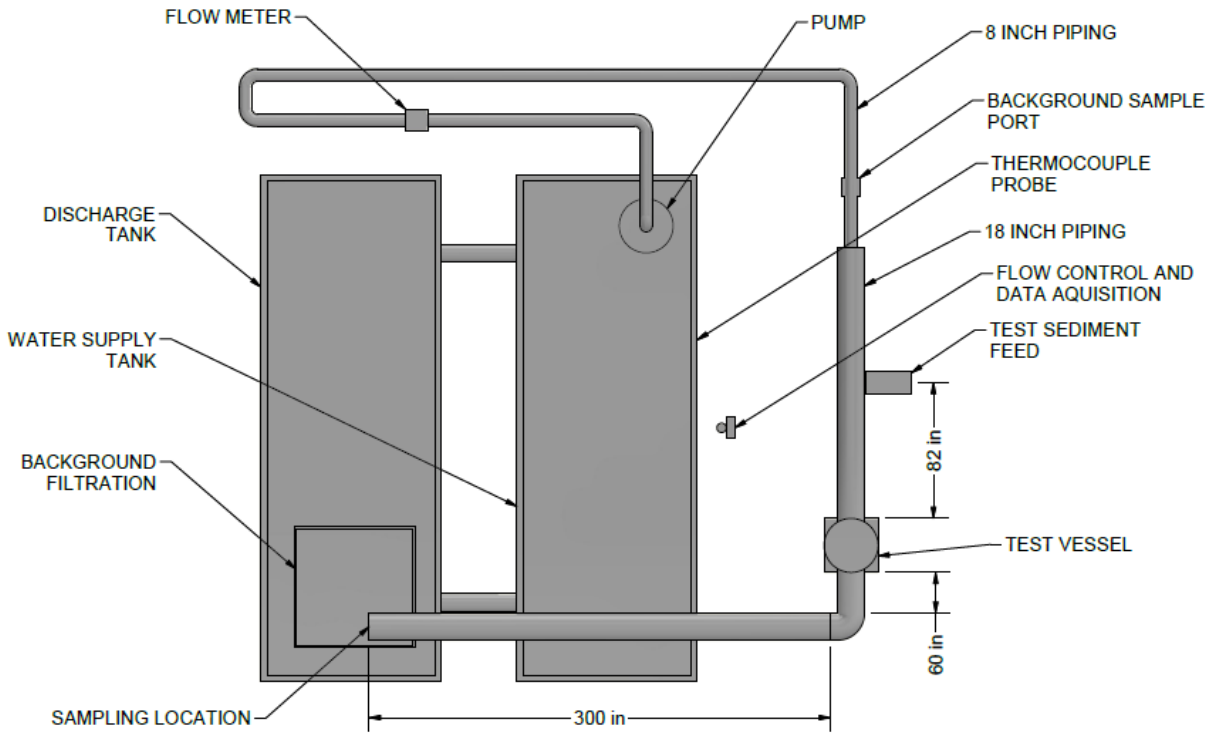


Figure 2 Laboratory Testing Arrangement Diagram

Test Unit Description

The laboratory arrangement was designed for a FD Optimum test unit comprised of full-scale, commercially available 3-ft FD Optimum internal components installed in a 3-ft round plastic manhole chamber consistent in all key dimensions with the precast chambers used for commercial installations (**Figure 4**). Both the inlet and outlet pipe diameters of the test model were nominally 18 inches, which was the maximum pipe size for a 3-ft FD Optimum. Both the inlet and outlet pipes were set at 1% slope.

The plastic manhole chamber was equipped with a detachable sediment storage zone (**Figure 3**) used for system maintenance between tests. This sediment storage zone was 18 inches deep and is located 26.5 inches below the pipe inverts. Mounting flanges supported a false floor at two

different positions. The upper position allowed for the simulation of a 50% full condition for use during TSS removal efficiency testing. The lower position allowed for 4 inches of sediment to be pre-loaded before scour testing.

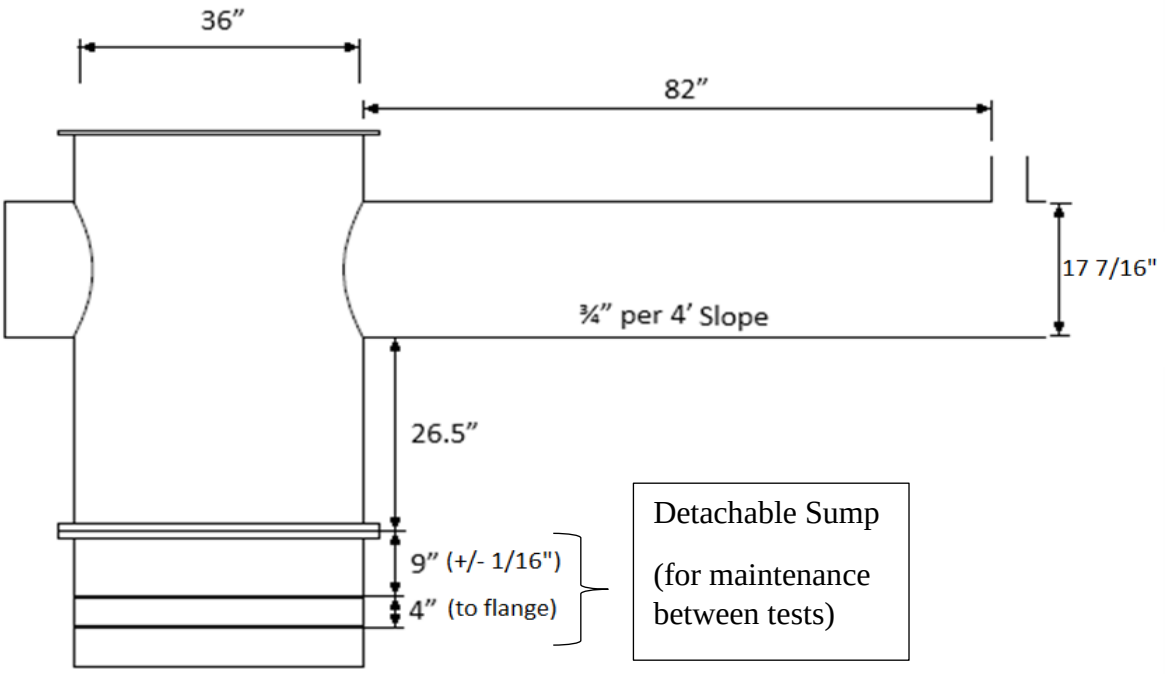


Figure 3 Key Dimensions of Test Vessel

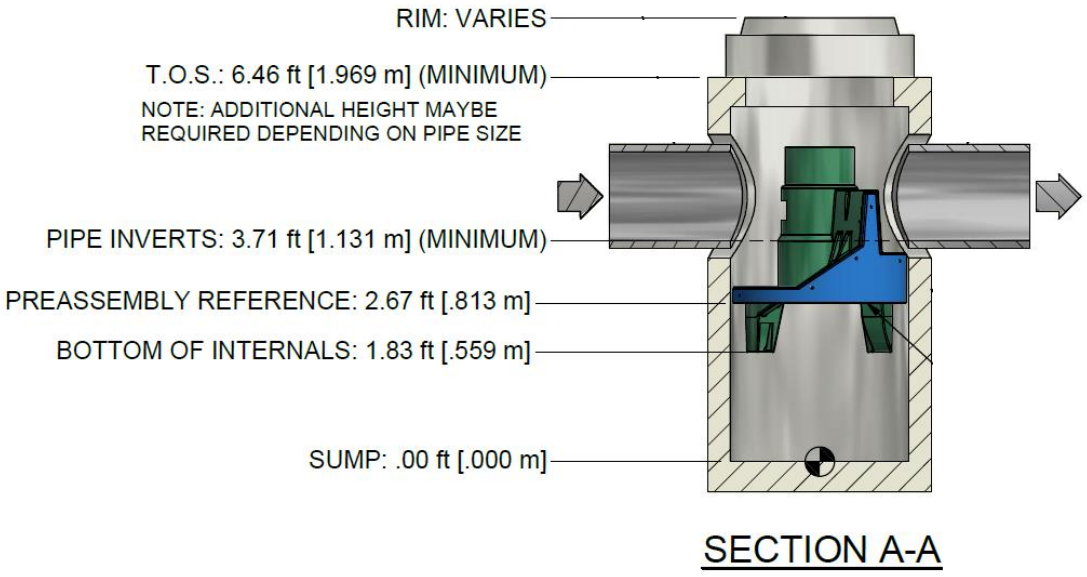


Figure 4 Key Dimensions of 3-ft FD Optimum

2.2 Test Sediment

The test sediment was a blend of commercially available silica particulate grades. The sediment was blended by Hydro and the particle size distribution was independently confirmed by GeoTesting Express in Acton, Massachusetts certifying that the supplied silica meets the specification within tolerance using ASTM D-422 as described in Section 5A of the Protocol. Results of particle size gradation testing are shown in **Table 1a** and **Figure 5a** below. The D_{50} of this blend is 56 microns.

Table 1a Particle Size Distribution Results of Removal Efficiency Sediment Samples

Particle Size (µm)	% Finer				Test Sediment Average	Diff. from Protocol
	Protocol	Sample 1	Sample 2	Sample 3		
1000	100	100	100	100	100	0
500	95	99	99	99	99	4
250	90	94	94	94	94	4
150	75	85	85	86	85	10
100	60	71	70	70	70	10
75	50	60	59	59	59	9
50	45	48	47	47	47	2
20	35	35	37	35	36	1
8	20	20	19	20	20	0
5	10	15	14	14	14	4
2	5	7	6	7	7	2
D_{50} (µm)	≤75	56	57	56	56	

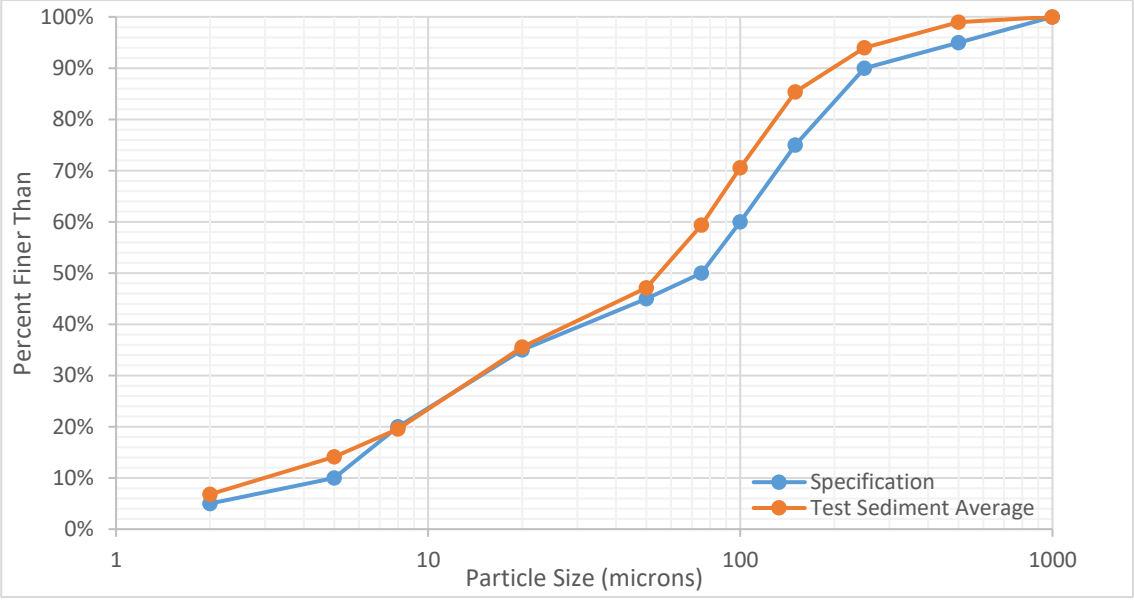


Figure 5a Average Removal Efficiency Sediment PSD Compared to Specification

The scour sediment was a blend of commercially available silica sand grades. The sediment was blended by Hydro and the particle size distribution was independently confirmed by GeoTesting Express in Acton, Massachusetts certifying that the supplied silica meets the specification within tolerance using ASTM D-422 as described in Section 5A of the Protocol. Results of particle size gradation testing are shown in **Table 1b** and **Figure 5b** below.

Table 1b Particle Size Distribution Results of Scour Sediment Samples

Particle Size (µm)	% Finer				Test Sediment Average	Diff. from Protocol
	Protocol	Sample 1	Sample 2	Sample 3		
1000	100	100	100	100	100	0
500	90	92	93	92	92	2
250	55	79	80	78	79	24
150	40	55	57	55	56	16
100	25	31	30	30	30	5
75	10	18	16	17	17	7
50	0	4	4	5	4	4

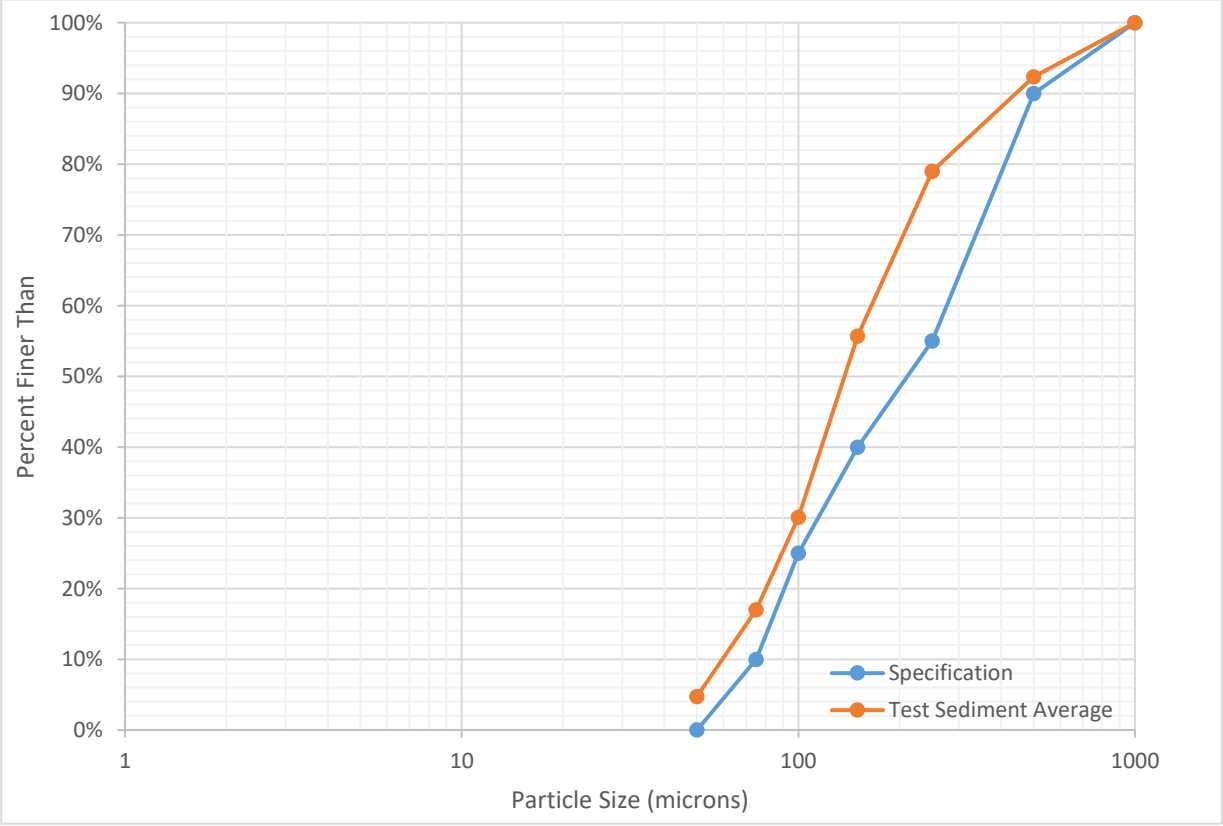


Figure 5b Average Scour Sediment PSD Compared to Specification

2.3 Removal Efficiency Testing

The FD Optimum performance was determined by testing its sediment removal efficiency. In accordance with the NJDEP Hydrodynamic Protocol Section 5, this was tested in the laboratory by seeding the system with a known test sediment gradation and concentration and determining what proportion of the material was retained within the device. The removal efficiency testing occurred by testing five flow rates from 25 to 125% of the maximum treatment flow rate (MTFR) in 25% increments as specified in the protocol.

The output of the EMCO Electromagnetic Flow Transmitter was logged every 30 seconds with a USB data logger. The coefficient of variance (COV) was not to exceed 0.03.

Background samples were taken at the background sample port located upstream of the FD Optimum unit. Influent background samples were taken in correspondence with the odd numbered effluent samples (first, third, fifth, etc.). The collection time was recorded for each background and effluent sample. The background data was used to adjust the effluent samples.

The test sediment feed rate and total mass of test sediment introduced during each test run was a known quantity. The target influent concentration was 200 mg/L. Total mass introduced was determined by weighing the mass of sediment placed in the auger hopper at the start of the test and then emptying the hopper at the end of the test to weigh the sediment remaining. All masses were taken with an Ohaus D25WR laboratory balance. The average influent concentration was then calculated based on the total mass and volume according to **Equation 1**.

$$\text{Average Influent Concentration} = \frac{\text{Total mass added}}{\text{Total volume of water flowing through the MTD during addition of test sediment}}$$

Equation 1 Calculation for Average Influent Concentration

Sediment feed calibration samples were taken from the injection point at the start of testing and after every third effluent sample. Samples were taken by interrupting the dry sediment feed from the auger and weighing with a Denver Instrument TR203 laboratory balance. The duration of sampling varied from 20 seconds to one minute and ensured that at least 100 mL of sediment was collected while causing minimal disturbance to the feed. The mass extracted for calibration was subtracted from the total sediment mass removed. The concentration COV was not to exceed 0.10.

