MARK W. BLANCHARD
PARTNER

KRISTEN K. WILSON
PARTNER
*Also admitted in CT

BLANCHARD & WILSON LLP

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P (914) 461-0280 F (914) 461-2369
BlanchardWilson.com

ALAN H. ROTHSCHILD
OF COUNSEL

DENNIS E.A. LYNCH
OF COUNSEL

May 6, 2022

Village of Hastings on Hudson Planning Board
Village Hall
7 Maple Avenue
Hastings on Hudson, New York 10706
c/o: Mr. Charles Minozzi, Jr., Building Inspector

Re: 1 Warburton Avenue, Hastings on Hudson, New York

Dear Chairman O'Reilly and members of the Planning Board:

In supplement to the submission for a zoning text amendment and site plan approval for the above referenced property, enclosed herein please find the Rock Slope Feasibility Study prepared by SESI Consulting Engineers. While the report sets forth extensive detail, it is worth noting that the rock-removal plan is a **no-blasting** plan.

Thank you for your attention to this matter and the Applicant's team is looking forward to presenting to this Board on May 19th. Should you have any questions or concerns prior to the meeting, please do not hesitate to contact the undersigned at mblanchard@blanchardwilson.com or by phone at (914) 582-7809.

Sincerely,

Mark W. Blanchard

cc: Linda B. Whitehead, Esq., Village Attorney (*via electronic delivery*)
Mr. Patrick Cleary, AICP, President, Cleary Consulting (*via electronic delivery*) Encl.

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May 5, 2022

Village of Hastings on Hudson Planning Board
Village Hall
7 Maple Avenue
Hastings on Hudson, New York 10706
c/o: Mr. Charles Minozzi, Jr., Building Inspector

Re: 1 Warburton Avenue, Hastings on Hudson, New York

Dear Chairman O'Reilly and members of the Planning Board:

The applicant for the above referenced property ("Applicant") is pleased to submit seven (7) copies of the enclosed supplemental materials in support of its petition for a zoning map amendment and application for site plan approval (petition and application collectively referred to as ("Application") relating to the property known as 1 Warburton Avenue, Section 4.160, Blocks: 166, 167 and Lots: 1,3,4 and 7[1] (collectively referred to as "Property").

The Applicant submits a 16-page revised set of engineering, architectural and landscape drawing setting forth the following:

- Sheet C-1 Updated existing Condition Plan,
- Sheet C-2 Updated Grading Plan,
- Sheet C-3 Updated Stormwater Management Plan,
- Sheet C-4 Updated Sediment and Erosion Control Plan,
- Sheet C-5 Updated Utilities Plan,
- Sheet C-6 Steep Slope Analysis,
- Sheets C-7 and C-8 Utility Plan Details,
- Sheet SK-2 Updated Architectural Townhouse Site Plan,
- Sheet SK-2.1 Photographic View-shed from the Olde Croton Aqueduct Park
- Sheet SK-3 Updated Landscape Development Plan
- Sheet SK-4.1 Updated Front and Rear Elevation Plan,

[1] The full assemblage relating to this petition and redevelopment project includes a parcel located in the Coty of Yonkers with an address at 1205 Warburton Avenue.

- Sheet SK-5 Updated Visual Impact Analysis Plan showing cut-away view along-with corresponding Photographic Perspective,
- Sheet SK-6 Full Planting Plan,
- Sheet SK-7 Lighting Plan and lighting schedule.

In addition, the Applicant is submitting a narrative steep- slope analysis dated May 4, 2022 and signed by Michael F. Stein, P.E., President of Hudson Engineering and Consulting, P.C., as well as Storm water Pollution Prevention Plan and Drainage Analysis dated May 4, 2022 and prepared by Hudson Engineering and Consulting, P.C..

Furthermore, prior to the May 19th meeting the Applicant will be submitting an updated rock-removal plan that will show a **no-blasting** process as well as traffic analysis that will demonstrate a marked reduction in traffic impacts relating to the proposed use at the Property that is the subject of this Application.

Thank you for your attention to this matter and the Applicant's team is looking forward to presenting to this Board on May 19th. Should you have any questions or concerns prior to the meeting, please do not hesitate to contact the undersigned at mblanchard@blanchardwilson.com or by phone at (914) 582-7809.

Sincerely,

Mark W. Blanchard

cc: Linda B. Whitehead, Esq., Village Attorney (*via electronic delivery*)
Mr. Patrick Cleary, AICP, President, Cleary Consulting (*via electronic delivery*)

Encl.

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HUDSON
ENGINEERING
&
CONSULTING, P.C.

May 4, 2022

Chairperson William O'Reilly and Members of the Board
Hastings-on Hudson Planning Board
7 Maple Avenue,
Hastings-On-Hudson, NY 10706

Re: Application for Steep Slope
1 Warburton Avenue
Village of Hastings-On-Hudson

Dear Chairperson O'Reilly and Members of the Planning Board,

Regarding the above referenced project, this letter seeks to provide information on the proposed residential development on parcels totaling approximately 2.67 acres. The development area is located on both the east and west side of Warburton Avenue and is directly adjacent to the City of Yonkers/Village of Hastings-on-Hudson municipal boundary.

The referenced property is located approximately 160 feet west of the Hudson River and approximately 80 feet from the associated flood plain.

This letter has been prepared in accordance with the requirements of Section 249-7 of the Village of Hastings-on-Hudson Code.

SITE COVERAGE

The site topography has been analyzed by our office. A slope analysis breakdown is provided on sheet C-1 detailing the breakdown of slope categories on the site as follows: areas sloped between 0% to 15% (63,329 square feet), 15% to 25% (16,498 square feet), and greater than 25% (54,253 square feet).

The code allows for a maximum disturbance of 100% of the slopes within 0% to 15% (63,329 square feet), maximum 35% disturbance of the slopes within 15% to 25% (5,774 square feet), and maximum 25% disturbance of the slopes greater than 25% (13,563 square feet).

DESIGN APPROACH

Slopes exceeding 15% encompass the majority of the site; Therefore, there are very limited options for positioning the development to avoid steeply sloped areas. Care has been taken by the design team to propose site improvements that will be stable, minimize erosion and sedimentation, control on-site stormwater runoff, and protect adjacent properties.

45 Knollwood Road –Suite 201 - Elmsford, NY 10523 (914) 909-0420 Fax (914) 560-2086

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The building foundations have been sited/designed to minimize rock removal and regrading on steep slopes areas.

A stormwater management plan & drainage analysis has been prepared by our office in Accordance with NYSDEC and the Village of Hastings-on-Hudson guidelines. The development proposes to utilize green roof technology to offset the environmental impact of the development and reduce the impervious coverage of the site by 32%. Additionally, any excess runoff from the building, as well as the runoff from the driveway on the east side of Warburton Avenue will be collected and conveyed to a hydrodynamic separator to provide further water quality treatment.

All proposed grading is designed to blend in with the existing grading on adjacent properties while providing positive drainage. No changes in topography on adjacent and nearby properties is proposed or required. The project utilizes various retaining walls as well as vertical rock cuts to minimize the necessary disturbance of steep slopes to achieve the intended improvements.

ENGINEER'S STATEMENT

Section 249-7 in Chapter 249 requires that the Civil Engineer for the project sign and seal the following statement, which is hereby made for the 1 Warburton Avenue Steep Slopes Application:

The proposed activity will disturb the slope to the minimum extent possible; and

The proposed mitigation measure will prevent, to the maximum extent practical, the adverse effect of any disturbance of the steep slope area on the environment and any neighboring properties.

We look forward to working with the Board for the successful completion and development of this application.

Thank you,

Michael F. Stein, P.E.
President

45 Knollwood Road –Suite 201 - Elmsford, NY 10523 (914) 909-0420 Fax (914) 560-2086

PROPOSED RESIDENCES
AT
1 WARBURTON AVENUE

HASTINGS-ON-HUDSON, NY 10706

MARCH 23, 2022

REVISED MAY 4, 2022

INDEX OF DRAWINGS

Sheet No.	Sheet Title	Last Revised Date
Prepared by Hudson Engineering & Consulting, P.C.		
COVER	Cover Sheet	5/4/2022
C-1	Existing Conditions	5/4/2022
C-2	Grading Plan	5/4/2022
C-3	Stormwater Management Plan	5/4/2022
C-4	Sediment & Erosion Control Plan	5/4/2022
C-5	Utilites Plan	5/4/2022
C-6	Steep Slope Analysis	5/4/2022
C-7	Details	5/4/2022
C-8	Details	5/4/2022

GRAPHIC SCALE

80 0 40 80 160 320

(IN FEET)
1 inch = 80 ft.

No.	Revision	Date
1.	REVISED PER VILLAGE STAFF COMMENTS	5-4-22

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PROJECT:
PROPOSED RESIDENCES
AT
1 WARBURTON AVENUE
VILLAGE OF HASTINGS–ON–HUDSON
WESTCHESTER COUNTY – NEW YORK

COVER SHEET

STATE OF NEW YORK · MICHAEL F. SCHIAVONE · No. 80657 · LICENSED PROFESSIONAL ENGINEER

HEC
HUDSON ENGINEERING & CONSULTING, P.C.
45 Knollwood Road – Suite 201
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Date: 03/23/22
Scale: 1" = 80'
Designed By: T.K.
Checked By: M.S.
Sheet: 1 of 6
Sheet No.
COVER

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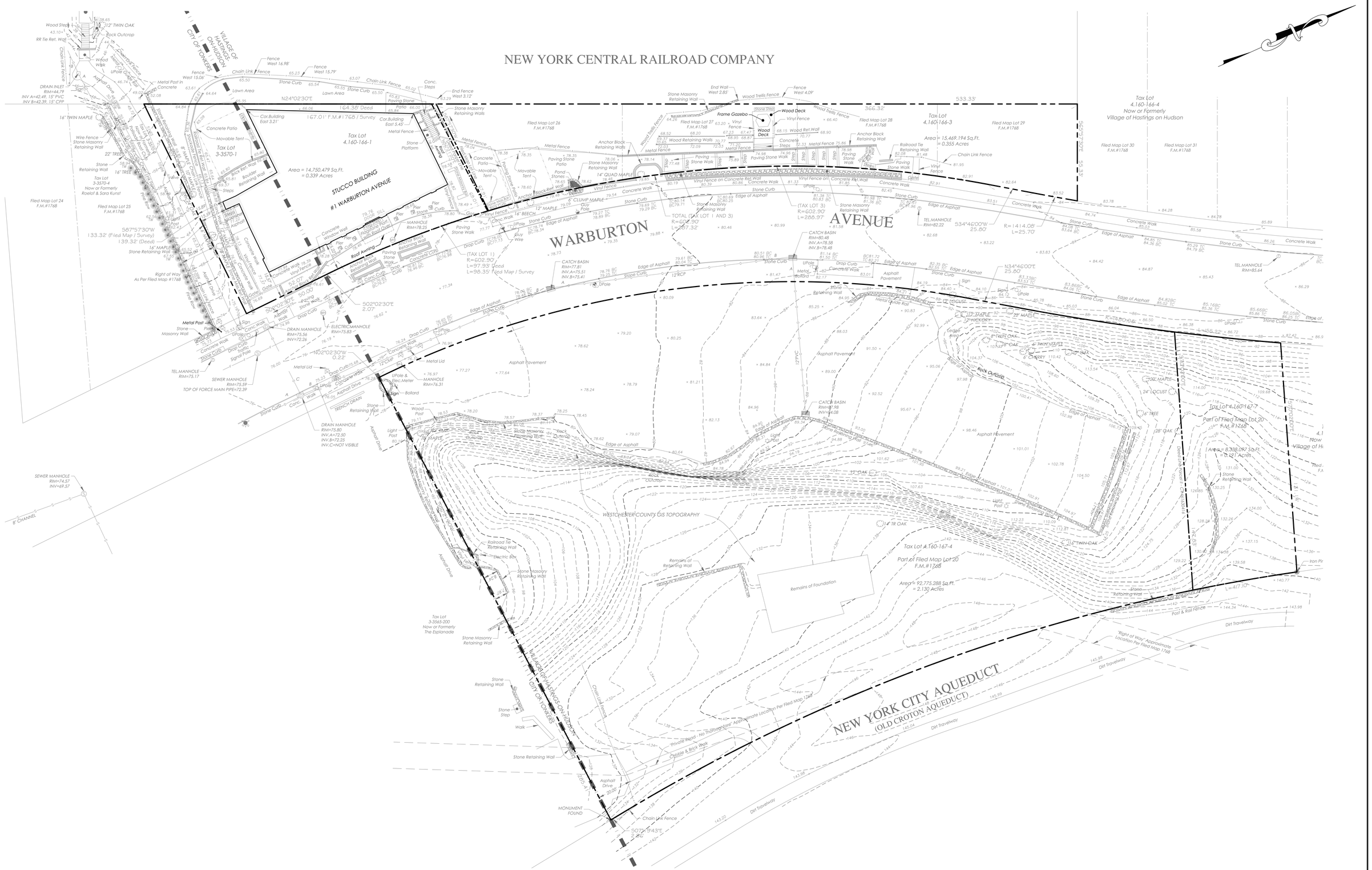
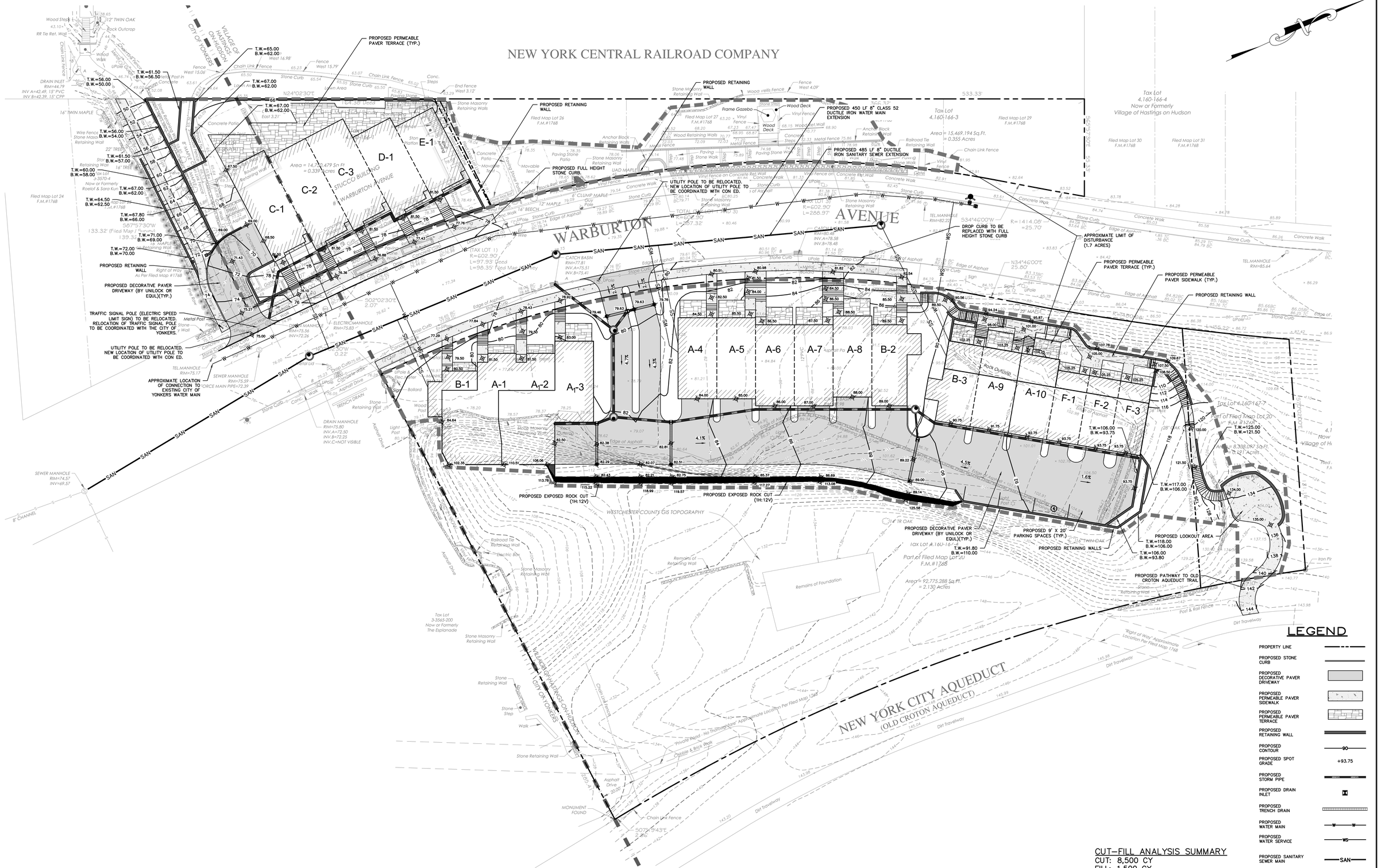

NEW YORK CENTRAL RAILROAD COMPANY
WARBURTON AVENUE
Tax Lot 3-3570-1
Area = 14,750.479 Sq.Ft. = 0.339 Acres
STUCCO BUILDING
#1 WARBURTON AVENUE
Tax Lot 4.160-166-1
Tax Lot 4.160-166-3
Area = 15,469.194 Sq.Ft. = 0.355 Acres
Tax Lot 4.160-166-4 Now or Formerly Village of Hastings on Hudson
Tax Lot 4.160-167-7
Part of Filed Map Lot 20 F.M.#1768
Area = 8,338.097 Sq.Ft. = 0.191 Acres
Tax Lot 4.160-167-4
Part of Filed Map Lot 20 F.M.#1768
Area = 92,775.288 Sq.Ft. = 2.130 Acres
Tax Lot 3-3565-200 Now or Formerly The Esplanade
Tax Lot 3-3570-4 Now or Formerly Roelof & Sara Kunst
VILLAGE OF HASTINGS-ON-HUDSON
CITY OF YONKERS
NEW YORK CITY AQUEDUCT
(OLD CROTON AQUEDUCT)
Remains of Foundation
Remains of Retaining Wall
WESTCHESTER COUNTY GIS TOPOGRAPHY
Dirt Travelway
Post & Rail Fence
"Right of Way" Approximate Location Per Filed Map 1768
"Private Road - No Through Use" Approximate Location Per Filed Map 1768
Cobble & Brick Walk
Chain Link Fence
MONUMENT FOUND
Asphalt Drive
Stone Retaining Wall
Stone Masonry Retaining Wall
Frame Gazebo
Wood Deck
Tennis Court
Pool
Pool Equipment Cabinet
Pool Equipment Cover
Pool Fence
Pool Gate
Pool Deck
Stone Masonry Retaining Walls
Paving Stone Walk
Concrete Walk
Edge of Asphalt
Stone Curb
Asphalt Pavement
Rock Outcrop
Metal Fence
Chain Link Fence
Wood Trellis Fence
Vinyl Fence
Wire Fence
Stone Masonry Retaining Wall
Railroad Tie Retaining Wall
Anchor Block Retaining Walls
Roof Awning
Concrete Window Wall
Vinyl Fence on Concrete Ret.Wall
Stone Masonry Retaining Wall
Concrete Ret.Wall
Concrete Patio
Movable Tent
Pond Stones
Paving Stone Patio
Stone Masonry Retaining Walls
Wood Retaining Walls
Wood Ret.Wall
Concrete Steps
Stone Steps
Wood Steps
Gate
Sign
Bollard
Light Post
Guy Pole
Utility Pole
Electric Box
Electric Meter
Metal Post
Metal Lid
Metal Post in Concrete
Trench Drain
Drain Inlet
Drain Manhole
Electric Manhole
Sewer Manhole
Manhole
Catch Basin
Tel.Manhole
Signal Pole
Pier
Curb
Walk
Step
Steps
Gate
Fence West 16.98'
Fence West 15.79'
Fence West 15.06'
Fence West 4.09'
End Fence West 3.12'
End Wall West 2.85'
Conc. Steps
Car.Building East 3.21'
Car.Building East 5.43'
Stone Platform
Paving Stone Patio
Lawn Area
Stone Curb
Drop Curb
Concrete Curb
Conc. Walk
Edge of Asphalt
Asphalt Drive
Asphalt Pavement
Rock Outcrop
Stone Retaining Wall
Stone Masonry Retaining Wall
Stone Step
Walk
Stone Retaining Wall
Post & Rail Fence
Dirt Travelway
Chain Link Fence
Asphalt Drive
Stone Retaining Wall
Stone Step
Walk
Stone Retaining Wall
Asphalt Drive
Chain Link Fence
Dirt Travelway
Dirt Travelway
Dirt Travelway
Iron Pin
Stone Retaining Wall
Stone Retaining Wall
Stone Retaining Wall
Stone Retaining Wall
Stone Retaining Wall
Railroad Tie Retaining Wall
Electric Box
Stone Masonry Retaining Wall
Stone Masonry Retaining Wall
Stone Masonry Retaining Wall



LEGEND

PROPERTY LINE	
PROPOSED STONE CURB	
PROPOSED DECORATIVE PAVER DRIVEWAY	
PROPOSED PERMEABLE PAVER SIDEWALK	
PROPOSED PERMEABLE PAVER TERRACE	
PROPOSED RETAINING WALL	
PROPOSED CONTOUR	90
PROPOSED SPOT GRADE	+93.75
PROPOSED STORM PIPE	
PROPOSED DRAIN INLET	
PROPOSED TRENCH DRAIN	
PROPOSED WATER MAIN	W W
PROPOSED WATER SERVICE	WS
PROPOSED SANITARY SEWER MAIN	SAN
PROPOSED SANITARY SEWER SERVICE	SS

CUT–FILL ANALYSIS SUMMARY

CUT: 8,500 CY
FILL: 1,500 CY
NET: 7,000 CY <CUT>

EXISTING INFORMATION SHOWN HEREON PROVIDED BY TC MERRITTS LAND SURVEYORS DATED MARCH 18, 2022

GRAPHIC SCALE

20 0 10 20 40 80

(IN FEET)
1 inch = 20 ft.

No.	Revision	Date	By
1	REVISED PER VILLAGE STAFF COMMENTS	5-4-22	SVW

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PROJECT:

PROPOSED RESIDENCES AT 1 WARBURTON AVENUE VILLAGE OF HASTINGS–ON–HUDSON WESTCHESTER COUNTY – NEW YORK

GRADING PLAN

STATE OF NEW YORK · MICHAEL F. SIMON · No. 60857 · LICENSED PROFESSIONAL ENGINEER

HEC

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Date:	03/23/22
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Designed By:	T.K.
Checked By:	M.S.
Sheet:	3 of 9
Sheet No.	C-2

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PROJECT:

PROPOSED RESIDENCES
AT
1 WARBURTON AVENUE
VILLAGE OF HASTINGS-ON-HUDSON
WESTCHESTER COUNTY – NEW YORK

STORMWATER MANAGEMENT PLAN

STATE OF NEW YORK · MICHAEL F. SHAW · No. 60857 · LICENSED PROFESSIONAL ENGINEER

HEC

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Sheet No. C-3

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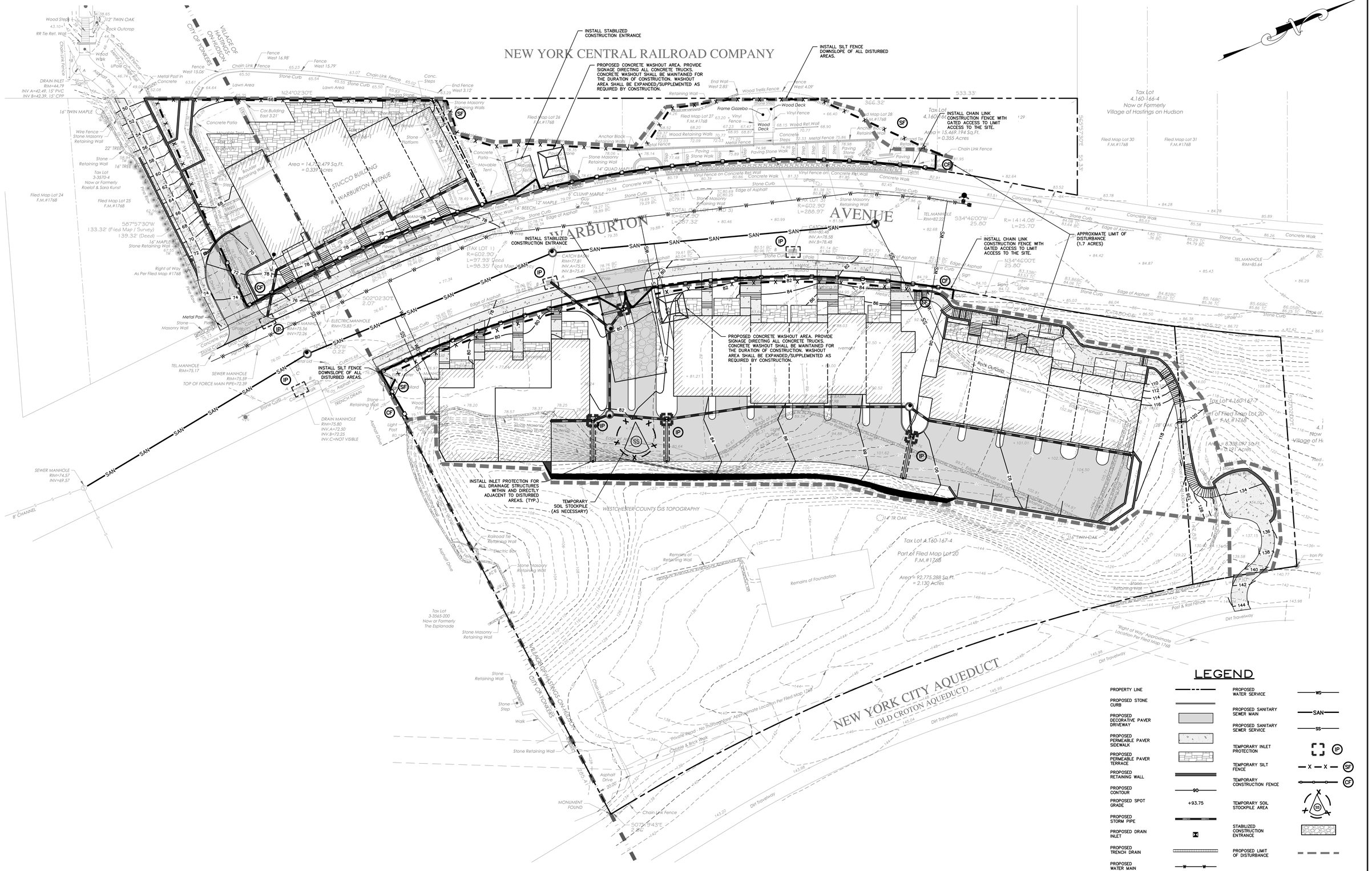
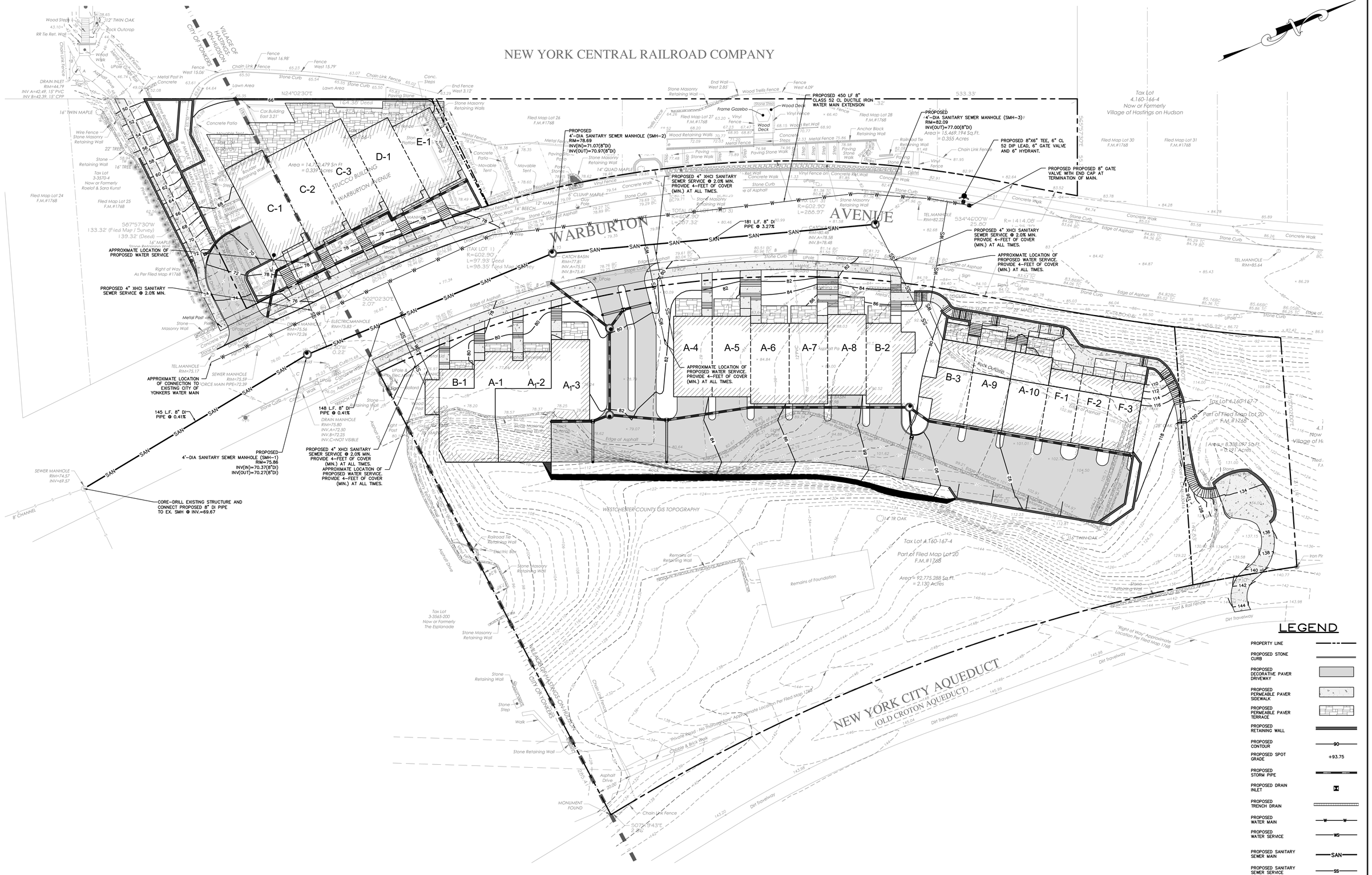

NEW YORK CENTRAL RAILROAD COMPANY
INSTALL STABILIZED CONSTRUCTION ENTRANCE
PROPOSED CONCRETE WASHOUT AREA. PROVIDE SIGNAGE DIRECTING ALL CONCRETE TRUCKS. CONCRETE WASHOUT SHALL BE MAINTAINED FOR THE DURATION OF CONSTRUCTION. WASHOUT AREA SHALL BE EXPANDED/SUPPLEMENTED AS REQUIRED BY CONSTRUCTION.
INSTALL SILT FENCE DOWNSLOPE OF ALL DISTURBED AREAS.
INSTALL CHAIN LINK CONSTRUCTION FENCE WITH GATED ACCESS TO LIMIT ACCESS TO THE SITE.
Area = 15,469.194 Sq.Ft. = 0.355 Acres
Area = 14,722.479 Sq.Ft. = 0.338 Acres
STUCCO BUILDING
WARBURTON AVENUE
APPROXIMATE LIMIT OF DISTURBANCE (1.7 ACRES)
INSTALL SILT FENCE DOWNSLOPE OF ALL DISTURBED AREAS.
INSTALL INLET PROTECTION FOR ALL DRAINAGE STRUCTURES WITHIN AND DIRECTLY ADJACENT TO DISTURBED AREAS. (TYP.)
TEMPORARY SOIL STOCKPILE (AS NECESSARY)
WESTCHESTER COUNTY GIS TOPOGRAPHY
Tax Lot 4.160-166-4 Now or Formerly Village of Hastings on Hudson
Tax Lot 4.160-167-7 Part of Filed Map Lot 20 F.M.#1768
Area = 8,338.097 Sq.Ft. = 0.191 Acres
Tax Lot 4.160-167-4 Part of Filed Map Lot 20 F.M.#1768
Area = 92,775.288 Sq.Ft. = 2.130 Acres
Remains of Foundation
Tax Lot 3-3565-200 Now or Formerly The Esplanade
NEW YORK CITY AQUEDUCT (OLD CROTON AQUEDUCT)
VILLAGE OF HASTINGS-ON-HUDSON
CITY OF YONKERS
MONUMENT FOUND
Dirt Traveway
Post & Rail Fence
Stone Retaining Wall
Chain Link Fence
Wood Deck
Frame Gazebo
Rock Outcrop
Concrete Walk
Stone Curb
Edge of Asphalt
Metal Fence
Vinyl Fence
Paving Stone Walk
Stone Masonry Retaining Walls
Concrete Patio
Movable Tent
Macadam Tennis Court
Filed Map Lot 30 F.M.#1768
Filed Map Lot 31 F.M.#1768
Filed Map Lot 24 F.M.#1768
Filed Map Lot 25 F.M.#1768
Filed Map Lot 26 F.M.#1768
Filed Map Lot 27 F.M.#1768
Filed Map Lot 28 F.M.#1768
Tax Lot 3-3570-4 Now or Formerly Roelof & Sara Kunst
Right of Way As Per Filed Map #1768
"Right of Way" Approximate Location Per Filed Map 1768
"Private Road - No Thoroughfare" Approximate Location Per Filed Map 1768
Chainlink Fence
Asphalt Drive
Walk
Stone Step
Railroad Tie Retaining Wall
Electric Box
Remains of Retaining Wall
Iron Pin
Light Post
Sign
Bollard
Wood Post
Metal Post
Stone Masonry Wall
Wood Step
RR Tie Ret. Wall
Wire Fence Stone Masonry Retaining Wall
Stone Retaining Wall
Boulder Retaining Wall
Wood Retaining Walls
Anchor Block Retaining Walls
Wood Trellis Fence
Chain Link Fence
Fence West 16.98'
Fence West 15.79'
Fence West 15.06'
Fence West 4.09'
End Fence West 3.12'
End Wall West 2.85'
Car.Building East 3.21'
Stone Platform
Conc. Steps
Lawn Area
Stone Curb
Concrete Steps
Metal Fence
Paving Stone Walk
Vinyl Fence on Concrete Ret.Wall
Concrete Ret.Wall
Stone Masonry Retaining Wall
Edge of Asphalt
Concrete Walk
Stone Curb
Drop Curb
Asphalt Drive
Asphalt Fence
Chain Link Fence
Wood Fence
Stone Masonry Retaining Walls
Concrete Walk
Stone Curb
Edge of Asphalt



LEGEND

PROPERTY LINE	
PROPOSED STONE CURB	
PROPOSED DECORATIVE PAVER DRIVEWAY	
PROPOSED PERMEABLE PAVER SIDEWALK	
PROPOSED PERMEABLE PAVER TERRACE	
PROPOSED RETAINING WALL	
PROPOSED CONTOUR	90
PROPOSED SPOT GRADE	+93.75
PROPOSED STORM PIPE	
PROPOSED DRAIN INLET	
PROPOSED TRENCH DRAIN	
PROPOSED WATER MAIN	W W
PROPOSED WATER SERVICE	WS
PROPOSED SANITARY SEWER MAIN	SAN
PROPOSED SANITARY SEWER SERVICE	SS

EXISTING INFORMATION SHOWN HEREON PROVIDED BY TC MERRITTS LAND SURVEYORS DATED MARCH 18, 2022

GRAPHIC SCALE

20 0 10 20 40 80

(IN FEET)
1 inch = 20 ft.

No.	Revision	Date
1.	REVISED PER VILLAGE STAFF COMMENTS	5-4-22

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PROJECT:

PROPOSED RESIDENCES
AT
1 WARBURTON AVENUE
VILLAGE OF HASTINGS-ON-HUDSON
WESTCHESTER COUNTY - NEW YORK

UTILITIES PLAN

STATE OF NEW YORK · MICHAEL F. SINOS · No. 80837 · LICENSED PROFESSIONAL ENGINEER

HEC

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Elmsford, New York 10523
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Designed By:	T.K.
Checked By:	M.S.
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Sheet No.	C-5

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LEGEND

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PROPOSED DECORATIVE PAVER DRIVEWAY	
PROPOSED PERMEABLE PAVER SIDEWALK	
PROPOSED PERMEABLE PAVER TERRACE	
PROPOSED RETAINING WALL	
PROPOSED CONTOUR	90
PROPOSED SPOT GRADE	+93.75
PROPOSED STORM PIPE	
PROPOSED DRAIN INLET	
PROPOSED TRENCH DRAIN	
PROPOSED WATER MAIN	W W
PROPOSED WATER SERVICE	WS
PROPOSED SANITARY SEWER MAIN	SAN
PROPOSED SANITARY SEWER SERVICE	SS

STEEP SLOPE DISTURBANCE

STEEP SLOPE CATEGORY (%)	TOTAL AREA OF EXISTING STEEP SLOPES ON-SITE (S.F.)	ALLOWABLE PERCENT OF DISTRUBANCE PER VILLAGE CODE (%)	ALLOWABLE AREA OF STEEP SLOPE DISTURBANCE (S.F.)	PROPOSED STEEP SLOPE DISTUBANCE		WAIVER REQUESTED	
				S.F.	%	S.F.	%
0-15%	63,329	100%	63,329	48,220	76%	0	0%
15-25%	16,488	35%	5,774	4,454	27%	0	0%
>25%	54,253	25%	13,563	19,237	35%	5,674	10%

EXISTING INFORMATION SHOWN HEREON PROVIDED BY TC MERRITTS LAND SURVEYORS DATED MARCH 18, 2022

GRAPHIC SCALE

20 0 10 20 40 80

(IN FEET)
1 inch = 20 ft.

