

NOTES

1. UTILITIES SHOWN DO NOT PURPORT TO CONSTITUTE OR REPRESENT ALL UTILITIES LOCATED UPON OR ADJACENT TO THE SURVEYED PREMISES. EXISTING UTILITY LOCATIONS ARE APPROXIMATE ONLY. THE CONTRACTOR SHALL FIELD VERIFY ALL UTILITY CONFLICTS. ALL DISCREPANCIES SHALL BE REPORTED TO THE ENGINEER. THE CONTRACTOR SHALL CONTACT DIG SAFE (888-344-7233) PRIOR TO ANY CONSTRUCTION.
2. PROPERTY LINE INFORMATION IS APPROXIMATE AND BASED ON EXISTING TAX MAP INFORMATION. THIS PLAN IS NOT A BOUNDARY SURVEY AND IS NOT INTENDED TO BE USED AS ONE.
3. SITE INFORMATION IS BASED ON A FIELD SURVEY PERFORMED BY CIVIL ENGINEERING ASSOCIATES, INC MAY 2025. CIVIL ENGINEERING ASSOCIATES, INC. SURVEY ORIENTATION IS "GRID NORTH", VERMONT COORDINATE SYSTEM OF 1983 (HORIZONTAL) AND NAVD88 (VERTICAL). ESTABLISHED FROM GPS OBSERVATIONS ON SITE.
4. CONTOUR INFORMATION OUTSIDE OF PROPOSED IMPROVEMENTS IS BASED UPON LIDAR DATA FROM VERMONT CENTER FOR GEOGRAPHIC INFORMATION STATE WIDE 1' CONTOURS. HORIZONTAL AND VERTICAL DATUM BASED ON VCS NAD 83 AND NAVD 88.

SITE ENGINEER:



CIVIL ENGINEERING ASSOCIATES, INC.
10 MANSFIELD VIEW LANE, SOUTH BURLINGTON, VT 05403
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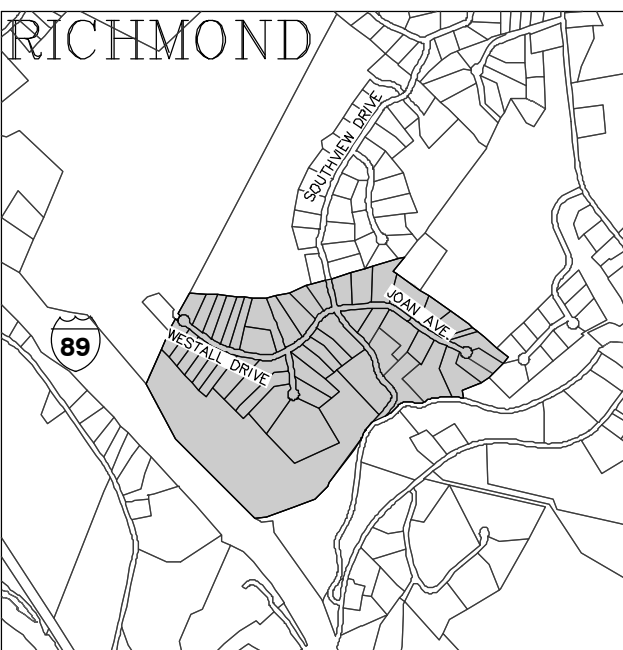
TOWN OF
RICHMOND

RICHMOND VERMONT

PROJECT:

SOUTHVIEW
STORMWATER
IMPROVEMENTS

RICHMOND, VT



LOCATION MAP

1" = 2000'