Once a constant feed of test sediment and flow rate was established, the first effluent sample was collected after three volume exchanges within the FD Optimum had passed. The effluent samples were collected from the test vessel discharge pipe and time stamped in 1-liter bottles using the grab sample method as described in Section 5D of the Protocol.

The time interval between sequential samples was evenly spaced during the test sediment feed period to achieve fifteen effluent samples. However, when the test sediment feed was interrupted for measurement, the next effluent sample collected was after three volume exchanges within the FD Optimum. An example sampling schedule (for 100% MTFR) is given in **Table 2**.

Table 2 Sampling Time for TSS Removal Efficiency Testing (100% MTFR)

Elapsed Time	Dry Feed Sample	Effluent Sample	Background Sample
00:00	1		
01:54		1	1
02:24		2	
02:54	2	3	2
04:48		4	
05:18		5	3
05:48	3	6	
07:42		7	4
08:12		8	
08:42	4	9	5
10:36		10	
11:06		11	6
11:36	5	12	
13:30		13	7
14:00		14	
14:30	6	15	8

All samples were collected in one-liter wide mouth bottles. At the conclusion of each flow rate test, the collected effluent and background water quality samples were placed into delivery containers and transported to the analytical laboratory by the independent observer. All samples were analyzed by Maine Environmental Laboratory, Yarmouth, ME in accordance with ASTM D3977-97 (re-approval 2019) "Standard Test Methods for Determining Sediment Concentrations in Water Samples". Removal efficiency was calculated per **Equation 2**. Captured sediment was removed from the sump and inlet pipe between each flow rate test.

$$\text{Removal Efficiency (\%)} = \frac{\left(\text{Average Influent Concentration} - \text{Adjusted Average Effluent* Concentration}\right)}{\text{Average Influent Concentration}} \times 100$$

* Adjusted for background concentration

Equation 2 Equation for Calculating Removal Efficiency

2.4 Scour Testing

To simulate a 50% full sump condition, the FD Optimum sump false bottom was set to a height of 5 inches and then topped with 4 inches of scour test sediment. The sediment was levelled, then the FD Optimum was filled with clean water up to the outlet pipe invert at a slow rate as to not disturb the sediment prior to the beginning of testing. Scour testing began on the following day after the sediment was added which was less than the required 96 hours maximum allowance. All setup and measurements, testing and sample collection were observed by the independent observer.

Scour testing began by slowly introducing flow and, in less than 5 minutes, ramping up the flow rate until it reached >200% of the MTFR. The flow rate was recorded every 30 seconds. The flow rate remained constant at the target maximum flow rate for the remainder of the test duration. Effluent samples were collected, and time stamped every 2 minutes after the target flow rate was reached. A total of 15 effluent samples were taken over the duration of the test.

Eight background samples were collected at evenly spaced intervals throughout the duration of the target maximum flow rate testing corresponding to the odd numbered effluent samples. The background samples were drawn from the background sample port located upstream of the FD Optimum.

All samples were collected in one-liter wide mouth bottles. At the conclusion of the test, the collected effluent and background water quality samples were placed into delivery containers and transported to the analytical laboratory by the independent observer. All samples were analyzed by Maine Environmental Laboratory in accordance with ASTM D3977-97 (re-approval 2019) "Standard Test Methods for Determining Sediment Concentrations in Water Samples".

Temperature readings of the test water were recorded every 30 seconds to ensure it did not exceed 80 degrees Fahrenheit at any point during the test.

2.5 Quality Objectives and Criteria

Samples sent for external analysis were shipped or delivered to the laboratory immediately following each flow rate test. Auger sample weights analyzed in-house were observed by the independent observer and were conducted immediately following sample collection.

A Chain of Custody form was used for externally analyzed samples to record sample containers and sampling date and time for each test run. A copy of these forms was also maintained by Hydro. Sample bottles were labeled to identify the test run and sample type (background or effluent), which corresponded to the sample identification on the Chain of Custody form. Samples were then placed in containers and transported to the analytical laboratory by the independent observer.

Data was recorded and maintained in accordance with standard laboratory procedures used at Hydro. Hard copies of all original data sets are maintained on site.

The following quality criteria had to be met in order for the data from a run to be included in the report:

- Background TSS concentrations ≤ 20 mg/L
- Temperature of test water ≤ 80 degrees Fahrenheit
- Variation in calculated influent concentration ≤ 10% of target concentration

- Coefficient of variation of dry calibration samples ≤ 0.10
- Variation in flow rate ≤ 10% of target flow rate
- Coefficient of variation of flow rates ≤ 0.03

3. Performance Claims

Per the NJDEP verification procedure and based on the laboratory testing conducted for the FD Optimum, the following are the performance claims made by Hydro.

Total Suspended Solids (TSS) Removal Efficiency

The TSS removal rate of the FD Optimum is dependent upon flow rate, particle density and particle size. For the particle size distribution and weighted calculation method required by the NJDEP Protocol, the 3-ft FD Optimum at a MTFR of 1.02 cfs will demonstrate at least 50% TSS removal efficiency.

Effective Sedimentation Treatment Area (ESTA)

The effective sedimentation treatment area (ESTA) of the 3-ft FD Optimum is 7.1 sq. ft.

Maximum Treatment Flow Rate (MTFR)

The MTFR for the 3-ft FD Optimum was demonstrated to be 458 gpm (1.02 cfs) which corresponds to a hydraulic loading rate of 64.5 gpm/sq. ft.

Sediment Storage Depth and Volume

The maximum sediment storage depth of the FD Optimum is 18 inches. Available sump volume varies with each FD Optimum model as diameter increases. The available sump volume for a 3-ft FD Optimum model is 0.39 cubic yards. The maximum sediment storage depth is 9 inches, which corresponds to a 50% full sump capacity (or 0.20 cubic yards) for this model (**see Appendix Table A-2**)

Online Installation

Based on the Scour Test results described in Section 4.2, the FD Optimum qualifies for online installation.

Wet Volume and Detention Time

The detention time of the FD Optimum depends on flow rate and model size as detention time is calculated by dividing the treatment volume by the flow rate. The inlet and outlet water levels measured during the hydraulic characterization of the system were used to calculate the treatment volume. The 28.5 sq.ft. volume calculated for a flow rate of 1.4 cfs was used to set the sampling schedule for all tested flow rates. For the tested 3-ft FD Optimum at the MTFR of 1.02 cfs, the detention time is 28 seconds.

4. Supporting Documentation

The NJDEP Procedure (NJDEP, 2013) for obtaining verification of a stormwater manufactured treatment device (MTD) from the New Jersey Corporation for Advanced Technology (NJCAT) requires that "copies of the laboratory test reports, including all collected and measured data; all data from performance evaluation test runs; spreadsheets containing original data from all performance test runs; all pertinent calculations; etc." be included in this section. This was discussed with NJDEP, and it was agreed that as long as such documentation could be made available by NJCAT upon request that it would not be prudent or necessary to include all this information in this verification report. This information was provided to NJCAT and is available upon request.

4.1 Removal Efficiency Results

In accordance with the NJDEP HDS Protocol, removal efficiency testing was executed on the 3-ft FD Optimum unit in order to establish the ability of the FD Optimum to remove the specified test sediment at 25%, 50%, 75%, 100% and 125% of the target MTFR. The target MTFR was 458 gpm (1.02 cfs). The target was chosen based on the ultimate goal of demonstrating greater than 50% annualized weighted solids removal as defined in the Protocol.

All results reported in this section were derived from test runs that fully complied with the terms of the protocol. None of the collection intervals of the calibration samples exceeded one minute in duration for any of the reported tests. The inlet feed concentration coefficient of variance did not exceed 0.10 for any flow rate test.

The mean influent concentration was calculated using **Equation 1** from *Section 5D Effluent Sampling Test Methods*. The mean effluent concentration was adjusted by subtracting the measured background concentrations. No background TSS concentrations exceeded the 20 mg/L maximum allowed by the protocol. At no point did the water temperature exceed 80 °F.

Maine Environmental Lab references an LOQ of 2.5 mg/L when reporting their analysis. This was indicated in the footnotes if analysis reported a value lower than the LOQ of 2.5 mg/L and a value of half the LOQ (1.25 mg/L) was used in its place.

25% MTFR Results

The 25% MTFR test was conducted in accordance with the NJDEP HDS Protocol at a target flow rate of 0.26 cfs. A summary of test readings, measurements and calculations are shown in **Table 3**. Feed rate calibration results are shown in **Table 4**. Background and effluent sediment concentrations are shown in **Table 5**.

The 3-ft FD Optimum removed 61.5% of the test sediment at a flow rate of 0.26 cfs. **Table 6** shows that the QA/QC results for flow rate, feed rate, background sediment concentration and temperature were within the allowable limits specified by the protocol.

Table 3 Summary of 3-ft FD Optimum 25% MTFR Test Results

Trial Date	Target Flow Rate (cfs)/(gpm)	Detention Time (sec)	Start Mass (lbs)	End Mass (lbs)	Influent Concentration[1] (mg/L)	Max. Water Temperature (°F)	Adj. Effluent Concentration (mg/L)	Removal Efficiency
4/21/21	0.26 / 117	110	70.000	62.495	202.3	75.3	77.9	61.5%

[1]The influent concentration reported is calculated by dividing the entire mass of test sediment injected into the flow stream over the duration of the test by the total flow during injection of test sediment.

Table 4 – 3-ft FD Optimum 25% MTFR Feed Rate Calibration Results

Sample ID	Sample Time (mm:ss)	Sample Mass (g)	Sample Duration (sec)	Feed Rate (mg/min)	Influent Concentration (mg/L)
1	00:00	85.379	60	85,379	195
2	07:30	87.737	60	87,737	201
3	15:00	88.309	60	88,309	202
4	22:30	89.264	60	89,264	204
5	30:00	90.121	60	90,121	206
6	37:30	92.134	60	92,134	211
			Mean	**88,284**	**203**

Table 5 – 3-ft FD Optimum 25% MTFR TSS Concentration Results

Time (mm:ss)	Effluent Concentration (mg/L)	Background Concentration[1] (mg/L)	Adjusted Effluent Concentration (mg/L)
06:30	80	3.7	76.3
7:00	86	6.9	79.2
07:30	85	10.0	75.0
14:00	80	6.7	73.4
14:30	81	3.3	77.7
15:00	87	4.3	82.8
21:30	81	5.2	75.8
22:00	83	6.1	77.0
22:30	86	6.9	79.1
29:00	86	6.3	79.7
29:30	81	5.7	75.3
30:00	81	9.4	71.7
36:30	99	13.0	86.0
37:00	87	9.7	77.4
37:30	89	6.3	82.7
Mean	**84.8**	**6.9**	**77.9**

[1]Shaded background concentrations are interpolated.

Table 6 – 3-ft FD Optimum 25% MTFR Test QA/QC Results

Parameter	Unit	Measured Value	Acceptable Range	Coefficient of Variance	Acceptable Range
Flow Rate	gpm	115	105 - 129	0.021	<0.03
Feed Rate	mg/L	202.3	180 - 220	0.026	<0.10
Max. BG Conc.	mg/L	13.0	≤20	-	-
Water Temperature	°F	75.3	≤80	-	-

50% MTFR Results

The 50% MTFR test was conducted in accordance with the NJDEP HDS Protocol at a target flow rate of 0.51 cfs. A summary of test readings, measurements and calculations are shown in **Table 7**. Feed rate calibration results are shown in **Table 8**. Background and effluent sediment concentrations are shown in **Table 9**.

The 3-ft FD Optimum removed 53.8% of the test sediment at a flow rate of 0.51 cfs. **Table 10** shows that the QA/QC results for flow rate, feed rate, background sediment concentration and temperature were within the allowable limits specified by the protocol.

Table 7 Summary of 3-ft FD Optimum 50% MTFR Test Results

Trial Date	Target Flow Rate (cfs)/(gpm)	Detention Time (sec)	Start Mass (lbs)	End Mass (lbs)	Influent Concentration[1] (mg/L)	Max. Water Temperature (°F)	Adj. Effluent Concentration (mg/L)	Removal Efficiency
4/26/21	0.51 / 229	56	75.000	65.635	198.4	76.9	91.6	53.8%

[1]The influent concentration reported is calculated by dividing the entire mass of test sediment injected into the flow stream over the duration of the test by the total flow during injection of test sediment.

Table 8 – 3-ft FD Optimum 50% MTFR Feed Rate Calibration Results

Sample ID	Sample Time (mm:ss)	Sample Mass (g)	Sample Duration (sec)	Feed Rate (mg/min)	Influent Concentration (mg/L)
1	00:00	168.127	60	168,127	196
2	04:48	168.736	60	168,736	197
3	09:36	170.858	60	170,858	200
4	14:24	168.958	60	168,958	197
5	19:12	172.563	60	172,563	202
6	24:00	171.990	60	171,990	201
			Mean	**170,205**	**199**

Table 9 – 3-ft FD Optimum 50% MTFR TSS Concentration Results

Time (mm:ss)	Effluent Concentration (mg/L)	Background Concentration[1] (mg/L)	Adjusted Effluent Concentration (mg/L)
03:48	90	1.3[2]	88.8
04:18	91	3.3	87.7
04:48	91	5.3	85.7
08:36	94	3.9	90.1
09:06	92	2.5	89.5
09:36	99	2.8	96.3
13:24	86	3.0	83.0
13:54	94	2.2	91.9
14:24	98	1.3[2]	96.7
18:12	94	3.1	91.0
18:42	104[2]	4.8	99.2
19:12	98	5.1	92.9
23:00	103	5.4	97.6
23:30	93	6.2	86.8
24:00	104	7.0	97.0
Mean	**95.4**	**3.8**	**91.6**

[1]Shaded background concentrations are interpolated. [2]LOQ was 2.5 mg/L; half LOQ was used.
[2]Material lost during sample analysis. Substituting maximum effluent concentration.

Table 10 – 3-ft FD Optimum 50% MTFR Test QA/QC Results

Parameter	Unit	Measured Value	Acceptable Range	Coefficient of Variance	Acceptable Range
Flow Rate	gpm	226	206 - 252	0.010	<0.03
Feed Rate	mg/L	198.4	180 - 220	0.011	<0.10
Max BG Conc.	mg/L	7.0	≤20	-	-
Water Temperature	°F	76.9	≤80	-	-

75% MTFR Results

The 75% MTFR test was conducted in accordance with the NJDEP HDS Protocol at a target flow rate of 0.77 cfs. A summary of test readings, measurements and calculations are shown in **Table 11**. Feed rate calibration results are shown in **Table 12**. Background and effluent sediment concentrations are shown in **Table 13**.

The 3-ft FD Optimum removed 46.1% of the test sediment at a flow rate of 0.77 cfs. **Table 14** shows that the QA/QC results for flow rate, feed rate, background sediment concentration and temperature were within the allowable limits specified by the protocol.

Table 11 Summary of 3-ft FD Optimum 75% MTFR Test Results

Trial Date	Target Flow Rate (cfs)/(gpm)	Detention Time (sec)	Start Mass (lbs)	End Mass (lbs)	Influent Concentration[1] (mg/L)	Max. Water Temperature (°F)	Adj. Effluent Concentration (mg/L)	Removal Efficiency
4/27/21	0.77 / 346	38	75.000	64.865	201.9	78.2	104.7	48.1%

[1]The influent concentration reported is calculated by dividing the entire mass of test sediment injected into the flow stream over the duration of the test by the total flow during injection of test sediment.

Table 12 – 3-ft FD Optimum 75% MTFR Feed Rate Calibration Results

Sample ID	Sample Time (mm:ss)	Sample Mass (g)	Sample Duration (sec)	Feed Rate (mg/min)	Influent Concentration (mg/L)
1	00:00	129.358	30	258,716	199
2	03:24	131.374	30	262,748	202
3	06:48	132.438	30	264,876	204
4	10:12	132.633	30	265,266	204
5	13:36	133.474	30	266,948	205
6	17:00	133.259	30	266,518	205
			Mean	**264,179**	**203**

Table 13 – 3-ft FD Optimum 75% MTFR TSS Concentration Results

Time (mm:ss)	Effluent Concentration (mg/L)	Background Concentration[1] (mg/L)	Adjusted Effluent Concentration (mg/L)
02:24	103	2.8	100.2
02:54	105	3.1	102.0
03:24	117	3.3	113.7
05:48	106	3.0	103.1
06:18	118	2.6	115.4
06:48	108	3.6	104.5
09:12	105	4.5	100.5
09:42	110	5.0	105.1
10:12	106	5.4	100.6
12:36	96	5.2	90.9
13:06	107	4.9	102.1
13:36	112	5.1	106.9
16:00	123	5.3	117.7
16:30	108	5.9	102.2
17:00	112	6.4	105.6
Mean	**109.1**	**4.4**	**104.7**

[1]Shaded background concentrations are interpolated.

Table 14 – 3-ft FD Optimum 75% MTFR Test QA/QC Results

Parameter	Unit	Measured Value	Acceptable Range	Coefficient of Variance	Acceptable Range
Flow Rate	gpm	343	311 - 381	0.008	<0.03
Feed Rate	mg/L	202	180 - 220	0.012	<0.10
Max BG Conc.	mg/L	6.4	≤20	-	-
Water Temperature	°F	78.2	≤80	-	-

100% MTFR Results

The 100% MTFR test was conducted in accordance with the NJDEP HDS Protocol at a target flow rate of 1.02 cfs. A summary of test readings, measurements and calculations are shown in **Table 15**. Feed rate calibration results are shown in **Table 16**. Background and effluent sediment concentrations are shown in **Table 17**.