No.	Revision	Date	By
1	REVISED PER VILLAGE STAFF COMMENTS	5-4-22	SVM

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PROJECT:

PROPOSED RESIDENCES
AT
1 WARBURTON AVENUE
VILLAGE OF HASTINGS-ON-HUDSON
WESTCHESTER COUNTY – NEW YORK

STEEP SLOPE ANALYSIS

STATE OF NEW YORK · MICHAEL F. SIMON · No. 60857 · LICENSED PROFESSIONAL ENGINEER

HEC
HUDSON ENGINEERING & CONSULTING, P.C.
45 Knollwood Road – Suite 201
Elmsford, New York 10523
T: 914-909-0420
F: 914-560-2086
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Date: 03/23/22
Scale: 1" = 20'
Designed By: T.K.
Checked By: M.S.
Sheet: 7 of 9
Sheet No. C-6

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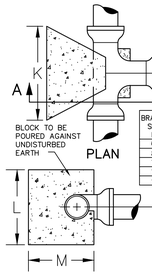
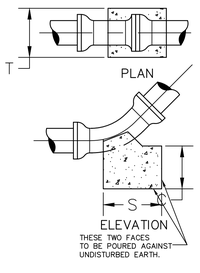


SECTION AA

BRANCH SIZE IN	BLOCK DIMENSIONS K IN	L IN	M IN	CONCRETE VOLUME CU. FT.
6	18	16	12	24
8	30	18	12	40
10	42	20	12	63
12	50	24	16	113
16	60	36	24	300

NOTES:
1. 2500 psi CONCRETE TO BE USED
2. BLOCK DIMENSIONS ARE BASED UPON SOIL BEARING PRESSURE OF 2000 psi AND WATER PRESSURE OF 150 psi. WHERE SOIL BEARING IS LESS OR WATER PRESSURE IS GREATER, A SPECIAL DESIGN WILL BE REQUIRED.

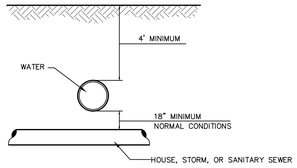
TEES



PIPE DIAM. IN	BEND	BLOCK DIMENSIONS S IN.	T IN.	U IN.	CONCRETE VOLUME CU. FT.
16	90	48	48	48	640
	45	48	34	20	189
	22 1/2	42	20	18	88
	11 1/4				(3)
12	90	36	36	36	270
	45	36	24	18	90
	22 1/2	28	18	12	35
	11 1/4				(3)
10	90	30	30	30	156
	45	30	20	18	63
	22 1/2	22	16	12	24
	11 1/4				(3)
8	90	24	24	24	80
	45	24	16	12	27
	22 1/2	18	12	12	15
	11 1/4				(3)
6	90	18	18	18	34
	45	18	12	12	15
	22 1/2	12	12	12	10
	11 1/4				(3)

NOTES:
1. 2500 psi CONCRETE TO BE USED
2. BLOCK DIMENSIONS ARE BASED UPON SOIL BEARING PRESSURE OF 2000 psi AND WATER PRESSURE OF 150 psi. WHERE SOIL BEARING IS LESS OR WATER PRESSURE IS GREATER, A SPECIAL DESIGN WILL BE REQUIRED.
3. BEND TO BE SET AGAINST UNDISTURBED EARTH, BACKFILL TO BE FIRMLY TAMPED, OR BLOCK TO BE FURNISHED AS DIRECTED BY THE ENGINEER.

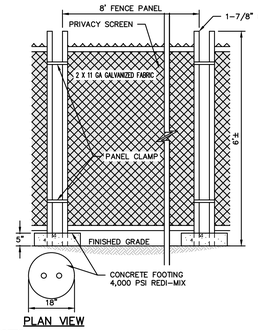
SAG VERTICAL BENDS



UNUSUAL CONDITIONS

WATER MAINS PASSING UNDER SEWERS SHALL HAVE A VERTICAL CLEARANCE OF 18" MIN. BETWEEN THE SEWER AND WATER MAIN AND THE SEWER SHALL BE SUPPORTED AS DIRECTED BY THE ENGINEER. TO THE EXTENT FEASIBLE, JOINTS IN THE WATER MAIN SHALL BE KEPT AS FAR AS POSSIBLE FROM THE SEWER. WHERE AN 18" SEPARATION CANNOT BE OBTAINED DUE TO FIELD CONDITIONS, SEPARATE APPROVAL OF THE WESTCHESTER COUNTY HEALTH DEPARTMENT SHALL BE REQUIRED.

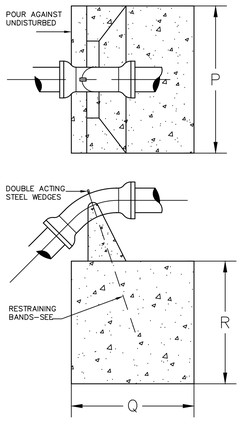
SEPARATION OF WATER MAINS AND SEWER CROSSINGS



PLAN VIEW

NOTES:
1. CONTRACTOR SHALL PROVIDE PERIODIC INSPECTION AND MAINTENANCE OF FENCE INCLUDING REPAIRS AS NECESSARY AND REQUIRED.
2. CONTRACTOR SHALL INSTALL GREEN PRIVACY SCREENING FABRIC OR APPROVED EQUAL AROUND THE PERIMETER OF THE TEMPORARY CONSTRUCTION FENCING.
3. PRIOR TO CONSTRUCTION THE CONTRACTOR SHALL SUBMIT SHOP DRAWINGS AND SAMPLES OF THE PRIVACY SCREENING TO THE ENGINEER FOR REVIEW AND APPROVAL.
4. NO PORTION OF THE FENCE SHALL EXCEED 6-FEET IN HEIGHT

TEMPORARY CHAIN LINK CONSTRUCTION FENCE



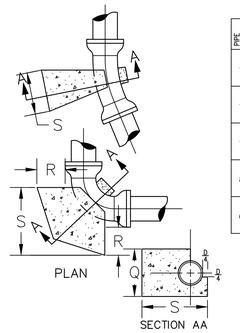
ELEVATION

PIPE DIAM. IN	BEND	BLOCK DIMENSIONS P IN.	Q IN.	R IN.	CONCRETE VOLUME CU. YD.
16	45	72	60	56	52
	22 1/2	60	48	44	27
	11 1/4	60	36	36	14
12	45	60	48	48	3.0
	22 1/2	42	42	40	15
	11 1/4	34	34	34	0.84
10	45	54	42	42	2.0
	22 1/2	36	36	36	1.0
	11 1/4	30	30	30	0.58
8	45	48	36	36	1.3
	22 1/2	32	32	32	0.71
	11 1/4	26	26	26	0.38
6	45	42	30	28	0.76
	22 1/2	26	26	26	0.38
	11 1/4	24	24	24	0.30

NOTES:
1. 2500 psi CONCRETE TO BE USED
2. BLOCK DIMENSIONS ARE BASED UPON SOIL BEARING PRESSURE OF 2000 psi AND WATER PRESSURE OF 150 psi. WHERE SOIL BEARING IS LESS OR WATER PRESSURE IS GREATER, A SPECIAL DESIGN WILL BE REQUIRED.
3. WHERE 90° CREST VERTICAL BEND IS REQUIRED APPROVAL MUST FIRST BE OBTAINED FROM THE ENGINEER. A SPECIAL DESIGN WILL BE REQUIRED.
4. 2-#6 REINFORCING RODS REQUIRED FOR 16" 45° BEND; 1#6 REINFORCING ROD REQUIRED FOR ALL OTHER BENDS. EXPOSED BARS TO BE PROVIDED WITH PROTECTIVE COATING.

CREST VERTICAL BENDS

IN ADDITION TO THE CONCRETE THRUST BLOCKS, ALL FITTINGS TO BE TIED TOGETHER WITH 3/4" GALVANIZED THREADED RODS, AND ANY OTHER SPECIALS AS DIRECTED BY THE WATER DISTRICT.



PIPE DIAM. IN	BEND	BLOCK DIMENSIONS S IN.	Q IN.	R IN.	CONCRETE VOLUME CU. FT.
16	90	48	48	48	640
	45	48	34	20	189
	22 1/2	42	20	18	88
	11 1/4				(3)
12	90	36	36	36	270
	45	36	24	18	90
	22 1/2	28	18	12	35
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10	90	30	30	30	156
	45	30	20	18	63
	22 1/2	22	16	12	24
	11 1/4				(3)
8	90	24	24	24	80
	45	24	16	12	27
	22 1/2	18	12	12	15
	11 1/4				(3)
6	90	18	18	18	34
	45	18	12	12	15
	22 1/2	12	12	12	10
	11 1/4				(3)

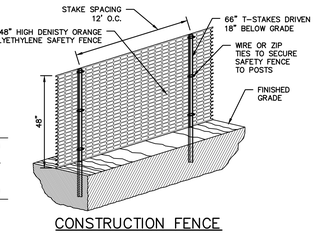
NOTES:
1. 2500 psi CONCRETE TO BE USED
2. BLOCK DIMENSIONS ARE BASED UPON SOIL BEARING PRESSURE OF 2000 psi AND WATER PRESSURE OF 150 psi. WHERE SOIL BEARING IS LESS OR WATER PRESSURE IS GREATER, A SPECIAL DESIGN WILL BE REQUIRED.

HORIZONTAL BENDS

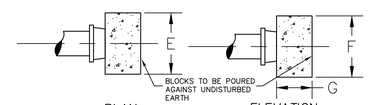
NOTE:

WHERE A 10' HORIZONTAL SEPARATION CANNOT BE OBTAINED DUE TO FIELD CONDITIONS, THE VERTICAL CLEAR DISTANCE SHALL BE A MINIMUM OF 18". HOWEVER, AN EXCEPTION TO THE 10' MINIMUM HORIZONTAL SEPARATION REQUIRES SEPARATE APPROVAL OF THE WESTCHESTER COUNTY HEALTH DEPT.

SEPARATION OF WATER MAINS AND SEWERS – PARALLEL INSTALLATION



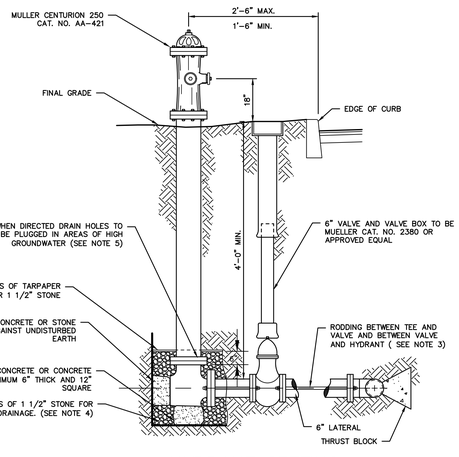
CONSTRUCTION FENCE



NOTES:
1. 2500 psi CONCRETE TO BE USED
2. BLOCK DIMENSIONS ARE BASED UPON SOIL BEARING PRESSURE OF 2000 psi AND WATER PRESSURE OF 150 psi. WHERE SOIL BEARING IS LESS OR WATER PRESSURE IS GREATER, A SPECIAL DESIGN WILL BE REQUIRED.
3. FOR USE ON ABANDONED LINES AND DEAD ENDS WHERE NO EXTENSION IS CONTEMPLATED.

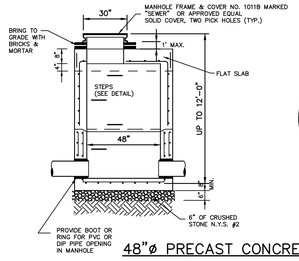
PIPE DIAM. IN	BLOCK DIMENSIONS E IN	F IN	G IN	CONCRETE VOLUME FT.
6	20	16	12	
8	28	20	12	
10	30	24	12	
12	42	30	14	
16	52	42	18	

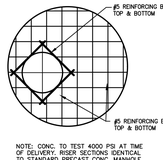
CAPS, PLUGS AND VALVES



HYDRANT SETTING

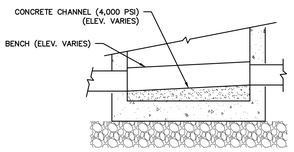
HYDRANT NOTES:
1. PUMPER OUTLET SHALL FACE STREET; HOSE OUTLETS SHALL BE PARALLEL TO STREET.
2. PLUMPNESS OF HYDRANT TO BE CHECKED IN TWO DIRECTIONS, 90° APART.
3. RODDING SHALL CONSIST OF TWO 3/4" THREADED RODS CAREFULLY COATED WITH BITUMASTIC PAINT. RODDING MAY BE OMITTED BETWEEN THE MAIN AND LATERAL VALVE ONLY WHERE A TAPPING VALVE OR HYDRANT VALVE ANCHORING TEE IS USED.
4. 1 1/2" STONE SHALL BE PLACED AROUND THE HYDRANT FROM THE BOTTOM OF THE TRENCH, BUT AT LEAST 6" BELLOW THE BASE OF THE HYDRANT TO 6" ABOVE THE WASTE OPENING AND TO A DISTANCE OF 12" AROUND THE ELBOW.
5. HYDRANTS WITH PLUGGED DRAINS SHALL HAVE A 3" BLACK CIRCLE PAINTED DIRECTLY UNDER THE PUMPER OUTLET.
6. HYDRANT DRAINS TO BE PLUGGED WHERE THE WATER TABLE IS WITHIN 7 FEET OF FINISHED GRADE. WHEN THE DRAINS AR 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 FT. OF SANITARY SEWERS OR STORM DRAINS.
7. HYDRANT TO CONFORM TO VILLAGE SPECIFICATIONS.
8. AS PER SECTION 8.4.4 OF THE RECOMMENDED STANDARDS FOR WATER WORKS, 2003 EDITION:
   8.1. HYDRANT DRAINS SHOULD BE PLUGGED. WHEN THE DRAINS ARE PLUGGED THE BARRELS MUST BE PUMPED DRY AFTER USE DURING FREEZING WEATHER.
   8.2. WHERE HYDRANT DRAINS ARE NOT PLUGGED, A GRAVEL POCKET OR DRY WELL SHALL BE PROVIDED UNLESS THE NATURAL SOILS WILL PROVIDE ADEQUATE DRAINAGE.
   8.3. HYDRANT DRAINS SHALL NOT BE CONNECTED TO OR LOCATED WITHIN 10 FEET OF SANITARY SEWERS, STORM SEWERS, OR STORM DRAINS.
   8.4. HYDRANT DRAINS, WHERE ALLOWED, MUST BE ABOVE THE SEASONAL GROUNDWATER TABLE.



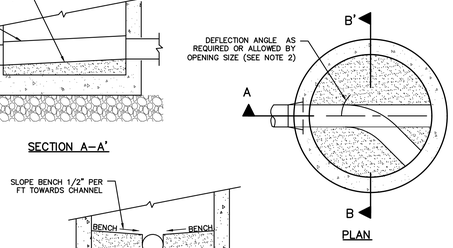


NOTE: CONC. TO TEST 4000 PSI AT TIME OF DELIVERY. RISER SECTIONS IDENTICAL TO STANDARD PRECAST CONC. MANHOLE.

48"ø PRECAST CONCRETE MANHOLE

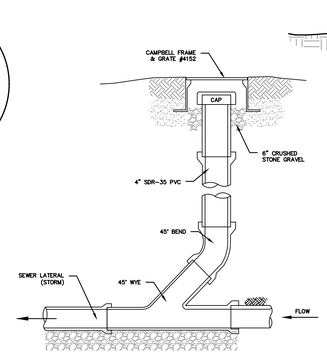


SECTION A–A'



NOTES:
1. SLOPE CHANNEL DOWN 0.10 FEET FROM INLET TO OUTLET.
2. MAKE CHANGES IN FLOW DIRECTION BY CIRCULAR CHANNEL CONSTRUCTION WITH MAXIMUM RADIUS POSSIBLE.
3. FOR DEAD-END MANHOLES, BUILD CHANNEL AS DIRECTED BY ENGINEER.

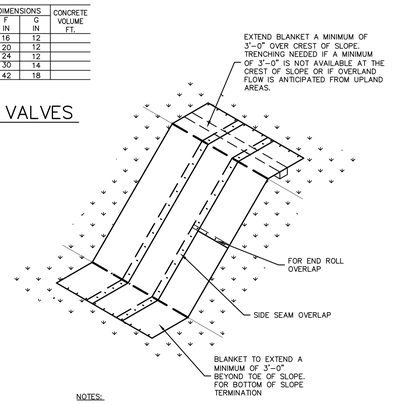
FORMED INVERT CHANNEL FOR SEWER MANHOLES



NOTES (STORM SEWER):
1. REFER TO PLAN FOR SPECIFIC PIPE SIZING AND SLOPE SPECIFICATIONS; HOWEVER, IN GENERAL, ALL STORM SEWER SERVICES TO BE 6"ø SCH. 40 @ 1.0% MINIMUM.
2. CLEANOUTS SHALL BE PLACED BEFORE SIGNIFICANT PIPE BEND LOCATIONS (I.E., JUNCTIONS, 90-DEGREE BENDS, ETC.) UNLESS A ROOF LEADER DOWNSPOUT CONNECTION IS PROPOSED.

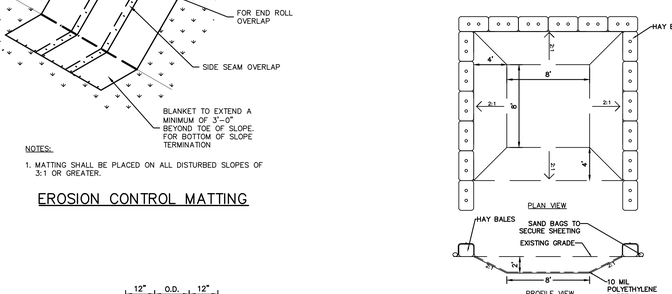
SEWER CLEANOUT DETAIL (GRAVITY)

(STORM)



NOTES:
1. MATTING SHALL BE PLACED ON ALL DISTURBED SLOPES OF 3:1 OR GREATER.

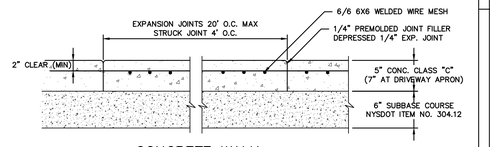
EROSION CONTROL MATTING



NOTES:
1. CONCRETE WASHOUT AREA TO BE INSTALLED PRIOR TO CONCRETE PLACEMENT ON SITE. CONCRETE WASHOUT AREA TO BE ENTIRELY SELF CONTAINED.
2. HAY BALES SHALL BE PROVIDED AROUND THE PERIMETER OF CONCRETE WASHOUT AREA FOR CONTAINMENT.
3. WASHOUT AREA SHALL BE LINED WITH PLASTIC SHEETING NO THINNER THAN 10 MILS. SHEETING SHALL HAVE NO HOLES OR TEARS AND SHALL BE ANCHORED BY SAND BAGS ON ALL SIDES EXCEPT ACCESS SIDE. PLASTIC LINING TO BE REPLACED WITH EACH CLEANING
4. SIGNS SHALL BE PROVIDED AT THE CONSTRUCTION ENTRANCE AND CONCRETE AREAS INDICATING LOCATION OF WASHOUT AREA.
5. WASHOUT AREA TO BE ENCLOSED IN CONSTRUCTION FENCE.
6. WASHOUT AREAS TO BE INSPECTED DAILY TO ENSURE LINER IS INTACT AND ADEQUATE CAPACITY IS AVAILABLE AT ALL TIMES. WASHOUT AREAS SHALL BE INSPECTED IMMEDIATELY AFTER HEAVIER RAINS. DAMAGED OR LEAKING WASHOUT AREAS TO BE DEACTIVATED AND REPAIRED IMMEDIATELY.
7. CONCRETE WASTE SHALL BE REMOVED AND DISPOSED OF ONCE IT REACHES THREE-QUARTERS OF THE WASHOUT AREA'S HEIGHT. ALL WASTE SHALL BE DISPOSED OF IN A MANNER CONSISTENT WITH APPLICABLE LAWS, REGULATIONS, AND GUIDELINES OF MUNICIPALITY.
8. PREFABRICATED CONCRETE WASHOUT CONTAINERS MAY BE UTILIZED ONLY WITH PRIOR APPROVAL FROM THE CITY'S ENGINEERING DEPARTMENT.

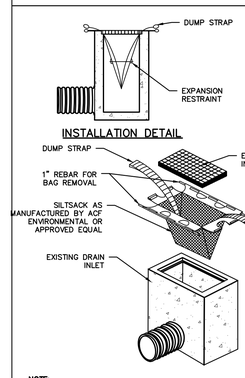
CONCRETE WASHOUT AREA

TRENCH BEDDING



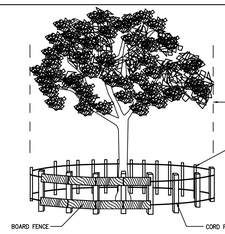
CONCRETE WALK (RIGHT-OF-WAY)

Siltsack Inlet Protection

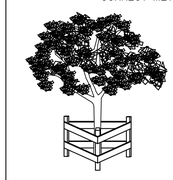


NOTE:
1. EACH SILTSACK SHALL BE PROPERLY SIZED FOR EACH INLET.
2. ALL CURB INLETS SHALL UTILIZE SILTSACK MODELS WITH BUILT IN CURB DEFLECTOR
3. SILTSACKS SHOULD ONLY BE UTILIZED ON DRAIN INLETS OUTSIDE OF THE DISTURBED AREAS TO PREVENT CONTAMINATION OF DOWN STREAM STORMWATER STRUCTURES.
4. SEDIMENT SHALL BE REMOVED FROM EACH SILTSACK WHEN SILT DEPTH EXCEEDS 6-INCHES.
5. SILTSACKS SHOULD BE INSPECTED REGULARLY FOR DAMAGE. ANY DAMAGED SILTSACKS SHOULD BE REPLACED.

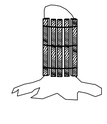
FENCING AND ARMORING



CORRECT METHODS OF TREE FENCING

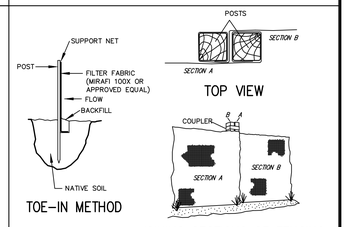


TRIANGULAR BOARD FENCE



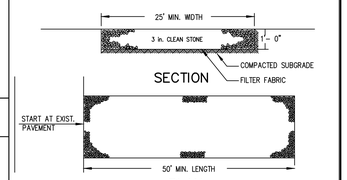
CORRECT TRUNK ARMORING

SILT FENCE



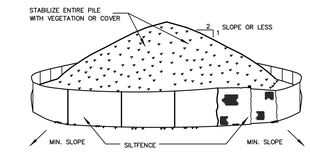
INSTALLATION NOTES:
1. EXCAVATE A 4 INCH * 4 INCH TRENCH ALONG THE LOWER PERIMETER OF THE SITE.
2. UNROLL A SECTION AT A TIME AND POSITION THE POSTS AGAINST THE BACK (DOWNSTREAM)WALL OF THE TRENCH (NET SIDE AWAY FROM DIRECTION OF FLOW).
3. DRIVE THE POST INTO THE GROUND UNTIL THE NETTING IS APPROXIMATELY 2 INCHES FROM THE TRENCH BOTTOM.
4. LAY THE TOE-IN FLAP OF FABRIC ONTO THE UNDISTURBED BOTTOM OF THE TRENCH, BACKFILL THE TRENCH AND TAMP THE SOIL. STEEPER SLOPES REQUIRE AN INTERCEPT TRENCH.
5. JOIN SECTIONS AS SHOWN ABOVE.

Stabilized Construction Entrance



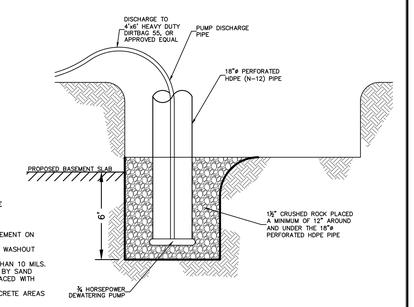
INSTALLATION NOTES:
1. STONE SIZE – USE 3" STONE.
2. LENGTH – AS REQUIRED, BUT NOT LESS THAN 50 FEET (EXCEPT ON A SINGLE RESIDENCE LOT WHERE A 30 FOOT MINIMUM LENGTH WOULD APPLY.
3. THICKNESS – NOT LESS THAN SIX (6) INCHES.
4. WIDTH – 25 FOOT MINIMUM, BUT NOT LESS THAN THE FULL WIDTH AT POINTS WHERE 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.

SOIL STOCKPILING



INSTALLATION NOTES

INSTALLATION NOTES:
1. AREA CHOSEN FOR STOCKPILING OPERATIONS SHALL BE DRY AND STABLE.
2. SOILS OR FILL TO BE STOCKPILED ON SITE DURING CUTTING AND FILLING ACTIVITIES SHOULD BE LOCATED ON LEVEL PORTIONS OF THE SITE WITH A MINIMUM OF 50-75 FOOT SETBACKS FROM TEMPORARY DRAINAGE SWALES.
3. MAXIMUM SLOPE OF STOCKPILE SHALL BE 1:2.
4. UPON COMPLETION OF SOIL STOCKPILING, EACH PILE SHALL BE SURROUNDED WITH EITHER SILT FENCING OR STRAWBALES, THEN STABILIZED WITH VEGETATION OR COVERED.
5. STOCKPILES REMAINING IN PLACE FOR MORE THAN A WEEK SHOULD BE SEEDED AND MULCHED OR COVERED WITH GEOTEXTILE FABRIC SURROUNDED BY SILT FENCE.
6. SEE SPECIFICATIONS FOR INSTALLATION OF SILT FENCE.



TYPICAL DEWATERING SUMP

ANY ALTERATIONS OR REVISIONS OF THESE PLANS, UNLESS DONE BY OR UNDER THE DIRECTION OF THE NYS LICENSED AND REGISTERED ENGINEER THAT PREPARED THEM, IS A VIOLATION OF THE NYS EDUCATION LAW.

No.	Description	Date
1.	REVISED FOR VILLAGE STAFF COMMENTS	5-4-22

THIS PLAN NOT VALID FOR CONSTRUCTION WITHOUT ENGINEERS SEAL & SIGNATURE

PROJECT:

PROPOSED RESIDENCES
AT
1 WARBURTON AVENUE
VILLAGE OF HASTINGS-ON-HUDSON
WESTCHESTER COUNTY – NEW YORK

UTILITIES PLAN

HEC

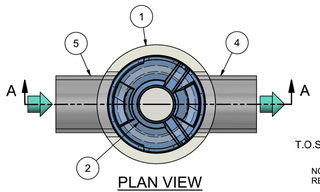
HUDSON ENGINEERING & CONSULTING, P.C.
45 Knollwood Road – Suite 201
Elmsford, New York 10523
T: 914-909-0620
F: 914-360-2086
© 2021

STATE OF NEW YORK · MICHAEL S. MILLER · No. 80857 · LICENSED PROFESSIONAL ENGINEER

Date:	03/23/22
Scale:	1" = 20'
Designed By:	T.K.
Checked By:	M.S.
Sheet:	8
	9

Sheet No.

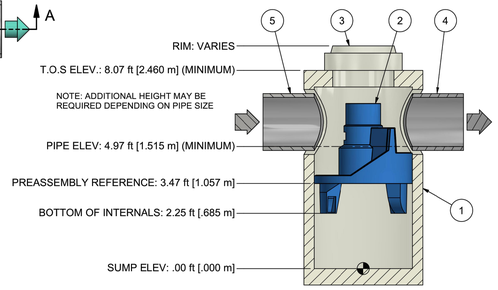
C-7



PLAN VIEW

HYDRO FRAME AND COVER (INCLUDED)

GRADE RINGS BY OTHERS AS REQUIRED



SECTION A-A

1. MANHOLE WALL AND SLAB THICKNESSES ARE NOT TO SCALE.

2. CONTACT HYDRO INTERNATIONAL FOR A BOTTOM OF STRUCTURE ELEVATION PRIOR TO SETTING FIRST DEFENSE MANHOLE.

3. CONTRACTOR TO CONFIRM RIM, PIPE INVERTS, PIPE DIA. AND PIPE ORIENTATION PRIOR TO RELEASE OF UNIT TO FABRICATION.

PRODUCT SPECIFICATION:

1. Peak Hydraulic Flow: 18.0 cfs (510 l/s)
2. Min Sediment Storage Capacity: 0.7 cu. yd. (0.5 cu. m.)
3. Maximum Inlet/Outlet Pipe Diameters: 24 in. (600 mm)
4. The Treatment System Shall Use An Induced Vortex To Separate Pollutants From Stormwater Runoff.
5. For More Product Information Including Regulatory Acceptances, Please Visit https://hydro-int.com/en/products/first-defense

GENERAL NOTES:
1. General Arrangement drawings only. Contact Hydro International for site specific drawings.
2. The diameter of the inlet and outlet pipes may be no more than 24".
3. Multiple inlet pipes possible (refer to project plan).
4. Inlet/outlet pipe angle can vary to align with drainage network (refer to project plans).
5. Peak flow rate and minimum height limited by available cover and pipe diameter.
6. Larger sediment storage capacity may be provided with a deeper sump depth.

PARTS LIST

ITEM	QTY	SIZE (in)	SIZE (mm)	DESCRIPTION
1	1	48	1200	I.D. PRECAST MANHOLE
2	1			INTERNAL COMPONENTS (PRE-INSTALLED)
3	1	30	750	FRAME AND COVER (ROUND)
4	1	24 (MAX)	600 (MAX)	OUTLET PIPE (BY OTHERS)
5	1	24 (MAX)	600 (MAX)	INLET PIPE (BY OTHERS)

PROJECTION

IF IN DOUBT ASK

DATE:	SCALE:	
11/2/2021	1:30	
DRAWN BY: ER	CHECKED BY: MRJ	APPROVED BY

Title: 4-ft DIAMETER FIRST DEFENSE

GENERAL ARRANGEMENT

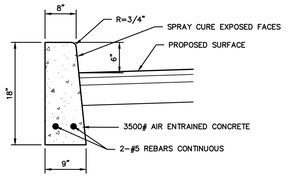
Hydro International®
hydro-int.com
HYDRO INTERNATIONAL

WEIGHT: | MATERIAL:

STOCK NUMBER:

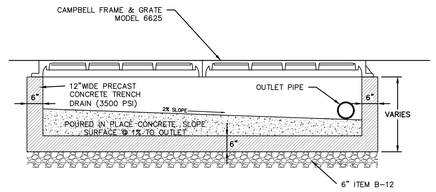
DRAWING NO.: FD GA-4

SHEET SIZE: B | SHEET: 1 OF 1 | Rev: -



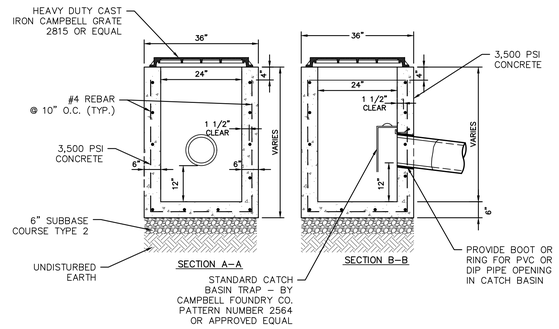
NOTE:
EXPANSION JOINTS TO BE INSTALLED EVERY 10 FEET.

CONCRETE CURB



NOTES:
1. CONCRETE – 3,500 PSI MINIMUM STRENGTH @ 28 DAYS
2. STEEL REINFORCEMENT – ASTM A-615, # 4 REBAR, GRADE 60
3. COVER TO STEEL – 1 ½" MINIMUM
4. DESIGN LOADING – AASHTO HS20-44
5. EARTH COVER – 0 TO 5 FEET
6. CONSTRUCTION JOINT – LAPPED

CONCRETE TRENCH DRAIN



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3. COVER TO STEEL – 1 ½" MINIMUM
4. DESIGN LOADING – AASHTO HS20-44
5. EARTH COVER – 0 TO 5 FEET
6. CONSTRUCTION JOINT – LAPPED

PRECAST DRAIN INLET

INSTALLATION & MAINTENANCE OF EROSION CONTROL:

CONSTRUCTION SCHEDULE
NOTIFY APPROPRIATE MUNICIPAL AGENCY HAVING JURISDICTION AT LEAST 5 DAYS PRIOR TO START.

EROSION CONTROL MEASURES
INSTALL ALL EROSION CONTROL MEASURES PRIOR TO START OF CONSTRUCTION. CALL FOR INSPECTION FROM THE APPROPRIATE MUNICIPAL AGENCY HAVING JURISDICTION AT LEAST 2 DAYS PRIOR TO FINISH.

INSPECTION BY MUNICIPALITY
MAINTENANCE (TO BE PERFORMED DURING ALL PHASES OF CONSTRUCTION)

AFTER ANY RAIN CAUSING RUNOFF, CONTRACTOR TO INSPECT HAYBALES, ETC. AND REMOVE ANY EXCESSIVE SEDIMENT AND INSPECT STOCKPILES AND CORRECT ANY PROBLEMS WITH SEED ESTABLISHMENT.
INSPECTIONS SHALL BE DOCUMENTED IN WRITING AND SUBMITTED TO THE APPROPRIATE MUNICIPAL AGENCY HAVING JURISDICTION.

INSPECTION BY MUNICIPALITY – FINAL GRADING
REMOVE UNNEEDED SUBGRADE FROM SITE.
CALL FOR INSPECTION FROM THE APPROPRIATE MUNICIPAL AGENCY HAVING JURISDICTION AT LEAST 2 DAYS PRIOR TO FINISH.

INSPECTION BY MUNICIPALITY – LANDSCAPING

SPREAD TOPSOIL EVENLY OVER AREAS TO BE SEEDED. HAND RAKE LEVEL. BROADCAST 1.25 LB. BAG OF JONATHAN GREEN "FASTGROW" MIX OR EQUAL OVER AREA TO BE SEEDED. APPLY STRAW MULCH AND WATER WITHIN 2 DAYS OF COMPLETION OF TOPSOILING. CALL FOR INSPECTION FROM THE APPROPRIATE MUNICIPAL AGENCY HAVING JURISDICTION AT LEAST 2 DAYS PRIOR TO FINISH.

INSPECTION BY MUNICIPALITY – FINAL LANDSCAPING

GRASS ESTABLISHED.
CALL FOR INSPECTION FROM THE APPROPRIATE MUNICIPAL AGENCY HAVING JURISDICTION AT LEAST 2 DAYS PRIOR TO FINISH.

INSPECTION BY MUNICIPALITY – FINAL INSPECTION

ALL EROSION CONTROL MEASURES REMOVED AND GRASS ESTABLISHED.
CALL FOR INSPECTION FROM THE APPROPRIATE MUNICIPAL AGENCY HAVING JURISDICTION AT LEAST 2 DAYS PRIOR TO FINISH.