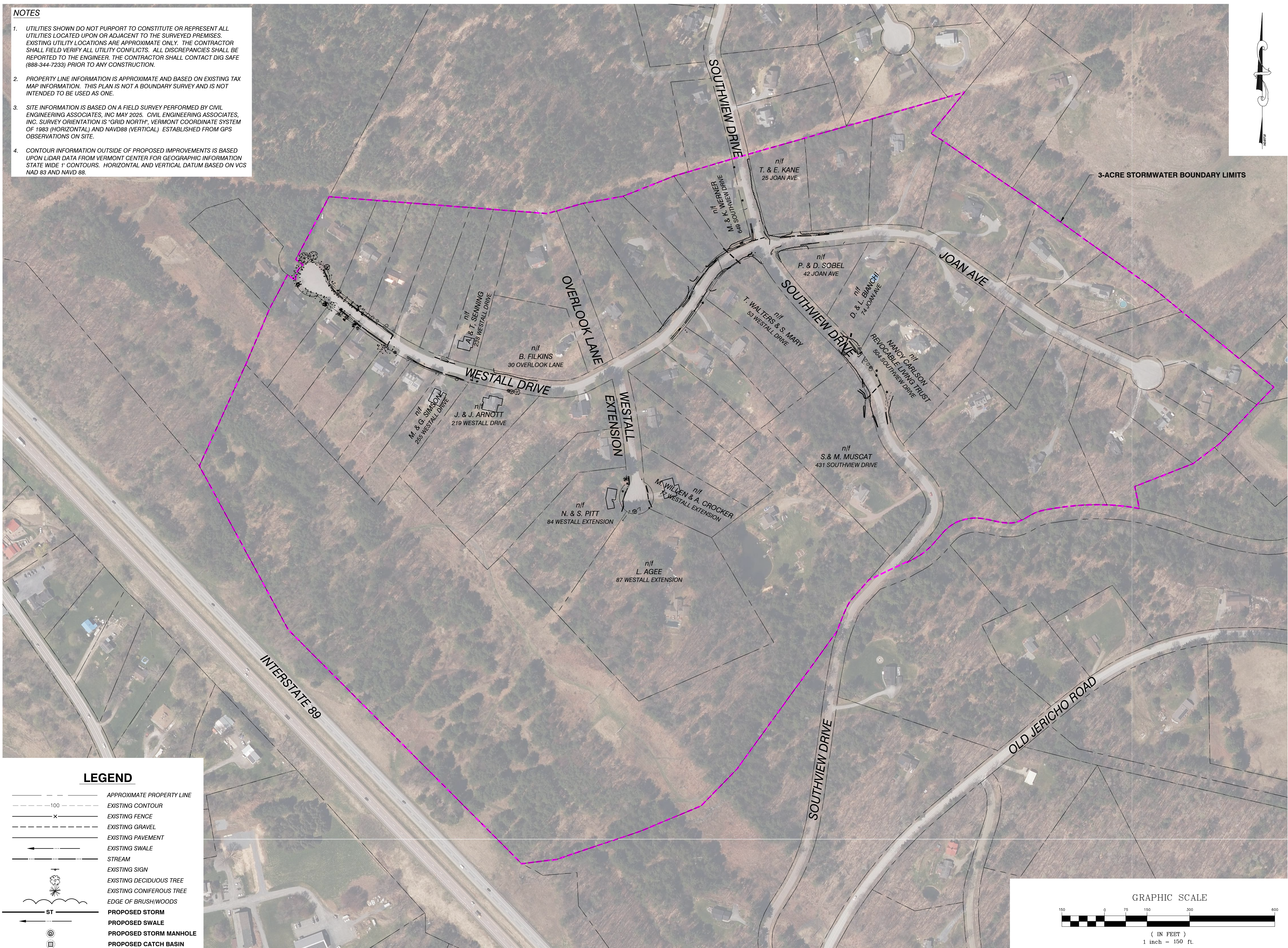
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EXISTING
CONDITIONS
PLAN

DATE
05/27/2026
SCALE
1" = 150'
PROJ. NO.
25117

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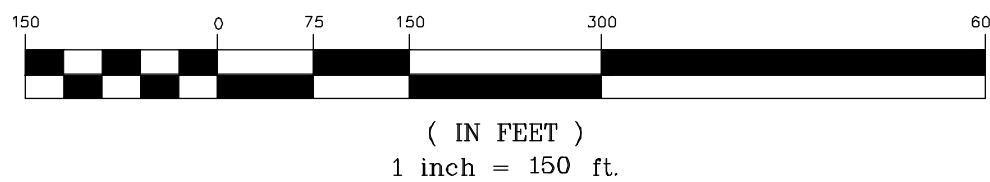
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LEGEND

- APPROXIMATE PROPERTY LINE
- EXISTING CONTOUR
- EXISTING FENCE
- EXISTING GRAVEL
- EXISTING PAVEMENT
- EXISTING SWALE
- STREAM
- EXISTING SIGN
- EXISTING DECIDUOUS TREE
- EXISTING CONIFEROUS TREE
- EDGE OF BRUSHWOODS
- PROPOSED STORM
- PROPOSED SWALE
- PROPOSED STORM MANHOLE
- PROPOSED CATCH BASIN