The 3-ft FD Optimum removed 45.3% of the test sediment at a flow rate of 1.02 cfs. **Table 18** shows that the QA/QC results for flow rate, feed rate, background sediment concentration and temperature were within the allowable limits specified by the protocol.

Table 15 Summary of 3-ft FD Optimum 100% MTFR Test Results

Trial Date	Target Flow Rate (cfs)/(gpm)	Detention Time (sec)	Start Mass (lbs)	End Mass (lbs)	Influent Concentration[1] (mg/L)	Max. Water Temperature (°F)	Adj. Effluent Concentration (mg/L)	Removal Efficiency
4/28/21	1.02 / 458	28	75.000	63.729	197.6	74.6	108.3	45.2%

[1]The influent concentration reported is calculated by dividing the entire mass of test sediment injected into the flow stream over the duration of the test by the total flow during injection of test sediment.

Table 16 – 3-ft FD Optimum 100% MTFR Feed Rate Calibration Results

Sample ID	Sample Time (mm:ss)	Sample Mass (g)	Sample Duration (sec)	Feed Rate (mg/min)	Influent Concentration (mg/L)
1	00:00	174.126	30	348,252	202
2	02:54	175.003	30	350,006	203
3	05:48	170.673	30	341,346	198
4	08:42	169.556	30	339,112	197
5	11:36	170.872	30	341,744	198
6	14:30	168.548	30	337,096	196
			Mean	**342,926**	**199**

Table 17 – 3-ft FD Optimum 100% MTFR TSS Concentration Results

Time (mm:ss)	Effluent Concentration (mg/L)	Background Concentration[1] (mg/L)	Adjusted Effluent Concentration (mg/L)
01:54	109	2.7	106.3
02:24	115	2.8	112.2
02:54	119	2.9	116.1
04:48	118	2.9	115.1
05:18	107	2.9	104.1
05:48	119	3.5	115.5
07:42	104	4.2	99.8
08:12	117	4.4	112.6
08:42	106	4.7	101.3
10:36	108	4.7	103.4
11:06	112	4.6	107.4
11:36	119	5.6	113.4
13:30	106	6.6	99.4
14:00	111	7.0	104.1
14:30	122	7.3	114.7
Mean	**112.8**	**4.5**	**108.3**

[1]Shaded background concentrations are interpolated.

Table 18 – 3-ft FD Optimum 100% MTFR Test QA/QC Results

Parameter	Unit	Measured Value	Acceptable Range	Coefficient of Variance	Acceptable Range
Flow Rate	gpm	455	412 - 504	0.008	<0.03
Feed Rate	mg/L	197.8	180 - 220	0.015	<0.10
Max BG Conc.	mg/L	7.3	≤20	-	-
Water Temperature	°F	74.6	≤80	-	-

125% MTFR Results

The 125% MTFR test was conducted in accordance with the NJDEP HDS Protocol at a target flow rate of 1.28 cfs. A summary of test readings, measurements and calculations are shown in **Table 19**. Feed rate calibration results are shown in **Table 20**. Background and effluent sediment concentrations are shown in **Table 21**.

The 3-ft FD Optimum removed 38.3% of the test sediment at a flow rate of 1.28 cfs. **Table 22** shows that the QA/QC results for flow rate, feed rate, background sediment concentration and temperature were within the allowable limits specified by the protocol.

Table 19 Summary of 3-ft FD Optimum 125% MTFR Test Results

Trial Date	Target Flow Rate (cfs)/(gpm)	Detention Time (sec)	Start Mass (lbs)	End Mass (lbs)	Influent Concentration[1] (mg/L)	Max. Water Temperature (°F)	Adj. Effluent Concentration (mg/L)	Removal Efficiency
5/3/21	1.28 / 575	23	75.000	63.085	195.7	74.1	120.3	38.5%

[1]The influent concentration reported is calculated by dividing the entire mass of test sediment injected into the flow stream over the duration of the test by the total flow during injection of test sediment.

Table 20 – 3-ft FD Optimum 125% MTFR Feed Rate Calibration Results

Sample ID	Sample Time (mm:ss)	Sample Mass (g)	Sample Duration (sec)	Feed Rate (mg/min)	Influent Concentration (mg/L)
1	00:00	142.209	20	426,627	197
2	02:29	146.255	20	438,765	203
3	04:58	142.995	20	428,985	199
4	07:27	141.493	20	424,479	196
5	09:56	142.116	20	426,348	197
6	12:25	141.964	20	425,892	197
			Mean	**428,516**	**198**

Table 21 – 3-ft FD Optimum 125% MTFR TSS Concentration Results

Time (mm:ss)	Effluent Concentration (mg/L)	Background Concentration[1] (mg/L)	Adjusted Effluent Concentration (mg/L)
01:29	112	7.2	104.8
01:59	129	5.9	123.1
02:29	121	4.6	116.4
03:58	131	5.3	125.7
04:28	130	6.0	124.0
04:58	119	6.1	113.0
06:27	115	6.1	108.9
06:57	136	6.1	129.9
07:27	134	6.1	127.9
08:56	128	9.1	119.0
09:26	119	12.0	107.0
09:56	143	11.0	132.0
11:25	130	10.0	120.0
11:55	129	9.2	119.9
12:25	141	8.3	132.7
Mean	**127.8**	**7.5**	**120.3**

[1]Shaded background concentrations are interpolated.

Table 22 – 3-ft FD Optimum 125% MTFR Test QA/QC Results

Parameter	Unit	Measured Value	Acceptable Range	Coefficient of Variance	Acceptable Range
Flow Rate	gpm	571	518 - 633	0.007	<0.03
Feed Rate	mg/L	196	180 - 220	0.012	<0.10
Max BG Conc.	mg/L	12.0	≤20	-	-
Water Temperature	°F	74.1	≤80	-	-

Excluded Data/Results

Section 5.D, *Verification Report Requirements: Supporting Documentation* of the NJDEP Process document requires that all data from performance evaluation test runs excluded from the computation of the removal rate or verification analysis be disclosed. Two test runs were excluded from the results for failure to meet the quality standards. The first 50% MTFR test had a background concentration exceeding 20 mg/L, and the wrong sampling schedule was used for the first 125% MTFR test resulting in an aborted test.

Annualized Weighted TSS Removal Efficiency

The NJDEP-specified annual weighted TSS removal efficiency calculation is shown in **Table 23** using the results from the removal efficiency testing.

Testing in accordance with the provisions detailed in the NJDEP HDS Protocol demonstrate that the 3-ft FD Optimum achieved a 51.8% annualized weighted TSS removal at an MTFR of 1.02 cfs (64.5 gpm/sf). This testing demonstrates that the 3-ft FD Optimum exceeds the NJDEP requirement that HDS devices demonstrate at least 50% weighted annualized TSS removal efficiency at the MTFR.

Table 23 Annualized Weighted TSS Removal of the 3-ft FD Optimum

% MTFR	Flow Rate (cfs)	Removal Efficiency	Weighting Factor	Weighted Efficiency-%
25	0.26	61.5%	0.25	15.4
50	0.51	53.8%	0.3	16.1
75	0.77	48.1%	0.2	9.6
100	1.02	45.2%	0.15	6.8
125	1.28	38.5%	0.1	3.9
Weighted Annualized TSS Removal Efficiency				**51.8**

4.2 Scour Testing Results

The FD Optimum underwent scour testing according to the requirements of Section 4 of the NJDEP Protocol at a flow rate greater than 200% of its MTFR in order to verify its suitability for online use. For the 3-ft FD Optimum with an MTFR of 1.02 cfs (458 gpm) the average scour test flow rate had to be at least 2.04 cfs (916 gpm). The average flow rate for the scour test was 2.3 cfs which represents 225% of the MTFR. The maximum water temperature during testing was 74.3°F. The flow rate COV was 0.007. The maximum background concentration measured was 0.7 mg/L which complies with the 20 mg/L maximum background concentration specified by the test protocol. Effluent and background sample measurements are shown in **Table 24**. The mean adjusted effluent concentration of 1.1 mg/L was below the 20 mg/L concentration specified by the test protocol.

Table 24 3-ft FD Optimum Scour Test TSS Concentration Results

Time (mm:ss)	Effluent Concentration (mg/L)	Background Concentration[1] (mg/L)	Adjusted Effluent Concentration (mg/L)
02:00	3.8	2.9	0.9
04:00	3.3	2.9	0.4
06:00	4.3	2.9	1.4
08:00	2.9	3.0	0.0
10:00	4.5	3.0	1.5
12:00	3.8	3.0	0.8
14:00	3.1	3.0	0.1
16:00	4.2	3.4	0.8
18:00	3.3	3.8	0.0
20:00	3.3	3.2	0.1
22:00	3.2	2.6	0.6
24:00	3.2	2.0	1.3
26:00	5.2	1.3[2]	3.9
28:00	2.9	1.3	1.6
30:00	4.0	1.3[2]	2.7
Mean	**3.7**	**2.6**	**1.1**

[1]Shaded background concentrations are interpolated. [2]LOQ was 2.5 mg/L; half LOQ was used.

Excluded Data/Results

The protocol requires the disclosure and discussion of any data collected as a part of the testing process that is excluded from the reported results. No test runs were aborted during the scour testing process, and no data from tests that did not meet protocol requirements have been excluded from the results presented in the scour testing section of this report.

5. Design Limitations

The FD Optimum is an engineered system for which Hydro International's engineers work with site designers to generate a detailed engineering submittal package for each installation. As such, design limitations are typically identified and managed during the design process. Design parameters and limitations are discussed in general terms below.

Required Soil Characteristics

The FD Optimum is a flow-through system contained within a watertight manhole. Therefore, the FD Optimum can be installed and function as intended in all soil types.

Slope

Hydro International recommends contacting our design engineers when the FD Optimum is going to be installed on a drainage line with a slope greater than 10%. With steeply sloping pipe, site specific parameters such as pipe size, online vs. offline arrangement of the FD Optimum and the frequency of peak flow are taken into consideration by the Hydro International team.

Maximum Treatment Flow Rate (MTFR)

The MTFR of the FD Optimum is dependent upon model size. The recommended maximum treatment flow rate is dependent on FD Optimum model size and other design and performance specifications. Hydro International recommends contacting their engineering staff with questions about managing high peak flow rates.

Maintenance Requirements

The FD Optimum should be inspected and maintained according to recommendations and guidelines set forth in the Operation and Maintenance manual at: (https://www.hydro-int.com/en/resources/first-defense-operations-maintenance-manual). A detailed discussion of inspection and maintenance requirements is discussed later in Section 6.

Operating Head

Water levels were measured in the First Defense Optimum using the vessel outlet invert as a datum. Measurements were taken to the nearest 1/16-inch using pressure taps and an engineer's scale. The average of three readings were used. Measured water levels are reported in **Table 25**. Total energy loss is calculated in **Table 26**.

Table 25 Measured Static Water Levels

	Static Head (inches)			
Flow (cfs)	Inlet Pipe	Vessel Inlet	Vessel Outlet	Outlet Pipe
0.00	0.63	0.00	0.00	-0.58
0.10	3.48	3.79	2.08	0.44
0.20	7.67	7.73	2.92	0.94
0.30	10.44	10.44	3.46	1.25
0.40	11.06	11.02	4.21	1.60
0.50	11.48	11.44	5.19	1.88
0.60	11.81	11.79	5.50	2.13
0.70	12.13	12.13	6.06	2.38
0.80	12.44	12.42	6.42	2.48
0.90	12.71	12.71	6.71	2.56
1.00	12.96	12.94	7.04	2.65
1.20	13.48	13.40	7.69	2.98
1.40	13.88	13.77	8.29	3.19
1.60	14.23	14.21	8.63	3.38
1.80	14.73	14.67	9.04	3.54
2.00	15.13	15.06	9.38	3.71
2.20	15.42	15.31	9.90	3.90
2.40	15.77	15.67	10.42	4.13

Table 26 Calculated Energy Losses

	DOF in Pipe (ft)		Velocity in Pipe (ft/s)		Velocity Head (ft)		Total head (ft)		Tot. Loss
Flow (cfs)	Inlet Pipe	Outlet Pipe	Inlet Pipe	Outlet Pipe	Inlet Pipe	Outlet Pipe	Inlet pipe	Outlet pipe	(ft)
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.05	-0.05	0.10
0.10	0.24	0.09	0.55	2.31	0.00	0.08	0.29	0.12	0.18
0.20	0.59	0.13	0.31	2.68	0.00	0.11	0.64	0.19	0.45
0.30	0.82	0.15	0.30	3.26	0.00	0.17	0.87	0.27	0.60
0.40	0.87	0.18	0.38	3.33	0.00	0.17	0.92	0.31	0.62
0.50	0.90	0.20	0.45	3.57	0.00	0.20	0.96	0.35	0.61
0.60	0.93	0.23	0.52	3.50	0.00	0.19	0.99	0.37	0.62
0.70	0.96	0.25	0.59	3.62	0.01	0.20	1.02	0.40	0.61
0.80	0.98	0.26	0.65	3.91	0.01	0.24	1.04	0.44	0.60
0.90	1.01	0.26	0.71	4.39	0.01	0.30	1.07	0.51	0.55
1.00	1.03	0.27	0.77	4.62	0.01	0.33	1.09	0.55	0.54
1.20	1.07	0.30	0.89	4.77	0.01	0.35	1.14	0.60	0.53
1.40	1.10	0.31	1.00	5.31	0.02	0.44	1.17	0.70	0.47
1.60	1.13	0.33	1.12	5.55	0.02	0.48	1.21	0.76	0.45
1.80	1.18	0.34	1.21	5.59	0.02	0.49	1.25	0.78	0.47
2.00	1.21	0.36	1.31	6.13	0.03	0.58	1.29	0.89	0.39
2.20	1.23	0.37	1.42	6.50	0.03	0.66	1.32	0.98	0.34
2.40	1.26	0.39	1.52	6.57	0.04	0.67	1.35	1.01	0.34

Installation limitations

Pick weights and installation procedures vary slightly with model size. Hydro International provides contractors with project-specific unit pick weights and installation instructions prior to delivery.

Configurations

The FD Optimum was designed for online applications in which the inlet and outlet are tied directly into the main drainage line.

Structural Load Limitations

Standard FD Optimum units are designed for HS-20 loading. Contact Hydro International engineering staff when heavier load ratings are required.

Pretreatment Requirements

The FD Optimum has no pre-treatment requirements.

Limitations on Tailwater

Hydro International recommends working with their engineering team if tailwater is present to increase the available driving head to ensure that the full water quality treatment flow rate is treated consistent with NJDEP protocol requirements.

Depth to seasonal high water table

Although the functionality of the FD Optimum is not impacted by high groundwater, Hydro International recommends consulting their engineering staff to determine whether the addition of anti-flotation collars to the base of the FD Optimum chamber are necessary to counterbalance buoyant forces.

Pipe Size

Each FD Optimum model has a maximum recommended inlet and outlet pipe size. When the diameter of the main storm drain line exceeds the maximum FD Optimum pipe size, Hydro International recommends contacting their engineering team. In some circumstances larger pipe sizes can be safely accommodated; otherwise, Hydro International recommends the FD Optimum be designed in an offline configuration. The maximum recommended inlet and outlet pipe diameter for each FD Optimum model are shown in **Table A-2** of the Verification Appendix.

6. Maintenance

Inspection and maintenance of the FD Optimum are simple procedures conducted from the surface. An Operation and Maintenance Manual can be found at:
https://www.hydro-int.com/en/resources/first-defense-operations-maintenance-manual

Neither inspection nor maintenance require purchasing spare parts or tools from Hydro International. The FD Optimum has one centrally located 30-in manhole lid to provide inspection and maintenance access to both the internal bypass chamber and vortex treatment chamber.

Inspection

The required frequency of cleanout depends on site use and other site specific characteristics and should therefore be determined by inspecting the unit after installation. During the first year of operation, the unit should be inspected at least every six months to determine the rate of sediment and floatables accumulation. More frequent inspections are recommended at sites that would generate heavy solids loads, like parking lots with winter sanding or unpaved maintenance lots. A dipstick can be used to measure accumulated oil; a sediment probe can be used to determine the level of accumulated solids stored in the sump.

Hydro International recommends that the units are cleaned when sediment volumes reach 50% sump capacity. The standard sediment storage depth in the FD Optimum is 18 inches. Because FD Optimum model sizes vary in diameter, pollutant storage volumes vary with model size as shown in **Table 25**. When sediment and oil depths are measured during inspection, they should be recorded on the Operation & Maintenance manual log and compared to the as-built drawings of the FD Optimum to assess whether accumulated sediment has reached 9 inches in depth.

Table 27 Pollutant Storage Capacities of the FD Optimum

Model	Sediment Volume at 50% Sump Capacity (yd^3)	Sediment Depth at 50% Sump Capacity (in)	Sump Volume (yd^3)	Sump Depth (in)
3-ft	0.20	9	0.39	18
4-ft	0.35	9	0.70	18
5-ft	0.55	9	1.1	18
6-ft	0.80	9	1.6	18
7-ft	1.1	9	2.1	18
8-ft	1.4	9	2.8	18
10-ft	2.2	9	4.4	18

Maintenance

The interval of required clean-out should be determined by post-installation inspection of pollutant accumulation rates. If post-installation inspection cannot be conducted for some reason, Hydro International recommends the FD Optimum be cleaned out at least once per year. There is no need for man entry into the FD Optimum during maintenance. However, if man entry does occur then proper confined space entry procedures must be followed.

Floatable trash and debris can be removed by lifting the floatable access lid and using a netted skimming pole or a vactor truck to skim trash from the surface of the standing water. Accumulated oil must be removed from the surface using a vactor truck or sump vac. Accumulated sediment can be removed by lifting the central access lid and dropping a vactor hose down the center shaft to the sump. The entire sump liquid volume does not necessarily need to be removed from the FD Optimum during maintenance. When all pollutants have been removed from the FD Optimum, the manhole lids should be put securely back in place.