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No.	Revisions	Date
1	REVISED PER VILLAGE STAFF COMMENTS	5-4-22

THIS PLAN NOT VALID FOR CONSTRUCTION WITHOUT ENGINEERS SEAL & SIGNATURE

PROJECT:
PROPOSED RESIDENCES
AT
1 WARBURTON AVENUE
VILLAGE OF HASTINGS-ON-HUDSON
WESTCHESTER COUNTY – NEW YORK

DETAILS

STATE OF NEW YORK · MICHAEL R. STEIN · No. 60657 · LICENSED PROFESSIONAL ENGINEER

HEC
HUDSON ENGINEERING & CONSULTING, P.C.
45 Knollwood Road – Suite 201
Elmsford, New York 10523
T: 914-909-0420
F: 914-560-2086
© 2021

Date:	03/23/22
Scale:	1" = 20'
Designed By:	T.K.
Checked By:	M.S.
Sheet:	9 / 9
Sheet No.	C-8

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Sullivan Architecture, P.C.
31 Mamaroneck Avenue
White Plains, New York 10601
914-761-6006 (F) 914-761-4919

Developer:
1 Warburton, LLC

Project Title
1 · Warburton Avenue
Hastings-on-Hudson, NY

Date Issue	
11.04.2021 VILLAGE BOARD SUBMISSION	03.16.2022 SKETCH
01.20.2022 PLANNING BOARD MEETING	05.05.2022 REVISED BOARD SUBMISSION
03.04.2022 UPDATED PER MEETING	
03.10.2022 UPDATED PER MEETING	
03.14.2022 REVISED GRADING	

Project No.	20201
Date	11.04.2021
Drawing By	gd
Scale	1" = 20'-0"

REGISTERED ARCHITECT JOHN P. SULLIVAN No. 017155 STATE OF NEW YORK

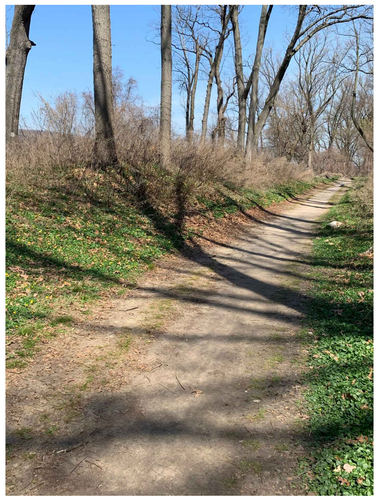
Drawing Title
ARCHITECTURAL TOWNHOUSE SITE PLAN

Drawing No.
SK-2

1 VIEW FROM COUNTY TRAIL

2 VIEW FROM COUNTY TRAIL

3 VIEW FROM COUNTY TRAIL

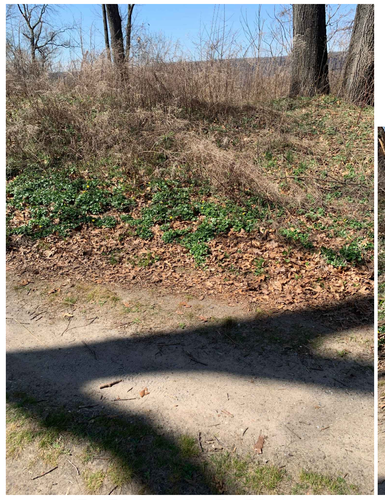


4 VIEW FROM COUNTY TRAIL

5 VIEW FROM COUNTY TRAIL

6 VIEW FROM COUNTY TRAIL

7 VIEW FROM COUNTY TRAIL



8 VIEW FROM COUNTY TRAIL

9 VIEW FROM COUNTY TRAIL

10 VIEW FROM COUNTY TRAIL

11 VIEW FROM COUNTY TRAIL

12 VIEW FROM COUNTY TRAIL

13 VIEW FROM COUNTY TRAIL

14 VIEW FROM COUNTY TRAIL

15 VIEW FROM COUNTY TRAIL

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31 Mamaroneck Avenue
White Plains, New York 10601
914-761-6006 (F) 914-761-4919

Developer:
1 Warburton, LLC

Project Title
1 · Warburton Avenue
Hastings-on-Hudson, NY

Date Issue
05.05.2022 REVISED BOARD SUBMISSION

Project No.	20201
Date	11.04.2021
Drawing By	gd
Scale	AS NOTED

REGISTERED ARCHITECT JOHN P. SULLIVAN No. 017185 STATE OF NEW YORK

Drawing Title
VIEW FROM COUNTY TRAIL PHOTO BOARD

Drawing No.
SK-2.1

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White Plains, New York 10601
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IQ
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31 Mamaroneck Ave., 7th FL.
White Plains, New York 10601
admin@iqlandarch.com
(914) 232-0200

Developer:
Warburton, LLC

Project Title
1 · Warburton Avenue
Hastings-on-Hudson, NY

Date	Issue
11.04.2021	VILLAGE BOARD SUBMISSION
03.24.2022	PLAN REVISIONS
05.05.2022	REVISED BOARD SUBMISSION

Project No.	20201
Date	11.04.2021
Drawing By	GV
Scale	AS NOTED

Drawing Title
LANDSCAPE DEVELOPMENT PLAN

Drawing No.
SK-3

1 FRONT ELEVATION
3/16" = 1'-0"

2 REAR ELEVATION
3/16" = 1'-0"

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White Plains, New York 10601
914-761-6006 (F) 914-761-4919

Developer:
1 Warburton, LLC

Project Title
1 · Warburton Avenue
Hastings-on-Hudson, NY

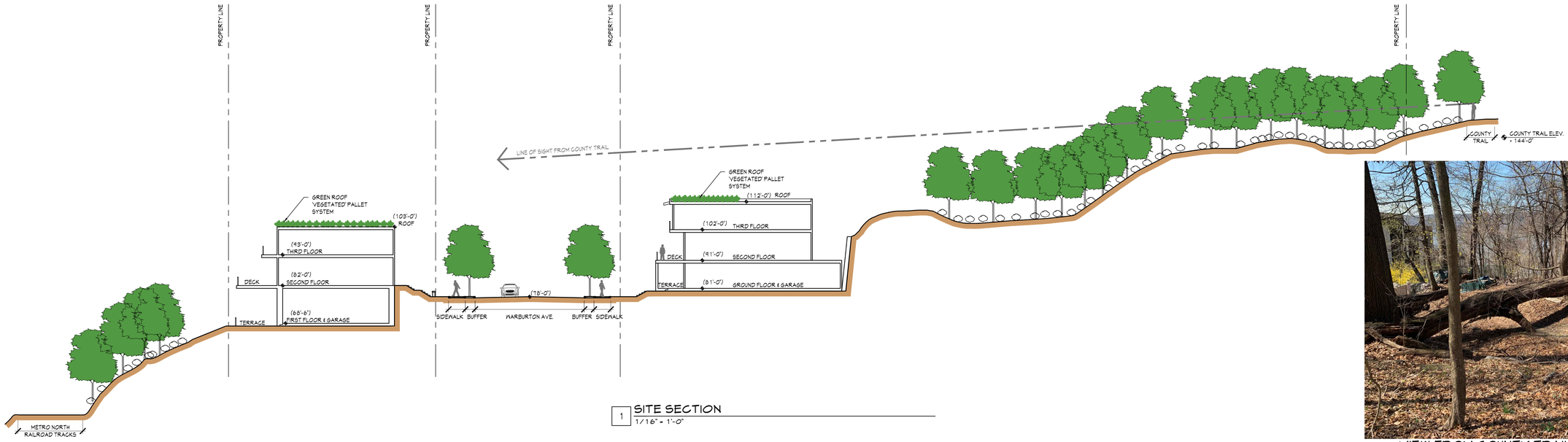
Date Issue
05.05.2022 REVISED BOARD SUBMISSION

Project No.	20201
Date	11.04.2021
Drawing By	gd
Scale	AS NOTED

REGISTERED ARCHITECT JOHN F. SULLIVAN NO. 017155 STATE OF NEW YORK

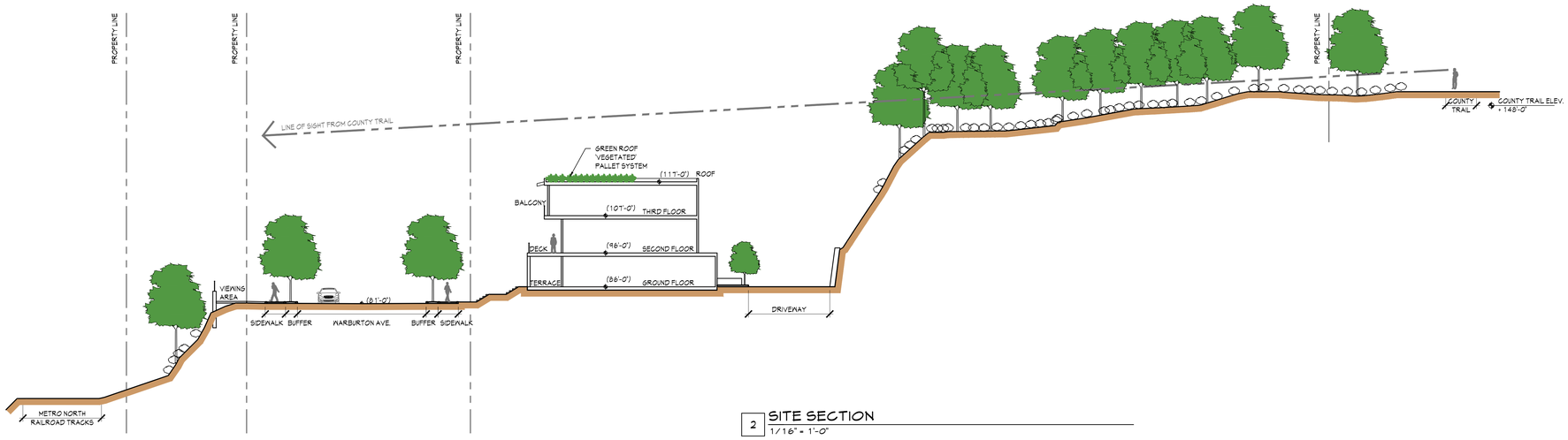
Drawing Title
MIDDLE BUILDING ELEVATIONS

Drawing No.
SK-4.1



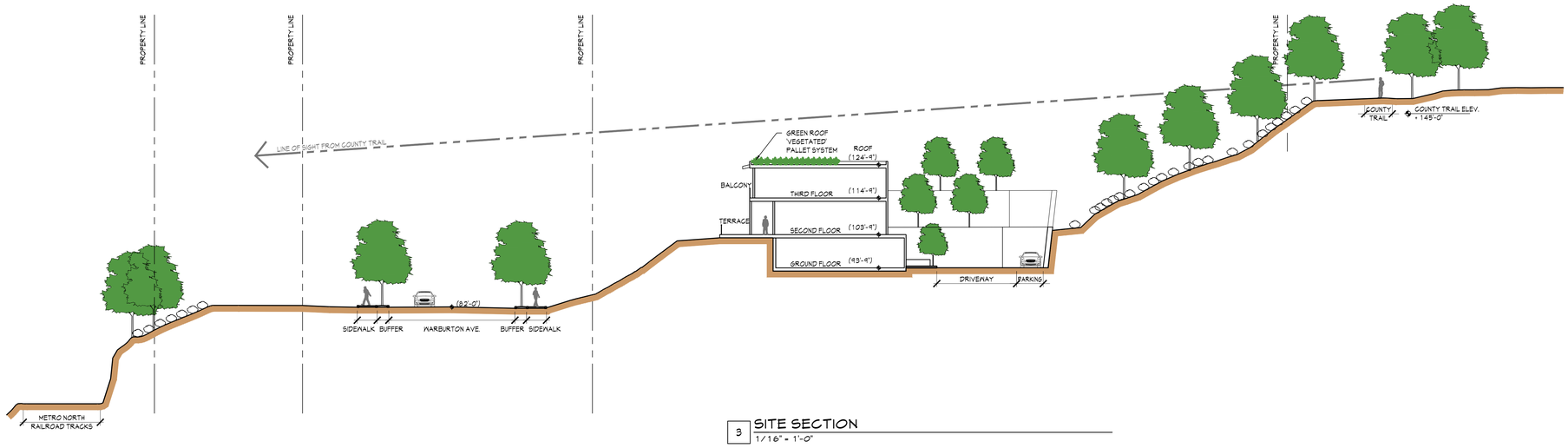
1 SITE SECTION
1/16" = 1'-0"

VIEW FROM COUNTY TRAIL (2)



2 SITE SECTION
1/16" = 1'-0"

VIEW FROM COUNTY TRAIL (5)



3 SITE SECTION
1/16" = 1'-0"

VIEW FROM COUNTY TRAIL (12)

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White Plains, New York 10601
914-761-6006 (F) 914-761-4919

Developer: 1 Warburton, LLC

Project Title: 1 · Warburton Avenue
Hastings-on-Hudson, NY

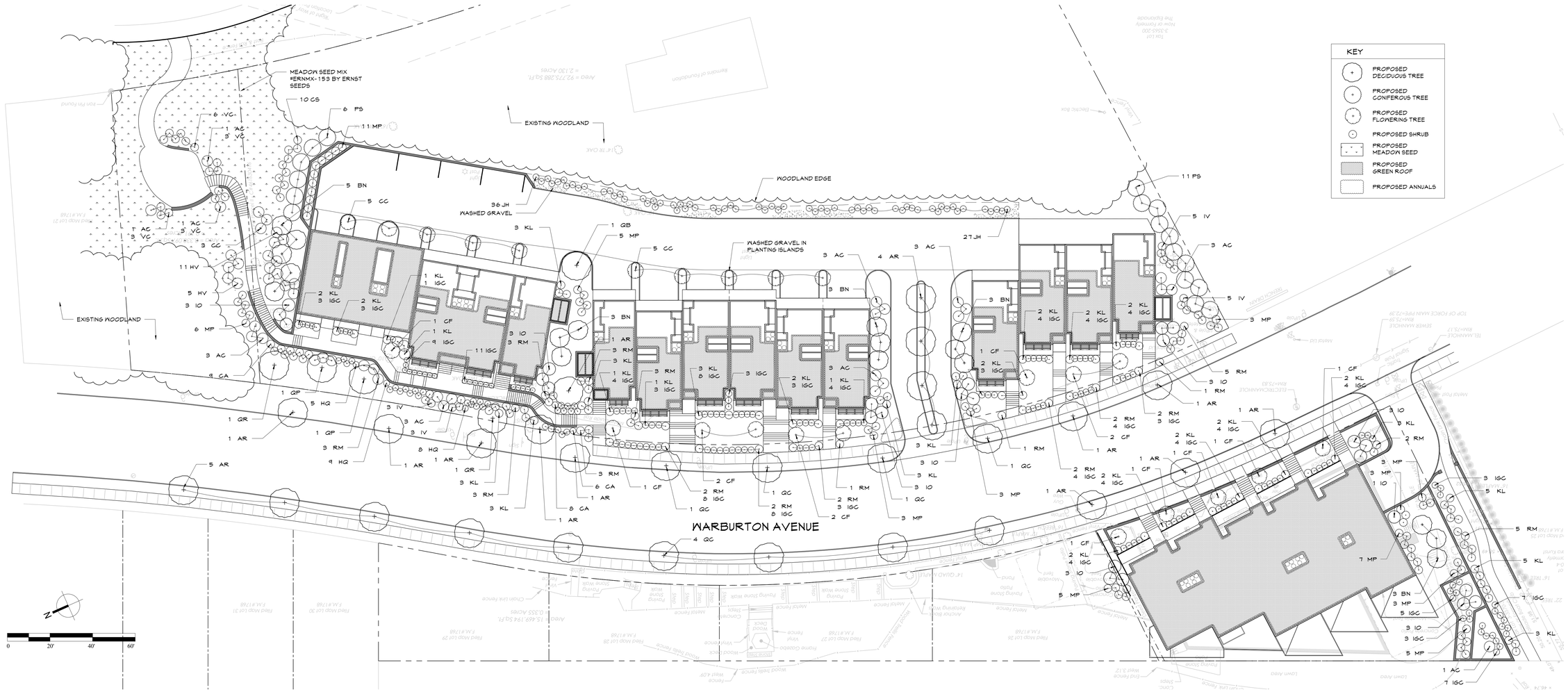
Date Issue
11.04.2021 VILLAGE BOARD SUBMISSION
05.05.2022 REVISED BOARD SUBMISSION

Project No.	20201
Date	11.04.2021
Drawing By	gd
Scale	AS NOTED

REGISTERED ARCHITECT JOHN F. SULLIVAN NO. 017195 STATE OF NEW YORK

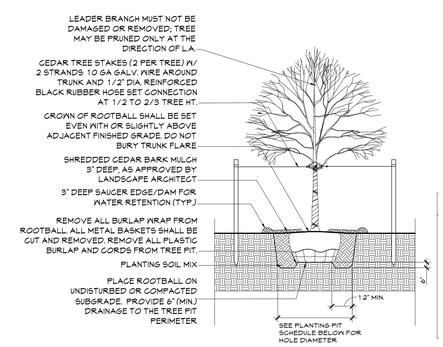
Drawing Title: SITE SECTIONS

Drawing No. SK-5



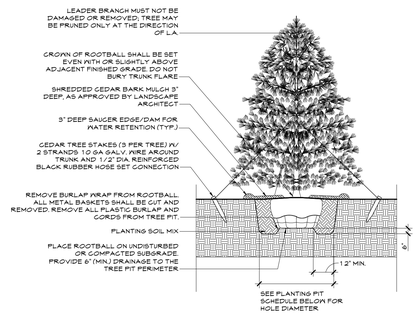
1 PLANTING PLAN

SCALE: 1"=20'



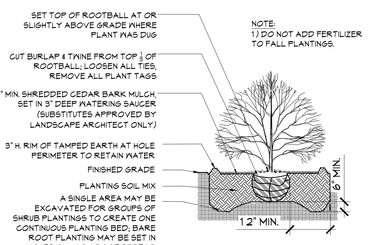
2 DECIDUOUS TREE PLANTING

SCALE: N.T.S



3 EVERGREEN PLANTING

SCALE: N.T.S



4 SHRUB PLANTING

SCALE: N.T.S

PLANT LIST

KEY	BOTANICAL NAME	COMMON NAME
TREES		
AC	Amelanchier canadensis	Serviceberry
AR	Acer rubrum 'October Glory'	October Glory Red Maple
BN	Betula nigra	River Birch
CC	Cercis canadensis	Eastern Redbud
CF	Cornus florida	Flowering Dogwood
IO	Ilex opaca	American Holly
QB	Quercus bicolor	Swamp White Oak
QC	Quercus coccinea	Scarlet Oak
QP	Quercus palustris	Pin Oak
QR	Quercus rubra	Northern Red Oak
SHRUBS		
CA	Clethra alnifolia	Sweet Pepperbush
CS	Cornus sericea	Red Twig Dogwood
HQ	Hydrangea quercifolia	Oak Leaf Hydrangea
HV	Hammamelis virginiana	Witch Hazel
IGC	Ilex glabra 'compacta'	Compact Inkberry
IV	Ilex verticillata	Winterberry
JH	Juniperus horizontalis	Creeping Juniper
KL	Kalmia latifolia	Mountain Laurel
MP	Myrica pensylvanica	Northern Bayberry
PS	Pinus strobus	Eastern White Pine
RM	Rhododendron maximum	Rosebay Rhododendron
VC	Vaccinum corymbosum	Highbush Blueberry

GREEN ROOF PLANTING NOTES:

1. GREEN ROOF VEGETATION SHALL BE 'INSTAGREEN' SEDUM CARPET GROWN INTO COCONUT COIR MATS AS SUPPLIED BY HYDROTECH 800-877-6125.
2. CARPET MUST HAVE A MINIMUM OF 85% COVERAGE AND SHALL CONTAIN 9 SEDUM VARIETIES. PROVIDE PLANT MIX SELECTION FOR L.A. APPROVAL.
3. INSTALL PER MANUFACTURER'S RECOMMENDATIONS ON DAY OF ARRIVAL.

'ERNMX-153' SHOWY NORTHEAST NATIVE WILDFLOWER & GRASS MIX BY ERNST SEEDS

34.0% Bouteloua curtipendula, Butte (Sideoats Grama, Butte)
20.8% Schizachyrium scoparium, Fort Indiantown Gap-PA Ecotype (Little Bluestem, Fort Indiantown Gap-PA Ecotype)
16.0% Elymus virginicus, PA Ecotype (Virginia Wildrye, PA Ecotype)
8.0% Echinacea purpurea (Purple Coneflower)
9.0% Chamaecrista fasciculata, PA Ecotype (Partridge Pea, PA Ecotype)
9.0% Coreopsis lanceolata (Lanceleaf Coreopsis)
9.0% Rudbeckia hirta (Blackeyed Susan)
2.0% Heliopsis helianthoides, PA Ecotype (Oxeye Sunflower, PA Ecotype)
1.4% Liatris spicata, PA Ecotype (Marsh Blazing Star, PA Ecotype)
1.2% Asclepias tuberosa, PA Ecotype (Butterfly Milkweed, PA Ecotype)
1.1% Tradescantia ohiensis, PA Ecotype (Ohio Spiderwort, PA Ecotype)
1.0% Penstemon digitalis, PA Ecotype (Tall White Beardtongue, PA Ecotype)
1.0% Zizia aurea, PA Ecotype (Golden Alexanders, PA Ecotype)
0.9% Pycnanthemum tenuifolium (Narrowleaf Mountainmint)
0.1% Senna hebecarpa, VA & NV Ecotype (Wild Senna, VA & NV Ecotype)
0.5% Baptisia australis, Southern NV Ecotype (Blue False Indigo, Southern NV Ecotype)
0.4% Monarda fistulosa, Fort Indiantown Gap-PA Ecotype (Wild Bergamot, Fort Indiantown Gap-PA Ecotype)
0.3% Aster oblongifolius, PA Ecotype (Aromatic Aster, PA Ecotype)
0.3% Oenothera fruticosa var. fruticosa (Sundrops)
0.2% Aster laevis, NY Ecotype (Smooth Blue Aster, NY Ecotype)
0.2% Aster novae-angliae, PA Ecotype (New England Aster, PA Ecotype)
0.2% Aster pilosus, PA Ecotype (Heath Aster, PA Ecotype)
0.2% Solidago nemoralis, PA Ecotype (Gray Goldenrod, PA Ecotype)
0.1% Aster prenanthoides, PA Ecotype (Zigzag Aster, PA Ecotype)
0.1% Penstemon hirsutus (Hairy Beardtongue)
0.1% Senna marilandica (Maryland Senna)
0.1% Solidago bicolor, PA Ecotype (White Goldenrod, PA Ecotype)
0.1% Solidago juncea, PA Ecotype (Early Goldenrod, PA Ecotype)
0.1% Solidago odora, PA Ecotype (Licorice Scented Goldenrod, PA Ecotype)

PLANTING NOTES:

1. REMOVE ALL EXISTING VEGETATION AT SOUTH SIDE. TRANSPLANT SELECTED MATERIAL AS DIRECTED BY LANDSCAPE ARCHITECT.
2. USE EXTREME CAUTION TO PROTECT UTILITIES.
3. IT IS THE INTENT OF THIS CONTRACT TO AVOID ANY DISTURBANCE TO EXISTING VEGETATION ON THE SITE OTHER THAN THOSE SPECIFICALLY DESIGNATED FOR REMOVAL. ADJUSTMENTS SHALL BE MADE IN THE FIELD AT THE DIRECTION OF THE LANDSCAPE ARCHITECT.
4. ALL PLANT MATERIAL SHALL BE NURSERY GROWN UNLESS OTHERWISE NOTED.
5. PROVIDE QUALITY, SIZE, GENUS, SPECIES, AND VARIETY OF TREES AND SHRUBS INDICATED, COMPLYING WITH APPLICABLE REQUIREMENTS OF ANSI Z60.1 "AMERICAN STANDARD FOR NURSERY STOCK."
6. THE CONTRACTOR SHALL FAMILIARIZE HIMSELF WITH THE LOCATION OF MECHANICAL EQUIPMENT AND UTILITIES EXISTING OR PROPOSED IN THE AREA TO BE PLANTED AND SHALL, WHERE NECESSARY, RELOCATE PLANTS AT THE DIRECTION OF THE LANDSCAPE ARCHITECT.
7. QUANTITIES GIVEN IN THE PLANT LIST ARE FOR REFERENCE ONLY. THE CONTRACTOR SHALL VERIFY ALL QUANTITIES SHOWN ON THE LIST ANS SHALL BE RESPONSIBLE FOR FURNISHING ALL MATERIALS REQUIRED TO COMPLETE THE PLANS.
8. THE CONTRACTOR SHALL VERIFY ALL GRADES, DIMENSIONS, AND EXISTING CONDITIONS AND REPORT ANY DISCREPANCIES TO THE LANDSCAPE ARCHITECT.
9. LOCATIONS OF NEW PLANTS SHALL BE STAKED BY THE CONTRACTOR AND APPROVED BY THE LANDSCAPE ARCHITECT BEFORE PROCEEDING WITH THE WORK.
10. ALL PLANTS SHALL BE SUBJECT TO THE LANDSCAPE ARCHITECT'S INSPECTION AND APPROVAL AT THE NURSERY AND AT THE SITE BEFORE ANY PLANTING WORK IS BEGUN.
11. ALL BEDS AND TREE SAUCERS AND OTHER AREAS NOTED SHALL RECEIVE 3 INCH (MINIMUM) OF APPROVED MULCH (SHREDDED CEDAR).
12. CONTRACTOR SHALL GUARANTEE ALL PLANT MATERIAL FOR ONE YEAR FROM TIME OF LANDSCAPE ARCHITECT'S FINAL WRITTEN APPROVAL.
13. CONTRACTOR TO COORDINATE PLANTING, SEEDING AND TREE WORK WITH OTHER TRADES.
14. CONTRACTOR RESPONSIBLE FOR OBTAINING ALL PERMITS WHERE REQUIRED.
15. CONTRACTOR RESPONSIBLE FOR RESTORING ALL AREAS DISTURBED DUE TO PLANTING OPERATIONS.
16. PERCOLATION TEST: PRIOR TO ANY TREE PLANTING, THE CONTRACTOR SHALL FILL A MINIMUM OF 25% OF THE PLANTING PITS WITH WATER AND OBSERVE THE RATE OF PERCOLATION. IF IN THE OPINION OF THE CONTRACTOR, SLOW PERCOLATION INDICATES A SOIL CONDITION MIGHT ENDANGER THE HEALTH OF MATERIALS TO BE PLANTED, HE SHALL CONTACT THE LANDSCAPE ARCHITECT TO ESTABLISH A MUTUALLY ACCEPTABLE METHOD OF PROVIDING ADEQUATE DRAINAGE. COMPENSATION FOR ANY NECESSARY DRAINAGE PROVISIONS SHALL BE AT A NEGOTIATED PRICE. NO CLAIMS FOR ADDITIONAL COMPENSATION ARISING FROM THE LOSS OF PLANT MATERIAL DUE TO GROUND WATER PROBLEMS WILL BE ACCEPTED UNLESS THIS PROCEDURE IS FOLLOWED.
17. TOP SOIL MIX SHALL INCLUDE:
    - 3 PARTS SCREENED TOPSOIL
    - 1 PART SAND
    - 1 PART HUMUS
    - 5 LBS. SUPERPHOSPHATE PER CU. YD. OF MIX

STATE OF NEW YORK · RICHARD P. GUIDA · No. 826 · LICENSED LANDSCAPE ARCHITECT

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Developer: Warburton, LLC

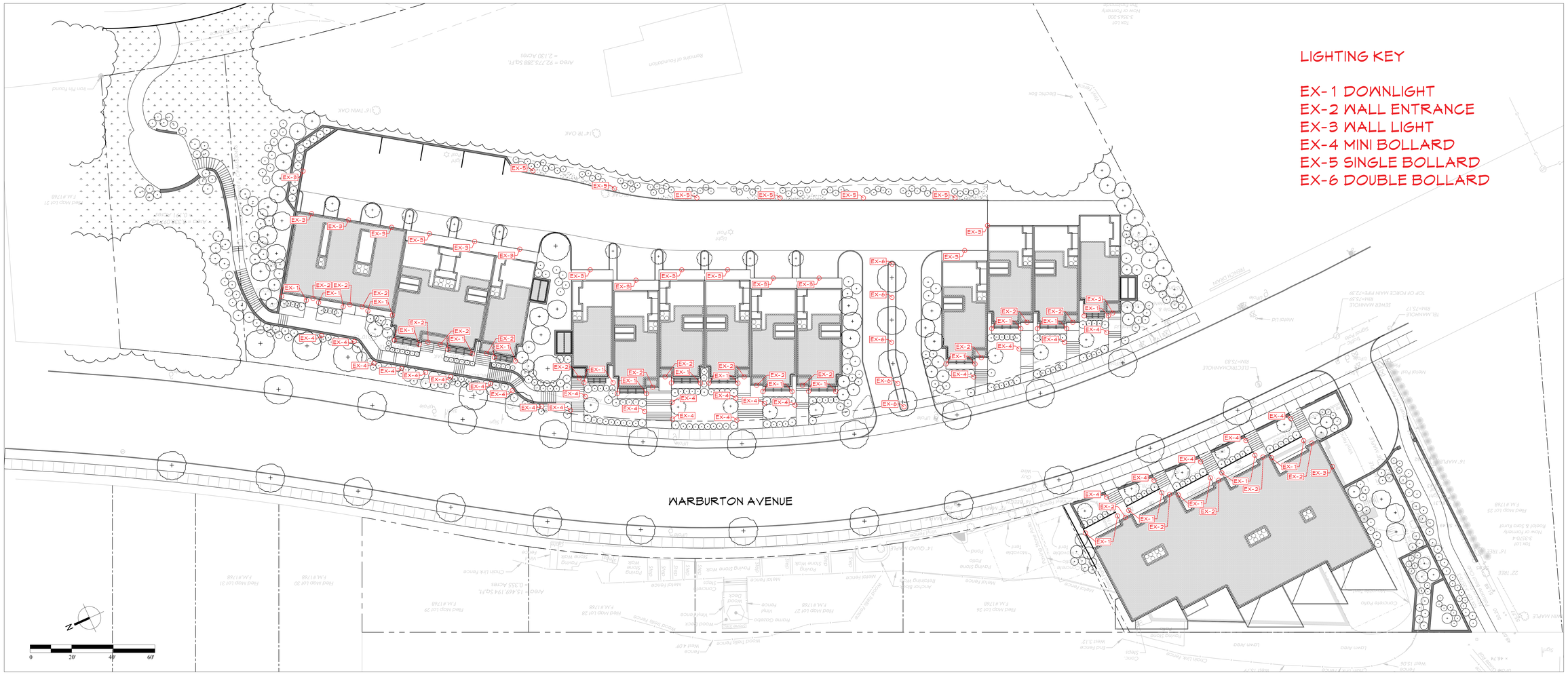
Project Title: 1 · Warburton Avenue, Hastings-on-Hudson, NY

Date Issue	
11.04.2021	VILLAGE BOARD SUBMISSION
03.24.2022	PLAN REVISIONS
05.05.2022	REVISED BOARD SUBMISSION

Project No.	20201
Date	11.04.2021
Drawing By	GV
Scale	AS NOTED

Drawing Title: PLANTING PLAN

Drawing No. SK-6



1 LIGHTING PLAN

SCALE: 1"=20'

Type	Location	Description	Lamp	Wattage	Voltage	MFR	Cat #
EX1	BALCONY	WALL MOUNTED UP/DOWN LIGHT, BLACK FINISH	LED	7.6	120	ASTRO	OSLO 255 #1298017
		Dimensons: H 10.4" - W 4.33" - L 4.57"					
EX2	FRONT ENTRANCE	WALL MOUNTED DOWNLIGHT, BLACK TEXTURED FINISH	LED	17	120	VISION 3	WM2-BLT-SQ-CS-M015-140-L3-0-H1
		Dimensons: H 6.75" - W 3.25" - L 3.25""					
EX3	REAR	WALL MOUNTED DOWNLIGHT, BLACK FINISH	LED	14	120	LIGMAN	ULEW-30011-14-T4-W30-01-120/277V
		Dimensons: H 8.03" - W 8.11" - L 4.97"					
EX4	PATHWAY	BOLLARD, 39" HT, BLACK FINISH, TYPE 3 OPTIC	LED	8	120	LIGMAN	UPRA-10002-8-T3-W30-01-120/277V-SP
		AMCHOR BOLT CONCRETE MOUNTING					
		Dimensons: H 39.3" - W 4" - L 5.7"					
EX5	ROADWAY	SINGLE HEAD BOLLARD, TYPE 3 OPTIC, BLACK FINISH	LED	28	120	LIGMAN	UVK-10002-28-T3-W30-10-120/277V
		SQUARE POLE, 47" OAH, ANCHOR BOLT CONCRETE MOUNTING					
		Dimensons: H 47.2" - W 10.2" - L 15.2"					
EX6	ROADWAY	DOUBLE HEAD BOLLARD, TYPE 3 OPTIC, BLACK FINISH	LED	56	120	LIGMAN	UVK-10012-T3-W30-01-120/277V-SP
		SQUARE POLE, 47" OAH, ANCHOR BOLT CONCRETE MOUNTING					
		Dimensons: H 47.2" - W 10.2" - L 26.3"					

2 LIGHTING SCEDULE

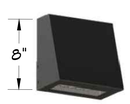
SCALE: 1"=20'

EX-1 ASTO OSLO 255

SCALE: N.T.S.

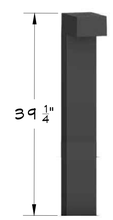
EX-2 VISION 3 WM2

SCALE: N.T.S.



EX-3 LIGMAN ULEW

SCALE: N.T.S.

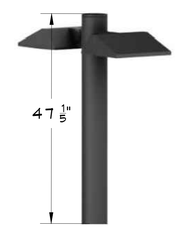


EX-4 LIGMAN UPRA

SCALE: N.T.S.

EX-5 LIGMAN UVK 10002

SCALE: N.T.S.



EX-6 LIGMAN UVK 10012

SCALE: N.T.S.

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Project No.	20201
Date	11.09.2021
Drawing By	GV
Scale	AS NOTED

Drawing Title: LIGHTING PLAN

Drawing No. SK-7

STORMWATER POLLUTION PREVENTION PLAN & DRAINAGE ANALYSIS

Proposed Subdivision
1 Warburton Avenue
Village of Hastings-on-Hudson

May 4, 2022

Hudson Engineering & Consulting, P.C.
45 Knollwood Road - Suite 201
Elmsford, NY 10523

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STORMWATER POLLUTION PREVENTION PLAN
1 Warburton Avenue
Village of Hastings-on-Hudson - New York

A. INTRODUCTION

This Stormwater Pollution Prevention Plan (SWPPP) presents the proposed Best Management Practices (BMPs) to control erosion and sedimentation, and manage stormwater, during the construction of a proposed residential development on a property totaling 3.0 acres. As proposed, the development disturbs approximately 1.7 Acres.

This SWPPP consists of this narrative with enclosures and a plan set entitled "Proposed Residences at 1 Warburton Avenue - Village of Hastings-on-Hudson – Westchester County – New York", all as prepared by Hudson Engineering and Consulting, P.C., Elmsford, New York, last revised May 4, 2022. The plans and report have been prepared to meet the requirements of the New York State Department of Environmental Conservation (NYSDEC) and the Village of Hastings-on-Hudson. This Plan is required by the New York State Department of Environmental Conservation (NYSDEC) pursuant to the Phase II regulations under General Permit GP-0-20-001.

B. METHODOLOGY

The stormwater analysis was developed utilizing the Soil Conservation Service (SCS) TR-20 methodologies (HydroCad®) to assist with the drainage analysis and design of the mitigating practice. The "Complex Number" (CN) value determination is based on soil type, vegetation and land use. *See Soil Map & Report contained herein.* The "Time of Concentration" (T_c) is determined by the time wise longest flow path within each watershed. The CN and T_c data is input into the computer model. The project site was modeled for the peak rates of runoff from the 1-year Type III – 24-hour extreme storm events in both the Pre- and Post-Developed Conditions. Additionally, portions of the site were analyzed for the 100-year storm event in the Post-Developed condition for the sizing of on-site stormwater infrastructure. *See Extreme Precipitation Table contained within the report*.

This project involves modifications to an existing developed property; therefore, this will be classified as redevelopment per the NYSDEC Phase II regulations. Stormwater management facilities have been designed in accordance with *Chapter 9: Redevelopment Activities of the New York State Design Manual*.

C. PROJECT DESCRIPTION

i) <u>Site Description:</u>

The proposed development is located on Warburton Avenue approximately 3,000 feet south of the intersection of Warburton Avenue and Pinecrest Drive. The development consists of two separate areas, one on the western side of Warburton avenue (approximately 0.7 acres) and one on the eastern side of Warburton Avenue (approximately 2.3 acres). The site consists of an event hall and associated improvements on the western lot and the parking area and associated improvements on the eastern lot. The project area is bounded by the Old Croton Aqueduct to the east and the Hudson River to the west. The project area slopes from east to west towards the Hudson River. The project area consists of a total of 48,356 square feet of impervious improvements. The remaining areas consist of woods and lawn areas. In the existing conditions, the stormwater runoff flows from east to west eventually into the Hudson River via pipe. There is no existing water quality or water quantity features located on the site.

The soil classifications, based upon Westchester County Soils Mapping, is, Chatfield-Charlton complex (CsD), 15 to 35 percent slopes, very rocky, with a hydrologic classification of Type “B", Riverhead Loam, 25 to 50 percent slopes, with a hydrologic classification of Type “A", and Urban land-Charlton-Chatfield Complex, Rolling, Very rocky, with no hydrologic classification. All existing soils onsite are considered as well drained. The on-site land cover is classified as Woods, and Lawn/Landscaping, with the remaining cover as impervious area.

ii) Stormwater Design Summary:

The proposed development includes the construction of four residential buildings, proposed access driveways and other various site improvements. As shown, the development utilizes various planning techniques such as utilizing green infrastructure and reducing parking area to minimize the impact of the development of runoff flows, quality, and the environment overall. These techniques and their overall impact to the design are discussed in depth within in this narrative.

Section 9.2 of the NYSDEC Design manual outlines the scope of the stormwater design for redevelopment projects with Section 9.2.1A focusing on water quantity controls and Section 9.2.1B focusing on water quality controls.

In accordance with section 9.2 A, analysis of the 10- and 100-year storm events is not required if there is no change to the hydrology of the site. Furthermore, 24-hour detention of the Channel Protection Volume is not required if there is a reduction in rate of runoff from the site.

> This narrative and supporting documents will demonstrate that there is no change to the overall hydrology of the development area and that there is a reduction of runoff for the 1-year storm event thus eliminating the analysis of the 10- and 100-year storm events and the 24-hour detention of the Channel Protection volume.

In accordance with Section 9.2 B. I, water quality treatment can be achieved through the reduction of 25% impervious coverage.

This narrative and supporting documents will demonstrate that there is a net reduction of impervious coverage exceeding 25% thus eliminating the need for any further water quality improvements.

D. LIST OF PERMITS

The following is a list of permits and approvals required for the project along with the status.

- Village of Hastings-on-Hudson Planning Board Approval
- Village of Hastings-on-Hudson Stormwater MS4 SWPPP Approval
- Village of Hastings-on-Hudson Village Board Zoning Ordinance Amendment.
- City of Yonkers Water Main Extension Approval
- City of Yonkers Sewer Main Extension Approval
- WCDOH Sewer and Water Main Extension Approval
- NYSDEC – SPDES General Permit # GP-0-20-001

E. PRE-DESIGN INVESTIGATIVE ANALYSIS

Due to the presence ledge rock throughout the property, conventional stormwater management practices could not be utilized in the stormwater design (i.e. infiltration chambers, infiltration basins, etc.). The existing site consist of no formal stormwater mitigation features.

F. PRE-DEVELOPED CONDITION

In the existing conditions, the development area was analyzed as three watershed, Watershed 1, Watershed 2, and Watershed 3. Each watershed was analyzed as follows:

Watershed 1 contains approximately 71,779 square feet; of which; 29,905 square feet is impervious in the form of existing parking area and retaining walls. The remaining 41,874 square feet is pervious in the form of wooded area in HSG 'Type B' soils. This watershed has a weighted CN Value of 76 and a calculated Tc of 10.2 minutes. Overland flow from the tributary area originates on the eastern property boundary adjacent to the aqueduct and flows in a westerly

direction where it enters an existing on-site drain inlet where it is then conveyed off-site via pipe and enters the municipal drainage system.

Watershed 2 contains approximately 29,322 square feet; of which; 858 square feet is impervious in the form of existing retaining walls. The remaining 28,464 square feet is pervious in the form of wooded area in HSG 'Type B' soils. This watershed has a weighted CN Value of 61 and a calculated Tc of 10.3 minutes. Overland flow from the tributary area originates on the eastern property boundary and flows in a southerly direction where it exits the site onto the adjacent property.

Watershed 3 contains approximately 32,979 square feet; of which; 17,593 square feet is impervious in the form of an existing building, driveway, and patio areas. The remaining 15,386 square feet is pervious in the form of wooded area in HSG 'Type A' and 'Type B' soils and lawn/landscaping in 'Type B' soils. This watershed has a weighted CN Value of 76 and a calculated Tc of 1.0 minutes (direct entry).

Combined runoff rates for the development area for the Channel Protection Volume Storm event (1-year) were calculated as 1.90 cfs.

G. POST-DEVELOPED CONDITION

In the proposed conditions, the development area was analyzed as five watershed, Watershed 1, Watershed 1A, Watershed 2, Watershed 3 and Watershed 3A. Each watershed was analyzed as follows:

Watershed 1 contains approximately 23,471 square feet; of which; 6,367 square feet is impervious in the form of walkways, patios and retaining walls. The remaining 17,104 square feet is pervious in the form of wooded area and lawn/landscaping in HSG 'Type B' soils. This watershed has a weighted CN Value of 71 and a calculated Tc of 7.5 minutes. Overland flow from the tributary area originates in the center of the site adjacent to the proposed driveway and travels west where it exits the property.

Watershed 1A contains approximately 48,411 square feet; of which; 20,307 square feet is impervious in the form of the proposed driveway and roof area. The remaining 28,104 square feet is pervious in the form of portions of green roof, lawn/landscaped areas, and wooded area in HSG 'Type B' soils. This watershed has a weighted CN Value of 76 and a calculated Tc of 10.6 minutes. Overland flow from the tributary area originates on the eastern property boundary adjacent to the aqueduct and flows in a westerly direction where it enters a proposed drain inlet and is conveyed via pipe to a proposed hydrodynamic separator prior to being discharge to the municipal drainage system. The proposed Hydrodynamic separator is designed to provide water quality treatment for the tributary area for the 1-Year storm event and by-pass flows up to and including the 100-Year storm event.