GRAPHIC SCALE





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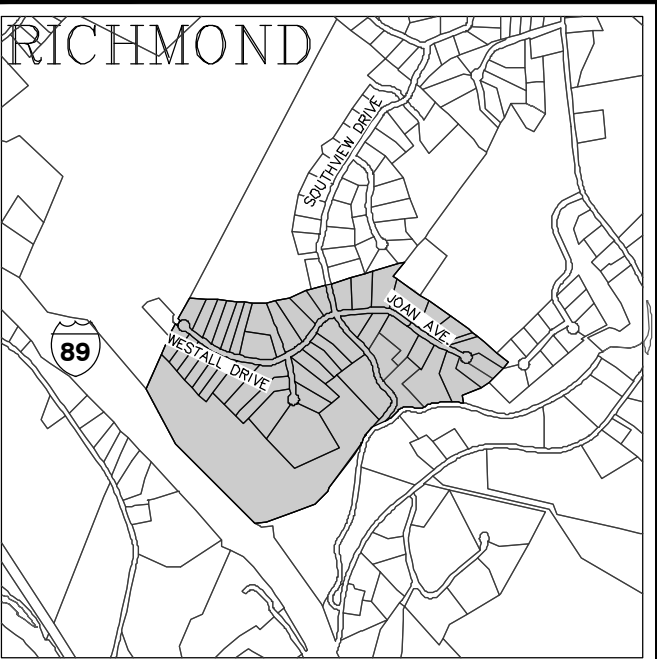
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RICHMOND VERMONT

PROJECT:

**SOUTHVIEW
STORMWATER
IMPROVEMENTS**

RICHMOND, VT



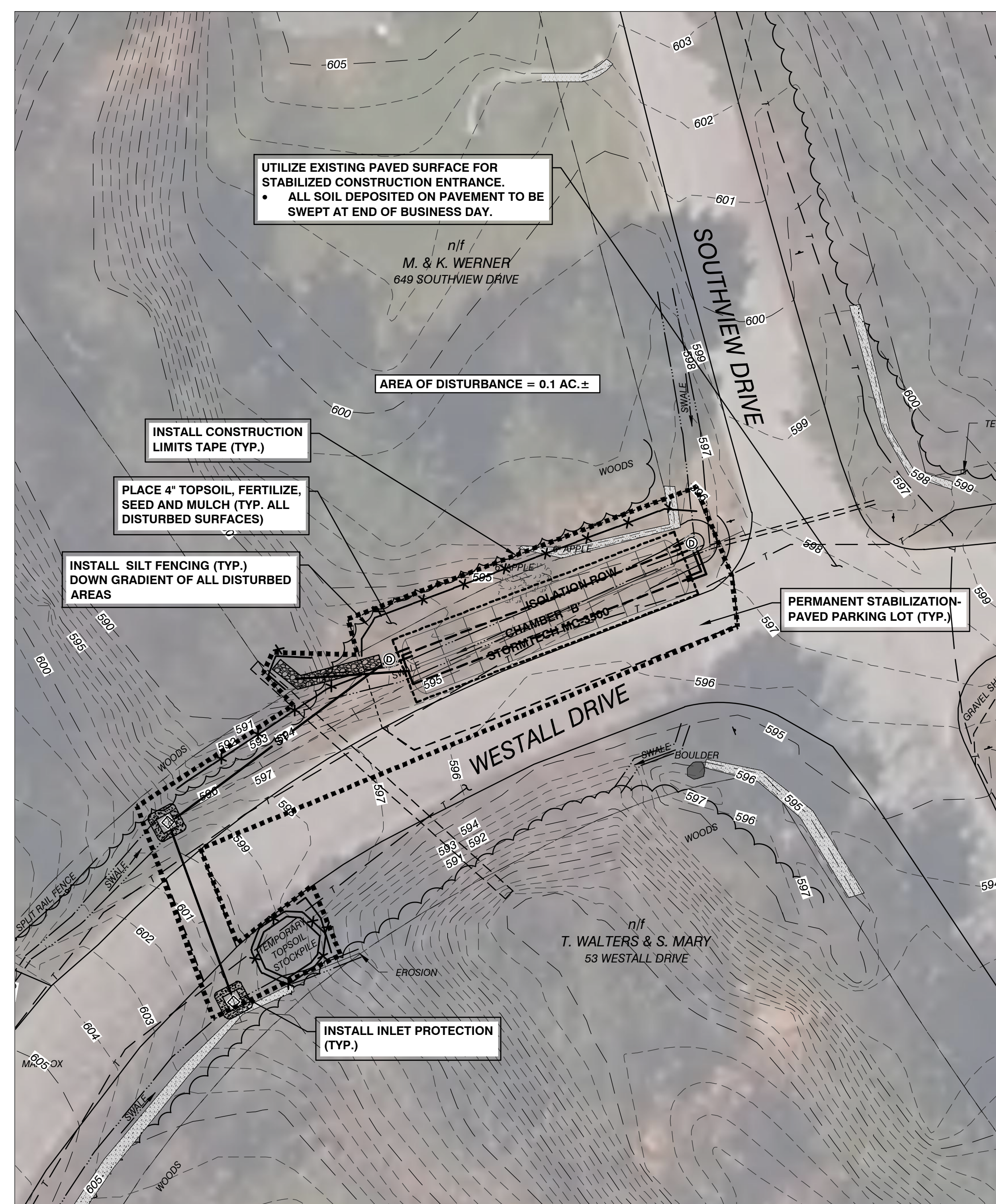
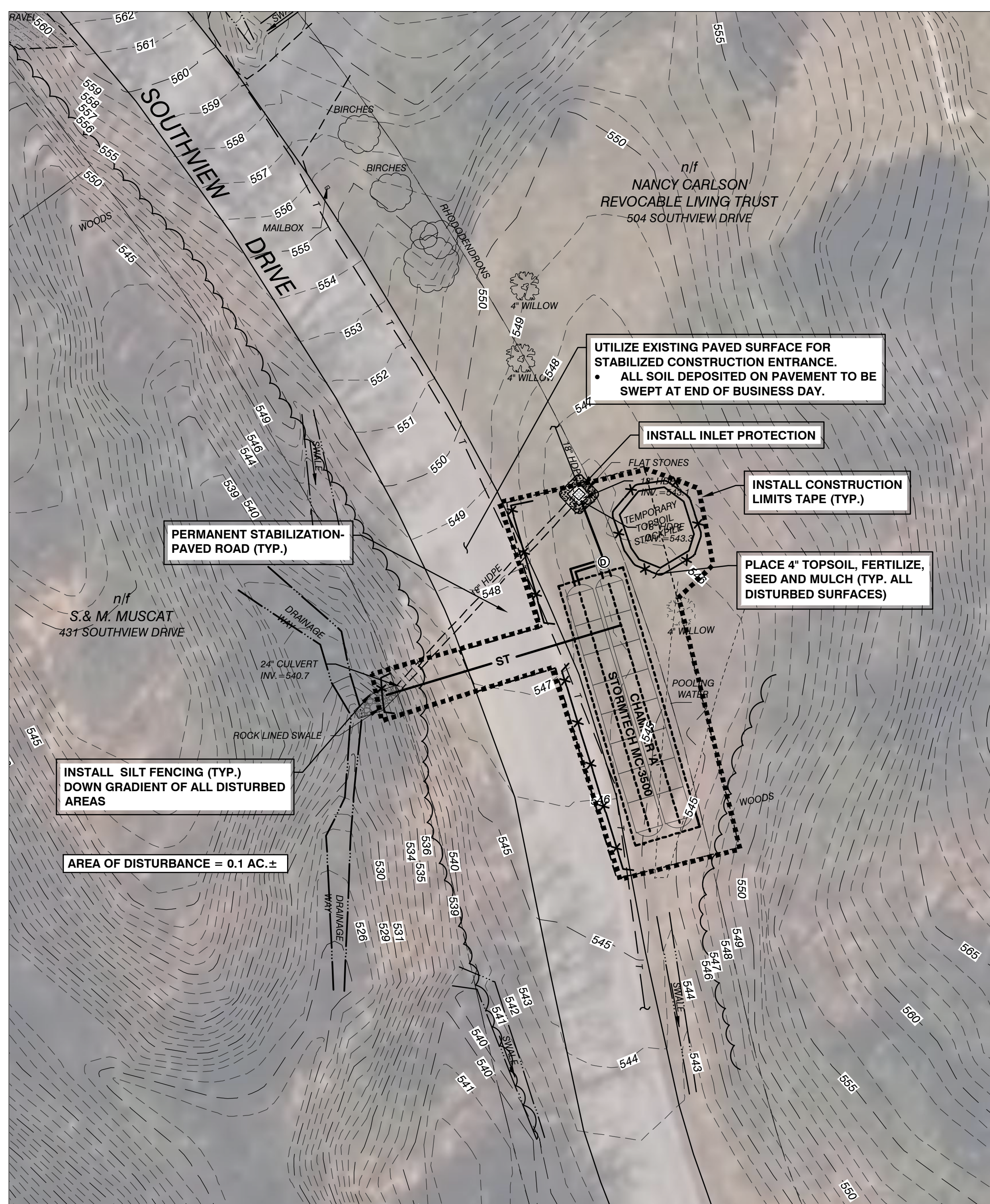
LOCATION MAP
1" = 2000'