Sediment, floatables, and gross debris can generally be disposed of at the local landfill in accordance with local regulations. The toxicity of the residues produced will depend on the activities in the contributing drainage area. Testing of the residues may be required if they are considered potentially hazardous. In all cases, local regulators should be contacted about disposal requirements.

7. Statements

The following signed statements from the manufacturer (Hydro International), third party observer (FB Environmental Associates) and NJCAT are required to complete the NJCAT verification process. In addition, it should be noted that this report has been subjected to public review (e.g. stormwater industry) and all comments and concerns have been satisfactorily addressed.

Stormwater Solutions

Hydro International

Turning Water Around...®

May 20th, 2021

Dr. Richard Magee, Sc.D., P.E., BCEE
Executive Director
New Jersey Corporation for Advanced Technology
c/o Center for Environmental Systems
Stevens Institute of Technology
One Castle Point on Hudson
Hoboken, NJ 07030

Re: Manufacturers Statement of Compliance

Dear Dr. Magee:

Hydro International has completed verification testing for the First Defense High Capacity Optimum in accordance with the *"New Jersey Department of Environmental Protection Laboratory Protocol to Assess Total Suspended Solids Removal by a Hydrodynamic Sedimentation Manufactured Treatment Device"* (January 25, 2013). As required by the *"NJDEP Procedure for Obtaining Verification of a Stormwater Manufactured Treatment Device from New Jersey Corporation for Advanced Technology (NJCAT)"*, this letter serves as Hydro International's statement that all procedures and requirements identified in the aforementioned protocol and process document were met or exceeded.

Specifically, a three foot diameter First Defense High Capacity Optimum unit was tested at Hydro International's laboratory in Portland, Maine for efficacy and scour resistance. To ensure that all procedures and methods were met, a test plan was completed and submitted to NJCAT for review and approval, all testing and sample collection was conducted under the direct supervision of the independent observer, FB Environmental Associates, and all collected samples were sent to either of two independent and certified laboratories; GeoTesting Express for particle size analysis or Maine Environmental Laboratories for measuring suspended solid concentrations. With this in mind, the preparation of the verification report and the documentation contained therein fulfill the submission requirements of the process document and protocol.

If you have any questions or comments regarding the verification please do not hesitate to contact us.

Sincerely,

Jeremy Fink, PE
Pr. Product Development Engineer

Hydro International (Stormwater), 94 Hutchins Drive, Portland ME 04102
Tel: (207) 756-6200 Fax: (207) 756-6212 Web: www.hydro-int.com

STATEMENT OF WITNESS | THIRD PARTY OBSERVER

TO: Jeremy Fink, Hydro International
FROM: Forrest Bell, FB Environmental Associates (FBE)
SUBJECT: Third Party Witness of Hydro International First Defense® Optimum Vortex Separator
DATE: May 25, 2021
CC: Margaret Mills, FB Environmental Associates (FBE)

Statement of Third Party Observer

FB Environmental served as the third-party observer for tests performed on the First Defense® Optimum Vortex Separator by Hydro International in April through May of 2021 to achieve certification through the New Jersey Department of Environmental Protection (NJDEP) according to the *New Jersey Department of Environmental Protection Process for Approval of Use for Manufactured Treatment Devices (January, 2013).* The test was performed by Hydro International staff at their laboratory located at 94 Hutchinson Drive in Portland, Maine. A member of our staff verified compliance with the laboratory test protocol above, and our staff member was physically present to observe the full duration of all testing procedures.

We have also reviewed the data, calculations, and conclusions associated with the removal efficiency testing in the *NJCAT Technology Verification: First Defense® Optimum Vortex Separator* report by Hydro International, dated May 2021 with the May 24, 2021 edits incorporated. We state that they conform to what we saw during our supervision as a third-party observer.

Forrest Bell ~ FB Environmental Associates

5/25/2021
Date

STATEMENT OF DISCLOSURE | THIRD PARTY OBSERVER

TO: Jeremy Fink, Hydro International
FROM: Forrest Bell, FB Environmental Associates (FBE)
SUBJECT: Third Party Observer Statement of Disclosure under New Jersey Department of Environmental Protection Process for Approval of Use for Manufactured Treatment Devices
DATE: May 25, 2021
CC: Margaret Mills, FB Environmental Associates (FBE)

Statement of Disclosure – Third Party Observer

FB Environmental has no financial conflict of interest regarding the test results of the stormwater device testing outlined in the *NJCAT Technology Verification: First Defense® Optimum Vortex Separator* report by Hydro International, dated May 2021 with the May 24, 2021 edits incorporated.

Disclosure Record

FB Environmental has provided the service of third-party observer for tests performed by Hydro International in April through May of 2021. The tests assessed the removal efficiency of the First Defense® Optimum vortex separator to prepare for its designated use of capturing particulate pollutants entering the system as part of surface runoff. Beyond this, FB Environmental and Hydro International have no relationships that would constitute a conflict of interest. For example, we have no ownership stake, do not receive commissions, do not have licensing agreements, and do not receive funds or grants beyond those associated with the testing program.

Forrest Bell ~ FB Environmental Associates

5/25/2021
Date

Center for Environmental Systems
Stevens Institute of Technology
One Castle Point
Hoboken, NJ 07030-0000

June 5, 2021

Gabriel Mahon, Chief
NJDEP
Bureau of Non-Point Pollution Control
Division of Water Quality
401 E. State Street
Mail Code 401-02B, PO Box 420
Trenton, NJ 08625-0420

Dear Mr. Mahon,

Based on my review, evaluation and assessment of the testing conducted on the First Defense® Optimum vortex separator (FD Optimum) by Hydro International and observed by FB Environmental Associates of Portland, Maine, the test protocol requirements contained in the *"New Jersey Laboratory Testing Protocol to Assess Total Suspended Solids Removal by a Hydrodynamic Sedimentation Manufactured Treatment Device, (January 25, 2013)"* (NJDEP HDS Protocol) were met or exceeded. Specifically:

Test Sediment Feed

The mean PSD of Hydro International's test sediments comply with the PSD criteria established by the NJDEP HDS protocol. The Hydro International removal efficiency test sediment PSD analysis was plotted against the NJDEP removal efficiency test PSD specification. The test sediment was shown to be significantly finer (d_{50} of 56µm vs 75µm) than the sediment blend specified by the protocol. The Hydro International scour test sediment PSD analysis was plotted against the NJDEP scour sediment test PSD specification and shown to be also much finer than specified by the protocol.

Removal Efficiency Testing

In accordance with the NJDEP HDS Protocol, removal efficiency testing was executed on a full-scale 3-ft FD Optimum model in order to establish the ability of the FD Optimum to remove the specified test sediment at 25%, 50%, 75%, 100% and 125% of the target MTFR. Prior to the start of testing Hydro International reviewed existing data and decided to utilize a target MTFR of 458 gpm (1.02 cfs). This target was chosen based on the ultimate goal of demonstrating greater than 50% annualized weighted solids removal as defined in the NJDEP HDS Protocol. The flow rates,

feed rates and influent concentration all met the NJDEP HDS test protocol's coefficient of variance requirements and the background concentration for all five test runs never exceeded 20 mg/L. The annualized weighted sediment removal of the 3-ft FD Optimum was 51.8%.

Scour Testing

In order to demonstrate the ability of the FD Optimum to be used as an online treatment device, scour testing was conducted at greater than 200% of the MTFR in accordance with the NJDEP HDS Protocol. The average flow rate during the online scour test was 2.3 cfs, which represents 225% of the MTFR (MTFR = 1.02 cfs). Background sediment concentration measured was 1.3 to 3.8 mg/L (LOQ = 2.5 mg/L) throughout the scour testing, which complies with the 20 mg/L maximum background concentration specified by the test protocol. Unadjusted effluent sediment concentrations ranged from 2.9 mg/L to 5.2 mg/L with a mean of 3.7 mg/L. When adjusted for background concentrations, the effluent concentrations range from 0.0 to 3.9 mg/L with a mean of 1.1 mg/L. These results confirm that the 3-ft. FD Optimum did not scour at 225% MTFR and meets the criterion for online use.

Maintenance Frequency

The predicted maintenance frequency for all models is 37 months.

Sincerely,

Richard S. Magee, Sc.D., P.E., BCEE

8. References

ASTM D422-63 (2007). *Standard Test Method for Particle-Size Analysis of Soils.*

ASTM D3977-97 (2013). *Standard Test Methods for Determining Concentrations in Water Samples*.

NJDEP 2013. *New Jersey Department of Environmental Protection Procedure for Obtaining Verification of a Stormwater Manufactured Treatment Device from New Jersey Corporation for Advanced Technology*. Trenton, NJ. January 25, 2013.

NJDEP 2013a. *New Jersey Department of Environmental Protection Laboratory Process for Approval of Use for Manufactured Treatment Devices.* Trenton, NJ. January 25, 2013.

NJDEP 2013b. *New Jersey Department of Environmental Protection Laboratory Protocol to Assess Total Suspended Solids Removal by a Hydrodynamic Sedimentation Manufactured Treatment Device.* Trenton, NJ. January 25, 2013.

VERIFICATION APPENDIX

Introduction

- Manufacturer – Hydro International, 94 Hutchins Drive, Portland, ME 04102. *General Phone: (207)756-6200. Website:* www.hydro-int.com/us.
- MTD – Typical FD Optimum Design Specifications are shown in **Table A-1**.
- TSS Removal Rate – 50%
- Online or offline installation

Detailed Specification

- FD Optimum maximum treatment flow rates (MTFRs), sediment storage amounts and sediment removal intervals per NJDEP sizing requirements are attached as **Table A-1**.
- Standard FD Optimum dimensions are attached as **Table A-2**.
- Pick weights and installation procedures vary with model size. Hydro International provides contractors with project-specific unit pick weights and installation instructions prior to delivery.
- Maximum recommended sediment depth prior to cleanout is 9 inches for all model sizes.
- For a reference maintenance plan, download the First Defense Operation & Maintenance Manual at: https://www.hydro-int.com/en/resources/first-defense-operations-maintenance-manual
- Under N.J.A.C. 7:8-5.5, NJDEP stormwater design requirements do not allow a hydrodynamic separator such as the FD Optimum to be used in series with another hydrodynamic separator to achieve an enhanced total suspended solids (TSS) removal rate.

Table A-1 MTFRs and Sediment Removal Intervals for FD Optimum Models

FD Optimum Model	Manhole Diameter (ft)	NJDEP 50% TSS Maximum Treatment Flow Rate (cfs)	Treatment Area (ft^2)	Hydraulic Loading Rate (gpm/ft^2)	50% Max Sediment Storage Volume (ft^3)	Required Sediment Removal Interval[1] (months)
3-ft	3	1.02	7.1	64.5	5.3	37
4-ft	4	1.81	12.6	64.5	9.4	37
5-ft	5	2.83	19.6	64.5	14.7	37
6-ft	6	4.07	28.3	64.5	21.2	37
7-ft	7	5.53	38.5	64.5	28.9	37
8-ft	8	7.23	50.3	64.5	37.7	37
10-ft	10	11.33	78.5	64.5	58.9	37

[1]Required sediment removal interval was calculated using the equation specified in Appendix B Part B of the NJDEP Laboratory Protocol for HDS MTDs:

Sediment Removal Interval (months) = (50% HDS MTD Max Sediment Storage Volume * 3.57) / (MTFR * TSS Removal Efficiency)

Table A-2 Standard Dimensions for FD Optimum Models

FD Optimum Model and Diameter	Maximum Treatment Flow Rate (cfs)	50% Max Sediment Storage Volume (ft^3)	Chamber Depth (ft)	Treated Chamber Depth[1] (ft)	Sediment Sump Depth (ft)	Aspect Ratio Treatment Depth: Diameter	Maximum Pipe Diameter (inch)
3-ft	1.02	5.3	3.71	2.96	1.5	0.99	18
4-ft	1.81	9.4	5.00	4.25	1.5	1.06	24
5-ft	2.83	14.7	5.25	4.50	1.5	0.90	24
6-ft	4.07	21.2	6.25	5.50	1.5	0.92	32
7-ft	5.53	28.9	7.25	6.50	1.5	0.93	42
8-ft	7.23	37.7	8.00	7.25	1.5	0.91	48
10-ft	11.33	58.9	10.25	9.50	1.5	0.95	60

[1]Treated Chamber Depth is the chamber depth minus ½ the sediment sump depth. Larger models (>250% MTFR of the tested unit) must be geometrically proportionate to the tested unit (3-ft model). A variance of 15% is allowable. For units <250% MTFR (4-ft model) the depth must be equal or greater than the depth of the unit tested.

APPENDIX H

Sand Filter Sizing Calculations

SMP 2.1P - NYSDEC Surface Sand Filter (Design F-1)

Project: Buckingham Property Management
Project #: 22194.100
Date: 9/13/2023

INSITE ENGINEERING, SURVEYING & LANDSCAPE ARCHITECTURE, P.C.

1a. WQv Required for SMP = 1,034 c.f.

1b. Subcatchment % Imeperviousness = 67 %

2. Required Pratice Volume

2a. Total required volume = 75% of WQv (in filter and pretreatment) = 259 c.f.

2b. Total volume provided in pretreatment and filter = 1392 c.f.
(Refer to Appendix C for provided volume)

3. Pretreatment Requirements:

3a. Required Pretreatment Basin Surface Area = 68 s.f.
Area = 0.066 WQv for I<=75% or 0.0081 for I>75%)

3b. Provided Pretreatment Basin Surface Area = 400 s.f.
(Refer to Appendix C for pretreatment provided area)

3c. Required Pretreatment Basin Volume=25% of WQv = 258.5 c.f.

3d. Provided Pretreatment Basin Volume= 842 c.f.
(Refer to Appendix C for pretreatment volume calculations)

4. Required Filter Area:

4a. Required Filter Area = $\frac{\text{WQv (df)}}{\text{k (hf + df) + tf}}$

df= 1.50 ft.
hf= 1.00 ft.
k= 3.50 ft./day
tf= 1.67 days
Required Filter Area= 106.14 s.f.

4b. Provided Filter Area = 400 s.f.
(Refer to project plans for provided surface area)

4c. Volume provided in filter= 550 c.f.

SMP 1.4P - NYSDEC Surface Sand Filter (Design F-1)

Project: Buckingham Property Management
Project #: 22194.100
Date: 9/13/2023

INSITE ENGINEERING, SURVEYING & LANDSCAPE ARCHITECTURE, P.C.

1a. WQv Required for Downstream SMP = 5,284 c.f.

1b. Subcatchment % Imeperviousness = 62 %

2. Required Pratice Volume

2a. Total required volume = 75% of WQv (in filter and pretreatment) = 1321 c.f.

2b. Total volume provided in pretreatment and filter = = 4375 c.f.
(Refer to Appendix C for provided volume)

3. Pretreatment Requirements:

3a. 100% Pretreatment of the WQv is provided in the hydrodynamic separator upstream of the infiltration basin.

4. Required Filter Area:

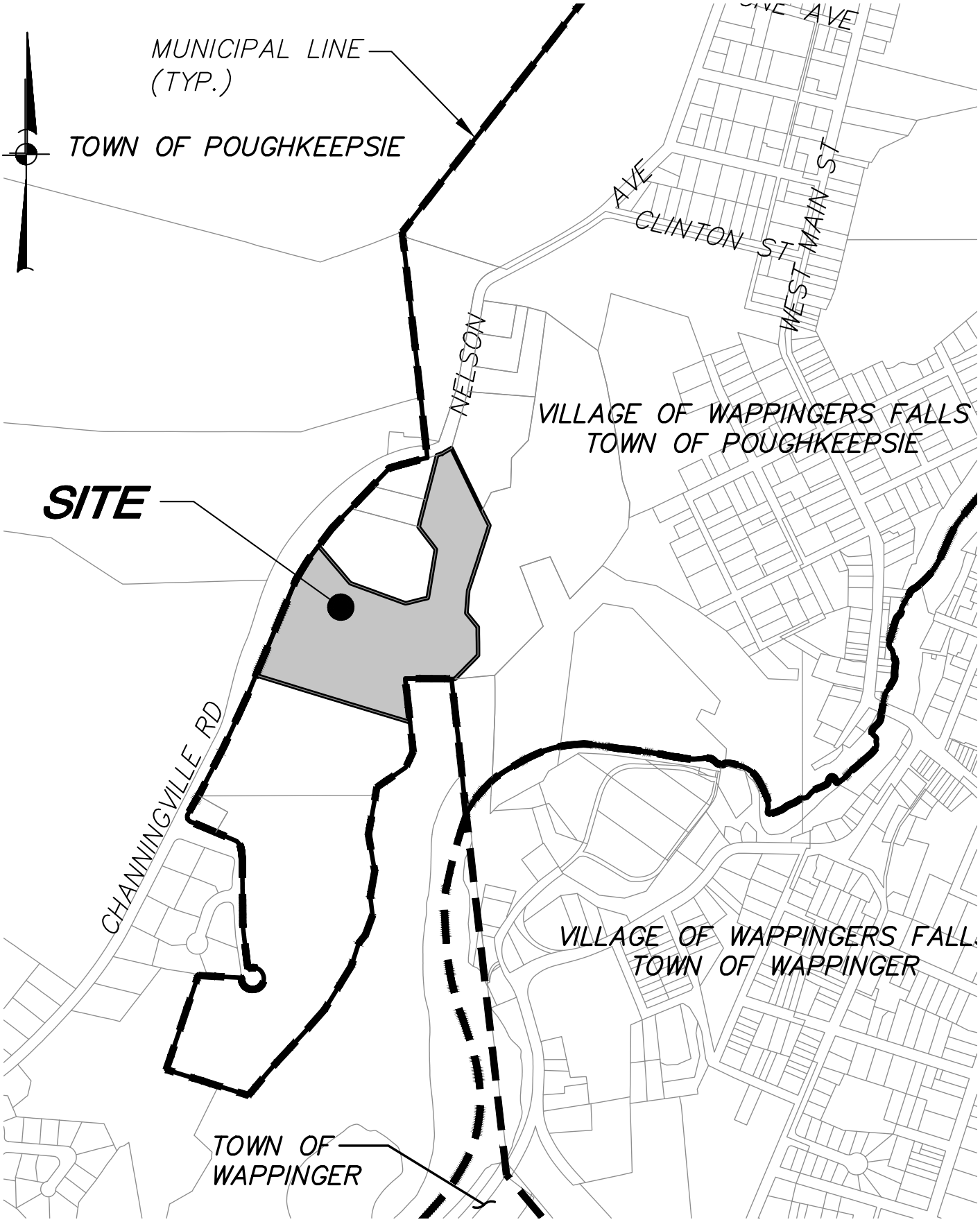
4a. Required Filter Area = $\frac{\text{WQv (df)}}{\text{k (hf + df) + tf}}$

df= 1.50 ft.
hf= 2.50 ft.
k= 3.50 ft./day
tf= 1.67 days
Required Filter Area= 339.01 s.f.