Watershed 2 contains approximately 29,219 square feet; of which; 858 square feet is impervious in the form of existing retaining walls. The remaining 28,361 square feet is pervious in the form of wooded area in HSG 'Type B' soils. This watershed has a weighted CN Value of 61 and a calculated Tc of 10.3 minutes. Overland flow from the tributary area originates on the eastern property boundary and flows in a southerly direction where it exits the site onto the adjacent property.

Watershed 3 contains approximately 25,415 square feet; of which; 3,745 square feet is impervious in the form of walkways, walls, and patio areas. The remaining 21,670 square feet is pervious in the form of wooded area and lawn/landscaping in HSG 'Type A' and 'Type B' soils. This watershed has a weighted CN Value of 60 and a calculated Tc of 1.0 minute (direct entry).

Watershed 3A contains approximately 7,564 square feet; of which; 1,551 square feet is impervious in the form of roof mechanical area and the proposed driveway. The remaining 6,013 square feet is pervious in the form of the green roof area. This watershed has a weighted CN Value of 69 and a calculated Tc of 1.0 minute (direct entry).

Combined runoff rates for the development area for the Channel Protection Volumes Storm event (1-year) were calculated as 1.47 cfs. Because there is no change to the overall hydrology of the site and a reduction of the rate of runoff for the Channel Protection Volume, no further analysis for water quantity measures is required.

H. WATER QUALITY VOLUME (WQv)

The SWPPP for this site has been designed to improve water quality in accordance with the criteria contained in the publication entitled, "New York State Stormwater Management Design Manual", as prepared by New York State Department of Environmental Conservation [NYSDEC], specifically, Section 9.2 B. I.

Water quality treatment has been provided by reducing the proposed impervious area by more than 25% over the existing conditions. This was achieved by incorporating green roofs into the design of the for buildings. Approximately 14,516 square feet of green roof area was incorporated into the design. As note in Section 5.3: Green infrastructure Techniques, of the NYSDEC Design manual; green roof areas can be used to reduce the impervious coverage for redevelopment projects. By utilizing green roofs into the design, the total impervious coverage and environmental impact of the development is significantly.

The proposed development results in a decrease from 48,356 square feet of impervious coverage in the existing conditions to 32,828 square feet in the existing conditions for a total reduction of 15,528 square feet or 32%.

Pre- and Post-Development coverage are summarized as follows:

Pre- and Post- Impervious Coverage Summary	
Total Existing Impervious Area	48,356-square feet
Total Proposed Impervious Area	32,828-square feet
Total Decrease in Impervious Area	15,528-square feet
Percent Decrease	32%

While no further water quality improvements are necessary due to the extensive reduction in impervious area, Additional water quality treatment is provided by a hydrodynamic separator sized to provide water quality treatment for the 1-year storm event over watershed 1A.

Sizing calculations for the proposed hydrodynamic separator are included within this report.

I. NYSDEC DESIGN MANUAL TABLE 3.1 DESIGN REGULATIONS

In order to preserve the existing natural resources, the practices outlined in table 3.1 of the NYSDEC design regulations were incorporated into the design as follows:

- Preservation of Undisturbed Areas: Permanent conservation easements of undisturbed areas are not proposed for this site.
- Preservation of Buffers: Permanent conservation easements of undisturbed areas are not proposed for this site.
- Reduction of Clearing and Grading: The construction area has been limited to the minimum extent possible.
- Locating Development in Less Sensitive Areas: All development has been located to minimize disturbance within any sensitive areas.
- Open Space Design: See Preservation of Undisturbed Areas.
- Soil Restoration: As required, all disturbed soil areas will be “deep tilled” prior to the establishment of ground cover and shall be restored per Table 5.3 ‘Soil Restoration Requirements’ in Chapter 5 of the New York State Stormwater Design Manual, latest edition. Deep tilling and soil enhancement restores the absorptive quality of the soil and increases water quality.
- Roadway Reduction: No roadway is proposed as part of this application.
- Sidewalk Reduction: Sidewalks are being proposed as part of this project and have been reduced to the extent practical for pedestrian access.

- Driveway Reduction: The driveway has been configured to provide access to each residential unit and reduce the footprint.
- Cul-de-sac Reduction: No Cul-de-sac is proposed.
- Building Footprint Reduction: The building footprint has been limited to the minimum extent practical for the real estate market within this area.
- Parking Reduction: No excess parking is being provided as part of this project. The majority of the parking has been provided within the footprint of the buildings to limit the footprint of parking areas.
- Conservation of Natural Areas: See Preservation of Undisturbed Areas.
- Sheet Flow to riparian buffers or filter strips: Not applicable to this application.
- Vegetated Open Swale: Not applicable to this application.
- Tree Planting/Tree Boxes: Not applicable to this project.
- Disconnection of Rooftop Runoff: Not applicable to this project.
- Stream Daylighting for Redevelopment Projects: Not applicable to this project.
- Rain Gardens: Not applicable to this application.
- Green Roof: Green roofs were incorporated to each building to reduce the impact of the development.
- Stormwater Planters: Not applicable to this project.
- Rain tank/Cistern: No rain tanks/cisterns are proposed as part of this project.
- Porous Pavement: Due to the presence of ledge rock and configuration of the driveway porous pavement would not be beneficial in this project and thus could not be incorporated. While porous pavement/surfaces do not have their place within the driveway, they have been utilized various walkways and patios on are in areas where runoff can be transferred to the soils.

J. CONSTRUCTION PHASE

During the construction phase of the project, a sediment and erosion control plan shall be implemented in accordance with the New York State Department of Environmental Conservation's Best Management Practices (BMP). The primary goals of the sediment and erosion control plan are to prevent the tracking of dirt and mud onto adjacent roads, to prevent mud and silt from entering into existing and proposed drainage facilities, and to protect the receiving waters from contamination during the construction.

During construction, the party responsible for implementing the temporary (during construction) Stormwater Management facilities Maintenance Program will be the Owner. The name and contact information will be filed with the Village of Hastings-on-Hudson and the NYSDEC at the time of the preconstruction meeting.

A New York State Professional Engineer or Certified Professional in Erosion and Sediment Control (P.E. or CPESC) shall conduct an assessment of the site prior to the commencement of construction and certify in an inspection report that the appropriate erosion and sediment controls shown on the plan have been adequately installed and/or implemented to ensure overall preparedness of the site for construction. Following the commencement of construction, site inspections shall be conducted by the P.E. or CPESC at least two (2) times every 7 calendar days and within 24 hours of the end of a storm event of 0.5 inches or greater.

During each inspection, the representative shall record the following:

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 approximate degree of sediment accumulation as a percentage of the sediment storage volume;

5. Inspect all erosion and sediment control practices and record all maintenance requirements. 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 the barrier. Record the depth of sediment within containment structures and any erosion near outlet and overflow structures.

6. All identified deficiencies.

The P.E. or CPESC shall maintain a record of all inspection reports in a site logbook. The site logbook shall be maintained on-site and be made available to the Village of Hastings-on-Hudson and the NYSDEC. A summary of the site inspection activities shall be posted on a monthly basis in a publicly accessible location at the site.

The projects anticipated start date is Spring 2023 and the anticipated completion date is estimated to occur by Fall 2024.

K. CONSTRUCTION SEQUENCING:

Schedule a pre-construction meeting with appropriate permitting authority prior to the start of work. All involved partied shall be present including representative from the Village of Hastings-on-Hudson Engineering Department, Contractor, and Licensed Professional Engineer. The following erosion control schedule should be used:

1. Install construction fence in all locations shown on the plans.
2. Install Tree Protection for trees and plants to remain within and immediately adjacent to the grading limit line with temporary orange construction fencing or solidly constructed wood barricades as required. Protect root systems from smothering. Do not store excavated material or allow vehicular traffic or parking within the canopy drip line. Restrict foot traffic to prevent excessive compaction of soil over root systems. Store materials and equipment in cleared areas away from tree roots. Prevent employees and equipment from trampling over woodland, existing planting, and established lawns
3. Selective vegetation removal for silt fence installation.
4. Install silt fence down slope of all areas to be disturbed as shown on the plan.
5. Install a construction entrance to the development area.
6. Establish construction staging areas.
7. Remove all buildings & site features as outlined on construction documents. All materials to be removed and recycled/disposed of in accordance with all local, state, and federal regulations.
8. Strip topsoil and stockpile at the locations specified on the plans (up gradient of erosion control measures). Temporarily stabilize topsoil stockpiles (hydroseed during may 1st/ through october 31st planting season or by covering with a tarpaulin(s) november 1st/ through april 30th/. Install silt fence around toe of slope.
9. Rough grade the site. Excavate and construct foundations & site retaining walls.
10. Install all utilities as outline on construction documents.
11. Install temporary inlet protection on all newly installed catch basins and drain inlets.
12. Install curbing, sub-base and base courses to stabilize driveway. Temporarily seed and mulch all disturbed areas.

13. Construct Buildings.
14. Install 4”-6” topsoil, fine grade, seed the entire project site and install landscape plantings. Spread salt hay over seeded areas. All seeding for final vegetative stabilization shall be applied per the following section entitled 'erosion and sediment control components - surface stabilization'.
15. Install pavement top course.
16. Clean stormwater conveyance system components, including all catch basins, manholes, piping and treatment devices.
17. Remove all temporary soil erosion and sediment control measures after the site is stabilized with vegetation.

    *Soil erosion and sediment control maintenance must occur at least once a week and prior to and after every ½” or greater rainfall event.

L. EROSION AND SEDIMENT CONTROL COMPONENTS

The primary aim of the soil and sediment control measures is to reduce soil erosion from areas stripped of vegetation during and after construction and to prevent silt from reaching the off-site drainage structures and downstream properties. As outlined in the Construction Sequencing schedule, the Sediment and Erosion Control Components are an integral component of the construction sequencing and will be implemented to control sedimentation and re-establish vegetation.

Planned erosion and sedimentation control practices during construction include the installation, inspection and maintenance of the inlet protection, soil stockpile areas, diversion swales and silt fencing. General land grading practices, including land stabilization and construction sequencing are also integrated into the Sediment and Erosion Control Plan. Dust control is not expected to be a problem due to the relatively limited area of exposure, the undisturbed perimeter of trees around the project area and the relatively short time of exposure. Should excessive dust be generated, it will be controlled by sprinkling.

All proposed soil erosion and sediment control practices have been designed in accordance with the following publications:

- New York State standards and Specifications for Urban Erosion and Sediment Control, August 2005
- New York State General Permit for Stormwater Discharges, GP-0-20-001 (General permit).

- "Reducing the Impacts of Stormwater Runoff from New Development", as published by the New York State Department of Environmental Conservation (NYSDEC), second edition, April, 1993.

The proposed soil erosion and sediment control devices include the planned erosion control practices outlined below. Maintenance procedures for each erosion control practice have also been outlined below.

- **SILT FENCE**

  Silt fence (geo-textile filter cloth) shall be placed in locations depicted on the approved plans. The purpose of the silt fence is to reduce the velocity of sediment laden stormwater from small drainage areas and to intercept the transported sediment load. In general, silt fence shall be used at the toe of slopes or intermediately within slopes where obvious channel concentration of stormwater is not present.

  Maintenance

  Silt fencing shall be inspected at a minimum of once per week and prior to and within 24 hours following a rain event ½" or greater. Inspections shall include ensuring that the fence material is tightly secured to the woven wire and the wire is secured to the wood posts. In addition, overlapping filter fabric shall be secured and the fabric shall be maintained a minimum of six (6) inches below grade. In the event that any "bulges" develop in the fence, that section of fence shall be replaced within 24 hours with new fence section. Any sediment build-up against the fence shall be removed within 24 hours and deposited on-site a minimum of 100 feet outside of any wetland or watercourse.

  The installation of silt fencing will be maintained or replaced until the fencing is no longer necessary. Once the site is stabilized, all silt fences shall be removed. The immediate area occupied by the silt fence will be shaped to an acceptable grade and stabilized.

- **INLET PROTECTION**

  After catch basins and surface inlets have been installed, these drain inlets will receive stormwater from the roadways, driveways, and surrounding overland watersheds. In order to protect the receiving waters from sedimentation, the contractor shall install stone and block inlet protection as shown on the plans. Once installed, ¾ inch stone aggregate shall be installed around the perimeter of all catch basins and surface inlets as illustrated on the approved plans. This barrier will allow stormwater to be filtered prior to reaching the basin inlet grate.

The stone barrier should have a minimum height of 1 foot and a maximum height of 2 feet. Do not use mortar. The height should be limited to prevent excess ponding and bypass flow. Recess the first course of blocks at least 2 inches below the crest opening of the storm drain for lateral support. Subsequent courses can be supported laterally if needed by placing a 2x4 inch wood stud through the block openings perpendicular to the course. The bottom row should have a few blocks oriented so flow can drain through the block to dewater the basin area. The stone should be placed just below the top of the blocks on slopes of 2:1 or flatter. Place hardware cloth of wire mesh with ½ inch openings over all block openings to hold stone in place.

As an optional design, the concrete blocks may be omitted and the entire structure constructed of stone, ringing the outlet ("doughnut"). The stone should be kept at a 3:1 slope toward the inlet to keep it from being washed into the inlet.

A level area 1 foot wide and four inches below the crest will further prevent wash. Stone on the slope toward the inlet should be at least 3 inches in size for stability and 1 inch or smaller away from the inlet to control flow rate. The elevation of the top of the stone crest must be maintained 6 inches lower than the ground elevation down slope from the inlet to ensure that all storm flows pass over the stone into the storm drain and not past the structure.

The barrier should be inspected after each rain event and repairs made within 24 hours. Remove sediment as necessary to provide for accurate storage volume for subsequent rains. Upon stabilization of contributing drainage area, remove all materials and any unstable soil and dispose of properly. Bring the disturbed area to proper grade, smooth, compact and stabilized in a manner appropriate to the site.

<u>Maintenance</u>

Stone Aggregate: The stone aggregate shall be inspected weekly prior to and within 24 hours following a rain event ½" or greater. Care shall be taken to ensure that all stone aggregate is properly located and secure and do not become displaced. The stone aggregate shall be inspected for accumulated sediments and any accumulated sediment shall be removed from the device and deposited not less than 100 feet from wetland or watercourse.

- **TREE PROTECTION**

All significant trees to be preserved located within the limits of disturbance and on the perimeter of the disturbance limits shall be protected from harm by erecting a 3' high (minimum) snow fence completely surrounding the tree. Snow fence should extend to the drip-line of the tree to be preserved. Trees designated to be protected shall be identified during the staking of the limits of disturbance for each construction phase.

Maintenance

The snow fence shall be inspected daily to ensure that the perimeter of the fence remains at the drip-line of the tree to be preserved. Any damaged portions of the fence shall be repaired or replaced within 24 hours. Care shall also be taken to ensure that no construction equipment is driven or parked within the drip-line of the tree to be preserved.

- **SOIL/SHOT ROCK STOCKPILING**

All soil and shot rock stripped from the construction area during grubbing and mass grading shall be stockpiled in locations shown on the plans, but in no case shall they be placed within 100' of a wetland or watercourse. The stockpiled soils shall be re-used during finish-grading to provide a suitable growing medium for plant establishment. Soil stockpiles shall be protected from erosion by vegetating the stockpile with rapidly –germinating grass seed (during the May 1st – October 30th) planting season or covering the stockpile with tarpaulin the remainder of the year. Install silt fence around toe of slope.

Maintenance

Sediment controls (silt fence) surrounding the stockpiles shall be inspected according to the recommended maintenance outline above. *All stockpiles shall be inspected for signs of erosion or problems with seed establishment weekly or tarpaulin and prior to and within 24 hours following a rain event ½" or greater.*

- **GENERAL LAND GRADING**

The intent of the Erosion & Sediment Control Plan is to control disturbed areas such that soils are protected from erosion by temporary methods and, ultimately, by permanent vegetation. Where practicable, all cut and fill slopes shall be kept to a maximum slope of 2:1. In the event that a slope must exceed a 2:1 slope, it will be stabilized with stone riprap. On fill slopes, all material will be placed in layers not to exceed 12 inches in depth and adequately compacted. Diversion swales shall be constructed on the top of all fill embankments to divert any overland flows away from the fill slopes.

- **SURFACE STABILIZATION**

All disturbed areas will be protected from erosion with the use of vegetative measures (i.e., grass seed mix, sod) hydromulch netting or hay. In areas where soil disturbance activity has temporarily or permanently ceased, the application of soil stabilization measures must be initiated by the end of the next business day and completed within seven (7) days from the date the current soil disturbance activity ceased. When activities temporarily cease

during construction, soil stockpiles and exposed soil should be stabilized by seed, mulch or other appropriate measures.

All seeded areas will be re-seeded, as necessary, and mulched according to the site plan to maintain a vigorous, dense vegetative cover,

Erosion control barriers (silt fencing) shall be placed around exposed areas during construction. Where exposed areas are immediately uphill from a wetland or watercourse, the erosion control barrier will consist of double rows of silt fencing. Any areas stripped of vegetation during construction will be vegetated and/or mulch, but in no case more than 7 days to prevent erosion of the exposed soils. And topsoil removed during construction will be temporarily stockpiled for future use in grading and landscaping.

As mentioned above, temporary vegetation will be established to protect exposed soil areas during construction. If growing conditions are not suitable for the temporary vegetation, mulch will be used to the satisfaction of the Town/Village Engineer. Materials that may be used for mulching include straw, hay, salt hay, wood fiber, synthetic soil stabilizers, mulch netting, sod or hydromulch. In site areas where significant erosion potential exists (steep slopes) and where specifically directed by the Town/Village's representative, Curlex Excelsior erosion control blankets (manufactured by American Excelsior, or approved equal) shall be installed. A permanent vegetative cover will be established upon completion of construction of those areas that have been brought to finish-grade and to remain undisturbed.

- **Temporary Stabilization (May 1st through October 31st planting season)**

  The following seeding application should be used depending on the time of year.

  - Spring/summer or early fall, seed the area with ryegrass (annual or perennial) at 30 lbs. per acre (Approximately 0.7 lb/1000 sq. ft. or use 1 lb/1000 sq. ft.).

  - Late fall or early winter, seed Certified 'Aroostook' winter rye (cereal rye) at 100 lbs. per acre (2.5 lbs/1000 sq. ft.).

- **Permanent Stabilization (May 1st through October 31st planting season)**

  1. Provide minimum of four (4) inches topsoil for all new lawn areas. Top dress all existing disturbed lawn areas with two (2) inches of topsoil.

  2. Grass seed shall be evenly sown by mechanical seeder at a rate of 3.0-4.0 pounds per 1,000 square feet.

  3. Fine rake, roll and water to a depth of one inch all seeded areas.

4. Apply air-dried hay or straw mulch to provide 90% coverage of surface (approximately 90 lbs. per 1,000 sf). Use small grain straw where mulch is maintained for more than three months

5. Contractor shall provide, at his own expense, protection against trespassing and other damage to lawn areas.

6. Lawn seed mix shall include:

   a. General Recreation areas and lawns:

      - 65% Kentucky Bluegrass blend
      - 20% Perennial Rye
      - 15% Fine fescue

      Sod may be used as an alternate to seeding in select areas.

      Slow release fertilizers will be applied by hand to horticultural plantings as part of regular horticultural maintenance program and shall be limited to a single spring application.

- **DEWATERING**

  Prevent surface water and subsurface or ground water from flowing into excavations and trenches. Pump out any accumulated water.

  Do not allow water to accumulate in excavations or trenches. Remove water from all excavations immediately to prevent softening of foundation bottoms, undercutting footings, and soil changes detrimental to the stability of subgrades and foundations. Furnish and maintain pumps, sumps, suction and discharge piping systems, and other system components necessary to convey the water away from the Site.

  Convey water removed from excavations, and rain water, to collecting or run-off area. Cut and maintain temporary drainage ditches and provide other necessary diversions outside excavation limits for each structure. Do not use trench excavations as temporary drainage ditches.

  Provide temporary controls to restrict the velocity of discharged water as necessary to prevent erosion and siltation of receiving areas.

M. CONSTRUCTION PRACTICES TO MINIMIZE STORMWATER CONTAMINATION

General:

Adequate measures shall be taken to minimize contaminant particles arising from the discharge of solid materials, including building materials, grading operations,

and the reclamation and placement of pavement, during project construction, including but not limited to:

- Building materials, garbage, and debris shall be cleaned up daily and deposited into dumpsters, which will be periodically removed from the site and appropriately disposed of. All dumpsters and containers left on-site shall be covered and surrounded with silt fence in order to prevent contaminants from leaving the site. Silt fencing shall be inspected on a weekly basis.

- Dump trucks hauling material from the construction site will be covered with a tarpaulin.

- The paved street adjacent to the site entrance will be swept daily to remove excess mud, dirt, or rock tracked from the site.

- Petroleum products will be stored in tightly sealed containers that are clearly labeled.

- All vehicles on site will be monitored for leaks and receive regular preventive maintenance to reduce the chance of leakage.

- All spills will be cleaned up immediately upon discovery. Spills large enough to reach the storm system will be reported to the National Response Center at 1-800-424-8802.

- Materials and equipment necessary for spill cleanup will be kept in the temporary material storage trailer onsite. Equipment will include, but not be limited to, brooms, dust pans, mops, rags, gloves, goggles, kitty litter, sand, saw dust, and plastic and metal trash containers.

- All paint containers and curing compounds will be tightly sealed and stored when not required for use. Excess paint will not be discharged to the storm system, but will be properly disposed according to the manufacturer’s instructions.

- Sanitary waste will be collected from portable units a minimum of two times a week to avoid overfilling. All sanitary waste units shall be surrounded by silt fence to prevent contaminants from leaving the site. Silt fencing shall be inspected on a weekly basis.

- Any asphalt substances used on-site will be applied according to the manufacturer's recommendation.

- Fertilizers will be stored in a covered shed and partially used bags will be transferred to a sealable bin to avoid spills and will be applied only in the

minimum amounts recommended by the manufacturer and worked into the soil to limit exposure to stormwater.

- No disturbed area shall be left un-stabilized for longer than 14 days during the growing season.

- When erosion is likely to be a problem, grubbing operations shall be scheduled and performed such that grading operations and permanent erosion control features can follow within 24 hours thereafter.

- As work progresses, patch seeding shall be done as required on areas previously treated to maintain or establish protective cover.

- Drainage pipes and swales/ditches shall generally be constructed in a sequence from outlet to inlet in order to stabilize outlet areas and ditches before water is directed to the new installation or any portion thereof, unless conditions unique to the location warrant an alternative method.

Spill Control & Spill Response:

- For all hazardous materials stored on site, the manufacturer's recommended methods for spill cleanup will be clearly posted. Site personnel will be made aware of the procedures, and the locations of the information and cleanup supplies.
- Appropriate cleanup materials and equipment will be maintained by the Contractor in the materials storage area on-site. As appropriate, equipment and materials may include items such as booms, dust pans, mops, rags, gloves, goggles, kitty litter, sand, sawdust, and plastic and metal trash containers specifically for clean up purposes.
- All spills will be cleaned immediately after discovery and the materials disposed of properly.
- The spill area will be kept well ventilated and personnel will wear appropriate protective clothing to prevent injury from contact with a hazardous substance.
- After a spill, a report will be prepared describing the spill, what caused it, and the cleanup measures taken. The spill prevention plan will be adjusted to include measures to prevent this type of spill from reoccurring, as well as clean up instructions in the event of reoccurrences.
- The Contractor's site superintendent, responsible for day-to-day operations, will be the spill prevention and cleanup coordinator. The Contractor is responsible for ensuring that the site superintendent has had appropriate training for hazardous materials handling, spill management, and cleanup.

- The Contractor's site superintendent will be notified immediately when a spill or the threat of a spill is observed. The superintendent will assess the situation and determine the appropriate response.
- If spills represent an imminent threat of escaping erosion and sediment controls and entering receiving waters, personnel will be directed to respond immediately to contain the release and notify the superintendent after the situation has been stabilized.
- Spill kits containing appropriate materials and equipment for spill response and cleanup will be maintained by the Contractor at the site.
- If oil sheen is observed on surface water, action will be taken immediately to remove the material causing the sheen. The Contractor will use appropriate materials to contain and absorb the spill. The source of the oil sheen will also be identified and removed or repaired as necessary to prevent further releases.
- If a spill occurs the superintendent or the superintendent's designee will be responsible for completing the spill reporting form and for reporting the spill to the contacts listed below.
- Personnel with primary responsibility for spill response and clean up will receive training by the Contractor's site superintendent or designee. The training must include identifying the location of the spill kits and other spill response equipment and the use of spill response materials.
- Spill response equipment will be inspected and maintained as necessary to replace any materials used in spill response activities.

<u>Spill Control Notification:</u>

- A reportable spill is a quantity of five (5) gallons or more or any spill of oil which: (1) violates water quality standards, (2) produces a "sheen" on a surface water, or (3) causes a sludge or emulsion. This spill must be reported immediately to the agencies listed below.

- Any spill of oil or hazardous substance to waters of the state must be reported immediately by telephone to the following agencies:

  - 911 – Police, Fire and EMS
  - Hastings-on-Hudson Building Department
    7 Maple Avenue
    Hastings-on-Hudson, NY 10706
    Phone: (914) 670-3000
  - NYS Department of Environmental Conservation (NYSDEC)
    Spill Reporting Hotline
    (1800) 457–7362

- National Response Center: (1800) 424-8802
- Local Emergency Planning Committee (LEPC)
  Westchester County Office of Emergency Management
  200 Bradhurst Avenue
  Hawthorne, NY 10532
  (914) 864–5450
- Westchester County Department of Health (WCDOH)
  Spill Reporting Hotline
  (914) 813-5000
- U.S. Environmental Protection Agency (USEPA)
  EPCRA Information Hotline
  (1800) 535–0202
- U.S. Department of Labor and Occupational Safety and Health Administration (OSHA)
  Tarrytown, NY
  (914) 524–7510

N. STORMWATER MANAGEMENT FACILITIES MAINTENANCE PROGRAM

The following maintenance plan has been developed to maintain the proper function of all drainage and erosion and sediment control facilities:

- <u>Erosion & Sediment Control Maintenance:</u>

  During the construction of the project, the site erosion and sediment control measures as well as basin embankments and outlet structures will be inspected by the project superintendent once a week and/or within 24 hours following a rainstorm ½" or greater. Any repairs required shall be performed in a timely manner. All sediment removal and/or repairs will be followed within 24 hours by re-vegetation. Remove sediment and correct erosion by re-seed eroded areas and gullies within 7 days.

- <u>General Stormwater Facilities Maintenance (Storm Sewer, Catch Basins/Drain Inlets, Manholes, Pre-treatment Device and Subsurface Infiltration Systems)</u>

  All stormwater facilities shall be inspected immediately after completion of construction, and then monthly for the first three (3) months following the completion of the Project. Within the first three (3) months, inspections shall immediately be performed following a large storm event (i.e. producing 1/2" (one-half inch) of rain or greater. Thereafter, these facilities shall be inspected as described as follows. Upon inspection, facilities shall be immediately maintained and/or cleaned as may be required. Any site areas

exhibiting soil erosion of any kind shall be immediately restored and stabilized with vegetation, mulch or stone, depending on the area to be stabilized.

Upon each inspection, all visible debris including, but not limited to, twigs, leaf and forest litter shall be removed from the swales, overflow discharge points and frames and grates of drainage structures.

- Sumps − Catch Basin/Drain Inlets and Drain Manholes

  All catch basin/drain inlets and drain manholes with sumps have been designed to trap sediment prior to its transport to the infiltration practice and, ultimately, downstream. These sumps will require periodic inspection and maintenance to ensure that adequate depth is maintained within the sumps.

  All sumps shall be inspected once per month for the first three (3) months (after drainage system has been put into service). Thereafter, all sumps shall be inspected every four (4) months. The Home Owners Associate (HOA), or their duly authorized representative, shall take measurements of the sump depth.

  If sediment has accumulated to 1/2 (one-half) the depth of the sump, all sediment shall be removed from the sump. Sediments can be removed with hand-labor or with a vacuum truck.

  The use of road salt shall be minimized for maintenance of roadway and driveway areas.

- Hydrodynamic Separator:

  The Hydrodynamic Separator shall be inspected every six (6) months (Spring and Fall) for excess sediment accumulation. During dry weather conditions, accumulated sediments shall be vacuumed out when sediment has reached 1/2 (one-half) the capacity of the isolated sump, or when an appreciable level of hydrocarbons and trash has accumulated, whichever occurs first. The Home Owners Associate (HOA), or their duly authorized representative, shall be responsible for continuing maintenance of the device.

  Upon completion of construction, each Unit should be inspected quarterly during the first year in order to develop an appropriate schedule of maintenance. When the sediment pile is within 30 to 36 inches of the water surface, the system should be maintained. A vacuum truck shall be used to remove the accumulated sediment and debris. Refer to manufacturer's literature for detailed maintenance instructions.

During construction, the party responsible for implementing the Stormwater

Management facilities Maintenance Program will be the owner's contractor. The name and contact information will be filed with the Village of Hastings-on-Hudson and the NYSDEC at the time of the preconstruction meeting.

O. CONCLUSION:

The stormwater management plan proposed meets all the requirements set forth by the Village of Hastings-on-Hudson and the New York State Department of Environmental Conservation (NYSDEC). Design modification requirements that may occur during the approval process, will be performed and submitted for review to the governing authority having jurisdiction.

6.) Extreme Precipitation Table

Extreme Precipitation Tables

Northeast Regional Climate Center

Data represents point estimates calculated from partial duration series. All precipitation amounts are displayed in inches.

Smoothing	Yes
State	New York
Location	
Longitude	73.887 degrees West
Latitude	40.977 degrees North
Elevation	0 feet
Date/Time	Thu, 05 May 2022 09:34:27 -0400

Extreme Precipitation Estimates

	5min	10min	15min	30min	60min	120min		1hr	2hr	3hr	6hr	12hr	24hr	48hr		1day	2day	4day	7day	10day	
1yr	0.33	0.51	0.63	0.83	1.03	1.29	**1yr**	0.89	1.23	1.48	1.84	2.28	2.82	3.20	**1yr**	2.49	3.08	3.57	4.29	4.92	**1yr**
2yr	0.40	0.62	0.77	1.01	1.27	1.59	**2yr**	1.10	1.49	1.83	2.26	2.78	3.42	3.84	**2yr**	3.02	3.69	4.25	5.04	5.72	**2yr**
5yr	0.47	0.73	0.91	1.22	1.56	1.98	**5yr**	1.35	1.85	2.28	2.83	3.48	4.27	4.86	**5yr**	3.78	4.67	5.41	6.31	7.07	**5yr**
10yr	0.52	0.82	1.04	1.41	1.83	2.33	**10yr**	1.58	2.17	2.70	3.36	4.13	5.06	5.80	**10yr**	4.48	5.58	6.50	7.48	8.29	**10yr**
25yr	0.61	0.96	1.23	1.70	2.26	2.91	**25yr**	1.95	2.70	3.39	4.22	5.20	6.33	7.35	**25yr**	5.60	7.07	8.29	9.37	10.25	**25yr**
50yr	0.69	1.10	1.41	1.98	2.66	3.45	**50yr**	2.29	3.19	4.02	5.02	6.16	7.50	8.79	**50yr**	6.64	8.45	9.96	11.11	12.05	**50yr**
100yr	0.78	1.26	1.62	2.29	3.13	4.09	**100yr**	2.70	3.77	4.78	5.97	7.33	8.89	10.52	**100yr**	7.87	10.11	11.98	13.18	14.16	**100yr**
200yr	0.88	1.43	1.86	2.66	3.68	4.84	**200yr**	3.18	4.45	5.68	7.10	8.71	10.55	12.59	**200yr**	9.34	12.11	14.42	15.64	16.64	**200yr**
500yr	1.05	1.72	2.25	3.26	4.58	6.06	**500yr**	3.95	5.56	7.12	8.91	10.94	13.23	15.98	**500yr**	11.71	15.36	18.42	19.62	20.63	**500yr**

Lower Confidence Limits

	5min	10min	15min	30min	60min	120min		1hr	2hr	3hr	6hr	12hr	24hr	48hr		1day	2day	4day	7day	10day	
1yr	0.28	0.44	0.54	0.72	0.89	1.11	**1yr**	0.76	1.09	1.29	1.48	2.16	2.46	2.54	**1yr**	2.17	2.44	3.28	4.02	4.44	**1yr**
2yr	0.38	0.59	0.73	0.99	1.21	1.46	**2yr**	1.05	1.43	1.67	2.17	2.69	3.32	3.72	**2yr**	2.94	3.58	4.12	4.88	5.56	**2yr**
5yr	0.42	0.64	0.80	1.10	1.39	1.70	**5yr**	1.20	1.66	1.97	2.54	3.17	3.98	4.52	**5yr**	3.52	4.35	4.99	5.81	6.53	**5yr**
10yr	0.45	0.69	0.85	1.19	1.54	1.88	**10yr**	1.33	1.84	2.18	2.81	3.59	4.56	5.22	**10yr**	4.03	5.02	5.74	6.62	7.31	**10yr**
25yr	0.49	0.75	0.93	1.33	1.74	2.14	**25yr**	1.51	2.09	2.57	3.21	4.22	5.49	6.32	**25yr**	4.86	6.08	6.89	7.87	8.42	**25yr**
50yr	0.52	0.79	0.99	1.42	1.91	2.35	**50yr**	1.65	2.30	2.88	3.54	4.77	6.31	7.29	**50yr**	5.59	7.01	7.88	8.94	9.27	**50yr**
100yr	0.55	0.84	1.05	1.51	2.08	2.56	**100yr**	1.79	2.50	3.22	3.89	5.36	7.29	8.43	**100yr**	6.45	8.10	9.04	10.17	10.18	**100yr**
200yr	0.58	0.88	1.11	1.61	2.24	2.75	**200yr**	1.94	2.69	3.61	4.26	6.06	8.42	9.74	**200yr**	7.45	9.36	10.35	11.54	11.13	**200yr**
500yr	0.62	0.93	1.19	1.73	2.46	3.03	**500yr**	2.12	2.96	4.20	4.79	7.14	10.20	11.72	**500yr**	9.03	11.27	12.37	13.64	12.45	**500yr**

Upper Confidence Limits

	5min	10min	15min	30min	60min	120min		1hr	2hr	3hr	6hr	12hr	24hr	48hr		1day	2day	4day	7day	10day	
1yr	0.38	0.58	0.71	0.96	1.18	1.41	**1yr**	1.02	1.38	1.64	2.08	2.47	3.04	3.47	**1yr**	2.69	3.33	3.84	4.59	5.21	**1yr**
2yr	0.42	0.64	0.79	1.07	1.32	1.59	**2yr**	1.14	1.56	1.83	2.35	2.90	3.54	3.97	**2yr**	3.13	3.82	4.44	5.23	6.00	**2yr**
5yr	0.52	0.80	0.99	1.36	1.73	2.05	**5yr**	1.49	2.00	2.35	3.05	3.81	4.58	5.24	**5yr**	4.05	5.04	5.82	6.80	7.58	**5yr**
10yr	0.62	0.95	1.17	1.64	2.12	2.50	**10yr**	1.83	2.44	2.89	3.73	4.67	5.57	6.48	**10yr**	4.93	6.23	7.20	8.32	9.18	**10yr**
25yr	0.79	1.20	1.50	2.14	2.81	3.26	**25yr**	2.43	3.18	3.73	4.92	6.16	7.20	8.57	**25yr**	6.37	8.24	9.55	10.88	11.84	**25yr**
50yr	0.95	1.45	1.80	2.59	3.49	4.02	**50yr**	3.01	3.93	4.56	6.08	7.60	8.75	10.60	**50yr**	7.75	10.19	11.83	13.33	14.38	**50yr**
100yr	1.16	1.76	2.20	3.18	4.36	4.95	**100yr**	3.76	4.84	5.60	7.54	9.39	10.64	13.13	**100yr**	9.42	12.63	14.69	16.34	17.50	**100yr**
200yr	1.42	2.13	2.70	3.91	5.46	6.11	**200yr**	4.71	5.97	6.87	9.38	11.59	12.94	16.26	**200yr**	11.45	15.64	18.26	20.05	21.30	**200yr**
500yr	1.87	2.78	3.58	5.20	7.40	8.10	**500yr**	6.38	7.92	9.01	12.58	15.34	16.74	21.60	**500yr**	14.81	20.77	24.36	26.28	27.67	**500yr**

Powered by ACIS
Northeast Regional Climate Center

7.) Soils Maps & Soils Data

Hydrologic Soil Group—Westchester County, New York

MAP LEGEND

Area of Interest (AOI)

Area of Interest (AOI)

Soils

Soil Rating Polygons

- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Soil Rating Lines

- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Soil Rating Points

- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Water Features

Streams and Canals

Transportation

- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background

Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:12,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Westchester County, New York
Survey Area Data: Version 17, Sep 1, 2021

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Jul 21, 2014—Sep 23, 2020

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Hydrologic Soil Group

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
CsD	Chatfield-Charlton complex, 15 to 35 percent slopes, very rocky	B	2.3	51.3%
RhE	Riverhead loam, 25 to 50 percent slopes	A	0.2	3.9%
UIC	Urban land-Charlton-Chatfield complex, rolling, very rocky		2.0	44.9%
Totals for Area of Interest			**4.5**	**100.0%**

Description

Hydrologic soil groups are based on estimates of runoff potential. Soils are assigned to one of four groups according to the rate of water infiltration when the soils are not protected by vegetation, are thoroughly wet, and receive precipitation from long-duration storms.

The soils in the United States are assigned to four groups (A, B, C, and D) and three dual classes (A/D, B/D, and C/D). The groups are defined as follows:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

If a soil is assigned to a dual hydrologic group (A/D, B/D, or C/D), the first letter is for drained areas and the second is for undrained areas. Only the soils that in their natural condition are in group D are assigned to dual classes.