4b. Provided Filter Area = 1000 s.f.
(Refer to project plans for provided surface area)

4c. Volume provided in filter= 4375 c.f.

FIGURES



PROJECT: BUCKINGHAM PROPERTY MANAGEMENT
CHANNINGVILLE RD & NELSON AVE, VILLAGE OF WAPPINGERS FALLS, DUTCHESS CO., NY

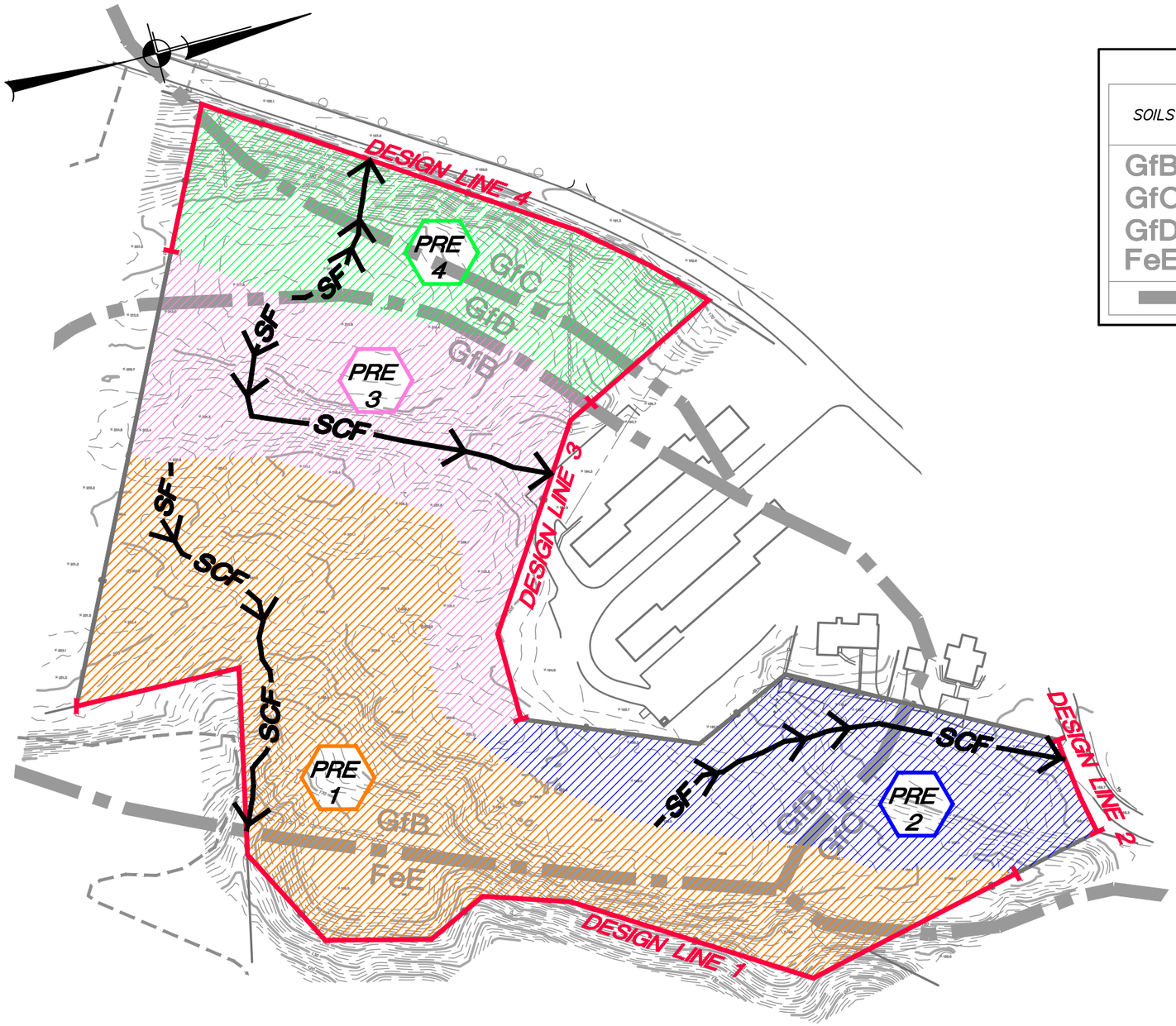
DRAWING: LOCATION MAP

PREPARED BY:

INSITE
ENGINEERING, SURVEYING & LANDSCAPE ARCHITECTURE, P.C.
3 Garrett Place • Carmel, New York 10512
Phone (845) 225-9690 • Fax (845) 225-9717
www.insite-eng.com

DATE:	2-1-23
SCALE:	1"=600'
PROJECT NO.:	22194.100
FIGURE:	1

Z:\E\22194100 Buckingham Wappinger\Stormwater\Figures\Figure-1 Location.dwg, 1/31/2023 5:57:22 AM, ependleton, 1:1



SOILS LEGEND

SOILS	DESCRIPTION	HYDROLOGICAL GROUP
GfB	Galway–Farmington complex, undulating, rocky, 1% to 6% slopes	B,C
GfC	Galway–Farmington complex, rolling, rocky, 5% to 16% slopes	B,C
GfD	Galway–Farmington complex, hilly, rocky, 15% to 30% slopes	B,C
FeE	Farmington–Rock Outcrop complex, steep, 25% to 45% slopes	C,D
	NRCS Soil Boundary Line	

LEGEND

PRE 4	SUBCATCHMENT
SF	TIME OF CONCENTRATION SHEET FLOW
SCF	TIME OF CONCENTRATION SHALLOW CONCENTRATED FLOW
DESIGN LINE	DESIGN LINE
	SUBCATCHMENT CONTRIBUTING AREA

PROJECT:
BUCKINGHAM PROPERTY MANAGEMENT
CHANNINGVILLE RD & NELSON AVE, VILLAGE OF WAPPINGERS FALLS, DUTCHESS CO., NY

DRAWING:
PRE–DEVELOPMENT

PREPARED BY:
INSITE
ENGINEERING, SURVEYING & LANDSCAPE ARCHITECTURE, P.C.
3 Garrett Place • Carmel, New York 10512
Phone (845) 225–9690 • Fax (845) 225–9717
www.insite–eng.com

GRAPHIC SCALE
0 75 150 300
(IN FEET)
1 inch = 150 ft.

DATE:	9–13–2023
SCALE:	1" = 150'
PROJECT NO.:	22194.100
FIGURE:	FIG–2

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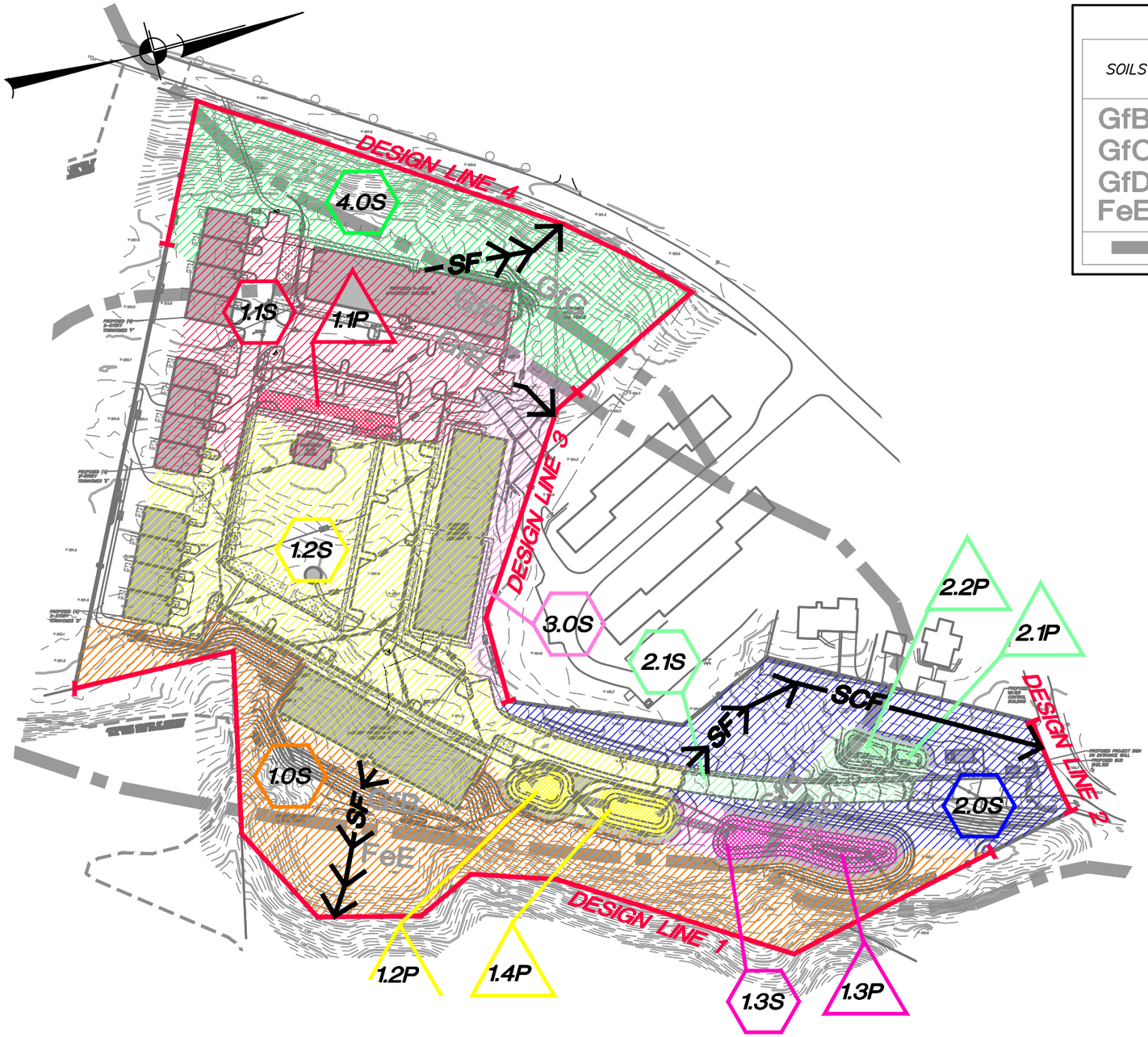

SOILS LEGEND

SOILS	DESCRIPTION	HYDROLOGICAL GROUP
GfB	Galway–Farmington complex, undulating, rocky, 1% to 6% slopes	B,C
GfC	Galway–Farmington complex, rolling, rocky, 5% to 16% slopes	B,C
GfD	Galway–Farmington complex, hilly, rocky, 15% to 30% slopes	B,C
FeE	Farmington–Rock Outcrop complex, steep, 25% to 45% slopes	C,D
	NRCS Soil Boundary Line	

LEGEND

- 4.0S — SUBCATCHMENT
- 1.1P — STORMWATER MANAGEMENT PRACTICE
- SF — TIME OF CONCENTRATION SHEET FLOW
- SCF — TIME OF CONCENTRATION SHALLOW CONCENTRATED FLOW
- PF — TIME OF CONCENTRATION PIPE FLOW
- CF — TIME OF CONCENTRATION CHANNEL FLOW
- DESIGN LINE — DESIGN LINE
- SUBCATCHMENT CONTRIBUTING AREA
- STORMWATER MANAGEMENT / GREEN INFRASTRUCTURE PRACTICE AREA

PROJECT:
BUCKINGHAM PROPERTY MANAGEMENT
CHANNINGVILLE RD & NELSON AVE, VILLAGE OF WAPPINGERS FALLS, DUTCHESS CO., NY

DRAWING:
POST–DEVELOPMENT

PREPARED BY:
INSITE
ENGINEERING, SURVEYING & LANDSCAPE ARCHITECTURE, P.C.
3 Garrett Place • Carmel, New York 10512
Phone (845) 225–9690 • Fax (845) 225–9717
www.insite–eng.com

GRAPHIC SCALE
0 75 150 300
(IN FEET)
1 inch = 150 ft.

DATE:	9–13–2023
SCALE:	1" = 150'
PROJECT NO.:	22194.100
FIGURE:	FIG–3

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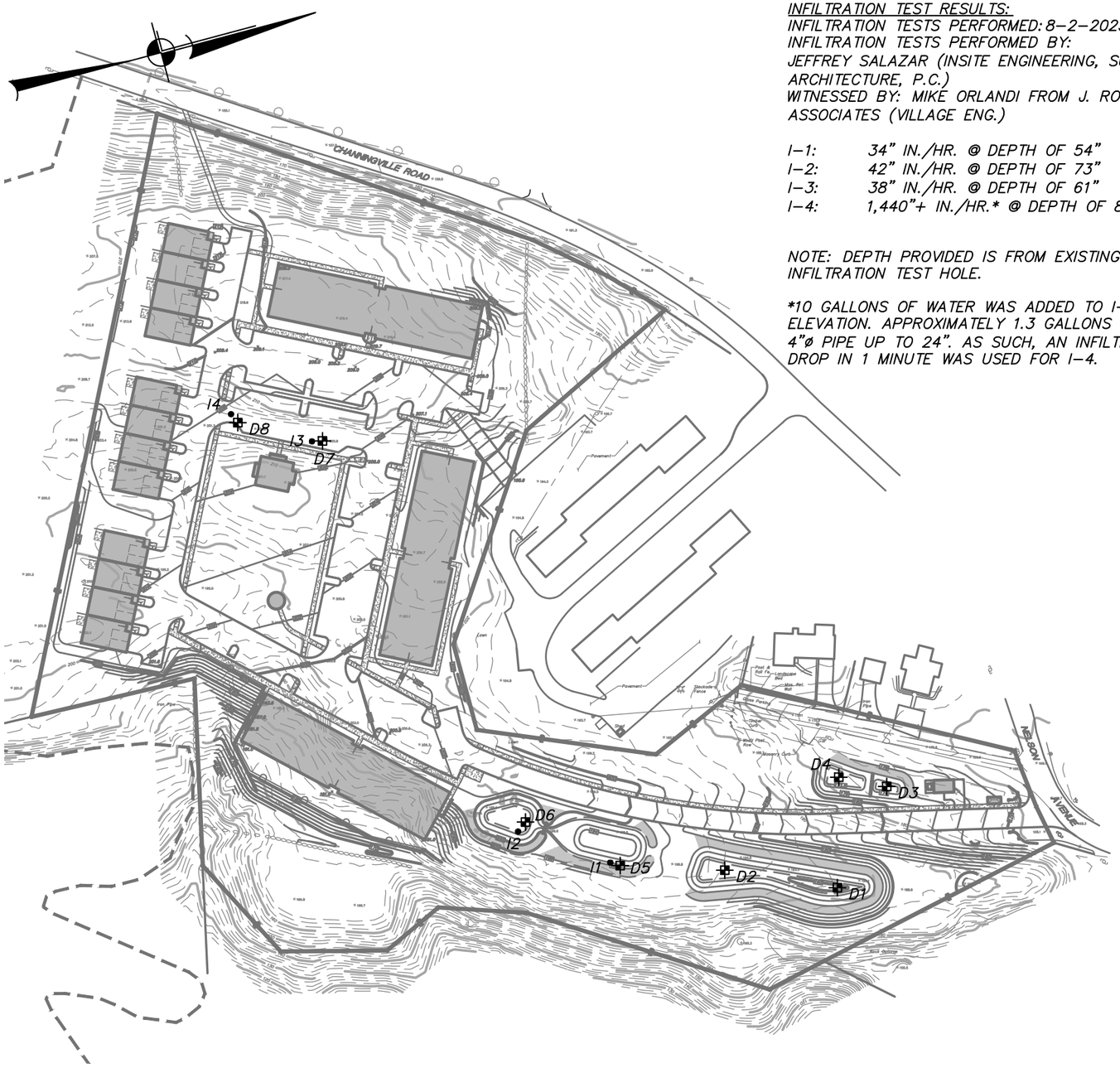


INFILTRATION TEST RESULTS:
INFILTRATION TESTS PERFORMED: 8–2–2023
INFILTRATION TESTS PERFORMED BY:
JEFFREY SALAZAR (INSITE ENGINEERING, SURVEYING & LANDSCAPE ARCHITECTURE, P.C.)
WITNESSED BY: MIKE ORLANDI FROM J. ROBERT FOLLCETTI & ASSOCIATES (VILLAGE ENG.)