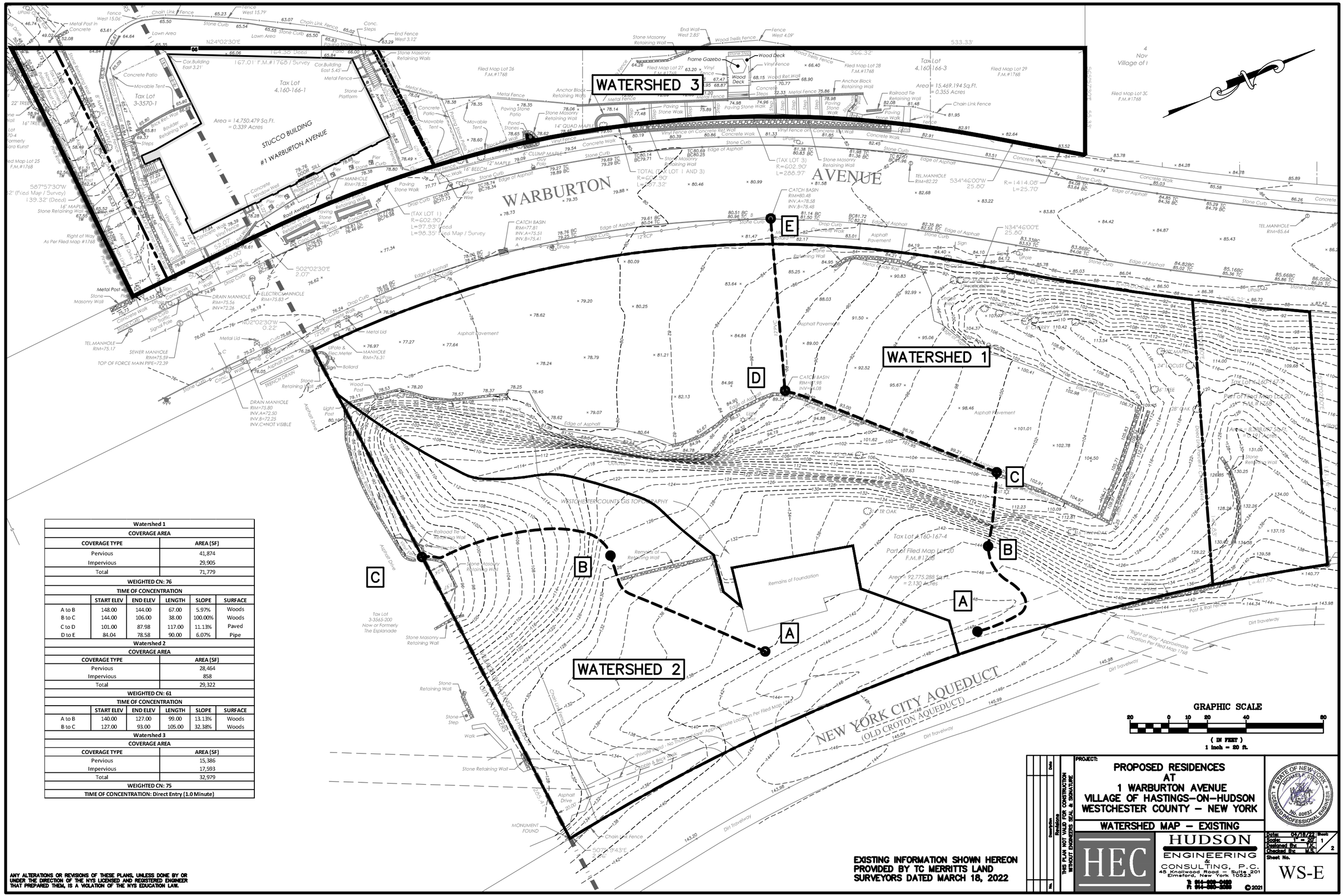
Rating Options

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Higher

8.) Existing Watershed Map



Watershed 1					
COVERAGE AREA					
COVERAGE TYPE			AREA (SF)		
Pervious			41,874		
Impervious			29,905		
Total			71,779		
WEIGHTED CN: 76					
TIME OF CONCENTRATION					
	START ELEV	END ELEV	LENGTH	SLOPE	SURFACE
A to B	148.00	144.00	67.00	5.97%	Woods
B to C	144.00	106.00	38.00	100.00%	Woods
C to D	101.00	87.98	117.00	11.13%	Paved
D to E	84.04	78.58	90.00	6.07%	Pipe
Watershed 2					
COVERAGE AREA					
COVERAGE TYPE			AREA (SF)		
Pervious			28,464		
Impervious			858		
Total			29,322		
WEIGHTED CN: 61					
TIME OF CONCENTRATION					
	START ELEV	END ELEV	LENGTH	SLOPE	SURFACE
A to B	140.00	127.00	99.00	13.13%	Woods
B to C	127.00	93.00	105.00	32.38%	Woods
Watershed 3					
COVERAGE AREA					
COVERAGE TYPE			AREA (SF)		
Pervious			15,386		
Impervious			17,593		
Total			32,979		
WEIGHTED CN: 75					
TIME OF CONCENTRATION: Direct Entry (1.0 Minute)					

EXISTING INFORMATION SHOWN HEREON PROVIDED BY TC MERRITTS LAND SURVEYORS DATED MARCH 18, 2022

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No.	Revisions	Description	Date

THIS PLAN NOT VALID FOR CONSTRUCTION WITHOUT ENGINEERS SEAL & SIGNATURE

PROJECT:

PROPOSED RESIDENCES AT 1 WARBURTON AVENUE VILLAGE OF HASTINGS-ON-HUDSON WESTCHESTER COUNTY – NEW YORK

WATERSHED MAP – EXISTING

STATE OF NEW YORK · MICHAEL F. STEIN · LICENSED PROFESSIONAL ENGINEER · No. 80037

HEC

HUDSON ENGINEERING & CONSULTING, P.C.
45 Knollwood Road – Suite 201
Elmsford, New York 10523
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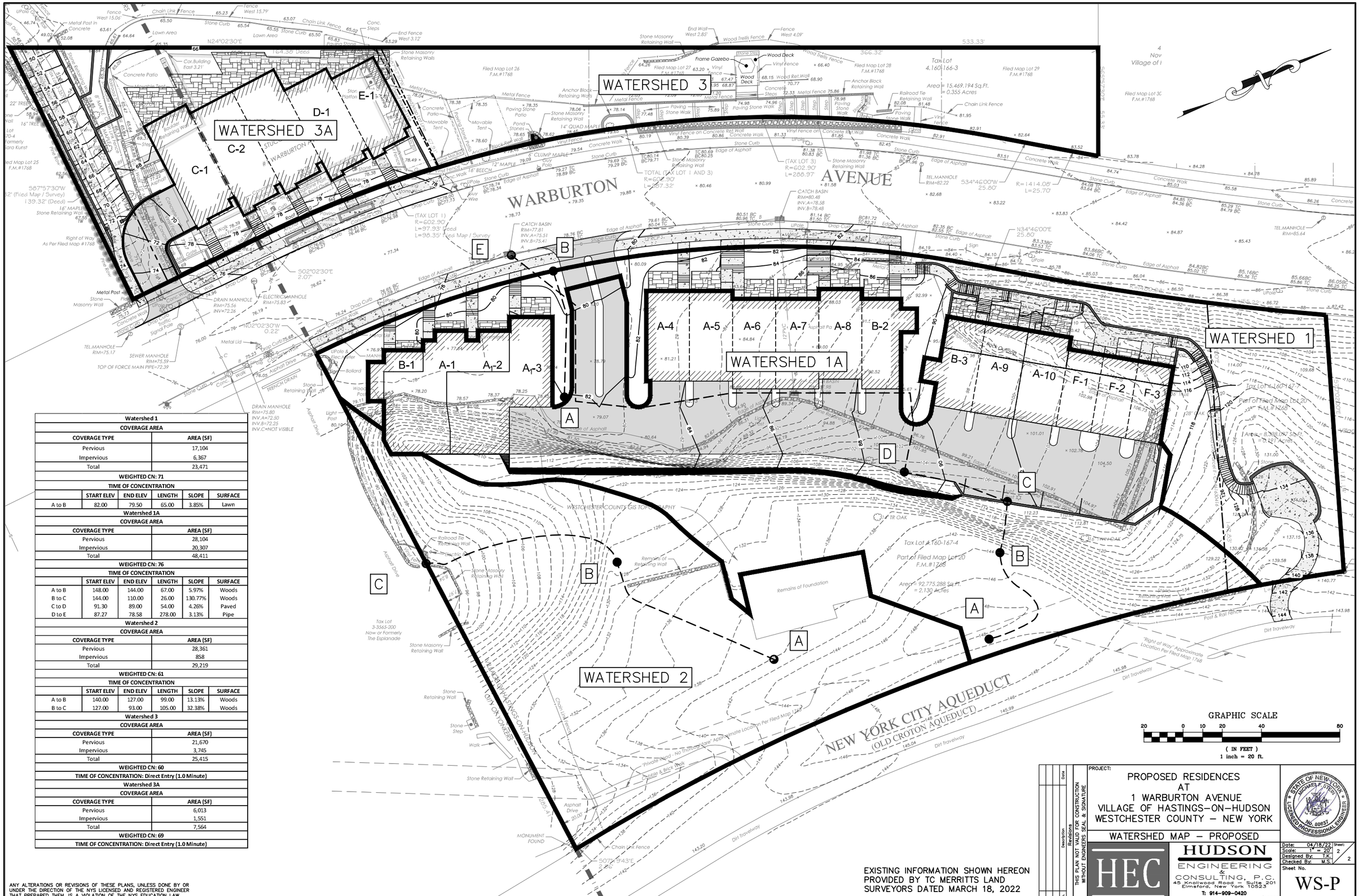
F: 914-592-0288
© 2021

Date:	04/18/22
Scale:	1" = 20'
Designed By:	TK
Checked By:	MS
Sheet No.	WS-E
Sheet	1 of 2

9.) Proposed Watershed Map



Watershed 1					
COVERAGE AREA					
COVERAGE TYPE			AREA (SF)		
Pervious			17,104		
Impervious			6,367		
Total			23,471		
WEIGHTED CN: 71					
TIME OF CONCENTRATION					
	START ELEV	END ELEV	LENGTH	SLOPE	SURFACE
A to B	82.00	79.50	65.00	3.85%	Lawn

Watershed 1A					
COVERAGE AREA					
COVERAGE TYPE			AREA (SF)		
Pervious			28,104		
Impervious			20,307		
Total			48,411		
WEIGHTED CN: 76					
TIME OF CONCENTRATION					
	START ELEV	END ELEV	LENGTH	SLOPE	SURFACE
A to B	148.00	144.00	67.00	5.97%	Woods
B to C	144.00	110.00	26.00	130.77%	Woods
C to D	91.30	89.00	54.00	4.26%	Paved
D to E	87.27	78.58	278.00	3.13%	Pipe

Watershed 2					
COVERAGE AREA					
COVERAGE TYPE			AREA (SF)		
Pervious			28,361		
Impervious			858		
Total			29,219		
WEIGHTED CN: 61					
TIME OF CONCENTRATION					
	START ELEV	END ELEV	LENGTH	SLOPE	SURFACE
A to B	140.00	127.00	99.00	13.13%	Woods
B to C	127.00	93.00	105.00	32.38%	Woods

Watershed 3					
COVERAGE AREA					
COVERAGE TYPE			AREA (SF)		
Pervious			21,670		
Impervious			3,745		
Total			25,415		
WEIGHTED CN: 60					
TIME OF CONCENTRATION: Direct Entry (1.0 Minute)					

Watershed 3A					
COVERAGE AREA					
COVERAGE TYPE			AREA (SF)		
Pervious			6,013		
Impervious			1,551		
Total			7,564		
WEIGHTED CN: 69					
TIME OF CONCENTRATION: Direct Entry (1.0 Minute)					

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EXISTING INFORMATION SHOWN HEREON PROVIDED BY TC MERRITTS LAND SURVEYORS DATED MARCH 18, 2022

No.	Description	Date
	Revisions	

THIS PLAN NOT VALID FOR CONSTRUCTION WITHOUT ENGINEERS SEAL & SIGNATURE

PROJECT:

PROPOSED RESIDENCES
AT
1 WARBURTON AVENUE
VILLAGE OF HASTINGS-ON-HUDSON
WESTCHESTER COUNTY – NEW YORK

WATERSHED MAP – PROPOSED

STATE OF NEW YORK · MICHAEL K. STEIN · No. 88837 · LICENSED PROFESSIONAL ENGINEER

HEC
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45 Knollwood Road – Suite 201
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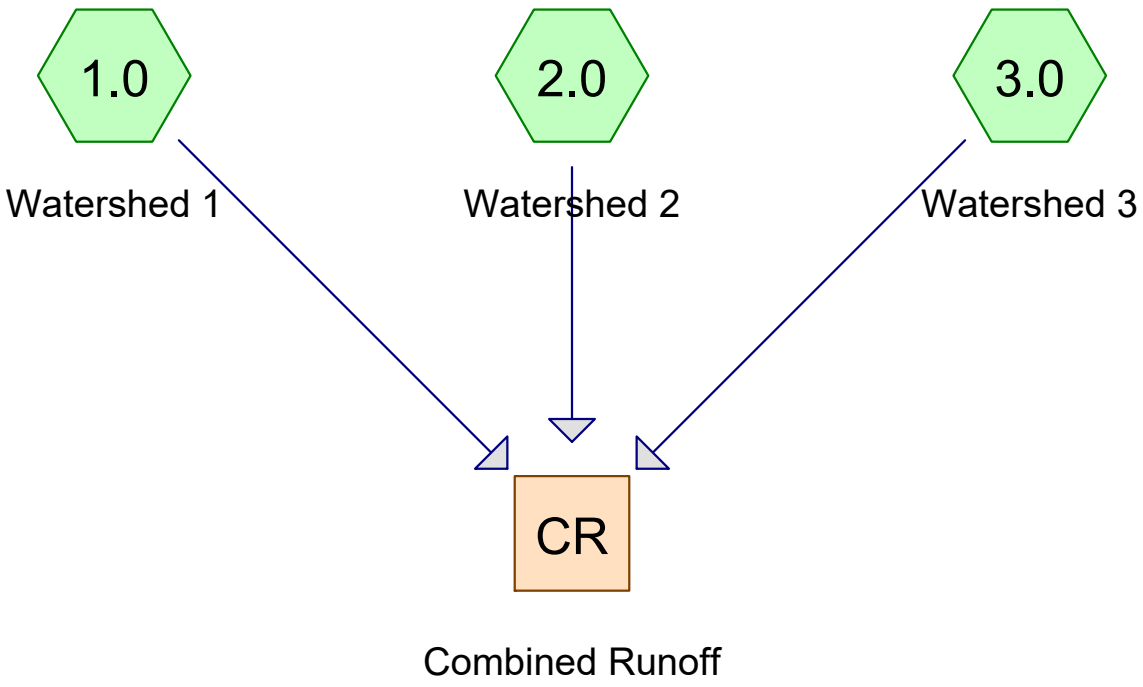
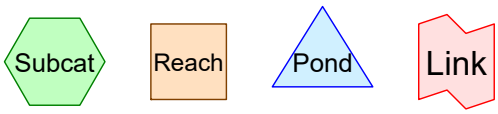
F: 914-560-2086
© 2021

Date: 04/18/22
Scale: 1" = 20'
Designed By: T.K.
Checked By: M.S.
Sheet: 2 / 2
Sheet No. WS-P

10.) Pre-Development Analysis of the 1-Year Storm Event





Routing Diagram for Existing Condition
Prepared by Hudson Engineering & Consulting
HydroCAD® 10.10-7c s/n 02549 © 2022 HydroCAD Software Solutions LLC

Summary for Subcatchment 1.0: Watershed 1

Runoff = 1.41 cfs @ 12.15 hrs, Volume= 5,358 cf, Depth= 0.90"
Routed to Reach CR : Combined Runoff

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type III 24-hr 1-Year Rainfall=2.82"

	Area (sf)	CN	Description
*	29,905	98	Parking area, walls
	41,874	60	Woods, Fair, HSG B
	71,779	76	Weighted Average
	41,874		58.34% Pervious Area
	29,905		41.66% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.7	67	0.0597	0.12		**Sheet Flow, A->B** Woods: Light underbrush n= 0.400 P2= 3.45"
0.1	38	1.0000	5.00		**Shallow Concentrated Flow, B->C** Woodland Kv= 5.0 fps
0.3	117	0.1113	6.77		**Shallow Concentrated Flow, C->D** Paved Kv= 20.3 fps
0.1	90	0.0607	14.53	11.41	**Pipe Channel, D->E** 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.010 PVC, smooth interior
10.2	312	Total			

Summary for Subcatchment 2.0: Watershed 2

Runoff = 0.10 cfs @ 12.32 hrs, Volume= 732 cf, Depth= 0.30"
Routed to Reach CR : Combined Runoff

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type III 24-hr 1-Year Rainfall=2.82"

	Area (sf)	CN	Description
*	858	98	Asphalt, Walls
	28,464	60	Woods, Fair, HSG B
	29,322	61	Weighted Average
	28,464		97.07% Pervious Area
	858		2.93% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.7	99	0.1313	0.17		**Sheet Flow, A->B** Woods: Light underbrush n= 0.400 P2= 3.45"
0.6	105	0.3238	2.85		**Shallow Concentrated Flow, B->C** Woodland Kv= 5.0 fps
10.3	204	Total			

Summary for Subcatchment 3.0: Watershed 3

Runoff = 0.90 cfs @ 12.02 hrs, Volume= 2,462 cf, Depth= 0.90"
Routed to Reach CR : Combined Runoff

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type III 24-hr 1-Year Rainfall=2.82"

	Area (sf)	CN	Description
*	16,159	98	Building, Patios, Walls etc
	6,280	36	Woods, Fair, HSG A
	7,780	60	Woods, Fair, HSG B
*	1,434	98	Walkway
	1,326	61	>75% Grass cover, Good, HSG B
	32,979	76	Weighted Average
	15,386		46.65% Pervious Area
	17,593		53.35% Impervious Area

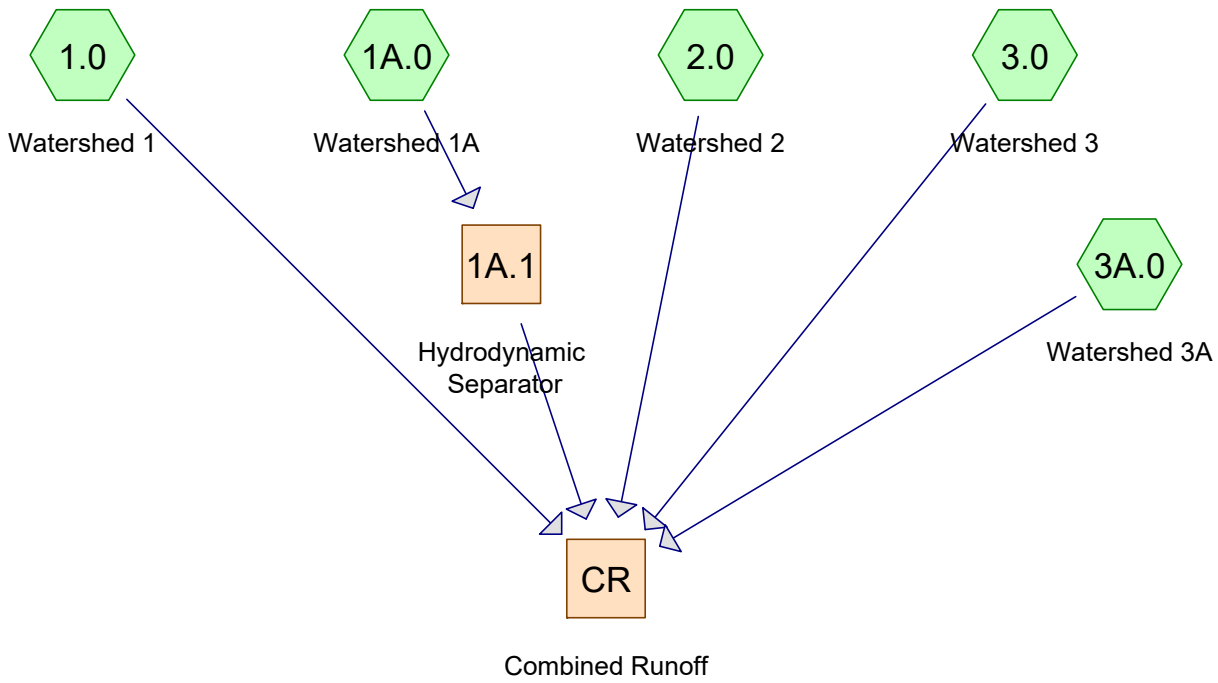
Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.0					**Direct Entry,**

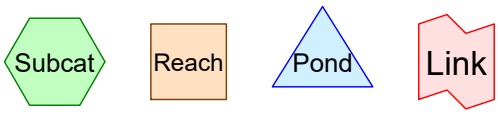
Summary for Reach CR: Combined Runoff

Inflow Area = 134,080 sf, 36.07% Impervious, Inflow Depth = 0.77" for 1-Year event
Inflow = 1.90 cfs @ 12.15 hrs, Volume= 8,552 cf
Outflow = 1.90 cfs @ 12.15 hrs, Volume= 8,552 cf, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs

11.) Post-Development Analysis of the 1- and 100-Year Storm Events





Routing Diagram for Proposed Condition
Prepared by Hudson Engineering & Consulting
HydroCAD® 10.10-7c s/n 02549 © 2022 HydroCAD Software Solutions LLC

Summary for Subcatchment 1.0: Watershed 1

Runoff = 0.34 cfs @ 12.12 hrs, Volume= 1,289 cf, Depth= 0.66"
Routed to Reach CR : Combined Runoff

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type III 24-hr 1-Year Rainfall=2.82"

	Area (sf)	CN	Description
*	6,367	98	Walkways, Walls etc
	6,351	61	>75% Grass cover, Good, HSG B
	10,753	60	Woods, Fair, HSG B
	23,471	71	Weighted Average
	17,104		72.87% Pervious Area
	6,367		27.13% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.5	65	0.0385	0.14		**Sheet Flow, A->B** Grass: Dense n= 0.240 P2= 3.45"

Summary for Subcatchment 1A.0: Watershed 1A

Runoff = 0.94 cfs @ 12.16 hrs, Volume= 3,614 cf, Depth= 0.90"
Routed to Reach 1A.1 : Hydrodynamic Separator

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type III 24-hr 1-Year Rainfall=2.82"

	Area (sf)	CN	Description
*	7,705	98	Roof Area
*	12,602	98	Driveway
*	8,503	61	Green roof
	1,127	61	>75% Grass cover, Good, HSG B
	18,474	60	Woods, Fair, HSG B
	48,411	76	Weighted Average
	28,104		58.05% Pervious Area
	20,307		41.95% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.7	67	0.0597	0.12		**Sheet Flow, A->B** Woods: Light underbrush n= 0.400 P2= 3.45"
0.1	26	1.0000	5.00		**Shallow Concentrated Flow, B->C** Woodland Kv= 5.0 fps
0.2	54	0.0426	4.19		**Shallow Concentrated Flow, C->D** Paved Kv= 20.3 fps
0.6	278	0.0313	8.03	6.30	**Pipe Channel, D->E** 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.013 Corrugated PE, smooth interior
10.6	425	Total			

Summary for Subcatchment 2.0: Watershed 2

Runoff = 0.10 cfs @ 12.32 hrs, Volume= 729 cf, Depth= 0.30"
Routed to Reach CR : Combined Runoff

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type III 24-hr 1-Year Rainfall=2.82"

	Area (sf)	CN	Description
*	858	98	Asphalt, Walls
	28,361	60	Woods, Fair, HSG B
	29,219	61	Weighted Average
	28,361		97.06% Pervious Area
	858		2.94% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.7	99	0.1313	0.17		**Sheet Flow, A->B** Woods: Light underbrush n= 0.400 P2= 3.45"
0.6	105	0.3238	2.85		**Shallow Concentrated Flow, B->C** Woodland Kv= 5.0 fps
10.3	204	Total			

Summary for Subcatchment 3.0: Watershed 3

Runoff = 0.09 cfs @ 12.07 hrs, Volume= 574 cf, Depth= 0.27"
Routed to Reach CR : Combined Runoff

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type III 24-hr 1-Year Rainfall=2.82"

	Area (sf)	CN	Description
*	1,807	98	Deck/Patio
*	1,938	98	Walkways/walls/front entrance
	10,665	61	>75% Grass cover, Good, HSG B
	4,184	60	Woods, Fair, HSG B
	2,977	39	>75% Grass cover, Good, HSG A
	3,844	36	Woods, Fair, HSG A
	25,415	60	Weighted Average
	21,670		85.26% Pervious Area
	3,745		14.74% Impervious Area

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

Summary for Subcatchment 3A.0: Watershed 3A

Runoff = 0.11 cfs @ 12.02 hrs, Volume= 363 cf, Depth= 0.58"
Routed to Reach CR : Combined Runoff

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type III 24-hr 1-Year Rainfall=2.82"

	Area (sf)	CN	Description
*	1,194	98	Driveway
*	357	98	Roof Mech Area
*	6,013	61	Green roof
	7,564	69	Weighted Average
	6,013		79.49% Pervious Area
	1,551		20.51% Impervious Area

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

Summary for Reach 1A.1: Hydrodynamic Separator

Inflow Area = 48,411 sf, 41.95% Impervious, Inflow Depth = 0.90" for 1-Year event
Inflow = 0.94 cfs @ 12.16 hrs, Volume= 3,614 cf
Outflow = 0.94 cfs @ 12.16 hrs, Volume= 3,614 cf, Atten= 0%, Lag= 0.0 min
Routed to Reach CR : Combined Runoff

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs

Summary for Reach CR: Combined Runoff

Inflow Area = 134,080 sf, 24.48% Impervious, Inflow Depth = 0.59" for 1-Year event
Inflow = 1.47 cfs @ 12.15 hrs, Volume= 6,569 cf
Outflow = 1.47 cfs @ 12.15 hrs, Volume= 6,569 cf, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs

Summary for Subcatchment 1.0: Watershed 1

Runoff = 3.21 cfs @ 12.11 hrs, Volume= 10,485 cf, Depth= 5.36"
Routed to Reach CR : Combined Runoff

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-Year Rainfall=8.89"

	Area (sf)	CN	Description
*	6,367	98	Walkways, Walls etc
	6,351	61	>75% Grass cover, Good, HSG B
	10,753	60	Woods, Fair, HSG B
	23,471	71	Weighted Average
	17,104		72.87% Pervious Area
	6,367		27.13% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.5	65	0.0385	0.14		**Sheet Flow, A->B** Grass: Dense n= 0.240 P2= 3.45"

Summary for Subcatchment 1A.0: Watershed 1A

Runoff = 6.62 cfs @ 12.14 hrs, Volume= 24,101 cf, Depth= 5.97"
Routed to Reach 1A.1 : Hydrodynamic Separator

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-Year Rainfall=8.89"

	Area (sf)	CN	Description
*	7,705	98	Roof Area
*	12,602	98	Driveway
*	8,503	61	Green roof
	1,127	61	>75% Grass cover, Good, HSG B
	18,474	60	Woods, Fair, HSG B
	48,411	76	Weighted Average
	28,104		58.05% Pervious Area
	20,307		41.95% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.7	67	0.0597	0.12		**Sheet Flow, A->B** Woods: Light underbrush n= 0.400 P2= 3.45"
0.1	26	1.0000	5.00		**Shallow Concentrated Flow, B->C** Woodland Kv= 5.0 fps
0.2	54	0.0426	4.19		**Shallow Concentrated Flow, C->D** Paved Kv= 20.3 fps
0.6	278	0.0313	8.03	6.30	**Pipe Channel, D->E** 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.013 Corrugated PE, smooth interior
10.6	425	Total			

Summary for Subcatchment 2.0: Watershed 2

Runoff = 2.79 cfs @ 12.15 hrs, Volume= 10,072 cf, Depth= 4.14"
Routed to Reach CR : Combined Runoff

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-Year Rainfall=8.89"

	Area (sf)	CN	Description
*	858	98	Asphalt, Walls
	28,361	60	Woods, Fair, HSG B
	29,219	61	Weighted Average
	28,361		97.06% Pervious Area
	858		2.94% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.7	99	0.1313	0.17		**Sheet Flow, A->B** Woods: Light underbrush n= 0.400 P2= 3.45"
0.6	105	0.3238	2.85		**Shallow Concentrated Flow, B->C** Woodland Kv= 5.0 fps
10.3	204	Total			

Summary for Subcatchment 3.0: Watershed 3

Runoff = 3.26 cfs @ 12.02 hrs, Volume= 8,503 cf, Depth= 4.01"
Routed to Reach CR : Combined Runoff

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-Year Rainfall=8.89"

	Area (sf)	CN	Description
*	1,807	98	Deck/Patio
*	1,938	98	Walkways/walls/front entrance
	10,665	61	>75% Grass cover, Good, HSG B
	4,184	60	Woods, Fair, HSG B
	2,977	39	>75% Grass cover, Good, HSG A
	3,844	36	Woods, Fair, HSG A
	25,415	60	Weighted Average
	21,670		85.26% Pervious Area
	3,745		14.74% Impervious Area

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

Summary for Subcatchment 3A.0: Watershed 3A

Runoff = 1.24 cfs @ 12.02 hrs, Volume= 3,224 cf, Depth= 5.12"
Routed to Reach CR : Combined Runoff

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-Year Rainfall=8.89"

	Area (sf)	CN	Description
*	1,194	98	Driveway
*	357	98	Roof Mech Area
*	6,013	61	Green roof
	7,564	69	Weighted Average
	6,013		79.49% Pervious Area
	1,551		20.51% Impervious Area

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

Summary for Reach 1A.1: Hydrodynamic Separator

Inflow Area = 48,411 sf, 41.95% Impervious, Inflow Depth = 5.97" for 100-Year event
Inflow = 6.62 cfs @ 12.14 hrs, Volume= 24,101 cf
Outflow = 6.62 cfs @ 12.14 hrs, Volume= 24,101 cf, Atten= 0%, Lag= 0.0 min
Routed to Reach CR : Combined Runoff

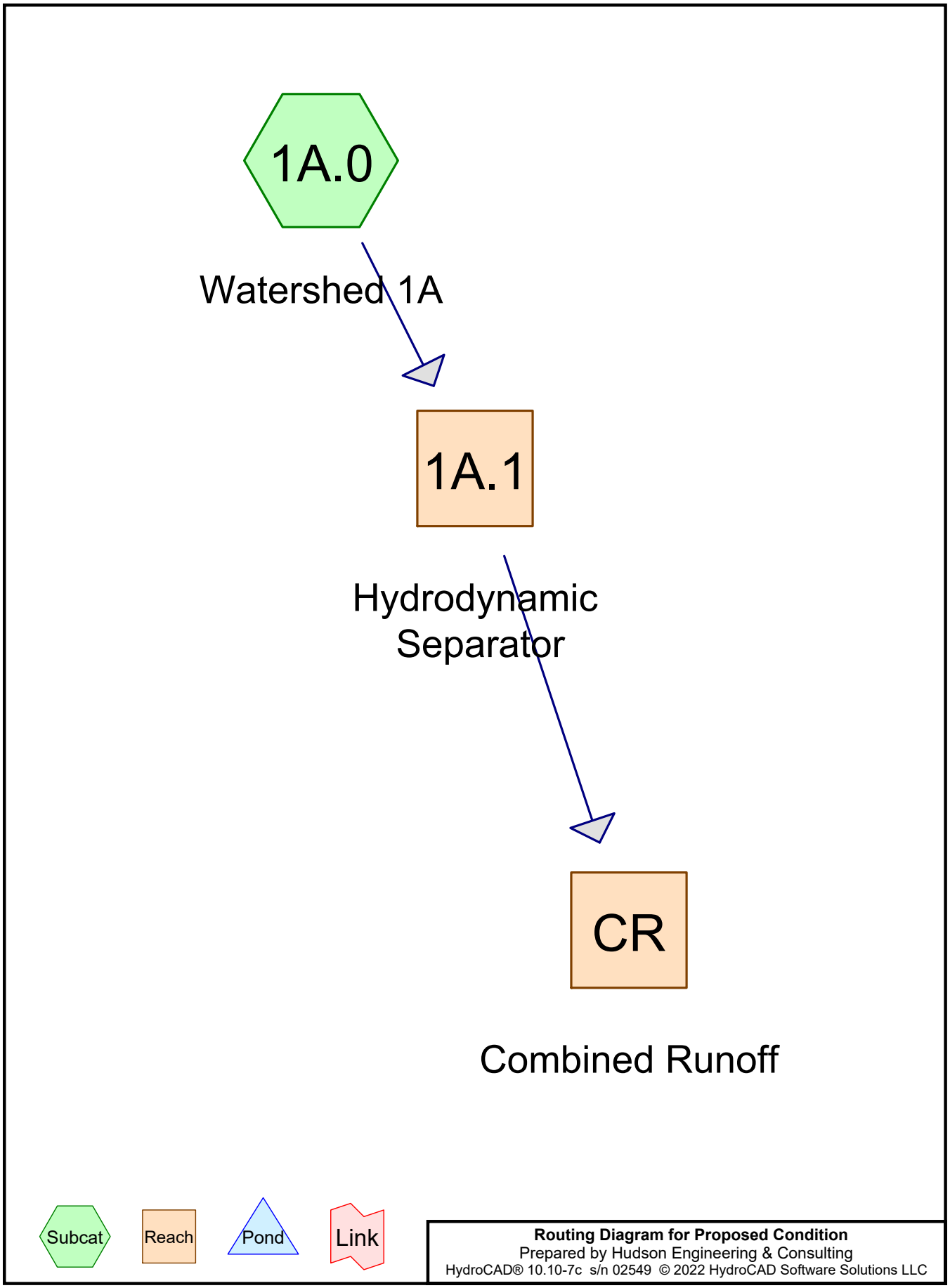
Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs

Summary for Reach CR: Combined Runoff

Inflow Area = 134,080 sf, 24.48% Impervious, Inflow Depth = 5.05" for 100-Year event
Inflow = 14.40 cfs @ 12.13 hrs, Volume= 56,386 cf
Outflow = 14.40 cfs @ 12.13 hrs, Volume= 56,386 cf, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs

12.) Water Quality Volume Calculations



Routing Diagram for Proposed Condition
Prepared by Hudson Engineering & Consulting
HydroCAD® 10.10-7c s/n 02549 © 2022 HydroCAD Software Solutions LLC

Summary for Subcatchment 1A.0: Watershed 1A

Runoff = 0.94 cfs @ 12.16 hrs, Volume= 3,614 cf, Depth= 0.90"
Routed to Reach 1A.1 : Hydrodynamic Separator

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type III 24-hr 1-Year Rainfall=2.82"

	Area (sf)	CN	Description
*	7,705	98	Roof Area
*	12,602	98	Driveway
*	8,503	61	Green roof
	1,127	61	>75% Grass cover, Good, HSG B
	18,474	60	Woods, Fair, HSG B
	48,411	76	Weighted Average
	28,104		58.05% Pervious Area
	20,307		41.95% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.7	67	0.0597	0.12		**Sheet Flow, A->B** Woods: Light underbrush n= 0.400 P2= 3.45"
0.1	26	1.0000	5.00		**Shallow Concentrated Flow, B->C** Woodland Kv= 5.0 fps
0.2	54	0.0426	4.19		**Shallow Concentrated Flow, C->D** Paved Kv= 20.3 fps
0.6	278	0.0313	8.03	6.30	**Pipe Channel, D->E** 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.013 Corrugated PE, smooth interior
10.6	425	Total			

Summary for Reach 1A.1: Hydrodynamic Separator

Inflow Area = 48,411 sf, 41.95% Impervious, Inflow Depth = 0.90" for 1-Year event
Inflow = 0.94 cfs @ 12.16 hrs, Volume= 3,614 cf
Outflow = 0.94 cfs @ 12.16 hrs, Volume= 3,614 cf, Atten= 0%, Lag= 0.0 min
Routed to Reach CR : Combined Runoff

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs

Summary for Reach CR: Combined Runoff

Inflow Area = 134,080 sf, 24.48% Impervious, Inflow Depth = 0.59" for 1-Year event
Inflow = 1.47 cfs @ 12.15 hrs, Volume= 6,569 cf
Outflow = 1.47 cfs @ 12.15 hrs, Volume= 6,569 cf, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs

SESI CONSULTING ENGINEERS
GEOTECHNICAL | ENVIRONMENTAL | SITE CIVIL

Principals
Anthony Castillo, PE
Fuad Dahan, PhD, PE, LSRP
Franz W. Laki, PE
John M. Nederfield, PE
Justin M. Protasiewicz, PE
Michael St. Pierre, PE

May 6, 2022 ***via email: NJDeluca1@yahoo.com***

1 Warburton, LLC.
15 Bradhurst Avenue
Hawthorne, NY 10532

RE: 1 Warburton Rock Slope Study
1 Warburton Avenue
Hastings-on-Hudson
SESI Project No. 12391

Dear Mr. Neil DeLuca :

SESI Consulting Engineers (SESI) has completed our Rock Slope Feasibility Study in accordance with our Professional Services Agreement dated March 28, 2022. This letter contains a summary of our initial findings and presents our initial proposed rock stabilization methods.

In preparation of this letter, SESI has completed a review of the following documents:

- Proposed Residence at 1 Warburton Avenue Civil drawings, which include Existing Conditions Plan, Grading Plan, Stormwater Management Plan, Sediment & Erosion Control Plan and Utility Plan by Hudson Engineering and Consulting, P.C. dated March 23, 2022.
- Topographic Survey prepared by TC Merritts Land Surveyors, dated January 13, 2021.
- Record drawings of the New York City Aqueduct received from the New York State Parks Department on April 7, 2022.
    1. Old Croton Aqueduct Alignment Drawing No. 17 dated September 29, 1966.
    2. Historic renderings of typical foundation wall cross-sections.

SITE DESCRIPTION

The proposed construction consists of two (2) lots, 4.160-166-1 (1 Warburton Avenue) and 4.160-167-4, in the Village of Hasting-on-Hudson, Westchester County, New York. The lots consist of about 14,750.5 and 92,775.3 square feet, respectively. The focus of this feasibility letter is to make a determination about the exposed rock face located in Lot 4.160-167-4 (Site). The Site is bordered by woods with numerous trees on the north, the Old Croton Trailway State Park and New York City Aqueduct (Old Croton Aqueduct) on the east, 1200 Warburton Avenue on the south, and Warburton Avenue on the west.

The Site is currently used as an open-air paved parking lot and generally slopes down north to south from about elevation (el.) ±120.0 to ±76.0.

NEW YORK CITY AQUEDUCT

The referenced survey identifies the New York City Aqueduct (Aqueduct) along the eastern property limits in the north-south direction. On April 7, 2022, SESI engaged the New York State Parks, Recreation and Historic Preservation Department (NYS Parks) to discuss the proposed development and possible construction impact on the Aqueduct. Preliminary conversations with NYS Parks provided record drawings consisting of an alignment drawing dated September 29, 1966, and typical cross-sections of the structure.

The cross-sections identify the Aqueduct to vary between 12 and 15 feet in width and from about 9.2 to 10.0 feet in height (refer to **Appendix A**). NYS Parks indicated the Aqueduct typically has 3 to 4 feet of cover and the invert of the aqueduct is about 15 feet below the Old Croton Trailway. The typical cross-sections identify the Aqueduct to consist of a masonry arched roof and interior walls encased by a rubble foundation wall. The Aqueduct appears to bear on sand underlain by bedrock with invert elevations that vary between el. 129 and 132. We estimate the proposed rock cut along the eastern side of the property to be ±90 feet from the Aqueduct structure. These elevations and estimated distance are to be considered approximate and should be verified by a licensed surveyor. The proposed construction and rock stabilization must be completed without causing adverse impacts to the Aqueduct.

PROPOSED DEVELOPMENT

The proposed development will consist of twenty-one (21) residences divided between the two (2) lots. Lot 4.160-166-1 will have five (5) residences while the remaining sixteen (16) will be constructed at the Site (Lot 4.160-167-4), see Figure 2. The grading plan indicates the area of focus will consist of an exposed rock face along the east of the proposed construction between 22 and 30 feet in height. Final grading elevations along the rock vary north to south from about el. 94.0 to 82.0. The rock face will need to be stabilized and provide adequate falling debris protection as part of the proposed improvements on site. We anticipate rock excavation will be necessary to obtain the proposed grade elevations. In addition to rock excavation and stabilization, the proposed development will include proposed retaining walls along the north and east exposure.

PROJECT CONSTRAINTS

The Site has some construction challenges: the proximity of the New York City Aqueduct and adjacent New York State land requires additional agency interaction and construction surveying and monitoring of the existing structure. During our site visit, we observed the rock to be moderately fractured and the top of the rock slope to be covered by trees and vegetation. The tree line on top of the rock, immediately within the vicinity of the proposed rock face, may also cause long-term concerns for rock stabilization, as over time, the roots of the trees grow and can allow water to infiltrate and cause the rock to fracture further during thermal expansion and contraction cycles.

PRELIMINARY RECOMMENDATIONS

We preliminary anticipate the proposed rock cut to have an exposed height between 22 and 30 feet. Our preliminary recommendations have taken into consideration our understanding of the project scope, the site area, and various rock stabilization and safety methods. We propose a

combined system consisting of some rock slope scaling and a rockfall net with rock bolts and anchors. The combined system will aid to stabilize the rock and provide protection between the Site development and the rock cut.

We propose the first stabilization sequence consist of a scaling program. Scaling consists of vertical line drilling and manually removing any loose and soft rock material near the surface. This process is typically done by rappelling or staging equipment and people along the rock face and assessing sections of the slope. If further stabilization is required for areas where weathered rock and spalling are encountered, rock benching with heights no greater than eight (8) feet is recommended. This operation should be done in the presence of a qualified geotechnical engineer. In areas where more significant rock cuts are required to allow for the proposed development, a line drilling operation will be performed to allow for rock to be removed without over breaking. Line drilling entails drilling ±2" diameter holes at ±6 to 10" on center prior to chopping with a pneumatic hammer or splitter. Based on our initial discussions with NYC Parks, the agency does not have a reason to believe that rock removal through blasting would pose adverse impacts on the Aqueduct but would review for final approval. It is our understanding that project ownership, although could propose blasting, will proceed with line drilling and removal of rock with a pneumatic hammer or splitter. Once a detailed geotechnical investigation is complete, further recommendations of the most appropriate system will be provided.

As discussed herein, one of the challenges will be the tree line and vegetation on and above the rock. We anticipate some removal of vegetation including trees will be required to aid in stabilizing the rock face.

As the scaling program is completed, a rock netting system consisting of steel wire mesh, such as the Maccaferri MAC.RO. SYSTEM – Steelgrid HR (refer to **Appendix B**), would be installed. The net system catches loose rock or falling debris coming from the exposed rock face. When debris hits the netting system, its impact is weakened and the system "catches" the debris and drops it to the ground behind the net.

Based on our initial visual observations of the rock face, we expect that rock bolts and anchors consisting of high-capacity self-drilling bars or continuous threaded bars will be required as the rock is further exposed and analyzed. We do recommend that the rock bolts and anchors extend a minimum of five (5) feet beyond potential failure planes of rock wedges. Importantly, a survey must be conducted prior to the installation of the rock bolts and anchors as to locate the New York City Aqueduct. The need for rock bolts and anchors, including spacing and length, will be analyzed once our geotechnical investigation is completed. Rock bolts are typically drilled in place as the rock net is installed. Accessories are available that allow for the individual systems to be combined and function as single rock support system.

In conjunction with the rock net, an additional protection barrier at the bottom of the rock face should be considered to provide protection and energy dissipation for any loose materials that fall to the bottom of the rock face. A possible system is a layer of pea gravel, wood chips or topsoil, approximately one (1) to two (2) feet thick along the base of the rock slope. A catch ditch should be excavated at the toe of the slope to allow falling debris to reman contained to the area. This area will provide a cushion for any falling debris that is stopped by the netting.

RECOMMENDED CONSTRUCTION MONITORING

All excavation, including rock removal, work should be performed carefully so as not to adversely impact or cause loss of support to the neighboring structures including the New York City

Aqueduct, sidewalks, streets, and utilities. We recommend conducting a pre-construction, or existing conditions, documentation to establish existing conditions of the neighboring structures and areas prior to the start of construction activities. As a minimum, the pre-construction conditions documentation should consist of a photographic documentation of exposed and accessible portions of the New York City Aqueduct, any neighboring building exteriors and any associated yard areas, the surrounding streets and sidewalks within at least 50 feet of the Site. Ambient vibration levels at the Site and at the neighboring structures should be measured as part of the documentation work. If NYS Parks and respective property owners grant permission during the documentation work, crack-monitoring gauges should be established for future monitoring at select pre-existing cracks observed at the neighboring structures. In addition, a Professional Land Surveyor licensed in the State of New York should establish elevation and lateral position control points at select locations along the adjacent structures and utilities.

The neighboring structures and utilities should be monitored periodically during the on-site excavation and foundation construction activities using the crack-monitoring gauges and elevation and lateral position control points. The purpose of the monitoring is so the Contractor(s) performing the work can determine if the neighboring structures/utilities are at risk of being adversely impacted by their work, so the Contractor(s) can make any necessary modifications to their means and methods to avoid such adverse impacts. Vibration levels at the Aqueduct and including the neighboring structures and utilities should also be continuously monitored during nearby on-site activities using seismograph vibration monitors placed at strategic locations within/ along these structures/utilities.

DISCLAIMER

This Feasibility Study was prepared by SESI for the sole and exclusive use of 1 Warburton, LLC. Nothing under the Professional Services Agreement between SESI and its client, 1 Warburton, LLC., shall be construed to give any rights or benefits to anyone other than Client and SESI, and all duties and responsibilities undertaken pursuant to the Agreement will be for the sole and exclusive benefit of Client and SESI and not for the benefit of any other party. This Study has been prepared and issued subject to the express condition that same is not to be disseminated to anyone other than Client, without the advance written consent of SESI (which SESI, in its sole discretion, is free to grant or withhold). Use of the Study by any other person is unauthorized and such use is at the sole risk of the user. SESI solely reviewed the existing documents and provided a preliminary recommendation solely for discussion and planning board discussion. No calculations or design assumptions were reviewed or performed for this design. None of the proposed concepts noted in this study should be used without full design under a Professional Engineer.

If you have any questions, please call.

Sincerely,

SESI CONSULTING ENGINEERS

Jose Rodriguez, P.E.
Senior Project Engineer

Sergio Chong Sosa

Sergio Chong Sosa
Assistant Project Engineer II

REFERENCE:

1. EXISTING CONDITIONS & BOUNDARY ARE TAKEN EXISTING CONDITION PLAN PREPARED BY HUDSON ENGINEERING & CONSULTING, P.C. DATED MARCH 23, 2022.
2. AERIAL IMAGING WAS OBTAINED FROM 2022 MICROSOFT CORPORATION, 2022 MAXAR CNES (2022) DISTRIBUTION AIRBUS DS 2022 TOMTOM ON APRIL 5, 2022.

Scale 1"=30'

0 15 30 60 90 120

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rev	date	description	by

dwg by: DW/GBY
chk by: CHKBY
scale: AS NOTED
date: 04/06/2022

SESI
CONSULTING ENGINEERS
CERT. OF AUTH. # 24GA27934700
SOILS / FOUNDATIONS
SITE DESIGN
ENVIRONMENTAL
12A MAPLE AVE. PINE BROOK, NJ. 07058 PH: 973-808-9050

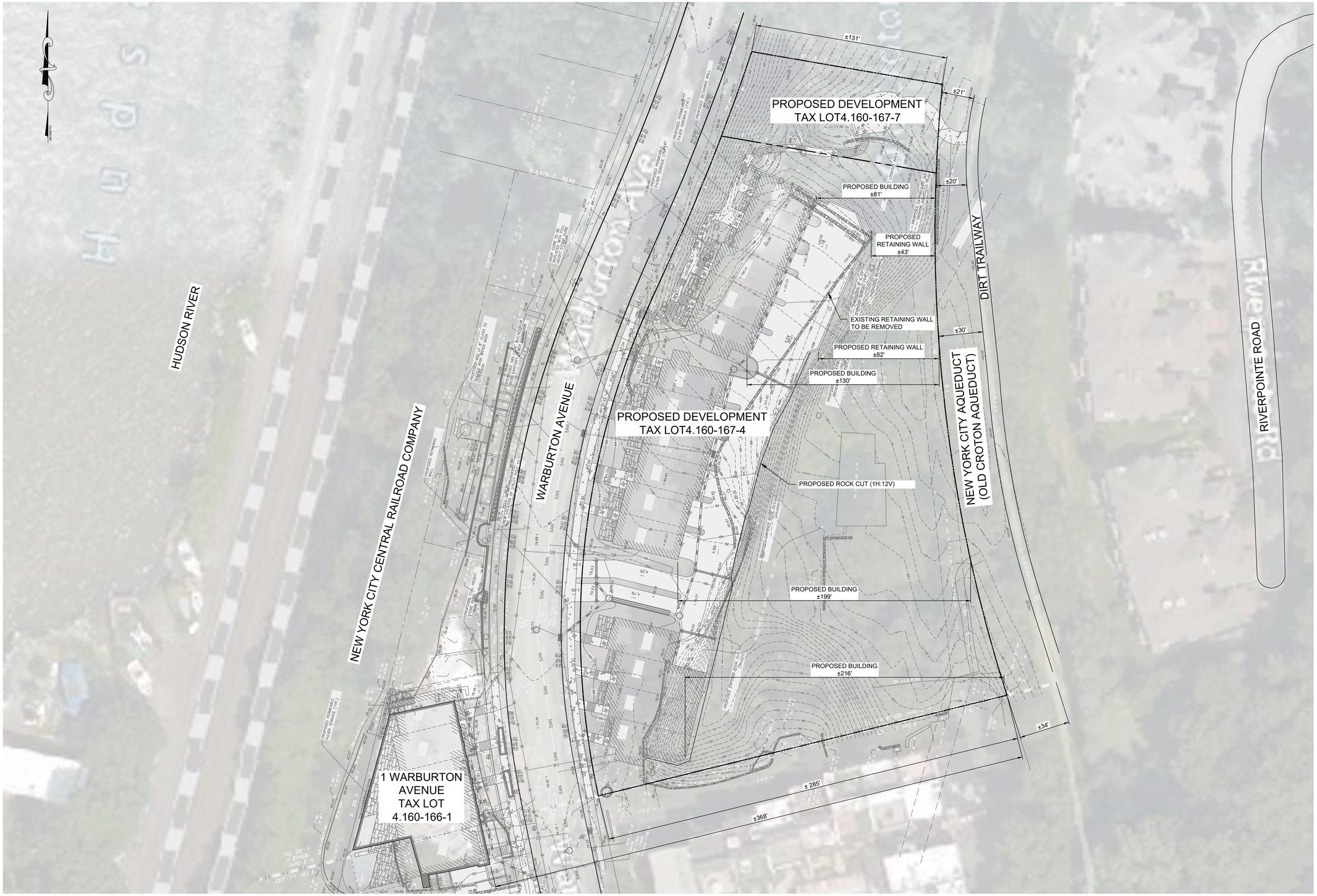
JOSE M. RODRIGUEZ, P.E.
PROFESSIONAL ENGINEER
N.Y. LIC. NO. 095960

PROPOSED DEVELOPMENT
VILLAGE OF HASTINGS ON HUDSON, NEW YORK

title:
AERIAL MAP WITH EXISTING CONDITIONS PLAN

job no. 12391
drawing no.
1

N:\ACAD\12391 - 1 WARBURTON AVENUE, HASTING, NY\CAD\GEOTECHNICAL\CONCEPT\12391.01.01 CONCEPT PLAN.DWG 04/07/23 10:19:19AM, sesi\b.sesa, LAYOUT:1



REFERENCES:

1. PROPOSED DEVELOPMENT OUTLINE TAKEN FROM THE GRADING PLAN PREPARED BY HUDSON ENGINEERING & CONSULTING, P.C. DATED MARCH 23, 2022.
2. AERIAL IMAGING WAS OBTAINED FROM 2022 MICROSOFT CORPORATION, 2022 MAXAR CNES (2022) DISTRIBUTION AIRBUS DS 2022 TOMTOM ON APRIL 5, 2022.

NOTES:

1. DIMENSIONS INDICATED HEREIN ARE CONSIDERED APPROXIMATE AND FOR REFERENCE ONLY BASED ON THE REFERENCED GRADING PLAN.

Scale 1"=30'

0 15 30 60 90 120

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rev	date	description	by

dwg by: DWGBY
chk by: CHKBY
scale: AS NOTED
date: 04/06/2022

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SOILS / FOUNDATIONS
SITE DESIGN
ENVIRONMENTAL
12A MAPLE AVE. PINE BROOK, N.J. 07058 PH: 973-808-9050

JOSE M. RODRIGUEZ, P.E.
PROFESSIONAL ENGINEER
N.Y. LIC. NO. 095960

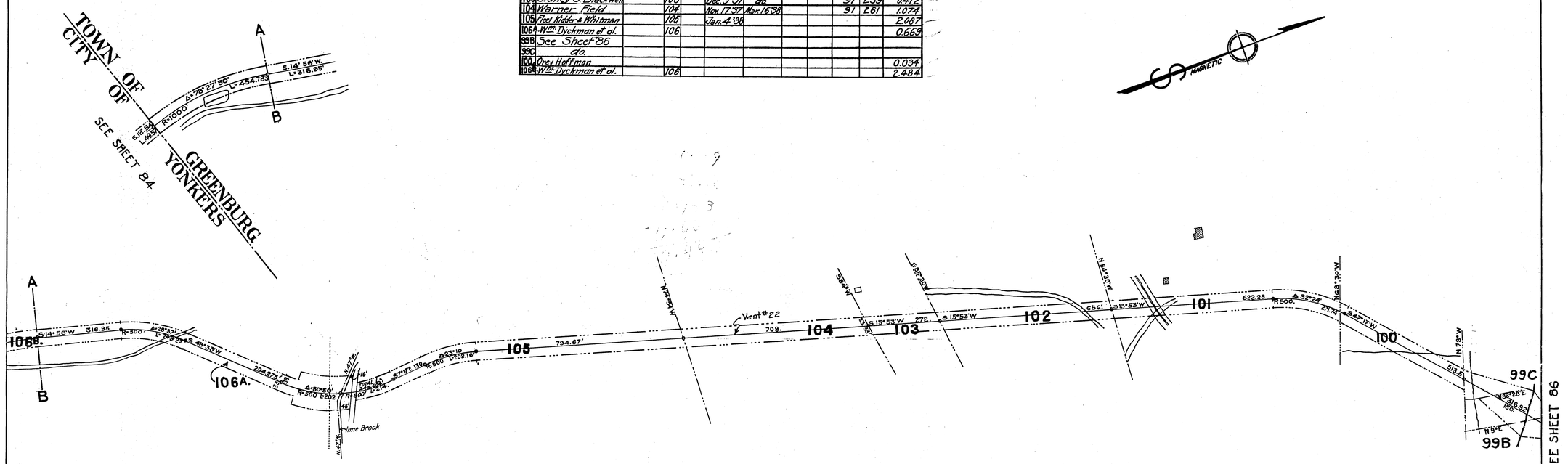
PROPOSED DEVELOPMENT
VILLAGE OF HASTINGS ON HUDSON, NEW YORK

title:
PROPOSED DEVELOPMENT PLAN

job no. 12391
drawing no.
2

Appendix A

NO.	NAME	Taking Map Number	Par.	Filed	Title Vested	Received or Filed	Lib.	Page	Description Book	Description Page	AREA
100	Francis Bellemere	Map 49	1		Jan 19,'38	Mar 16,'38			91	245	0.176
100	Daniel Webber	Map 49	2		do.	do.			91	247	0.014
100	Charlotte Kidder										0.402
101	George Harvey		101		June 28,'38	June 30,'38			91	254	1.959
102	James M. Thorp		102		Jan. 22,'38	Mar. 16,'38			91	257	0.993
103	Sidney S. Blackwell		103		Dec. 9,'37	do.			91	259	0.412
104	Warner Field		104		Nov. 12,'37	Mar. 16,'38			91	261	1.074
105	Fred Kidder & Whitman		105		Jan. 4,'38						2.087
106A	Wm. Dyckman et al.		106								0.663
99B	See Sheet 86										
99C	do.										
100	Grey Hoffman										0.034
106B	Wm. Dyckman et al.		106								2.484



VILLAGE OF HASTINGS ON HUDSON

George S. Skilton
ASSISTANT ENGINEER

CHIEF ENGINEER

APPROVED BY: Harold J. Dyer, DATE: 9/29/, 1966
HAROLD J. DYER, MANAGER, TACONIC STATE PARK COMMISSION

RECOMMENDED BY: Roland A. Block, DATE: 9/29/, 1966
ROLAND A. BLOCK, ASST. MANAGER; N.Y.S. P.E. & L.S. LIC. NO. 25002

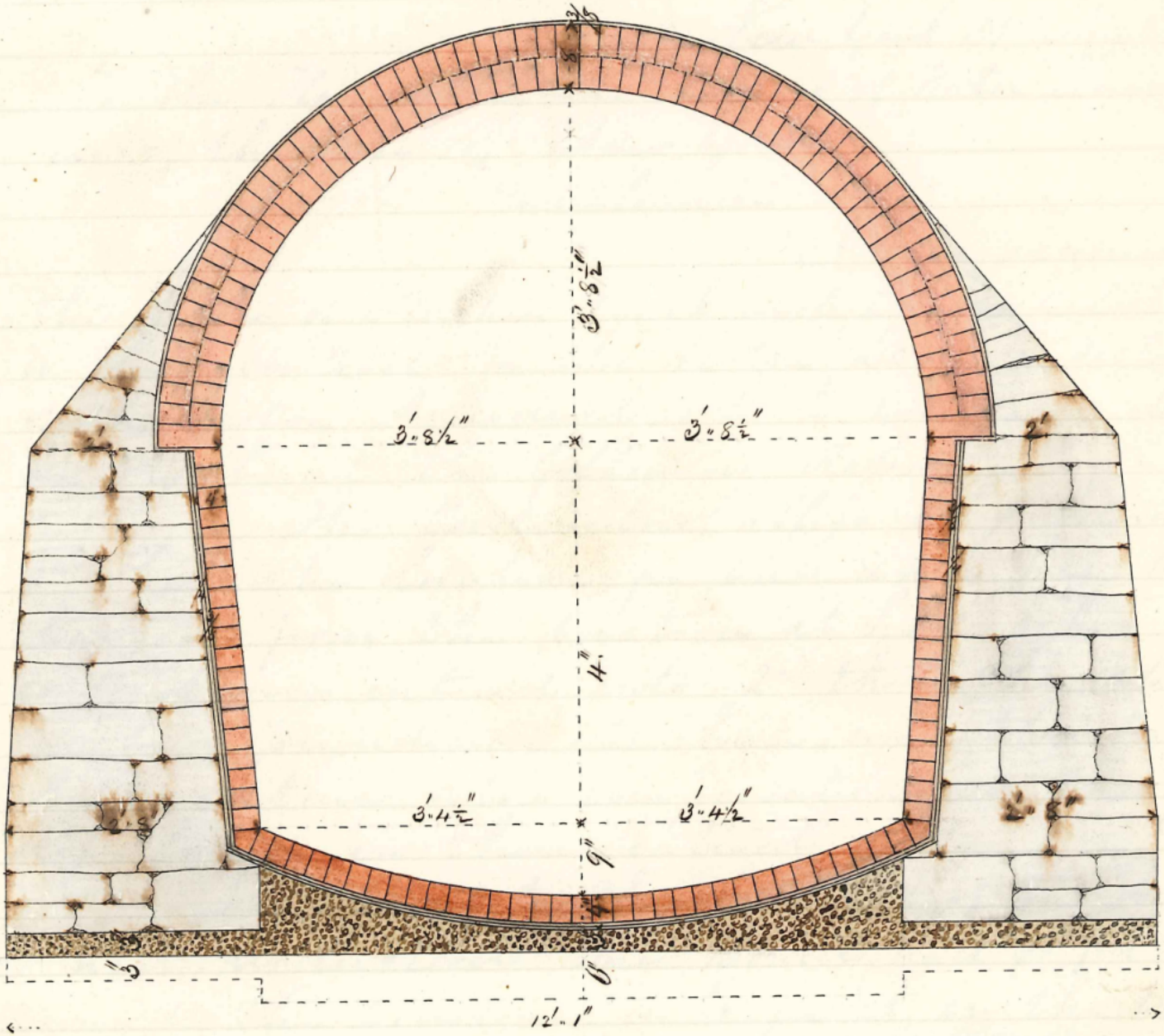
Chas. H. Cheney
DISTRICT SUPERINTENDENT OF SCHOOLS
SECOND DISTRICT WESTCHESTER COUNTY

CITY OF NEW YORK
DEPARTMENT OF WATER SUPPLY, GAS & ELECTRICITY
PROPERTY IN
Town of Greenburg
School District No. 4.
WESTCHESTER CO.
SHEET NO. 85.
REAL ESTATE DIVISION

O.A.E.

OLD CROTON AQUEDUCT

FILE NO. CASE NO. DRAW. NO. 17.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3'.8½"
3'.8½"
3'.8½"
4"
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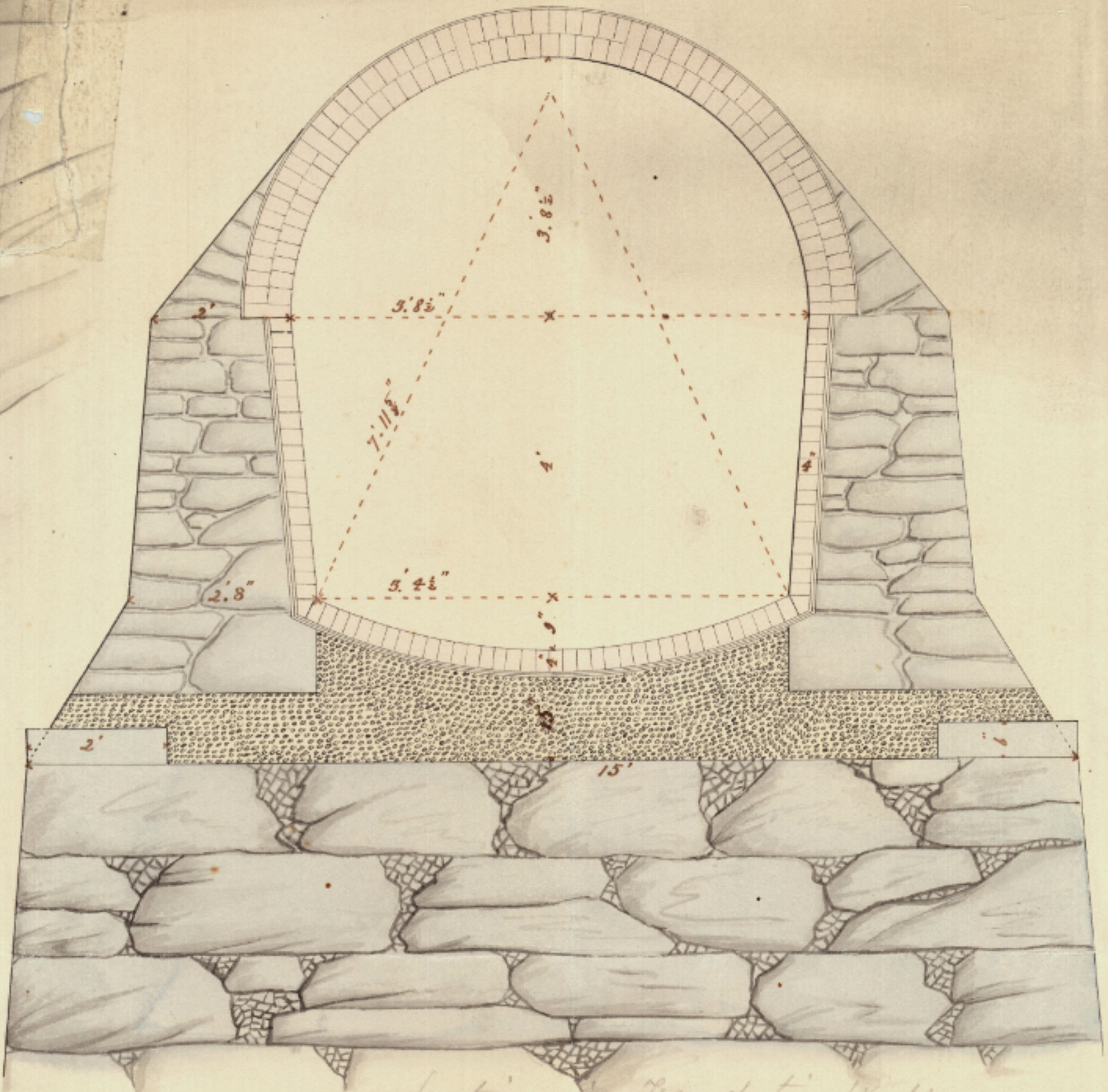
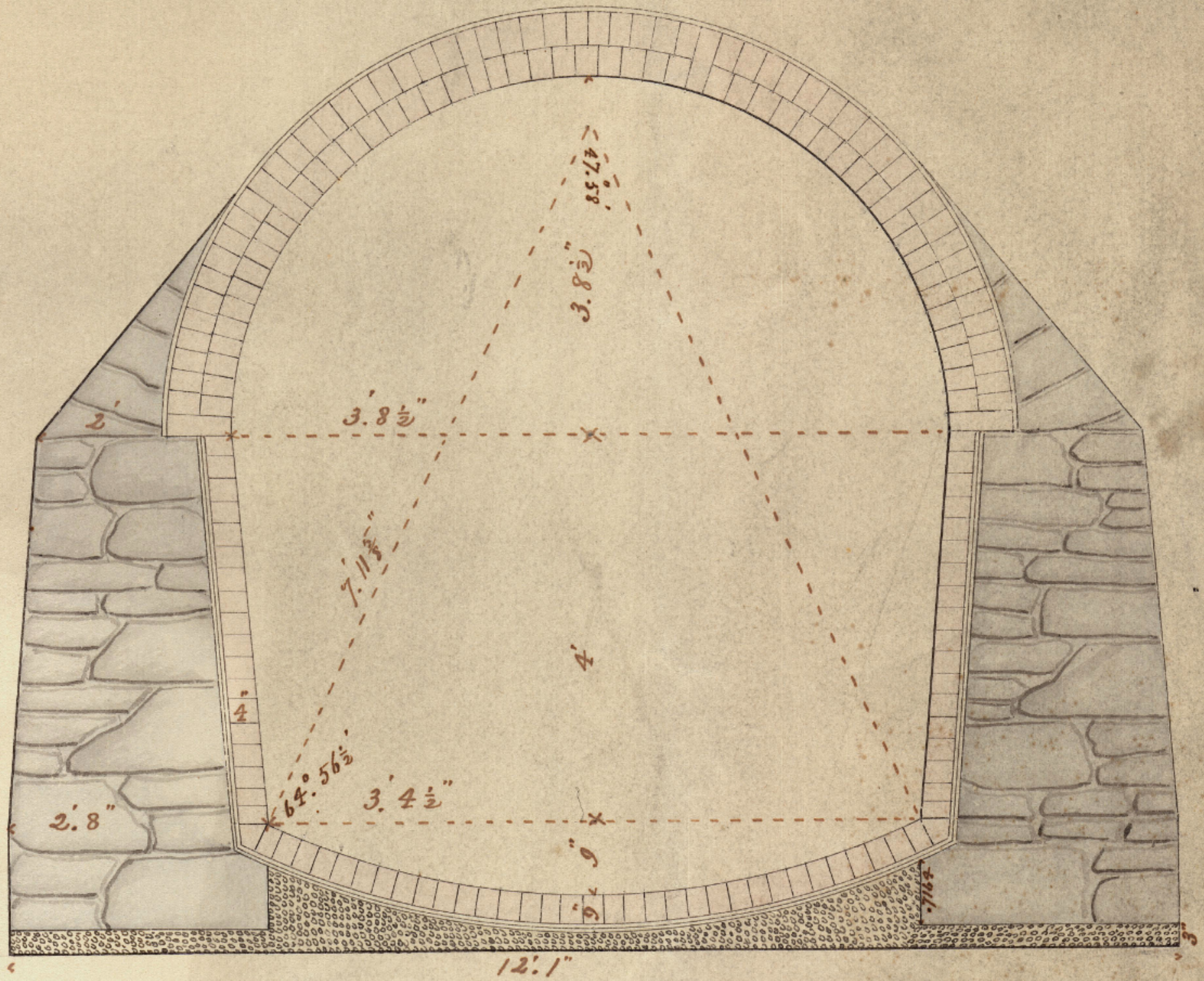
3'.4½"
9"
6"
6"
12'.1"
2'
2'
2'.8"
2'.8"



Section on Foundation Wall


47.58
3.8½"
3.8½"
7.11⅝"
2'
4"
4'
64.56½
3.4½"
2.8"
9"
9"
.7164
12.1"

Appendix B

MACCAFERRI

TECHNICAL DATA SHEET
Rev. 01, Date 01.01.2018

MAC.RO. SYSTEM - SteelGrid™ HR30G
HIGH RESISTANCE COMPOSITE MESH SYSTEM

Product Description

SteelGrid™ HR30G (Figure 3) is an innovative high tensile strength composite mesh particularly suitable for rockfall protection as a pinned or simple drapery system for surface or soil veneer slope stability.

SteelGrid™ HR30G consists of double twisted steel wire mesh, and high tensile strength steel wire ropes, which are inserted longitudinally and woven into the mesh during fabrication.

SteelGrid™ HR30G (Figure 1) is woven under tension providing straighter wire ropes, which creates a high strength low elongation mesh. This feature enables lower deflection under higher debris loads. In addition to overall mesh stiffness, the straightened wire ropes limit overall mesh elongation.

The steel wires used in the manufacturing of **SteelGrid™ HR30G** are heavily galvanized. The double twisted hexagonal wire mesh (Figure 2) has traditionally been used in the production of rockfall netting and provides a high resistance to the thrust and impact of rocks without unravelling even in the event of individual wire breakages.

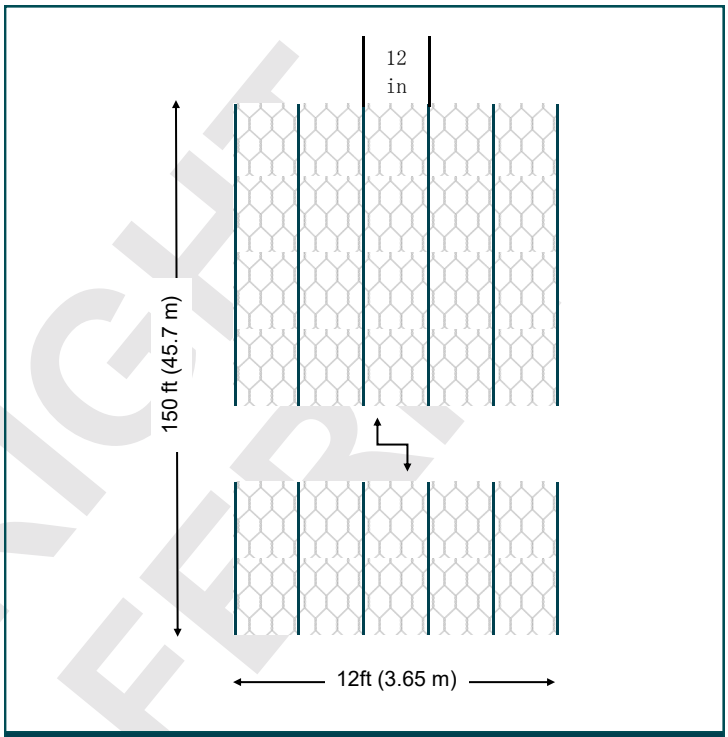


Figure 1: SteelGrid™ HR30G

The tolerance on the opening of mesh 'D' being the distance between the axis of two consecutive twists, is according to ASTM A975

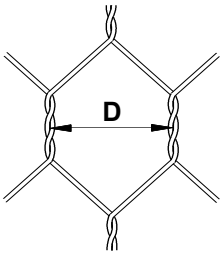


Figure 2: Standard Double Twist Wire Mesh

The high strength steel wire ropes used in the manufacturing of **SteelGrid™ HR30G** have an elongation range of 5-9%. This behavior is demonstrated through punch resistance testing shown in Table 2.

Figure 3: SteelGrid™ HR30G Simple Drapery

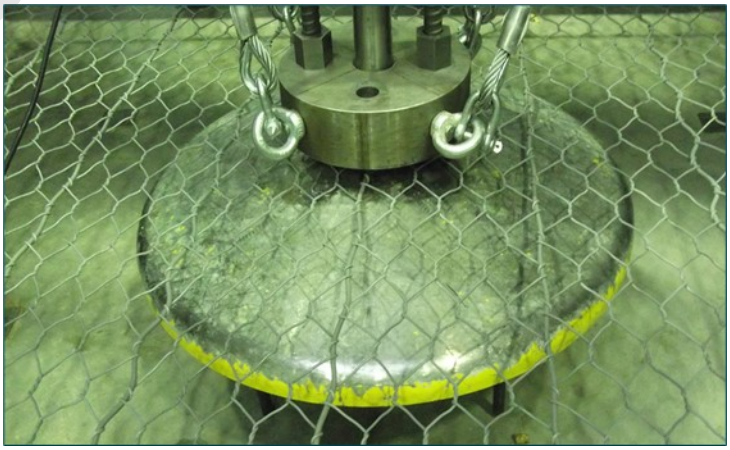


Figure 4: Punch test performances (UNI 11437)

Maccaferri reserves the right to amend product specifications without notice and specifiers are requested to check as to the validity of the specifications they are using.

MACCAFERRI
www.maccaferri.com/us

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AREA OFFICES:
AZ, Phoenix
CA, Sacramento
MD, Williamsport
MO, St. Louis
NJ, Trenton
NM, Albuquerque
PR, Caguas
TX, Lewisville
UT, Salt Lake City

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Table 1 - Standard Longitudinal Tensile Performance Data

SteelGrid™	Nominal Maximum Elongation	Nominal Longitudinal Tensile Strength lb/ft (kN/m)
HR 30G	6 %	12,131 (177)

Table 2 - Standard Punch Test Performance Data (UNI 11437)

SteelGrid™ HR30	Ultimate Punching Force Kips (kN)	Displacement at Ultimate Punching Force inch (mm)
No Soil	13.4 (59.8)	9.5 (239)
With Soil	91.5 (407)	8.0 (200)

Installlation

SteelGrid™ installation is easy to handle/install and will not require extensive modification of existing method and installation techniques. The inclusion of the steel ropes greatly enhances the transfer of loads from the mesh to the anchorage system thereby increasing capacity and durability of the mesh as a complete system.

Connecting Panels

Vertical Panel to Panel connections are made via wire rope lacing or using 302SS HR Links. Wire Rope lacing should be installed at one wrap per foot of seam, or the HR Links are installed two per foot of seam. Wire ropes used for panel connection shall be in accordance with ASTM A1023 (Table 6).

Table 6 - Lacing Wire Rope Specifications

Wire Rope Diameter	inch (mm)	5/16 (8)
Wire Rope Construction	Type	7x19 SC
Wire Rope Minimum Break	lbs (kN)	9800 (43.6)
Galmac™ (95%ZN/5%AL) Coating		ASTM A1007

*Wire rope specifications and tolerances per ASTM A1023 Table 9.

Table 3 - Standard Product Sizes

SteelGrid™	Roll Width ft (m)	Roll Length ft (m)	Longitudinal Rope Spacing inch (cm)
HR 30G	12 (3.65)	150 (46)	12 (30)

All sizes and dimensions are nominal. Confirmation should be sought from regional office prior to placement of an order. Mesh production tolerances of ±3% of the length, ±5% of width, ±8% of rope spacing shall be permitted.

Table 4 - SteelGrid™ Mesh Characteristics

Mesh Type	D in (mm)	Tolerance
8x10	3.25 (83)	±10%
Mesh Wire Diameter	inch (mm)	0.106 (2.70)
Galvanization Coating Weight	oz/ft^2 (gr/m^2)	0.80 (244)
Longitudinal Wire Rope	ø in. (mm)	5/16 (8)

*Double twisted wire mesh specifications and tolerances per ASTM A975.
*Mesh wire specifications and tolerances per ASTM A856.
*Longitudinal mesh rope specifications as per Table 5.

Table 5 - Longitudinal Wire Rope Specifications

Wire Rope Diameter	inch (mm)	5/16 (8)
Wire Rope Construction	Type	7x7 SC
Wire Rope Minimum Break	lbs (kN)	9200 (40.9)
Galmac™ (95%ZN/5%AL) Coating		ASTM A1007

*Wire rope specifications and tolerances per ASTM A1023 Table 9.