I–1:	34" IN./HR. @ DEPTH OF 54"
I–2:	42" IN./HR. @ DEPTH OF 73"
I–3:	38" IN./HR. @ DEPTH OF 61"
I–4:	1,440"+ IN./HR.* @ DEPTH OF 87"

NOTE: DEPTH PROVIDED IS FROM EXISTING GRADE TO BOTTOM OF INFILTRATION TEST HOLE.

*10 GALLONS OF WATER WAS ADDED TO I–4 WITH NO RISE IN ELEVATION. APPROXIMATELY 1.3 GALLONS OF WATER WOULD FILL 4"ø PIPE UP TO 24". AS SUCH, AN INFILTRATION RATE OF 24" DROP IN 1 MINUTE WAS USED FOR I–4.

DEEP HOLE TEST RESULTS:
DEEP TESTS PERFORMED: 8–1–2023
DEEP TESTS PERFORMED BY: EVAN PENDLETON, P.E. (INSITE ENGINEERING, SURVEYING & LANDSCAPE ARCHITECTURE, P.C.)
DEEP TESTS WITNESSED BY: J. ROBERT FOLLCETTI & ASSOCIATES (VILLAGE ENG.)

D1:	0"–6"	TOPSOIL
	6"–24"	BROWN SANDY LOAM WITH COBBLES
		ROCK AT 24"
		NO GROUNDWATER, NO MOTTLING
D2:	0"–6"	TOPSOIL
	6"–42"	BROWN SILTY LOAM
		ROCK AT 42"
		NO GROUNDWATER, NO MOTTLING
D3:	0"–6"	TOPSOIL
	6"–108"+	BROWN SANDY LOAM WITH COBBLES
		NO ROCK, NO GROUNDWATER, NO MOTTLING
D4:	0"–6"	TOPSOIL
	6"–48"	BROWN SANDY LOAM WITH COBBLES
		ROCK AT 48"
		NO GROUNDWATER, NO MOTTLING
D5:	0"–6"	TOPSOIL
	6"–60"	BROWN SANDY LOAM WITH COBBLES
		ROCK AT 60"
		NO GROUNDWATER, NO MOTTLING
D6:	0"–6"	TOPSOIL
	6"–60"	BROWN LOAM
	60"–84"+	BROWN SILTY LOAM
		NO ROCK, NO GROUNDWATER, NO MOTTLING
D7:	0"–6"	TOPSOIL
	6"–48"	DARK BROWN LOAM
	40"–84"+	LIGHT BROWN SILTY LOAM
		NO ROCK, NO GROUNDWATER, NO MOTTLING
D8:	0"–6"	TOPSOIL
	6"–24"	DARK BROWN LOAM
	24"–96"+	LIGHT BROWN SILTY LOAM
		NO ROCK, NO GROUNDWATER, NO MOTTLING

LEGEND

D1	DEEP TEST HOLE LOCATION
I1	INFILTRATION TEST HOLE LOCATION

PROJECT:
BUCKINGHAM PROPERTY MANAGEMENT
CHANNINGVILLE RD & NELSON AVE, VILLAGE OF WAPPINGERS FALLS, DUTCHESS CO., NY

DRAWING:
TESTING PLAN

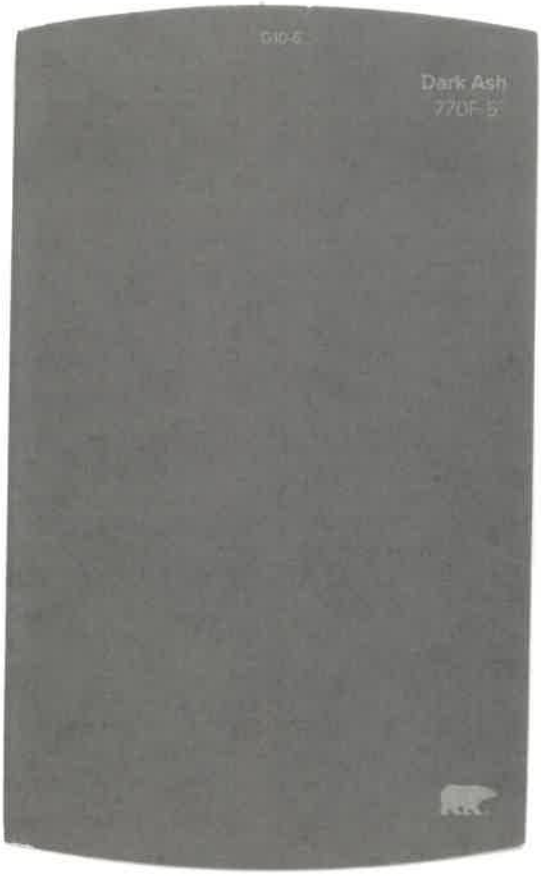
PREPARED BY:
INSITE
ENGINEERING, SURVEYING & LANDSCAPE ARCHITECTURE, P.C.
3 Garrett Place • Carmel, New York 10512
Phone (845) 225–9690 • Fax (845) 225–9717
www.insite–eng.com

GRAPHIC SCALE
0 75 150 300
(IN FEET)
1 inch = 150 ft.

DATE:	9–13–2023
SCALE:	1" = 150'
PROJECT NO.:	22194.100
FIGURE:	4

Z:\E\22194100 Buckingham Wappinger\Stormwater\Figures\Figure-4 Test Plan.dwg, 9/11/2023 7:50:02 AM, ependleton, 1:1


G9-7
DYNASTY
MARQUEE
ONE-COAT
BLACK


G10-6
Dark Ash
770F-5


YS5-7
Rococo Gold
S300-7

Joe's COPY

VILLAGE OF WAPPINGERS FALLS
Office of Building, Planning & Zoning
2582 South Avenue
Wappingers Falls, NY 12590
Phone: (845) 297-5277 Fax: (845) 296-0379
www.wappingersfallsny.gov

SIGN PERMIT APPLICATION

Name of Applicant Amy Parks
Address 2657 E Main St #3
Wappingers Falls NY 12590
Email parksamy@gmail.com
Phone 917-589-9704

Owner of Property Elmi Bensne
Address 21 S. Mesier Ave
Wappingers Falls, NY 12590
Phone 845-

Location of Property 2655 E Main St
Linear Frontage of building 25 ft **Zoning District** VC

Types of Signs
○ Post & Arm ○ Projecting ○ Seasonal ○ Multi-Tenant
☒ Wall ○ Window ○ Awning ○ Free Standing ○ Sidewalk

Sign Design All applications must be accompanied by a detailed scaled drawing showing all sign dimensions, graphic design (including lettering and pictorial matter),visual message (text, copy or content of sign), sign colors with color swatches, lighting, and landscaping.

Sign Location All applications must be accompanied by a plan, drawn to scale showing the following:

Freestanding signs- the position of the sign in relation to adjacent buildings, structures, roads, driveways, property lines, other signs, lighting fixtures, walls and fences.

Awning, Window, Wall or Projecting signs-the location on awning, window, wall or building, size of awning, total window area of principal façade, or linear frontage of building (as appropriate), projection from building, if relevant, proposed signs position in relation to adjacent signs and lighting fixtures.

Sign Specifications

Type Metal **Placement** Wall
Landscaping ___ Yes ✓ No **Size of Sign** ___ Height ___ Width
___ **Single Faced** ✗ **Double Faced** ✓ **Lighted**
Material ___ Wood ✓ Metal ___ other Durable

The undersigned respectfully petitions the Village of Wappingers Falls Code Enforcement Officer for a Sign Permit.

Application is being made in accordance with the Village Zoning Code. The undersigned acknowledges that permanent signs require review and approval of the Planning Board. In order to be considered complete and ready for review by the Planning Board, the following needs to be submitted to the Zoning Clerk no less than 15 days prior to the scheduled Planning Board Meeting:

- ✓ Application form (~~ten~~ 7 sets)
- ✓ Sign design drawings (~~ten~~ 7 sets)
- ___ Color swatch (if any color other than black/white)
- ___ Fee for sign permit of $75.00 per side (to be paid after Planning Board Approval)

Applicant Name Amy Parks

Applicant Signature _____ **Date:** 8/15/23

Owner of Property Signature Elmi Bertha **Date:** 8/16/23

THIS SECTION TO BE COMPLETED BY THE CODE ENFORCEMENT OFFICER

Sign Permit Granted: Date _____ **Permit # issued** _____

Permit Fee $_____ **Receipt #**_____ **Date**_____

Sign Permit Application referred to Planning Board Date _____

Comments:_____

_____

_____

VILLAGE OF WAPPINGERS FALLS
Office of Building, Planning & Zoning
2582 South Avenue
Wappingers Falls, NY 12590
Phone: (845) 297-5277 Fax: (845) 296-0379
www.wappingersfallsny.gov

SIGN PERMIT APPLICATION

Name of Applicant Oliver Wilkinson
Address 21 Trinity Way, Lagrangeville NY

Email ojwilki44@gmail.com
Phone 2037880475

Owner of Property Elmi Berisha
Address 21 S Mesier avenue, Wappingers Falls New York, 12590
Phone 845-590-4807

Location of Property 2665 East Main St
Linear Frontage of building _____ **Zoning District** _____

Types of Signs (●) Post & Arm ( ) Projecting ( ) Seasonal ( ) Multi-Tenant ( ) Wall ( ) Window ( ) Awning ( ) Free Standing ( ) Sidewalk

Sign Design All applications must be accompanied by a detailed scaled drawing showing all sign dimensions, graphic design (including lettering and pictorial matter),visual message (text, copy or content of sign), sign colors with color swatches, lighting, and landscaping.

Sign Location All applications must be accompanied by a plan, drawn to scale showing the following:

Freestanding signs- the position of the sign in relation to adjacent buildings, structures, roads, driveways, property lines, other signs, lighting fixtures, walls and fences.

Awning, Window, Wall or Projecting signs-the location on awning, window, wall or building, size of awning, total window area of principal façade, or linear frontage of building (as appropriate), projection from building, if relevant, proposed signs position in relation to adjacent signs and lighting fixtures.

Sign Specifications

Type Post & Arm **Placement** Above door

Landscaping ____ Yes ■ No **Size of Sign** 3 Height 3 Width

_____ **Single Faced** yes **Double Faced** no **Lighted**

Material _____ Wood _____ Metal _____ other Durable

The undersigned respectfully petitions the Village of Wappingers Falls Code Enforcement Officer for a Sign Permit.

Application is being made in accordance with the Village Zoning Code. The undersigned acknowledges that permanent signs require review and approval of the Planning Board. In order to be considered complete and ready for review by the Planning Board, the following needs to be submitted to the Zoning Clerk no less than 15 days prior to the scheduled Planning Board Meeting:

___Application form (ten sets)

___Sign design drawings (ten sets)

___Color swatch (if any color other than black/white)

___Fee for sign permit of $75.00 per side (to be paid after Planning Board Approval)

Applicant Name Oliver Wilkinson

Applicant Signature _____ **Date:** 8/17/23

Owner of Property Signature _____ **Date:** 8/17/23

THIS SECTION TO BE COMPLETED BY THE CODE ENFORCEMENT OFFICER

Sign Permit Granted: Date _____ **Permit # issued** _____

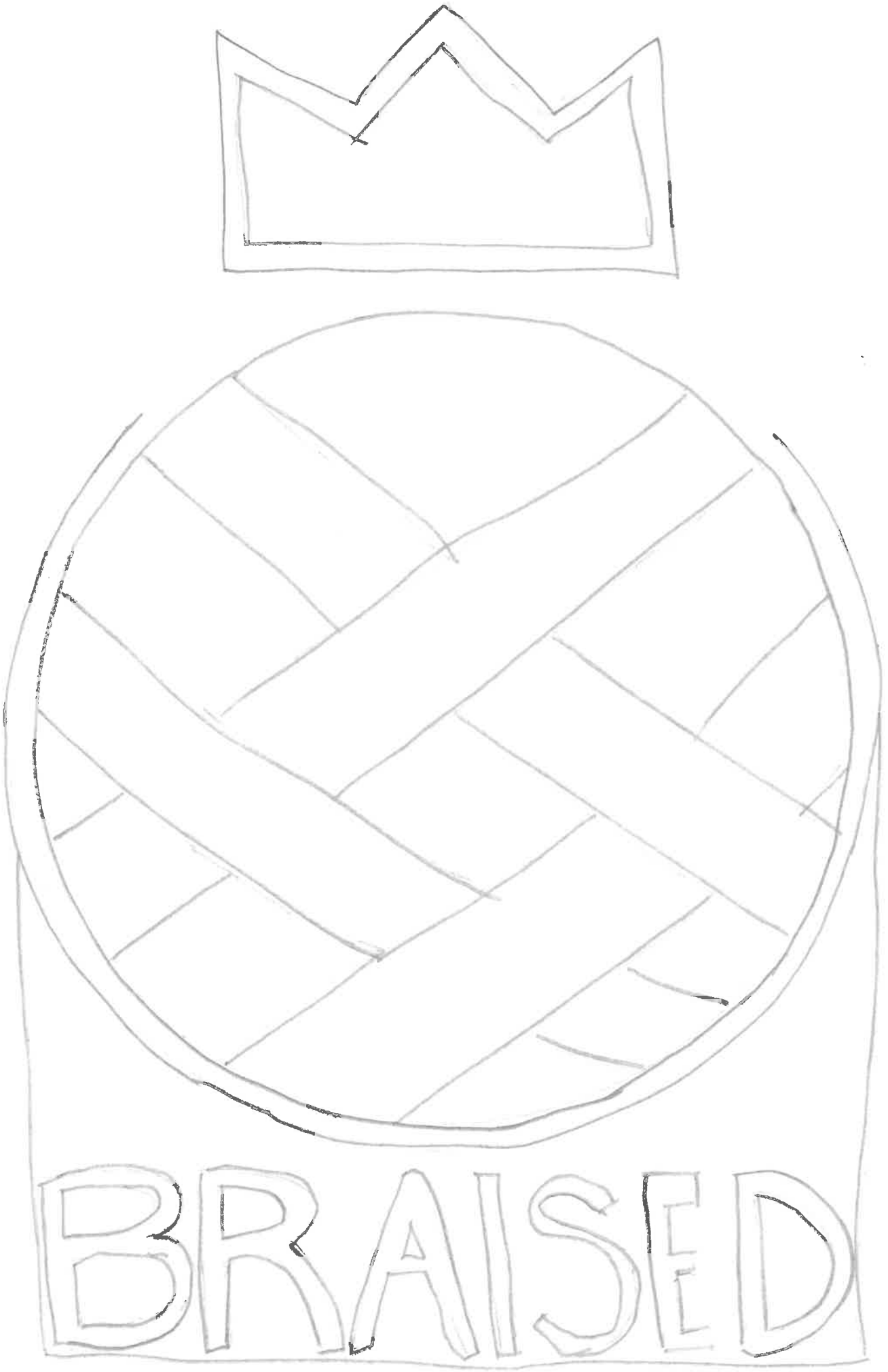
Permit Fee $_____ **Receipt #**_____ **Date**_____

Sign Permit Application referred to Planning Board Date _____

Comments:_____

_____

_____


BRAISED

VILLAGE OF WAPPINGERS FALLS

BUILDING DEPARTMENT
OFFICE OF CODE ENFORCEMENT
OFFICE OF THE FIRE INSPECTOR
2582 SOUTH AVENUE
WAPPINGERS FALLS, NY 12590
PHONE: (845) 297-5277 FAX: (845) 296-0379
E-mail: bmurphy@wappingersfallsny.gov
www.wappingersfallsny.gov

APPLICATION FOR PLANNING BOARD REVIEW

Submission Date: Sept. 6, 2023 Date of Meeting: ~~Sept~~ October 5, 2023

Meetings are held at the American Legion Hall, 7 Spring Street on the first Thursday of the month at 7:00 p.m.
All information must be completely filled out and returned no later than 15 business days before meeting date.
For the complete list of Planning Meeting Dates and Deadlines go to the Building, Planning and Zoning page on the village website www.wappingersfallsny.gov.
A filing fee is required in connection with any application to the Planning Board for approval.

The Planning Board is responsible for the review and approval of all applications concerning:

- ☐ Opening a new business in the Village
- ☐ Installing a new sign
- ☐ Building a new structure in a commercial zone
- ☐ Subdivision / Site Review/ Lot Line Adjustment

Items to be submitted for review: (Only items pertaining to project)

☐ PDF Emailed to Building Dept. and Ten (10) hard copy sets of construction/site/elevation/plans - Engineer drawings showing all areas to be affected. Or a sketch of the proposed floor plan layout (*All sets of plans must be folded)*

☐ Legal Documents (Right of Ways/Easements/Lease/Contracts of Sale, etc.)

☐ Consent Form *(The applicant must provide consent form, from homeowner authorizing him/her to file for Planning Review)*

☐ Application fee

☐ Application for proposed sign - Including Renderings/sketch of proposed sign/ Elevation/size/ exact color samples.

(Separate Application)

VILLAGE OF WAPPINGERS FALLS
BUILDING DEPARTMENT
2582 SOUTH AVENUE
WAPPINGERS FALLS, NY 12590
PHONE: (845) 297-5277 FAX: (845) 296-0379
E-mail: bmurphy@wappingersfallsny.gov
www.wappingersfallsny.gov

APPLICATION FOR PLANNING BOARD REVIEW

All information must be completely filled out and returned no later than the stated submition date.