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STEELGRID HR30 - PINNED DRAPERY SYSTEM

Typical Drawings

Rev:	Observations	Dis:	App:	Date:

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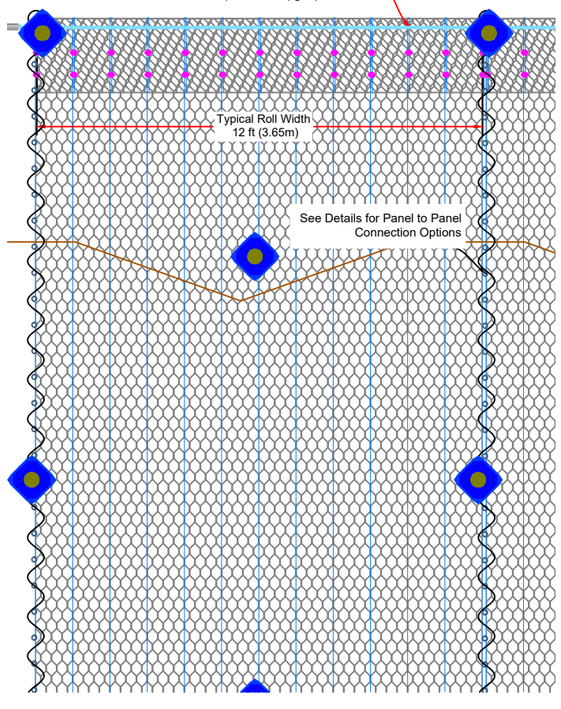
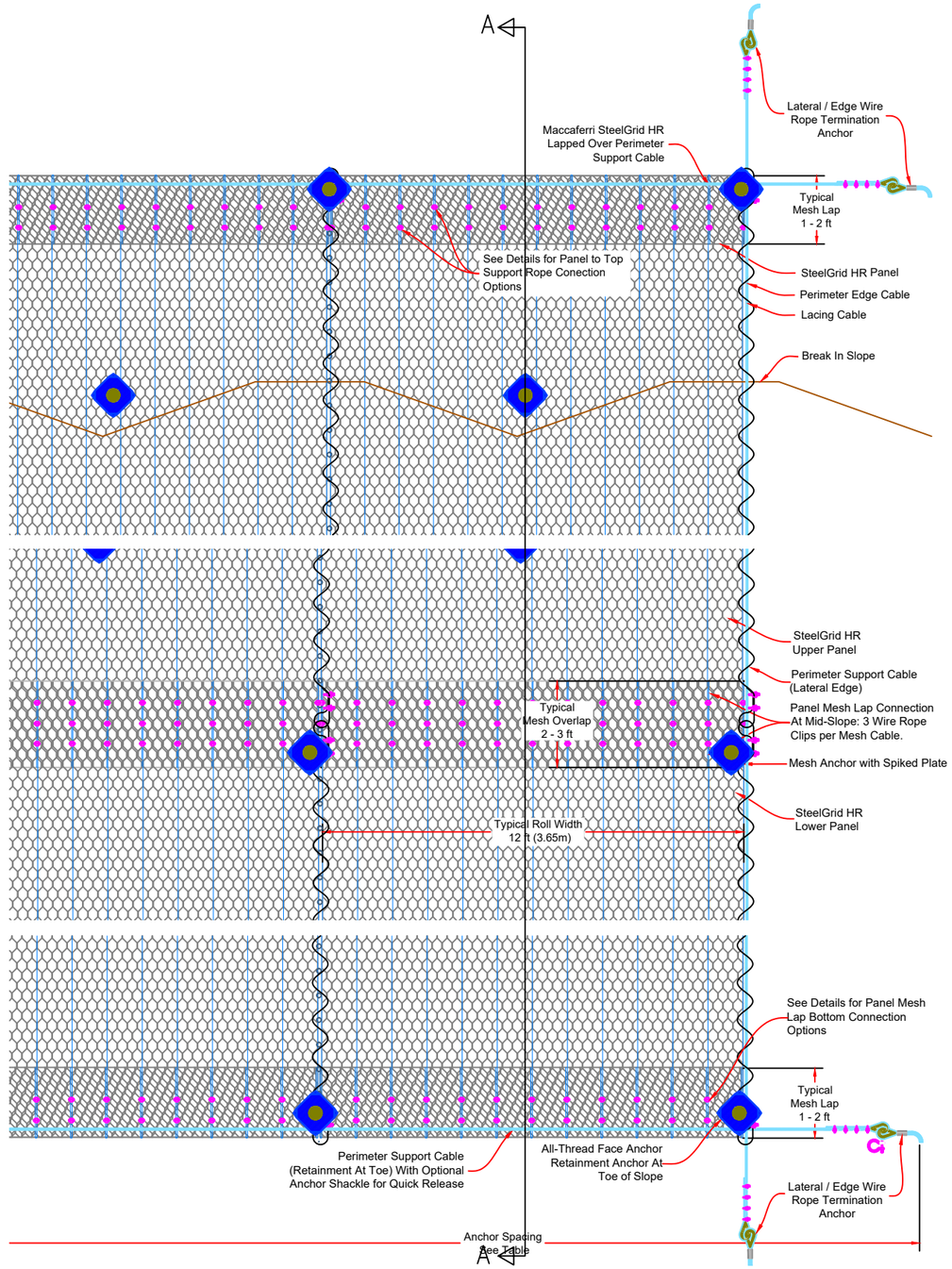
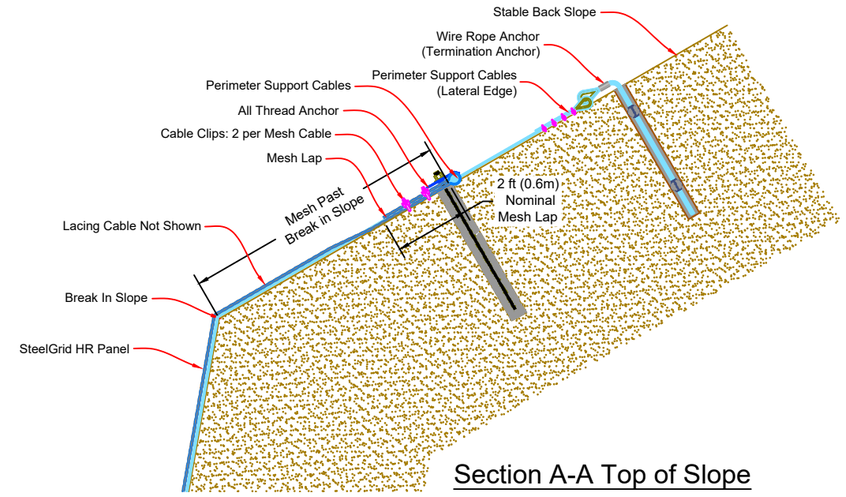
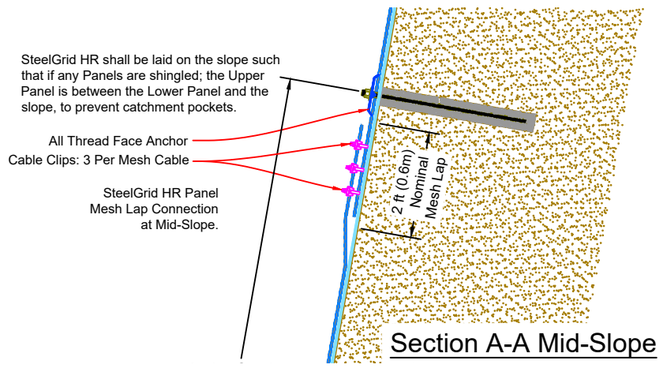


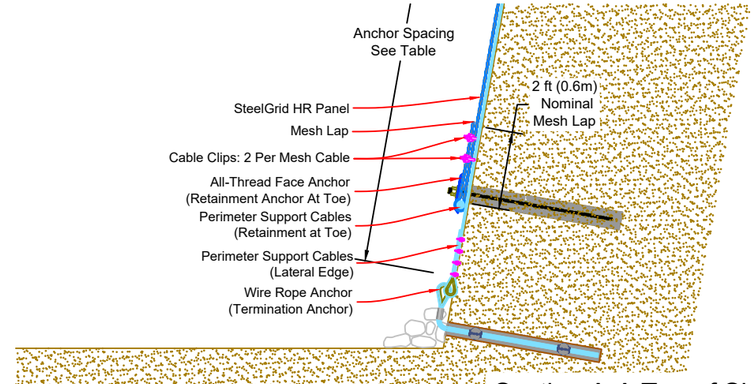




Section A-A Top of Slope



Section A-A Mid-Slope



Section A-A Toe of Slope

Pinned Drapery Notes:

All Wire Ropes As Listed Unless Otherwise Noted.

1. Perimeter Support Cables, (If Applicable) Ø= 5/8" (16 mm) Wire Rope Class 6x19 IWRC, Galvanized.
2. Tag Lines (If Applicable), Ø= 5/8" (16 mm) Wire Rope Class 6x19 IWRC, Galvanized.
3. Panel to Panel Lacing Cable (I.D.), Ø= 5/16" (8 mm) Wire Rope Type 7x19 SC, Galvanized Plus PVC (O.D.), Ø= 5/16" (8mm) **Anchors:** Please See Anchor Details pg.2 and 3.

SteelGrid Panels.

4. SteelGrid **HR30** Composite Cable Panel Construction: DT Mesh Type 8x10 Galvanized, with Interwoven 5/16" (8 mm) Wire Ropes, Type 7x7 / 7x19 SC, Galvanized. Wire Rope Spacing 12 in (30 cm) Longitudinal.

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Rev:	Issue / Revision:	Drawn:	App:	Date:

Drawing Title: SteelGrid HR Simple Drapery Elevation and Cross Section Views

Project No:	Client:		
----	CLIENT		
Drawing No: 1 /5	Units: Feet	Scale: NTS	Rev: LM2 Printed on: 11/19/20

Designed:	Date:
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Drawn: BLM	Date: 11/05/20
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Project: STEELGRID HR30 - PINNED DRAPERY SYSTEM

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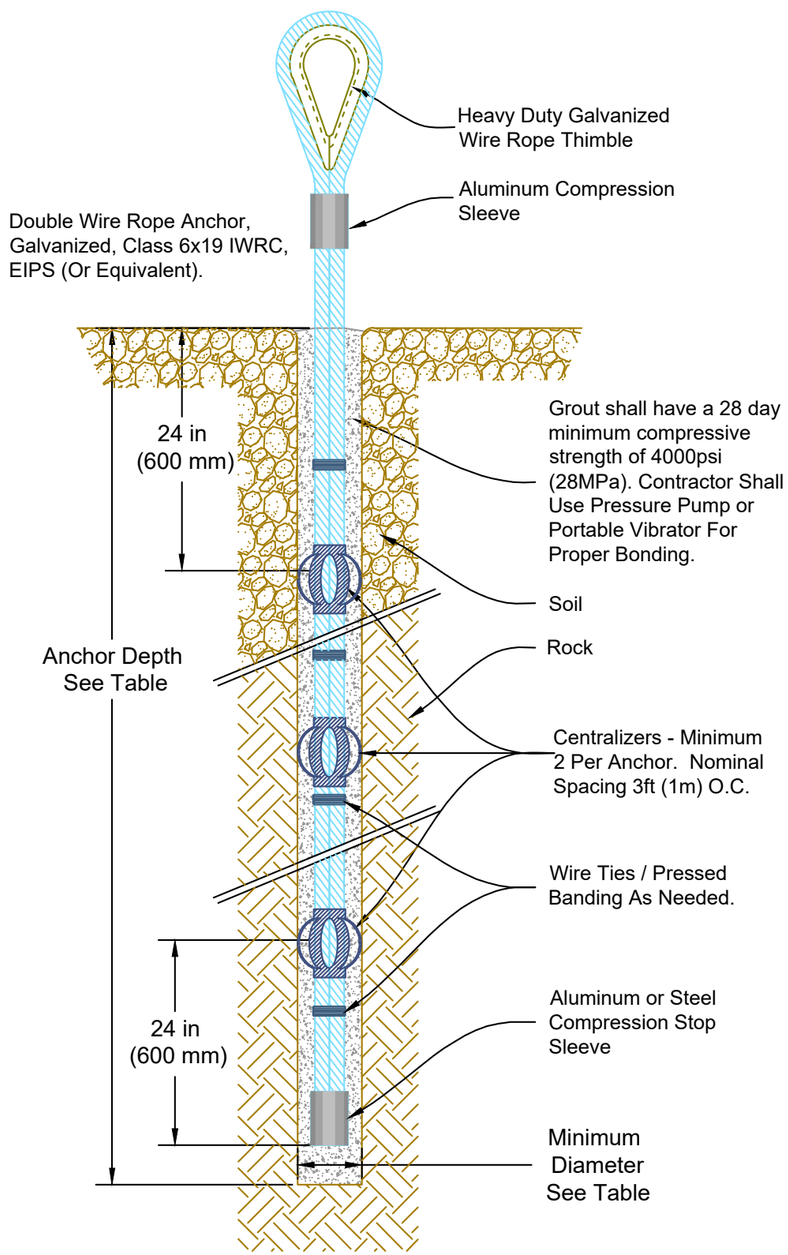
DOUBLE WIRE ROPE ANCHOR DETAILS

Anchor Designation / Location	Maximum Anchor Spacing	Foundation Material	Nominal Drilled Hole Diameter	Nominal Embedment Depth	Minimum Pullout
Lateral / Edge Termination Wire Rope Anchors Ø= 5/8in (16mm)	200 ft (61 m)	Soil	4 in (102 mm)	7 ft (2.1 m)	20 Kips (88 kN)
		Rock	2 in (50 mm)	6 ft (1.8 m)	
Intermediate Anchors Wire Rope Anchor Ø= 5/8in (16mm)	50 ft (15 m)	Soil	4 in (102 mm)	7 ft (2.1 m)	20 Kips (88 kN)
		Rock	2 in (50 mm)	6 ft (1.8 m)	

Note:
1. Suggested Anchor Spacing and Depths based on typical mesh only loads. Anchors to meet minimum Pullout testing Per Design.
2. Anchor Depth and Hole Diamters based on Allowable grout to soil /rock stresses of 15psi for soil & 85psi for rock with factor of safety
3. Intermediate Wire Rope Anchors Used If Bar Anchor Pattern Does not Support The Top Support Cable.

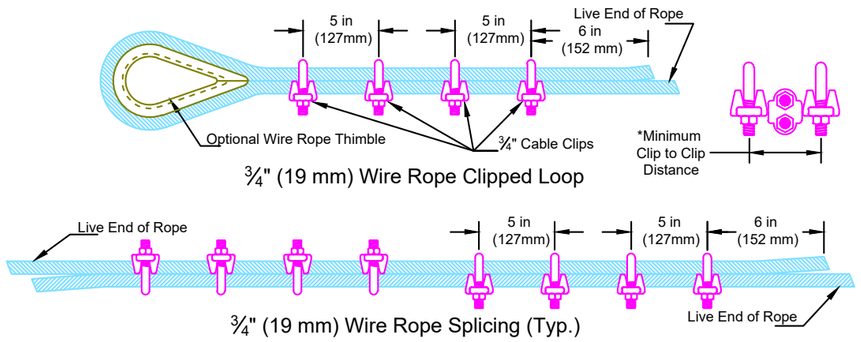
Detail A.2.1 - Wire Rope Anchor
- Pressed Aluminum Sleeve w/ Heavy Thimble -



Wire Rope Clip Specifications Table

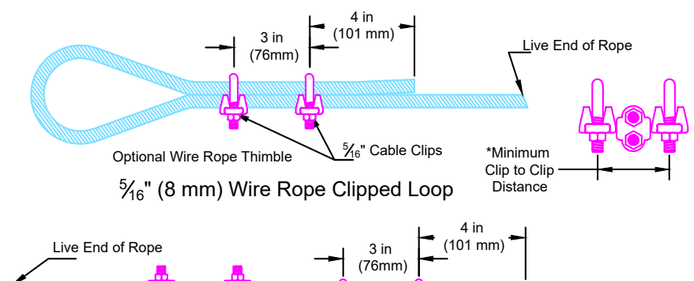
Clip Size Ø mm [in]	Cable Diameter mm [in]	Number of Clips	Nominal Turnback mm [in]	Nominal Spacing mm [in]	Tightening torque Nm [ft.lbs]
8 [5/16]	8 [5/16]	2	275 [11]	76 [3.0]	40 [30]
20 [3/4]	20 [3/4]	4	660 [26]	127 [5.0]	175 [130]

*If a greater number of clips are used than shown in the table, the amount of turnback should be increased proportionally.
*The tightening torque values shown are based upon the threads being clean, dry, and free of lubrication.



Note: 1.) Always Place Saddle of Clamp on Live Rope End, U-Bolt on Dead End.
2.) First Wire Rope Clip Should Be Placed As Close As Possible To The Thimble.
3.) *Minimum Clip to Clip Distance should be greater than the width of the Saddle.

Detail B.3: 3/4" (19mm) Wire Rope Ends and Spliced Connections



Note: 1.) Always Place Saddle of Clamp on Live Rope End, U-Bolt on Dead End.
2.) First Wire Rope Clip Should Be Placed As Close As Possible To The Thimble.
3.) *Minimum Clip to Clip Distance should be greater than the width of the Saddle.

Detail B.7: 5/16" (8 mm) Wire Rope Ends and Spliced Connections

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Drawing Title: SteelGrid HR Simple Drapery Wire Rope and Anchor Details

Project No: ----
Client: CLIENT
Drawing No: 2 /5
Units: Feet
Scale: NTS
Rev: LM2
Printed on: 11/19/20

Designed: BML Date: -
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Project: STEELGRID HR30 - PINNED DRAPERY SYSTEM

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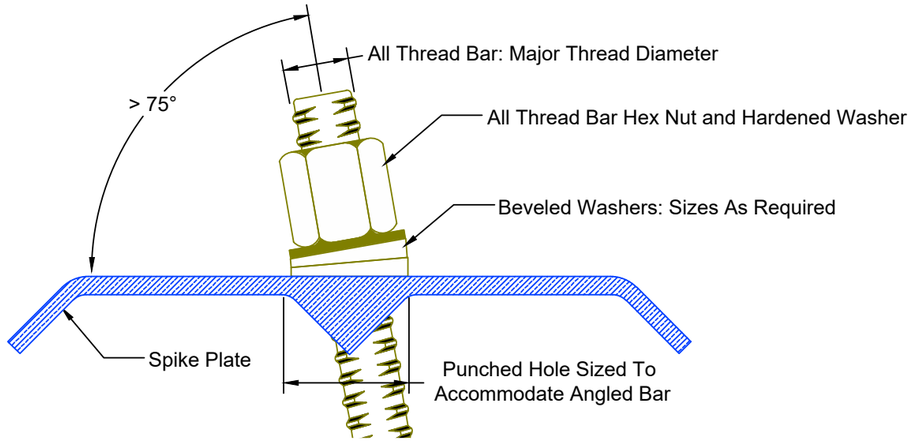
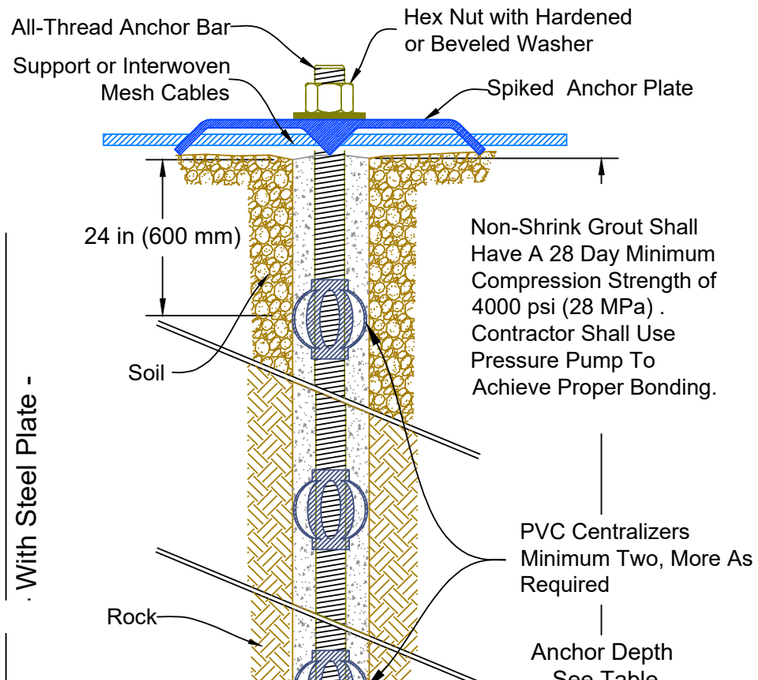
ALL-THREAD BAR ANCHOR DETAILS

Anchor Designation / Location	Suggested Anchor Spacing / Pattern	Foundation Material	Suggested Minimum Anchor Depth	Suggested Drilled Hole Diameter	Suggested Minimum Pullout
Threaded Bar Anchor Spacing to be Design According to Site Conditions.	To be Design According to Site Conditions	Soil	To be Determined According to Site Conditions	4 in (102 mm)	20 Kips (89 kN)
		Rock		2.5 in (63 mm)	20 Kips (89 kN)



Detail A.12 - All-Thread Bar With Spike Plate

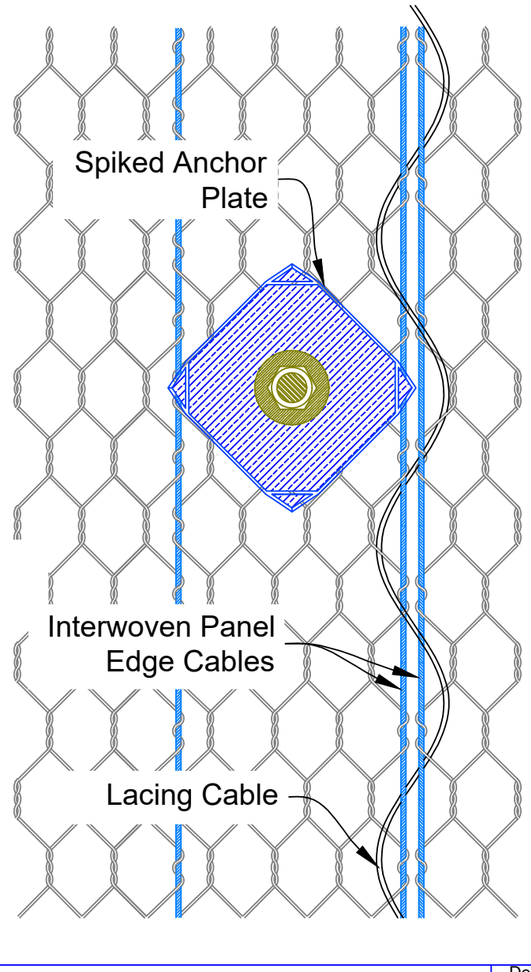
- Beveled Washer(s) For Bar to Plates Angles < 15° From Normal -

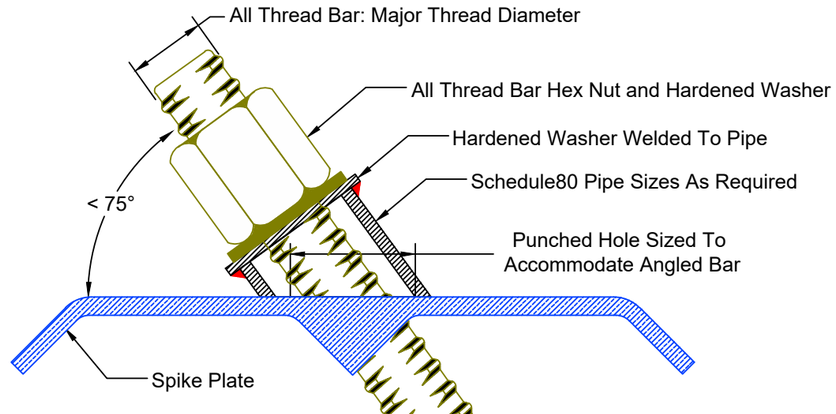


Typical Anchor X-Section Detail

Detail A.1 - All Thread Anchor

- With Steel Plate -





Detail A.11 - All-Thread Bar With Spike Plate

- Pipe Washer For Bar to Plates Angles > 15° From Normal -

Notes:

1. All Thread Bar Grade 75 (ASTM A615), Hot Dip Galvanized.
2. Heavy Hex Nut (ASTM A108), Hot Dip Galvanized.
3. Hardened Washer (ASTM F436), Hot Dip Galvanized.
4. Beveled Washer(s) (ASTM A536), Hot Dip Galvanized. *To Flush Plate To Slope*.
5. Standard 10'x10'x$\frac{3}{8}$" Spiked Bearing Plate (ASTM A36), Hot Dip Galvanized.

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Drawing Title: SteelGrid HR Simple Drapery Wire Rope and Anchor Details

Project No: ----

Client: CLIENT

Drawing No: 3 /5

Units: Feet

Scale: NTS

Rev: LM2

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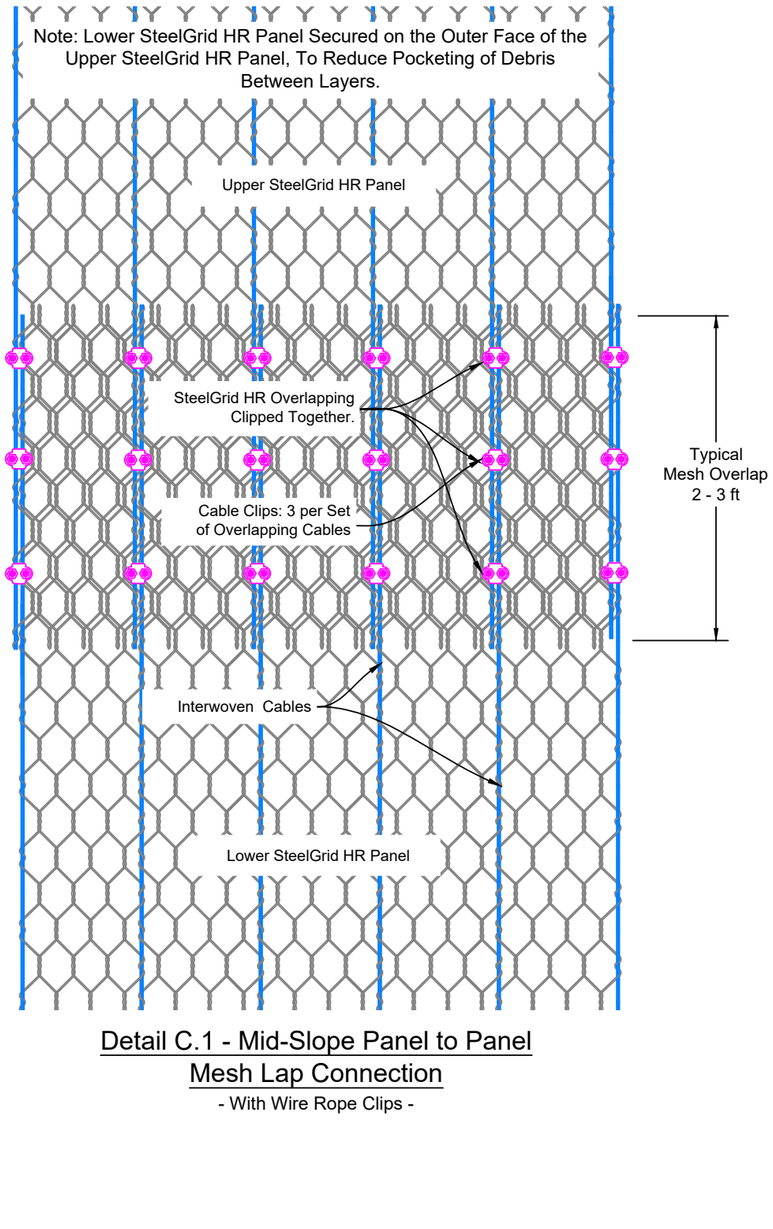
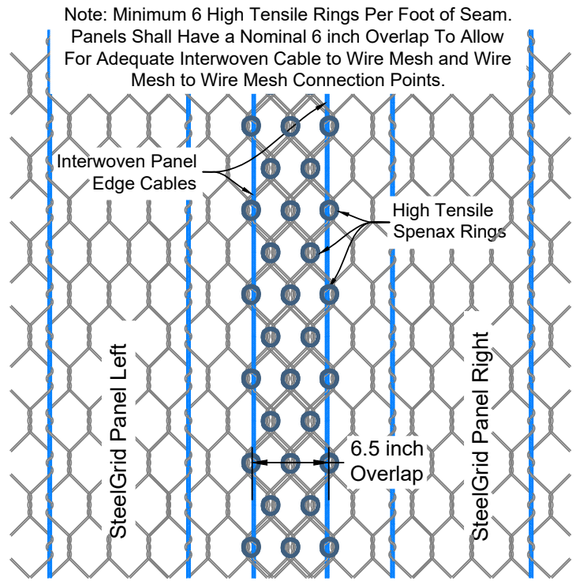


Detail C.1 - Mid-Slope Panel to Panel Mesh Lap Connection

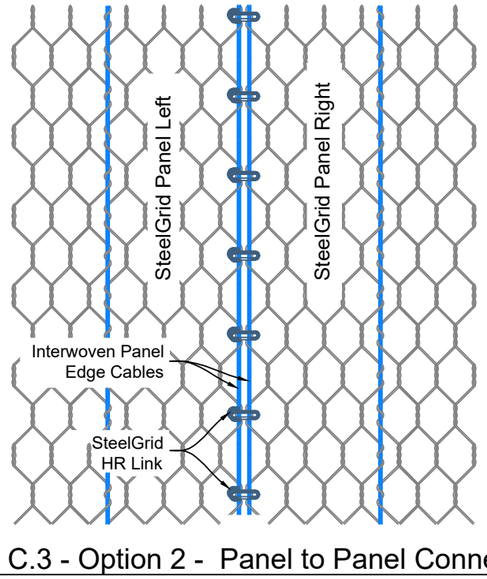
- With Wire Rope Clips -



Detail C.2 - Option 1 - Panel to Panel Connection

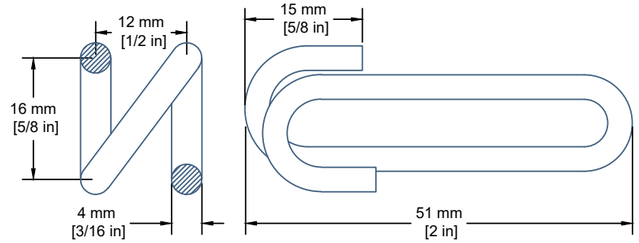
- Overlap With High Tensile Hog Rings -
- Simple Draperies Only -

Note: Minimum 2 HR Links Per Foot of Seam.



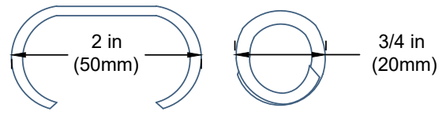
Detail C.3 - Option 2 - Panel to Panel Connection

- With HR Link Option -



Detail D.10: SteelGrid HR Link

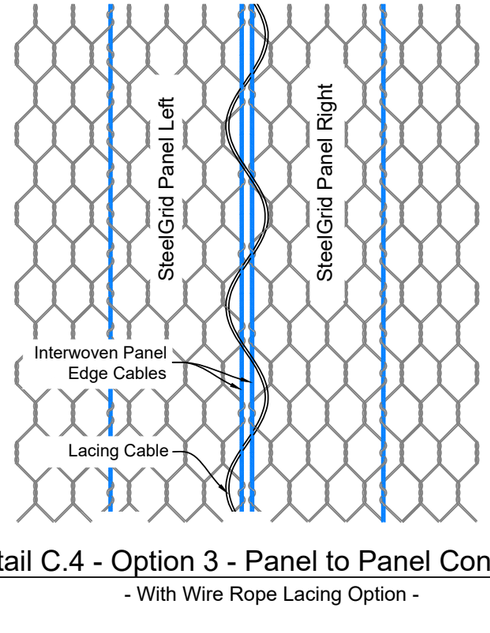
- Panel to Panel Vertical Seam Connections -



1.) Spenax Fastener Ø= 2in (50mm) open and 3/4in (20 mm) closed.
2.) Spenax Fastener has 170 Kg/mm² Breaking Load
3.) Spenax Fastener Wire Ø= 0.120in (3.00mm), Nominal 11 Gauge Wire Fastener

Detail H.1 - Spenax Ring Fastener

Note: Minimum One (1) Rotation of Lacing Cable Per Foot of Seam.



Detail C.4 - Option 3 - Panel to Panel Connection

- With Wire Rope Lacing Option -

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Drawing Title: SteelGrid HR Simple Drapery
Mid-Slope Slices & Panel to Panel Connections

Project No:	Client:		
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Drawing No: 4 /5	Units: Feet	Scale: NTS	Rev: LM2
			Printed on: 11/19/20

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Project: STEELGRID HR30 - PINNED DRAPERY SYSTEM

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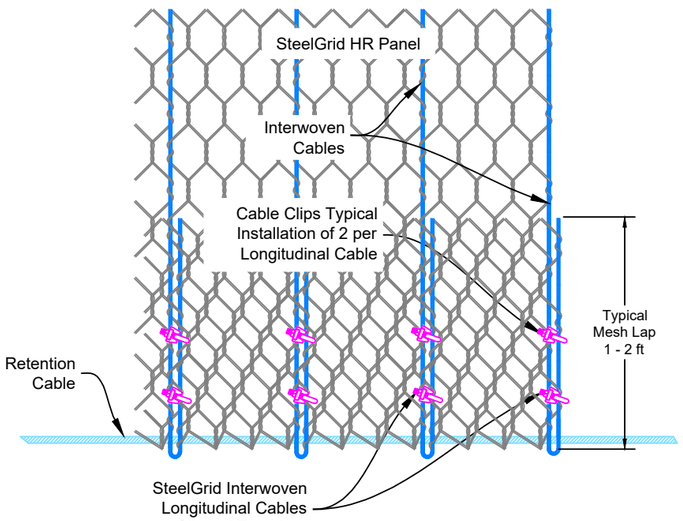
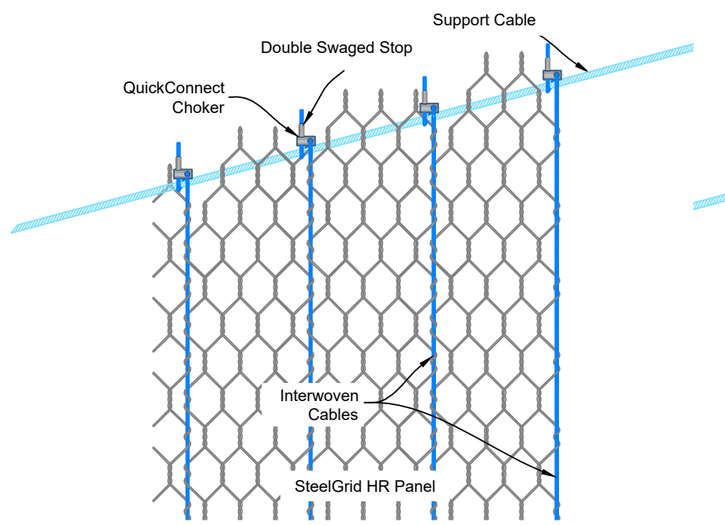


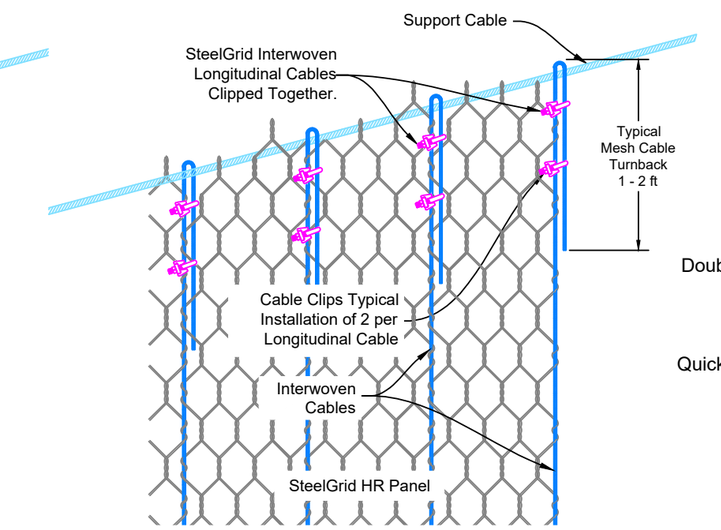
Detail C.5 - Option 1 - Panel to Retention Cable Connection

- With Wire Rope Clip Fold Over Option -
- For Simple or Pinned Drapery Systems -



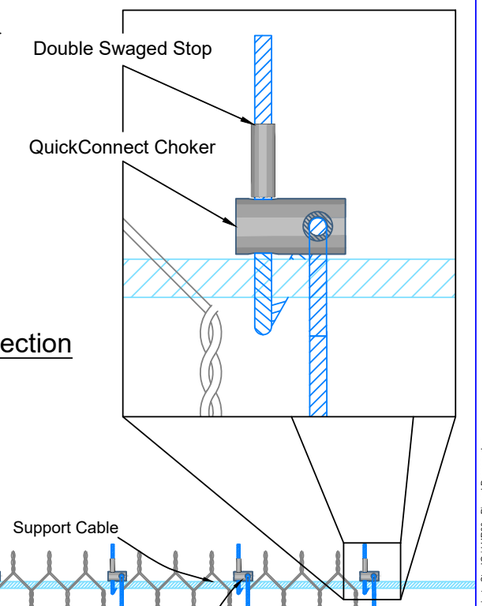
Detail C. 6- Panel to Angled Support Cable Connection

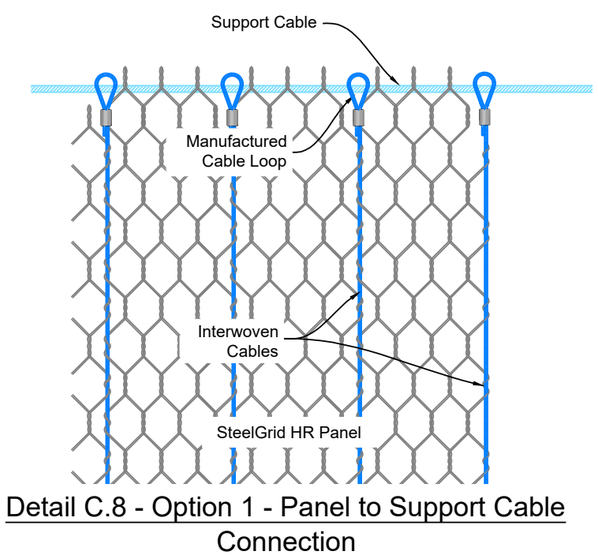
- With QuickConnect Option -
- For Simple or Pinned Drapery Systems -



Detail C.7 - Panel to Angled Support Cable Connection

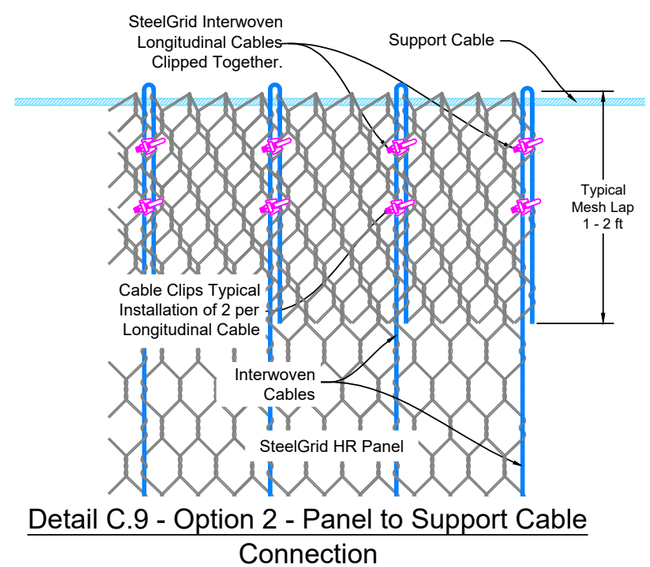
- With Wire Rope Clip Fold Over Option -
- For Simple or Pinned Drapery Systems -





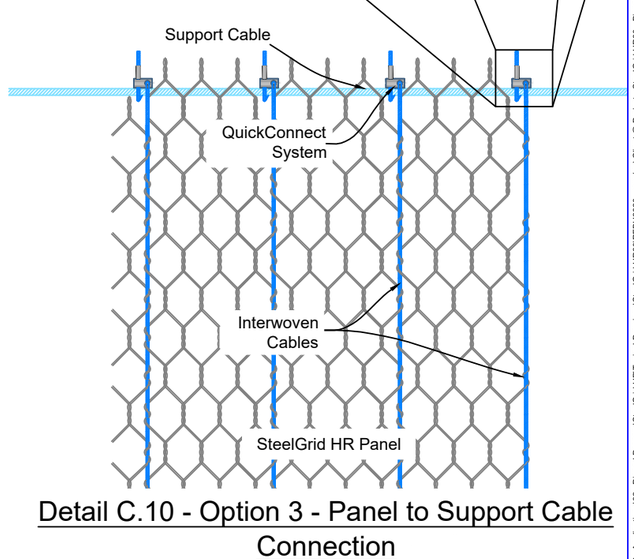
Detail C.8 - Option 1 - Panel to Support Cable Connection

- With Fabricated Cable Loop Option -
- For Simple or Pinned Drapery Systems -



Detail C.9 - Option 2 - Panel to Support Cable Connection

- With Wire Rope Clip Fold Over Option -
- For Simple or Pinned Drapery Systems -



Detail C.10 - Option 3 - Panel to Support Cable Connection

- With QuickConnect System Option -
- QuickConnect Choker and Stopper -
- For Simple or Pinned Drapery Systems -

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Drawing Title: SteelGrid HR Simple Drapery Panel to Support & Retention Cable Connections

Project No: ----	Client: CLIENT		
Drawing No: 5 /5	Units: Feet	Scale: NTS	Rev: LM2
			Printed on: 11/19/20

Designed: BML	Date: -		
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Project: STEELGRID HR30 - PINNED DRAPERY SYSTEM

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STEELGRID HR30 - SIMPLE DRAPERY SYSTEM

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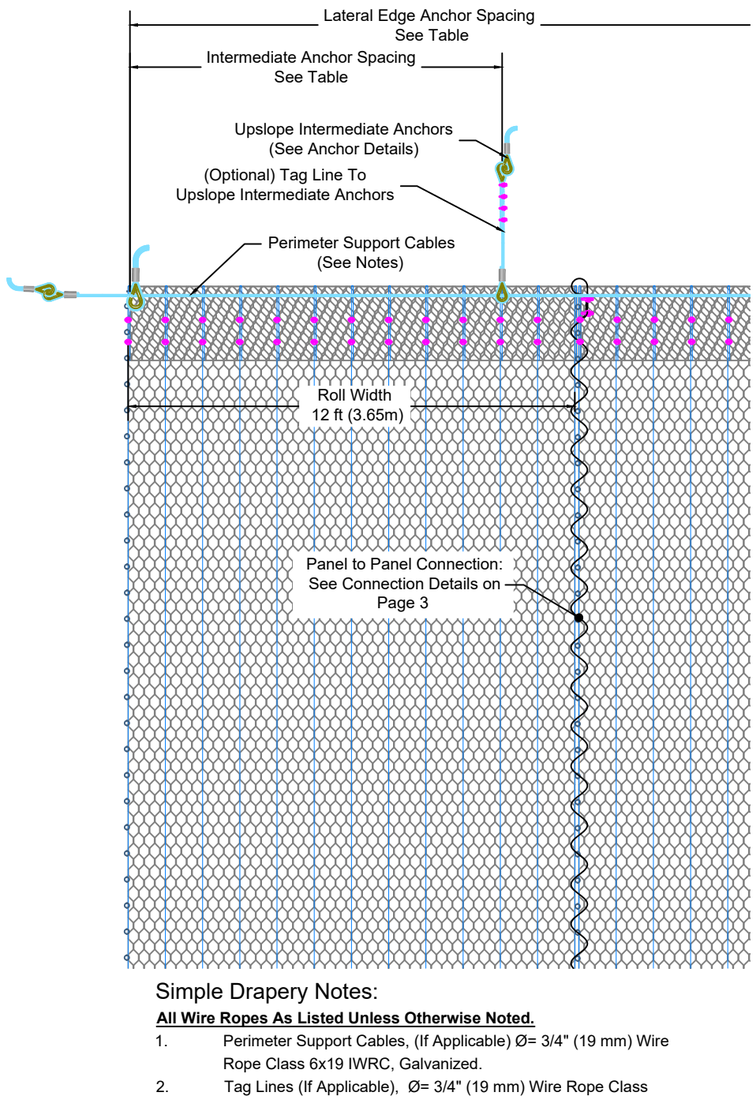
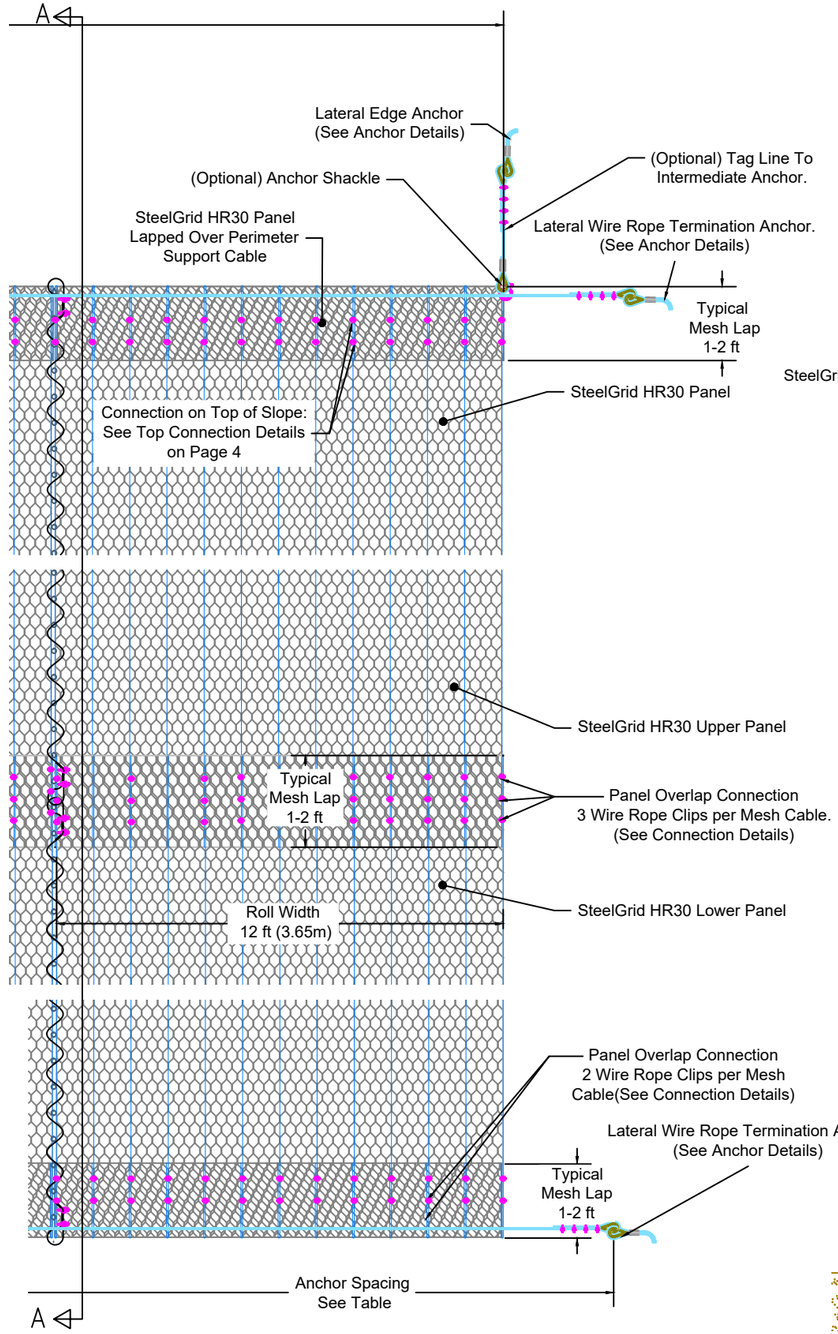
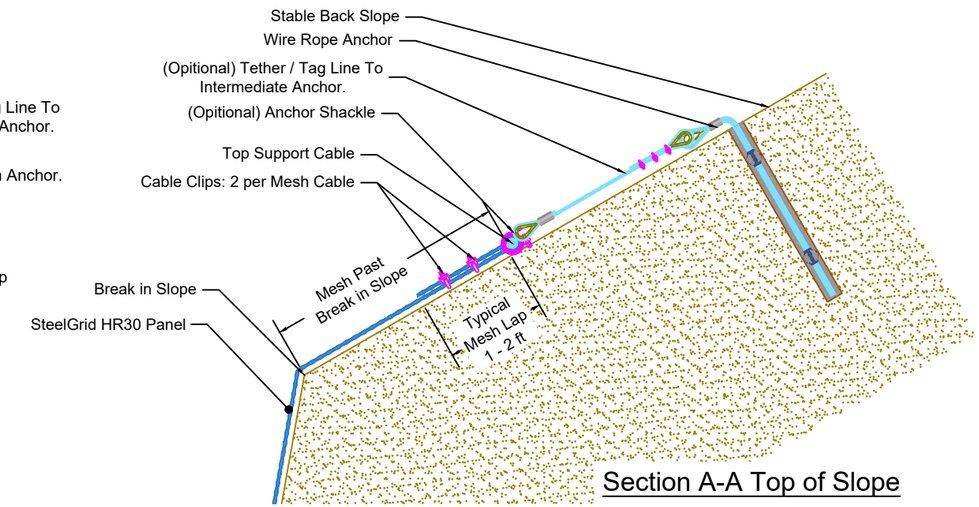
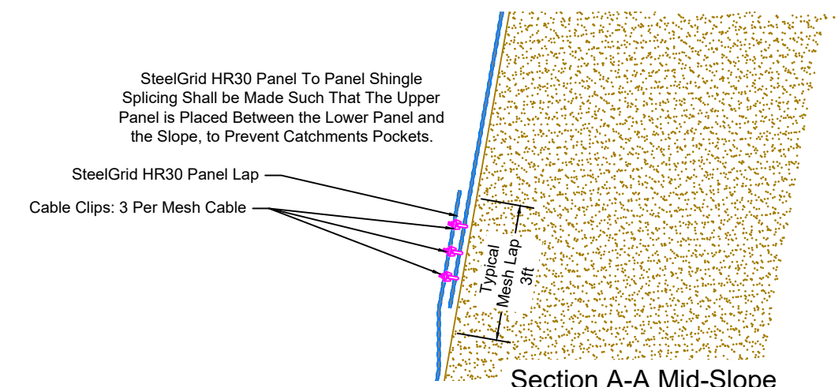


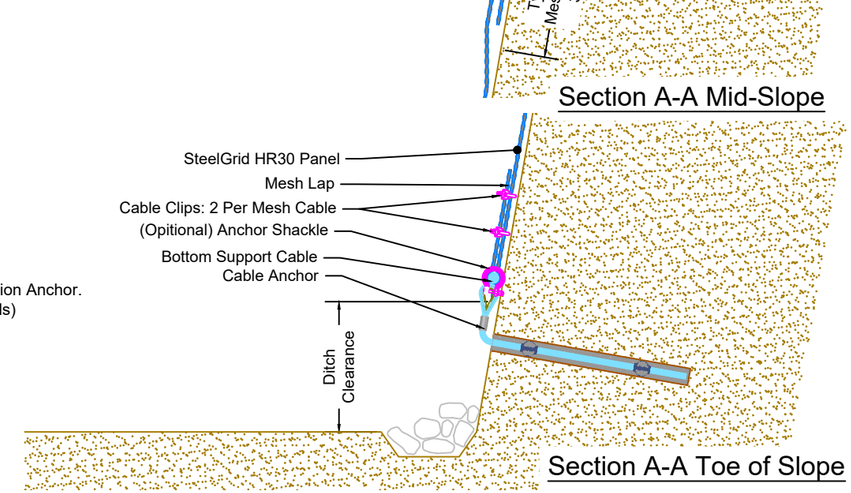




Section A-A Top of Slope



Section A-A Mid-Slope



Section A-A Toe of Slope

Simple Drapery Notes:

All Wire Ropes As Listed Unless Otherwise Noted.

1. Perimeter Support Cables, (If Applicable) Ø= 3/4" (19 mm) Wire Rope Class 6x19 IWRC, Galvanized.
2. Tag Lines (If Applicable), Ø= 3/4" (19 mm) Wire Rope Class 6x19 IWRC, Galvanized.
3. Panel to Panel Lacing Cable (I.D.), Ø= 5/16" (8 mm) Wire Rope Type 7x19 SC, Galvanized Plus PVC (O.D.), Ø= 5/16" (8mm)
   Anchors: Please See Anchor Details pg.2 and 3.

SteelGrid Panels.

4. SteelGrid **HR30** Composite Cable Panel Construction: DT Mesh Type 8x10 Galvanized, with Interwoven 5/16" (8 mm) Wire Ropes, Type 7x7 / 7x19 SC, Galvanized. Wire Rope Spacing 12 in (30 cm) Longitudinal.

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Rev:	Issue / Revision:	Drawn:	App:	Date:

Drawing Title: SteelGrid HR30 Simple Drapery Elevation and Cross Section Views

Project No:	Client:		
----	...		
Drawing No: 1 / 4	Units: Feet	Scale: NTS	Rev: 1 Printed on: 1/18/21

Designed:	Date:
BML	-
Drawn: LM	Date: 1/15/21
Checked: -	Date: -

Project: STEELGRID HR30 - SIMPLE DRAPERY SYSTEM

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Bleed B (11.00 X 17.00 Inches)

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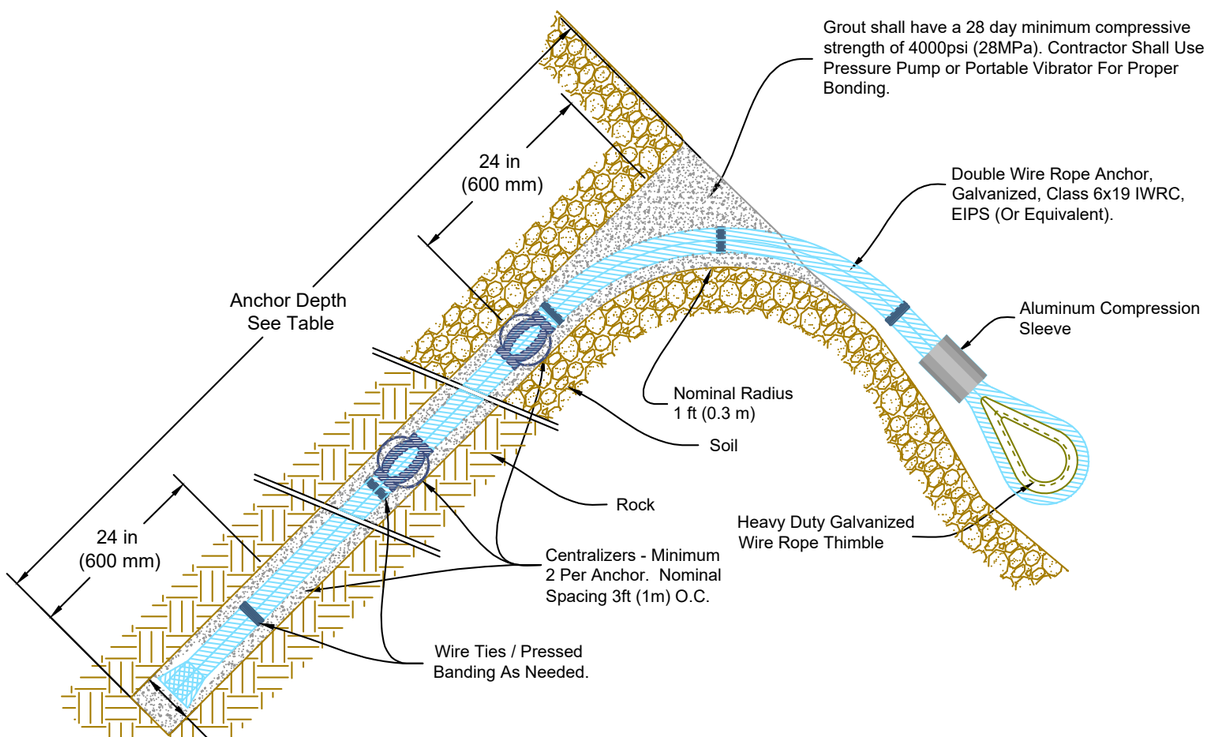
BACKSLOPE / TOESLOPE & LATERAL WIRE ROPE ANCHOR DETAILS

Anchor Designation / Location	Maximal Anchor Spacing	Foundation Material	Nominal Embedment Depth	Nominal Hole Diameter	Minimum Pullout
Back-Slope / Toe-Slope Anchors Double Wire Rope Ø= 5/8in (16mm)	Based on Mesh Height	Soil	10ft (3m)	5 in (127 mm)	25 Kips (111 kN)
		Rock	8ft (2.5m)	2.5 in (63 mm)	
Lateral Termination Anchors Double Wire Rope Ø= 5/8in (16mm)	Based on Mesh Height	Soil	10ft (3m)	5 in (127 mm)	45 Kips (200 kN)
		Rock	8ft (2.5m)	2.5 in (63 mm)	

Note: Nominal Anchor Spacing, Embedment Depth, Hole Diameter and Minimum Pullout based on nominal mesh loads.
Anchors to meet minimum Pullout testing.

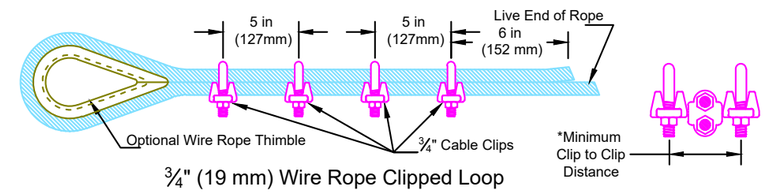


Detail A.2.2 - Radial Wire Rope Anchor
- Pressed Aluminum Sleeve w/ Heavy Thimble -

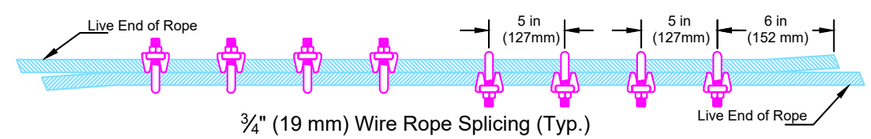
Wire Rope Clip Specifications Table

Clip Size Ø mm [in]	Cable Diameter mm [in]	Number of Clips	Nominal Turnback mm [in]	Nominal Spacing mm [in]	Tightening torque Nm [ft.lbs]
8 [5/16]	8 [5/16]	2	275 [11]	76 [3.0]	40 [30]
20 [3/4]	20 [3/4]	4	660 [26]	127 [5.0]	175 [130]

*If a greater number of clips are used than shown in the table, the amount of turnback should be increased proportionally.
*The tightening torque values shown are based upon the threads being clean, dry, and free of lubrication.



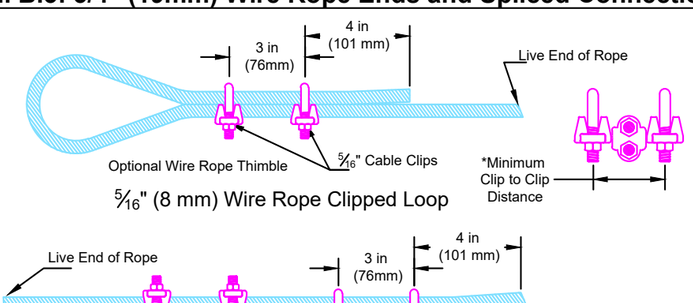
¾" (19 mm) Wire Rope Clipped Loop



¾" (19 mm) Wire Rope Splicing (Typ.)

Note: 1.) Always Place Saddle of Clamp on Live Rope End, U-Bolt on Dead End.
2.) First Wire Rope Clip Should Be Placed As Close As Possible To The Thimble.
3.) *Minimum Clip to Clip Distance should be greater than the width of the Saddle.

Detail B.3: 3/4" (19mm) Wire Rope Ends and Spliced Connections



5/16" (8 mm) Wire Rope Clipped Loop

5/16" (8 mm) Wire Rope Splicing (Typ.)

Note: 1.) Always Place Saddle of Clamp on Live Rope End, U-Bolt on Dead End.
2.) First Wire Rope Clip Should Be Placed As Close As Possible To The Thimble.
3.) *Minimum Clip to Clip Distance should be greater than the width of the Saddle.

Detail B.7: 5/16" (8 mm) Wire Rope Ends and Spliced Connections

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Rev:	Issue / Revision:	Drawn:	App:	Date:

Drawing Title: SteelGrid HR30 Simple Drapery Wire Rope and Anchor Details

Project No: ----
Client: ...
Drawing No: 2 / 4
Units: Feet
Scale: NTS
Rev: 1
Printed on: 1/18/21

Designed: BML Date: -
Drawn: LM Date: 1/15/21
Checked: - Date: -

Project: STEELGRID HR30 - SIMPLE DRAPERY SYSTEM

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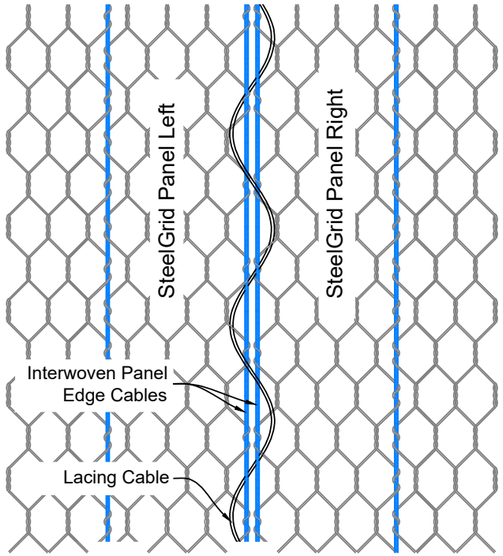
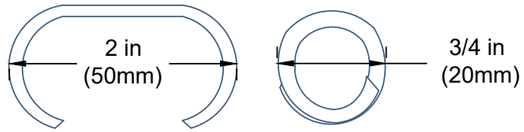
Note: Minimum One (1) Rotation of Lacing Cable Per Foot of Seam.



Detail C.1 - Option 1 - Panel to Panel Connection

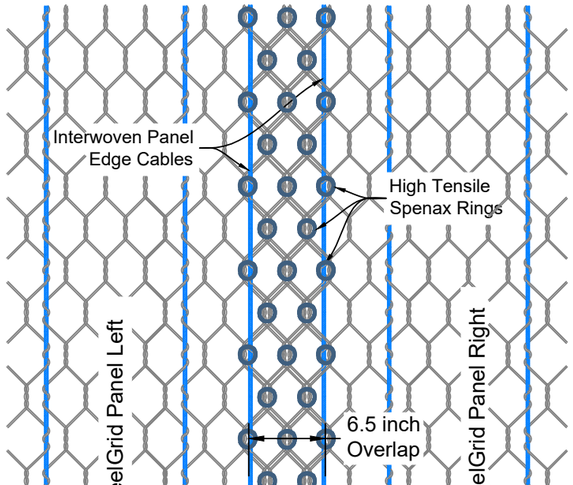
- With Wire Rope Lacing Option -



1.) Spenax Fastener Ø= 2in (50mm) open and 3/4in (20 mm) closed.
2.) Spenax Fastener has 170 Kg/mm² Breaking Load
3.) Spenax Fastener Wire Ø= 0.120in (3.00mm), Nominal 11 Gauge Wire Fastener

Detail H.1 - Spenax Ring Fastener

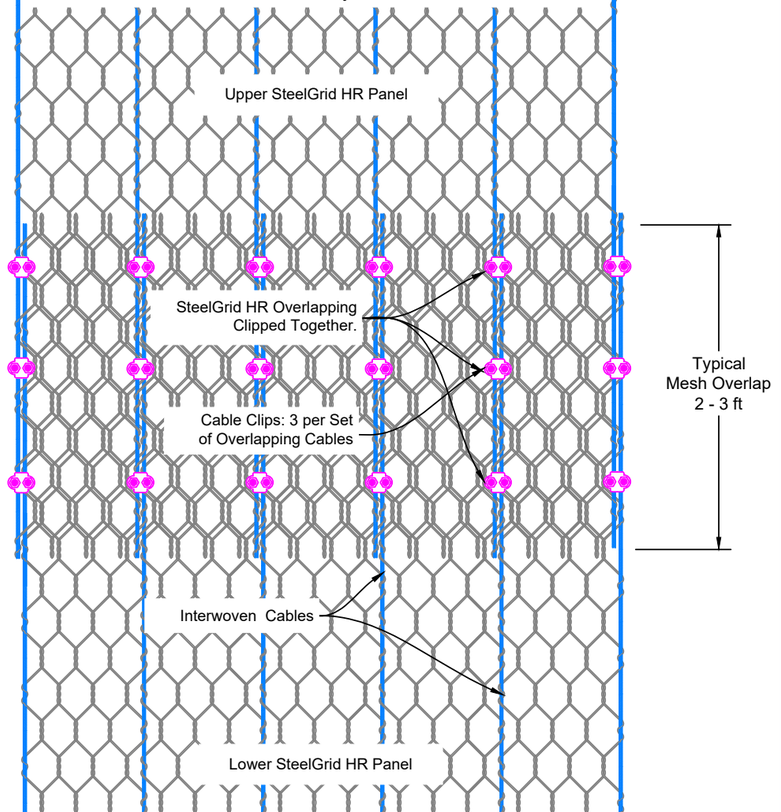
Note: Minimum 6 High Tensile Rings Per Foot of Seam. Panels Shall Have a Nominal 6 inch Overlap To Allow For Adequate Interwoven Cable to Wire Mesh and Wire Mesh to Wire Mesh Connection Points.



Detail C.3 - Option 3 - Panel to Panel Connection

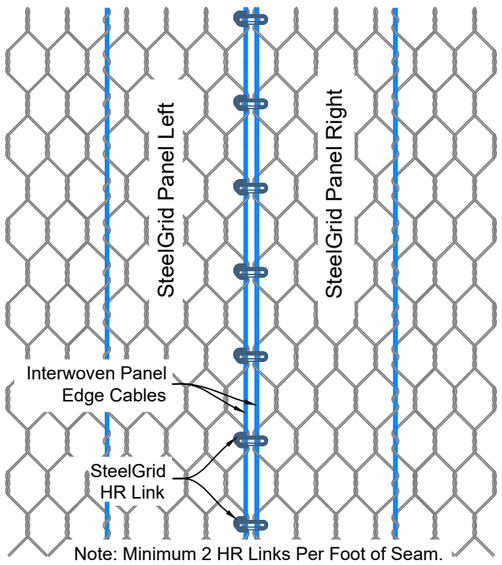
- Overlap With High Tensile Hog Rings -
- Simple Draperies Only -

Note: Lower SteelGrid HR Panel Secured on the Outer Face of the Upper SteelGrid HR Panel, To Reduce Pocketing of Debris Between Layers.



Detail C.4 - Mid-Slope Panel to Panel Mesh Lap Connection

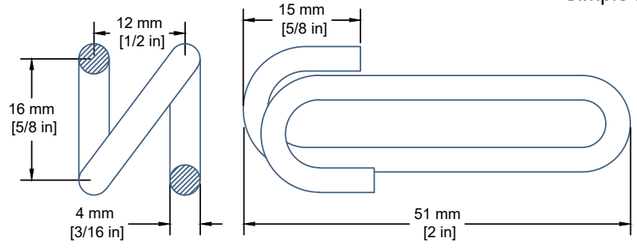
- With Wire Rope Clips -



Note: Minimum 2 HR Links Per Foot of Seam.

Detail C.2 - Option 2 - Panel to Panel Connection

- With HR Link Option -



Detail D.10: SteelGrid HR Link

- Panel to Panel Vertical Seam Connections -

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Rev:	Issue / Revision:	Drawn:	App:	Date:

Drawing Title: SteelGrid HR30 Simple Drapery Panel to Panel and Mid-Slope Connection

Project No: ----	Client: ...		
Drawing No: 3 / 4	Units: Feet	Scale: NTS	Rev: 1 Printed on: 1/18/21

Designed: BML	Date: -
Drawn: LM	Date: 1/15/21
Checked: -	Date: -

Project: STEELGRID HR30 - SIMPLE DRAPERY SYSTEM

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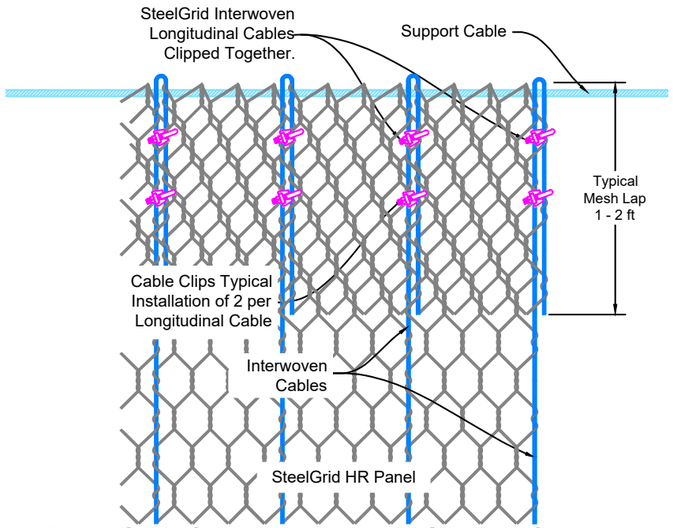
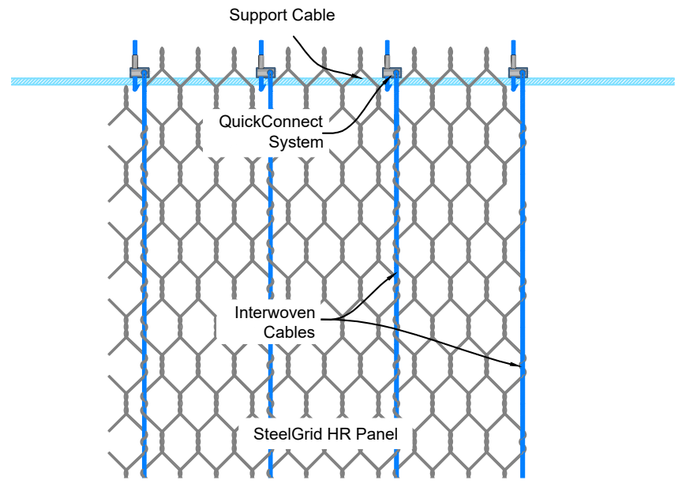


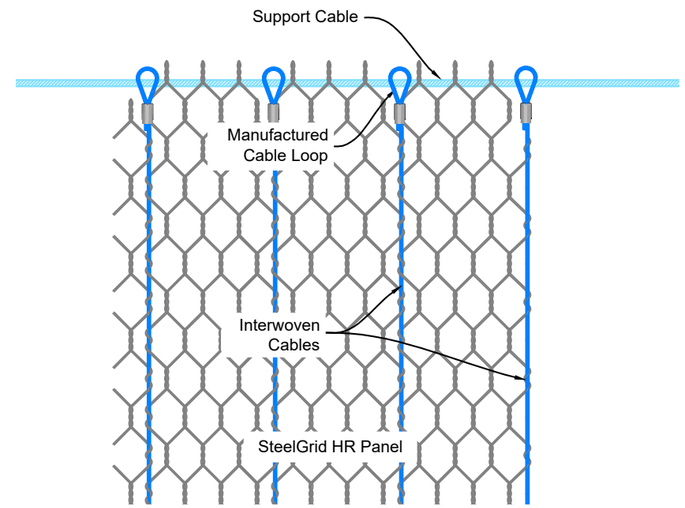
Detail C.5 - Option 1 - Panel to Support Cable Connection

- With Wire Rope Clip Fold Over Option -
- For Simple or Pinned Drapery Systems -



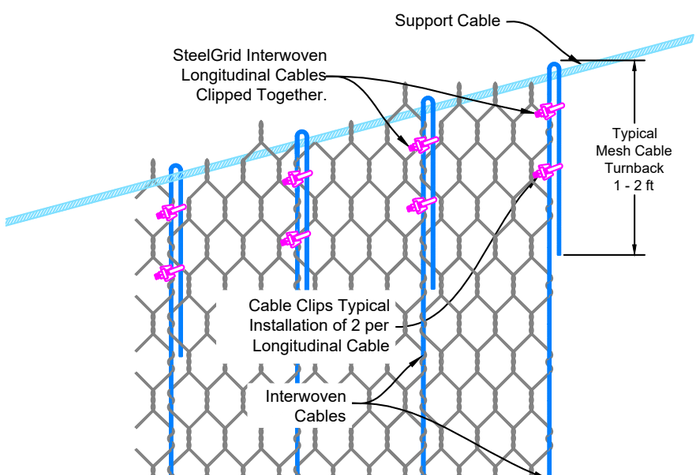
Detail C.6 - Option 2 - Panel to Support Cable Connection

- With QuickConnect System Option -
- QuickConnect Choker and Stopper -
- For Simple or Pinned Drapery Systems -



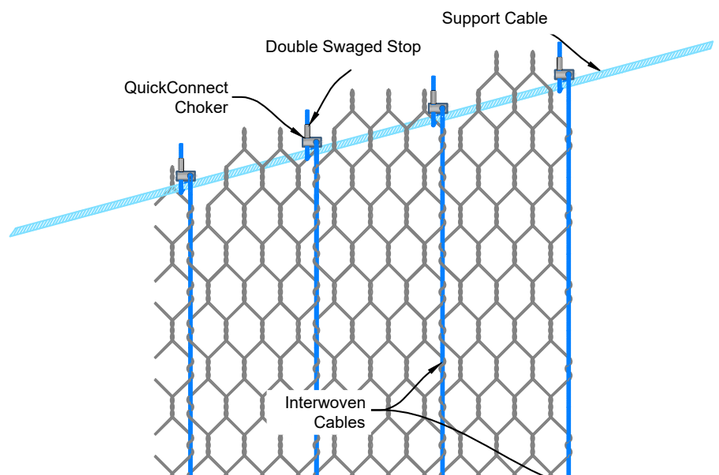
Detail C.7 - Option 3 - Panel to Support Cable Connection

- With Fabricated Cable Loop Option -
- For Simple or Pinned Drapery Systems -



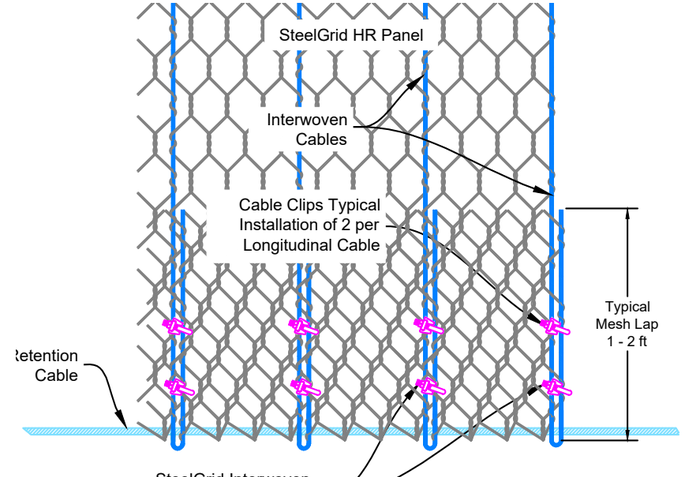
Detail C.8- Panel to Angled Support Cable Connection

- With Wire Rope Clip Fold Over Option -
- For Simple or Pinned Drapery Systems -



Detail C. 9- Panel to Angled Support Cable Connection

- With QuickConnect Option -
- For Simple or Pinned Drapery Systems -



Detail C.10 - Option 1 - Panel to Retention Cable Connection

- With Wire Rope Clip Fold Over Option -
- For Simple or Pinned Drapery Systems -

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Rev:	Issue / Revision:	Drawn:	App:	Date:

Drawing Title: SteelGrid HR30 Simple Drapery Panel to Support and Retention Cable Connection

Project No: ----	Client: ...		
Drawing No: 4 / 4	Units: Feet	Scale: NTS	Rev: 1 Printed on: 1/18/21

Designed: BML	Date: -
Drawn: LM	Date: 1/15/21
Checked: -	Date: -

Project: STEELGRID HR30 - SIMPLE DRAPERY SYSTEM

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