Date Submitted: Sept. 6, 2023 Date of Meeting : October 5, 2023

Property Identification:

Address: 2642 East Main Street, Wappingers Falls, NY

Zoning District: _____ **Existing site area:** _____

Owner Information:

Name : Grinnell Public Library

Address : 2642 East Main St Wapp. Falls

City: W.F. **State:** NY **Zip:** 12590

Contact Numbers: (H) 845-297-3428 ~~(C)~~ _____

(E-mail) director@grinnell-library.org

Applicant Information:

(Please provide if someone other than the property owner is the applicant)

Name : _____

Address: _____

City: _____ **State:** _____ **Zip:** _____

Contact Numbers: (H) _____ **(C)** _____

E-mail Address: _____

Lead Design Professional: *(If applicable)*

(Indicate the primary design professional associated with this application)

Name: Michael Bufi

Title: Project Manager

~~Architect~~ **Engineer**

Company: P2G Architecture

Address: 43 Broad St. Suite 2, Fishkill, NY 12524

Telephone # : 845-592-9330

E-mail Address: ngafur@p2garchitecture.com

VILLAGE OF WAPPINGERS FALLS

APPLICATION FOR PLANNING BOARD REVIEW
(Continued)

Proposed Site:

(Property where improvements are proposed)

Existing Use(s): Public library

Proposed square footage: 5600 total building

Project Description : *(Please print or type)*

(Describe the project in detail indicating all areas of work, type(s) of improvement and materials to be used as a part of the proposed improvements. Use additional sheets if necessary.)

Reno/Restoration of the front of the library (South)
- replace existing shingles - stained to match replicate existing color
- paint window frames, eaves, sills
- replace exact replica of existing sign
- paint 2 doors (exterior) ~~BM~~ BM - HC-255 Palace Armor Red

Items to be submitted for review: (Only items pertaining to project)

- ☐ Ten (10) sets of plans.
- ☐ Legal Documents (Right of Ways/Easements/Lease/Contracts of Sale, etc.)
- ☐ Consent Form
- ☐ Application for proposed sign
- ☐ Application Fee
- ☐ Proof that the taxes, utility bills and fines for the property are paid in full.

With the completion of this application, I hereby state that the information provided and all Accompanying documentation is accurate to the best of my knowledge, and that the attached plans contain all information required by the appropriate checklist.

Beth Devine — **Signature of Applicant Signed**

9/6/23 — **Date**

Trustee/Chair of Building Committee

Office use only:

[ ] FEE : _____ **Receipt No.:** _____ **Cash / Check #** _____ **Date:** _____

Revised by : _____ **Revision date :** _____

Zoning Administrator/Code Enforcement Officer

VILLAGE OF WAPPINGERS FALLS

Office of Building, Planning & Zoning
2582 South Avenue
Wappingers Falls, NY 12590
Phone: (845) 297-5277 Fax: (845) 296-0379
E-mail: bmurphy@wappingersfallsny.gov
www.wappingersfallsny.gov

CONSENT FORM

Name of property owner: Grinnell Public Library

Address of property owner: 2642 East Main St.

City: Wappingers Falls **State:** NY **Zip:** 12590

Phone number of property owner: (Include home, work, mobile number and e-mail address):

(H) 845-297-3428 **(C)** director Kristen Campbell

(W) _____ **(Email)** director@grinnell-library.org

Address of site where work is being conducted: 2642 East Main St. Wappingers Falls, NY

Description of work: Renovation/restoration - front facade of library building

Name of person doing work: Joseph Barone

Address of person doing work: 43 New Paltz Rd,

City: Highland **State:** NY **Zip:** 12528

Phone number of person doing work (Include home, work, mobile numbers and e-mail address):

(H) _____ **(C)** _____

(W) 845-691-2244 **(Email)** joseph.barone@bcgcmgc.com

I, as property owner for the above mentioned property, am aware of all work described above and give my consent to the aforementioned person to do the work.

Beth Devine, Trustee — 8/31/23

Signature of Property Owner — **Date Signed**

Building Committee Chair

617.20
AppendixB
Short Environmental Assessment Form

Instructions for Completing

Part 1 - Project Information. The applicant or project sponsor is responsible for the completion of Part 1. 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.

Complete all items in Part 1. You may also provide any additional information which you believe will be needed by or useful to the lead agency; attach additional pages as necessary to supplement any item.

Part 1 - Project and Sponsor Information

Renovation/Restoration of front (South) of Library
Name of Action or Project:

2642 East Main St., Wappingers Falls NY 12590
Project Location (describe, and attach a location map):

Brief Description of Proposed Action:
Renovation/Restoration of front facade
- Reshingle
- Scrape & Paint
- Replace existing windows - see renderings

replace replica of existing sign

Name of Applicant or Sponsor:	Telephone:
Grinnell Public Library	E-Mail:

Address: 2642 East Main St.

City/PO: Wappingers Falls State: NY Zip Code: 12590

	NO	YES
1. Does the proposed action only involve the legislative adoption of a plan, local law, ordinance, administrative rule, or regulation? If Yes, attach a narrative description of the intent of the proposed action and the environmental resources that may be affected in the municipality and proceed to Part 2. If no, continue to question 2.	X	
2. Does the proposed action require a permit, approval or funding from any other governmental Agency? If Yes, list agency(s) name and permit or approval:	X	

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

NA

4. Check all land uses that occur on, adjoining and near the proposed action.

Urban Rural (non-agriculture) Industrial (Commercial) Residential (suburban)

Forest Agriculture Parkland Aquatic Other (specify): _____

	NO	YES	NIA
5. Is the proposed action, a. A permitted use under the zoning regulations?		✓	
b. Consistent with the adopted comprehensive plan?		✓	
6. Is the proposed action consistent with the predominant character of the existing built or natural landscape?		✓	
7. Is the site of the proposed action located in, or does it adjoin, a state listed Critical Environmental Area? If Yes, identify: _____	✓		
8. a. Will the proposed action result in a substantial increase in traffic above present levels?	✓		
b. Are public transportation service(s) available at or near the site of the proposed action?		✓	
c. Are any pedestrian accommodations or bicycle routes available on or near site of the proposed action?		✓	
9. Does the proposed action meet or exceed the state energy code requirements? If the proposed action will exceed requirements, describe design features and technologies: _____		✓	
10. Will the proposed action connect to an existing public/private water supply? If No, describe method for providing potable water: _____	✓		
11. Will the proposed action connect to existing wastewater utilities? If No, describe method for providing wastewater treatment: _____	✓		
12. a. Does the site contain a structure that is listed on either the State or National Register of Historic Places? we are listed in the W.F. Historic District. we are not a single listing	✓		
b. Is the proposed action located in an archeological sensitive area?			
13. a. Does any portion of the site of the proposed action, or lands adjoining the proposed action, contain wetlands or other waterbodies regulated by a federal, state or local agency?	✓		
b. Would the proposed action physically alter, or encroach into, any existing wetland or waterbody? If Yes, identify the wetland or waterbody and extent of alterations in square feet or acres:	NO ✓	YES	
14. Identify the typical habitat types that occur on, or are likely to be found on the project site. Check all that apply: Shoreline Forest Agricultural/grassland Early mid-successional Wetland			NA
15. Does the site of the proposed action contain any species of animal, or associated habitats, listed by the State or Federal government as threatened or endangered?	✓		
16. Is the project site located in the 100 year flood plain?	✓		
17. Will the proposed action create storm water discharge, either from point or non-point sources? If Yes, a. Will storm water discharges flow to adjacent properties?	✓		
b. Will storm water discharges be directed to established conveyance systems off and storm drains)? If Yes, briefly describe: _____	✓		

	NO	YES
18. Does the proposed action include construction or other activities that result in the impoundment of water or other liquids (e.g. retention pond, waste lagoon, dam)? If Yes, explain purpose and size:	✓	
19. Has the site of the proposed action or an adjoining property been the location of an active or closed solid waste management facility? If Yes, describe:	✓	
20. Has the site of the proposed action or an adjoining property been the subject ofremediation (ongoing or completed) for hazardous waste? If Yes, describe:	✓	

I AFFIRM THAT THE INFORMATION PROVIDED ABOVE IS TRUE AND ACCURATE TO THE BEST OF MY KNOWLEDGE

Applicant/sponsor name: Beth Devine - Trustee Date: 8/31/23

Signature: Beth Devine

Part 2 - Impact Assessment. The Lead Agency is responsible for the completion of Part 2. Answer all of the following questions in Part 2 using the information contained in Part 1 and other materials submitted by the project sponsor or otherwise available to the reviewer. When answering the questions the reviewer should be guided by the concept "Have my responses been reasonable considering the scale and context of the proposed action?"

	No,or small impact may occur	Moderate to large impact may occur
1. Will the proposed action create a material conflict with an adopted land use plan or zoning regulations?	✓	
2. Will the proposed action result in a change in the use or intensity of use ofland?	✓	
3. Will the proposed action impair the character or quality of the existing community?	✓	
4. Will the proposed action have an impact on the environmental characteristics that caused the establishment of a Critical Environmental Area (CEA)?	✓	
5. Will the proposed action result in an adverse change in the existing level of traffic or affect existing infrastructure for mass transit, biking or walkway?	✓	
6. Will the proposed action cause an increase in the use of energy and it fails to incorporate reasonably available energy conservation or renewable energy opportunities?	✓	
7. Will the proposed action impact existing: a. public / private water supplies?	✓	
b. public / private wastewater treatment utilities?	✓	
8. Will the proposed action impair the character or quality of important historic, archaeological, architectural or aesthetic resources?	✓	
9. Will the proposed action result in an adverse change to natural resources (e.g., wetlands, waterbodies, groundwater, air quality, flora and fauna)?	✓	

	No,or small impact may occur	Moderate to large impact may occur
10. Will the proposed action result in an increase in the potential for erosion, flooding or drainage problems?	✓	
11. Will the proposed action create a hazard to environmental resources or human health?	✓	

Part 3 - Determination of significance. The Lead Agency is responsible for the completion of Part 3. For every question in Part 2 that was answered "moderate to large impact may occur", or if there is a need to explain why a particular element of the proposed action may or will not result in a significant adverse environmental impact, please complete Part 3. Part 3 should, in sufficient detail, identify the impact, including any measures or design elements that have been included by the project sponsor to avoid or reduce impacts. **Part** 3 should also explain how the lead agency determined that the impact may or will not be significant. Each potential impact should be assessed considering its setting, probability of occurring, duration, irreversibility, geographic scope and magnitude. Also consider the potential for short-term, long-term and cumulative impacts.

☐ Check this box if you have determined, based on the information and analysis above, and any supporting documentation, that the proposed action may result in one or more potentially large or significant adverse impacts and an environmental impact statement is required.

☒ Check this box if you have determined, based on the information and analysis above, and any supporting documentation, that the proposed action will not result in any significant adverse environmental impacts.

P2G Architecture
Name of Lead Agency

Date

Nasim Gafur
Print or Type Name of Responsible Officer in Lead Agency

Title of Responsible Officer

Nasim Gafur
Signature of Responsible Officer in Lead Agency

Signature of Preparer (if different from Responsible Officer)

PART "A"
OWNER AFFIDAVIT

State of New York }
County of Dutchess } ss:

Beth Devine being duly sworn, deposes and says:

1. That I/we are the Owner(s) of the within property as described in the foregoing application for Subdivision / Lot Line Change / Site Plan / Land Contour / Aquatic Resource approval(s) and that the statements contained therein are true to the best of my/our knowledge and belief.
2. That I/we hereby authorize Beth Devine, to act as my/our representative in all matters regarding said application(s), and that I/we have the legal right to make or authorize the making of said application.
3. That I/we understand that by submitting this application for Planning Board approval that I/we expressly grant permission to the Planning Board and its authorized representatives to enter upon the property, at all reasonable times, for the purpose of conducting inspections and becoming familiar with site conditions. I/we acknowledge that this grant of permission may only be revoked by the full withdrawal of said application from further Planning Board action.
4. That I/we understand that by submitting this application that I/we shall be responsible for the payment of all application fees, review fees, and inspection fees incurred by the Village related to this application.
5. That I/we understand that I/we, and any of our contractors and representatives shall be jointly and severally liable for all costs incurred, including environmental restoration costs, resulting from non-compliance with the approved application, and with non-compliance with any provision of the Village Code. I/we acknowledge that approval of the plan and commencement of any work related to the approved application shall constitute express permission to the Planning Board, the Building Inspector, the Planning Department, the Zoning Administrator, and any duly authorized representative of the Village of Wappingers Falls, to enter the property for the purposes of inspection for compliance with the approved application and any provision of the Town Code, whether or not any other permits have been applied for or issued for the project. I/we acknowledge that by submitting this application, and by approval of said application, including the commencement of any work related to the approved plan is an express waiver of any objection to authorized Village official(s) entering the property for the purpose of conducting inspections.
6. That I/we understand that the Village of Wappingers Falls Planning Board intends to rely on the foregoing representations in making a determination to issue the requested applications and approvals and that under penalty of perjury I/we declare that I/we have examined this affidavit and that it is true and correct.

Beth Devine
Applicant/Owner

Applicant/Owner

Sworn to before me this 1 day of
September, 2023.

Jennifer E. Thompson
Notary Public

JENNIFER E THOMPSON
STATE OF NEW YORK
NOTARY PUBLIC
Qualified in Dutchess County
01TH6443180
MY COMMISSION EXPIRES 10/31/2026

PART "B"
APPLICANT / AGENT AFFIDAVIT

State of New York }
} ss:
County of Dutchess }

Beth Devine being duly sworn, deposes and says:

1. That I/we are the Beth Devine named in the foregoing application for Planning Board for Subdivision / Lot Line Change / Site Plan / Land Contour / Aquatic Resource approval(s) and that the statements contained therein are true to the best of my/our knowledge and belief.
2. That he/she resides at or conducts business at Grinnell Public Library District in the County of Dutchess and the State of New York.
3. That I/we understand that by submitting this application for Planning Board approval that I/we expressly grant permission to the Planning Board and its authorized representatives to enter upon the property, at all reasonable times, for the purpose of conducting inspections and becoming familiar with site conditions. I/we acknowledge that this grant of permission may only be revoked by the full withdrawal of said application from further Planning Board action. That I/we understand that by submitting this application that I/we shall be responsible for the payment of all application fees, review fees, and inspection fees incurred by the Village related to this application.
4. That I/we understand that I/we, and any of our contractors and representatives shall be jointly and severally liable for all costs incurred, including environmental restoration costs, resulting from non-compliance with the approved application, and with non-compliance with any provision of the Village Code. I/we acknowledge that approval of the plan and commencement of any work related to the approved application shall constitute express permission to the Planning Board, the Building Inspector, the Planning Department, the Zoning Administrator, and any duly authorized representative of the Village of Wappingers Falls, to enter the property for the purposes of inspection for compliance with the approved application and any provision of the Village Code, whether or not any other permits have been applied for or issued for the project. I/we acknowledge that by submitting this application, and by approval of said application, including the commencement of any work related to the approved plan is an express waiver of any objection to authorized Village official(s) entering the property for the purpose of conducting inspections.
5. That I/we understand that the Village of Wappingers Falls Planning Board intends to rely on the foregoing representations in making a determination to issue the requested applications and approvals and that under penalty of perjury I/we declare that I/we has examined this affidavit and that it is true and correct.

Beth Devine
Applicant/Agent

Applicant/Agent

Sworn to before me this 1 day of
September, 2023.

Jennifer E. Thompson
Notary Public

JENNIFER E THOMPSON
STATE OF NEW YORK
NOTARY PUBLIC
Qualified in Dutchess County
01TH6443180
MY COMMISSION EXPIRES 10/31/2026

BENJAMIN MOORE
302 – YOU ARE MY SUNSHINE

BENJAMIN MOORE
CW-255 – PALACE ARMS RED

SHERWIN WILLIAMS
SW2824 – RENWICK GOLDEN OAK

BENJAMIN MOORE
640 – ARBOR COAT SOLID STAIN
COLOR: CSP-390 ESPRESSO BARK

P2G ARCHITECTURE

43 Broad Street, Suite 2
Fishkill, New York 12524
845-592-9330

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WARNING:
IT IS A VIOLATION OF THE LAW FOR ANY PERSON, UNLESS ACTING UNDER THE DIRECTION OF A LICENSED ARCHITECT, TO ALTER AN ITEM IN ANY WAY. IF ANY ITEM BEARING THE SEAL OF AN ARCHITECT IS ALTERED, THE ALTERING ARCHITECT SHALL AFFIX TO THE ITEM HIS/HER SEAL AND THE NOTATION "ALTERED BY" FOLLOWED BY THEIR SIGNATURE AND THE DATE OF SUCH ALTERATION, AND A SPECIFIC DESCRIPTION OF THE ALTERATION. THESE DOCUMENTS ARE NOT-RELEASED FOR CONSTRUCTION UNTIL BOTH THE SEAL AND SIGNATURE OF THE ARCHITECT OF RECORD

OWNER:

GRINNELL PUBLIC LIBRARY

PROJECT NAME:

EXTERIOR REHABILITATION AND WINDOW REPLACEMENT

PROJECT ADDRESS:

2642 EAST MAIN ST
WAPPINGERS FALLS, NY 12590

REVISIONS

NO.	REVISIONS	BY	DATE

DRAWN BY	CHECKED BY
NG	NG

ISSUED DATE:

SEPT. 5, 2023

SHEET NAME

FRONT ELEVATION – COLOR RENDERING

SHEET NO.

R101

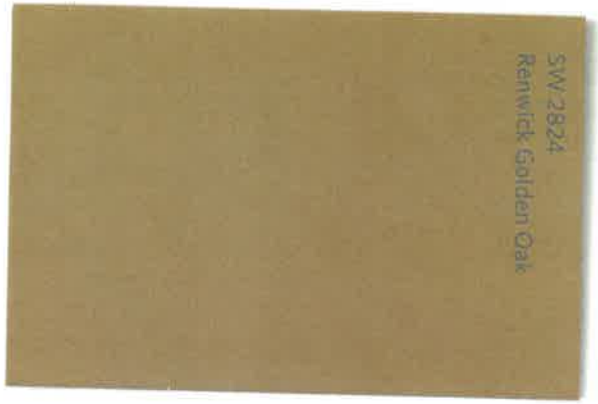
PROJECT NO.

P2G.23.006

9/5/2023 - 3:52 PM - H:\Grinnell\1801.008.Windows and Painting\900\Rendering\Front Rendering.dwg


Espresso Bark
CSP-390
SW 2824
Renwick Golden Oak
CW-255
302


Espresso Bark
CSP-390


SW 2824
Renwick Golden Oak


CW-255

302

VILLAGE OF WAPPINGERS FALLS

BUILDING DEPARTMENT
OFFICE OF CODE ENFORCEMENT
OFFICE OF THE FIRE INSPECTOR
2582 SOUTH AVENUE
WAPPINGERS FALLS, NY 12590
PHONE: (845) 297-5277 FAX: (845) 296-0379
E-mail: bmurphy@wappingersfallsny.gov
www.wappingersfallsny.gov

RECEIVED
SEP 06 2023
By

APPLICATION FOR PLANNING BOARD REVIEW

Submission Date: September 11, 2023 Date of Meeting: October 5, 2023

Meetings are held at the American Legion Hall, 7 Spring Street on the first Thursday of the month at 7:00 p.m.
All information must be completely filled out and returned no later than 15 business days before meeting date.
For the complete list of Planning Meeting Dates and Deadlines go to the Building, Planning and Zoning page on the village website www.wappingersfallsny.gov.
A filing fee is required in connection with any application to the Planning Board for approval.

The Planning Board is responsible for the review and approval of all applications concerning:

- ■ Opening a new business in the Village
- ■ Installing a new sign
- □ Building a new structure in a commercial zone
- □ Subdivision / Site Review/ Lot Line Adjustment

Items to be submitted for review: (Only items pertaining to project)

□ PDF Emailed to Building Dept. and Ten (10) hard copy sets of construction/site/elevation/plans - Engineer drawings showing all areas to be affected. Or a sketch of the proposed floor plan layout (*All sets of plans must be folded)*

□ Legal Documents (Right of Ways/Easements/Lease/Contracts of Sale, etc.)

□ Consent Form *(The applicant must provide consent form, from homeowner authorizing him/her to file for Planning Review)*

□ Application fee

□ Application for proposed sign - Including Renderings/sketch of proposed sign/ Elevation/size/ exact color samples.

(Separate Application)

2582 SOUTH AVENUE
WAPPINGERS FALLS, NY 12590
PHONE: (845) 297-5277 FAX: (845) 296-0379
E-mail: bmurphy@wappingersfallsny.gov
www.wappingersfallsny.gov

APPLICATION FOR PLANNING BOARD REVIEW

All information must be completely filled out and returned no later than the stated submition date.

Date Submitted: September 11, 2023 Date of Meeting : October 5, 2023

Property Identification:

Address: 2653 East Main Street , Wappingers Falls NY 12590

Zoning District: _____ **Existing site area:** _____

Owner Information:

Name : Anita 2653 LLC.

Address : 169 Main Street

City: Beacon **State:** NY **Zip:** 12508

Contact Numbers: (H) 845-765-2281 office **(C)** _____

(E-mail) berishabrothers@optonline.net

Applicant Information:

(Please provide if someone other than the property owner is the applicant)

Name : PEACH PHYSIQUE LLC

Address: 2 BAXTER BLVD., UNIT 209

City: POUGHKEEPSIE **State:** NY **Zip:** 12603

Contact Numbers: (H) 917-686-5601 **(C)** 508-566-0655

E-mail Address: patriciajohn64@icloud.com, jocelyndrew@me.com, alaina.mosny@gmail.com

Lead Design Professional: *(If applicable)*

(Indicate the primary design professional associated with this application)

Name: _____

Title: _____

□ **Architect** **Engineer**

Company: _____

Address: _____

Telephone # : _____

E-mail Address: _____

APPLICATION FOR PLANNING BOARD REVIEW
(Continued)

Proposed Site:

(Property where improvements are proposed)

Existing Use(s): Gift shop

Proposed square footage: 900

Project Description : *(Please print or type)*

(Describe the project in detail indicating all areas of work, type(s) of improvement and materials to be used as a part of the proposed improvements. Use additional sheets if necessary.)

taking down temporary walls adding mirrors

Items to be submitted for review: (Only items pertaining to project)

- ☐ Ten (10) sets of plans.
- ☐ Legal Documents (Right of Ways/Easements/Lease/Contracts of Sale, etc.)
- ☐ Consent Form
- ☐ Application for proposed sign
- ☐ Application Fee
- ☐ Proof that the taxes, utility bills and fines for the property are paid in full.

With the completion of this application, I hereby state that the information provided and all Accompanying documentation is accurate to the best of my knowledge, and that the attached plans contain all information required by the appropriate checklist.

Signature of Applicant Signed Peach Physique LLC

9/11/2023
Date

Office use only:

[ ] FEE :_____ **Receipt No. :**_____ **Cash / Check #**_____ **Date:** _____

Revised by : _____ **Revision date :** _____

Zoning Administrator/Code Enforcement Officer

VILLAGE OF WAPPINGERS FALLS

Office of Building, Planning & Zoning
2582 South Avenue
Wappingers Falls, NY 12590
Phone: (845) 297-5277 Fax: (845) 296-0379
E-mail: bmurphy@wappingersfallsny.gov
www.wappingersfallsny.gov

CONSENT FORM

Name of property owner: Anita 2653 LLC - Gjafer Berisha

Address of property owner: 169 Main Street

City: Beacon **State:** NY **Zip:** 12508

Phone number of property owner: (Include home, work, mobile number and e-mail address):

(H) _____ **(C)** 845-742-3050

(W) 845-765-2281 - Office **(Email)** Berishabrothers@optonline.net

Address of site where work is being conducted: 2653 East Main Street
Wappingers Falls, NY 12590

Description of work: Installing mirrors on the walls and removing non-structural wall

Name of person doing work: Driton Berisha

Address of person doing work: _____

City: _____ **State:** _____ **Zip:** _____

Phone number of person doing work (Include home, work, mobile numbers and e-mail address):

(H) _____ **(C)** 516-853-8343

(W) 516-853-8343 **(Email)** _____

I, as property owner for the above mentioned property, am aware of all work described above and give my consent to the aforementioned person to do the work.

_____
Signature of Property Owner

09-11-23
Date Signed

617.20
AppendixB
Short Environmental Assessment Form

Instructions for Completing

Part 1 - Project Information. The applicant or project sponsor is responsible for the completion of Part 1. 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.

Complete all items in Part 1. You may also provide any additional information which you believe will be needed by or useful to the lead agency; attach additional pages as necessary to supplement any item.

Part 1 - Project and Sponsor Information

Peach Physique LLC

Name of Action or Project: barre/pilates fitness studio

Project Location (describe, and attach a location map):

Brief Description of Proposed Action:
- Remove temporary walls
- install mirrors/barres

Name of Applicant or Sponsor: Peach Physique LLC

Telephone: 917-686-5601

E-Mail: patriciawhitcas@gmail.com

Address: 2 Baxter Blvd. #209

City/PO: Poughkeepsie State: NY Zip Code: 12603

	NO	YES
1. Does the proposed action only involve the legislative adoption of a plan, local law, ordinance, administrative rule, or regulation? If Yes, attach a narrative description of the intent of the proposed action and the environmental resources that may be affected in the municipality and proceed to Part 2. If no, continue to question 2.	X	
2. Does the proposed action require a permit, approval or funding from any other governmental Agency? If Yes, list agency(s) name and permit or approval:	X	

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

?

4 . Check all land uses that occur on, adjoining and near the proposed action.

Urban Rural (non-agriculture) Industrial Commercial Residential (suburban)

Forest Agriculture Parkland Aquatic Other (specify): _____

	NO	YES	N/A
5. Is the proposed action, a. A permitted use under the zoning regulations?			
b. Consistent with the adopted comprehensive plan?			
6. Is the proposed action consistent with the predominant character of the existing built or natural landscape?		✓	
7. Is the site of the proposed action located in, or does it adjoin, a state listed Critical Environmental Area? If Yes, identify: _____		✓	
8. a. Will the proposed action result in a substantial increase in traffic above present levels?	✓		
b. Are public transportation service(s) available at or near the site of the proposed action?		✓	
c. Are any pedestrian accommodations or bicycle routes available on or near site of the proposed action?		✓	
9. Does the proposed action meet or exceed the state energy code requirements? If the proposed action will exceed requirements, describe design features and technologies: _____		✓	
10. Will the proposed action connect to an existing public/private water supply? If No, describe method for providing potable water: _____		✓	
11. Will the proposed action connect to existing wastewater utilities? If No, describe method for providing wastewater treatment: _____		✓	
12. a. Does the site contain a structure that is listed on either the State or National Register of Historic Places?	✓		
b. Is the proposed action located in an archeological sensitive area?	✓		
13. a. Does any portion of the site of the proposed action, or lands adjoining the proposed action, contain wetlands or other waterbodies regulated by a federal, state or local agency?	✓		
	NO	YES	
b. Would the proposed action physically alter, or encroach into, any existing wetland or waterbody? If Yes, identify the wetland or waterbody and extent of alterations in square feet or acres:	✓		
14. Identify the typical habitat types that occur on, or are likely to be found on the project site. Check all that apply: Shoreline Forest Agricultural/grassland Early mid-successional Wetland			
15. Does the site of the proposed action contain any species of animal, or associated habitats, listed by the State or Federal government as threatened or endangered?	✓		
16. Is the project site located in the 100 year flood plain?	✓		
17. Will the proposed action create storm water discharge, either from point or non-point sources? If Yes,	✓		
a. Will storm water discharges flow to adjacent properties?	✓		
b. Will storm water discharges be directed to established conveyance systems off and storm drains)? If Yes, briefly describe: _____		✓	

	NO	YES
18. Does the proposed action include construction or other activities that result in the impoundment of water or other liquids (e.g. retention pond, waste lagoon, dam)? If Yes, explain purpose and size:		✓
19. Has the site of the proposed action or an adjoining property been the location of an active or closed solid waste management facility? If Yes, describe:		✓
20. Has the site of the proposed action or an adjoining property been the subject ofremediation (ongoing or completed) for hazardous waste? If Yes, describe:		✓

I AFFIRM THAT THE INFORMATION PROVIDED ABOVE IS TRUE AND ACCURATE TO THE BEST OF MY KNOWLEDGE

Applicant/sponsor name: Peach Physique, LLC Date: 9/12/2023

Signature:

Part 2 - Impact Assessment. The Lead Agency is responsible for the completion of Part 2. Answer all of the following questions in Part 2 using the information contained in Part 1 and other materials submitted by the project sponsor or otherwise available to the reviewer. When answering the questions the reviewer should be guided by the concept "Have my responses been reasonable considering the scale and context of the proposed action?"

	No,or small impact may occur	Moderate to large impact may occur
1. Will the proposed action create a material conflict with an adopted land use plan or zoning regulations?	✓	
2. Will the proposed action result in a change in the use or intensity of use ofland?	✓	
3. Will the proposed action impair the character or quality of the existing community?	✓	
4. Will the proposed action have an impact on the environmental characteristics that caused the establishment of a Critical Environmental Area (CEA)?	✓	
5. Will the proposed action result in an adverse change in the existing level of traffic or affect existing infrastructure for mass transit, biking or walkway?	✓	
6. Will the proposed action cause an increase in the use of energy and it fails to incorporate reasonably available energy conservation or renewable energy opportunities?	✓	
7. Will the proposed action impact existing: a. public / private water supplies?	✓	
b. public / private wastewater treatment utilities?	✓	
8. Will the proposed action impair the character or quality of important historic, archaeological, architectural or aesthetic resources?	✓	
9. Will the proposed action result in an adverse change to natural resources (e.g., wetlands, waterbodies, groundwater, air quality, flora and fauna)?	✓	

	No,or small impact may occur	Moderate to large impact may occur
10. Will the proposed action result in an increase in the potential for erosion, flooding or drainage problems?	✓	
11. Will the proposed action create a hazard to environmental resources or human health?	✓	

Part 3 - Determination of significance. The Lead Agency is responsible for the completion of Part 3. For every question in Part 2 that was answered "moderate to large impact may occur", or if there is a need to explain why a particular element of the proposed action may or will not result in a significant adverse environmental impact, please complete Part 3. Part 3 should, in sufficient detail, identify the impact, including any measures or design elements that have been included by the project sponsor to avoid or reduce impacts. **Part** 3 should also explain how the lead agency determined that the impact may or will not be significant. Each potential impact should be assessed considering its setting, probability of occurring, duration, irreversibility, geographic scope and magnitude. Also consider the potential for short-term, long-term and cumulative impacts.

☐ Check this box if you have determined, based on the information and analysis above, and any supporting documentation, that the proposed action may result in one or more potentially large or significant adverse impacts and an environmental impact statement is required.

☐ Check this box if you have determined, based on the information and analysis above, and any supporting documentation, that the proposed action will not result in any significant adverse environmental impacts.

Name of Lead Agency	Date
Print or Type Name of Responsible Officer in Lead Agency	Title of Responsible Officer
Signature of Responsible Officer in Lead Agency	Signature of Preparer (if different from Responsible Officer)

PART "A"
OWNER AFFIDAVIT

State of NY }
County of Dutchess } ss:
}

Peach Physique LLC being duly sworn, deposes and says:

1. That I/we are the Owner(s) of the within property as described in the foregoing application for Subdivision / Lot Line Change / Site Plan / Land Contour / Aquatic Resource approval(s) and that the statements contained therein are true to the best of my/our knowledge and belief.
2. That I/we hereby authorize Peach Physique LLC, to act as my/our representative in all matters regarding said application(s), and that I/we have the legal right to make or authorize the making of said application.
3. That I/we understand that by submitting this application for Planning Board approval that I/we expressly grant permission to the Planning Board and its authorized representatives to enter upon the property, at all reasonable times, for the purpose of conducting inspections and becoming familiar with site conditions. I/we acknowledge that this grant of permission may only be revoked by the full withdrawal of said application from further Planning Board action.
4. That I/we understand that by submitting this application that I/we shall be responsible for the payment of all application fees, review fees, and inspection fees incurred by the Village related to this application.
5. That I/we understand that I/we, and any of our contractors and representatives shall be jointly and severally liable for all costs incurred, including environmental restoration costs, resulting from non-compliance with the approved application, and with non-compliance with any provision of the Village Code. I/we acknowledge that approval of the plan and commencement of any work related to the approved application shall constitute express permission to the Planning Board, the Building Inspector, the Planning Department, the Zoning Administrator, and any duly authorized representative of the Village of Wappingers Falls, to enter the property for the purposes of inspection for compliance with the approved application and any provision of the Town Code, whether or not any other permits have been applied for or issued for the project. I/we acknowledge that by submitting this application, and by approval of said application, including the commencement of any work related to the approved plan is an express waiver of any objection to authorized Village official(s) entering the property for the purpose of conducting inspections.
6. That I/we understand that the Village of Wappingers Falls Planning Board intends to rely on the foregoing representations in making a determination to issue the requested applications and approvals and that under penalty of perjury I/we declare that I/we have examined this affidavit and that it is true and correct.

Peach Physique LLC
Applicant/Owner

Applicant/Owner

Sworn to before me this 12 day of
September, 2023

Notary Public

JOHN M. KARGE NO. 01KA6081945
NOTARY PUBLIC, STATE OF NEW YORK
QUALIFIED IN DUTCHESS COUNTY
COMMISSION EXPIRES 10-15 2026

PART "B"
APPLICANT / AGENT AFFIDAVIT

State of NY }
County of Dutchess } ss:
}

Peach Physique, LLC being duly sworn, deposes and says:

1. That I/we are the applicant / Patricia Whitcas named in the foregoing application for Planning Board for Subdivision / Lot Line Change / Site Plan / Land Contour / Aquatic Resource approval(s) and that the statements contained therein are true to the best of my/our knowledge and belief.

2. That he/she resides at or conducts business at 2653 East Main St. in the County of Dutchess and the State of New York.

3. That I/we understand that by submitting this application for Planning Board approval that I/we expressly grant permission to the Planning Board and its authorized representatives to enter upon the property, at all reasonable times, for the purpose of conducting inspections and becoming familiar with site conditions. I/we acknowledge that this grant of permission may only be revoked by the full withdrawal of said application from further Planning Board action. That I/we understand that by submitting this application that I/we shall be responsible for the payment of all application fees, review fees, and inspection fees incurred by the Village related to this application.

4. That I/we understand that I/we, and any of our contractors and representatives shall be jointly and severally liable for all costs incurred, including environmental restoration costs, resulting from non-compliance with the approved application, and with non-compliance with any provision of the Village Code. I/we acknowledge that approval of the plan and commencement of any work related to the approved application shall constitute express permission to the Planning Board, the Building Inspector, the Planning Department, the Zoning Administrator, and any duly authorized representative of the Village of Wappingers Falls, to enter the property for the purposes of inspection for compliance with the approved application and any provision of the Village Code, whether or not any other permits have been applied for or issued for the project. I/we acknowledge that by submitting this application, and by approval of said application, including the commencement of any work related to the approved plan is an express waiver of any objection to authorized Village official(s) entering the property for the purpose of conducting inspections.

5. That I/we understand that the Village of Wappingers Falls Planning Board intends to rely on the foregoing representations in making a determination to issue the requested applications and approvals and that under penalty of perjury I/we declare that I/we has examined this affidavit and that it is true and correct.

Peach Physique, LLC
Applicant/Agent

Applicant/Agent

Sworn to before me this 12 day of September, 2023

Notary Public

JOHN M. KARGE NO. 01KA6081945
NOTARY PUBLIC, STATE OF NEW YORK
QUALIFIED IN DUTCHESS COUNTY
COMMISSION EXPIRES 10-15 2026