DATE	CHECKED	REVISION

**PROPOSED
CONDITIONS
PLAN
-CHAMBER A-**

DATE 05/27/2026	DRAWING NUMBER C2.1
SCALE 1" = 10'	
PROJ. NO. 25117	



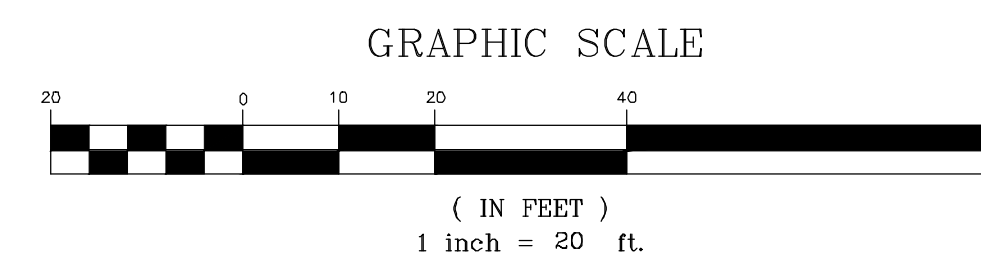


LEGEND

	CONSTRUCTION LIMITS TAPE
	EROSION CONTROL MATTING
	SILT FENCE
	INLET PROTECTION

NOTES:

1. ALL EROSION AND SEDIMENT CONTROL DEVICES MUST BE INSTALLED AND STABILIZED BEFORE THE START OF CONSTRUCTION.
2. LOAM, SEED AND MULCH ALL DISTURBED AREAS (TYP.)
3. INSTALL TEMPORARY STABILIZATION OF DISTURBED SOILS THROUGH THE INSTALLATION OF 1" OF HAY MULCH NO MORE THAN 7 DAYS AFTER WORK HAS CEASED IN A PARTICULAR AREA.
4. SLOPES 3:1 SHALL RECEIVE EROSION CONTROL MATTING.
5. MAXIMUM AMOUNT OF DISTURBED SOILS TO BE LIMITED TO NO MORE THAN 2 ACRES.
6. SILT FENCE CONTRIBUTORY AREA TO BE LIMITED TO ¼ ACRE / 100 L.F.



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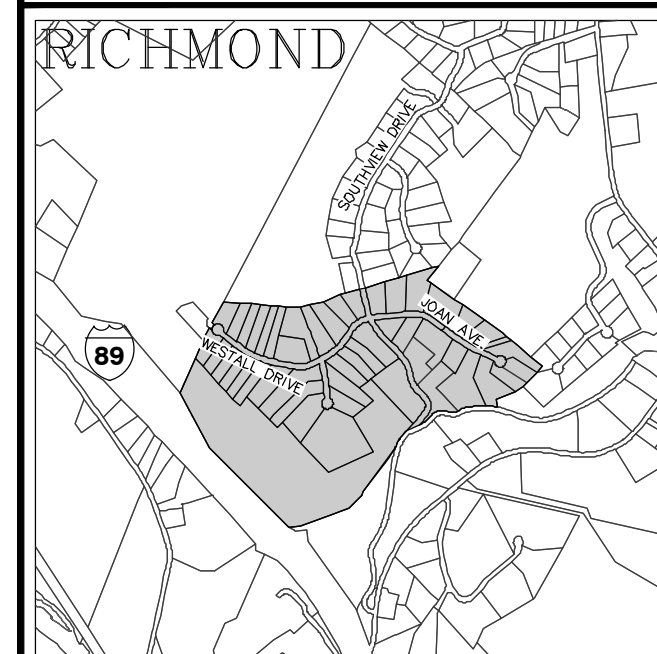
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STORMWATER
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LOCATION MAP

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EPSC SITE PLAN

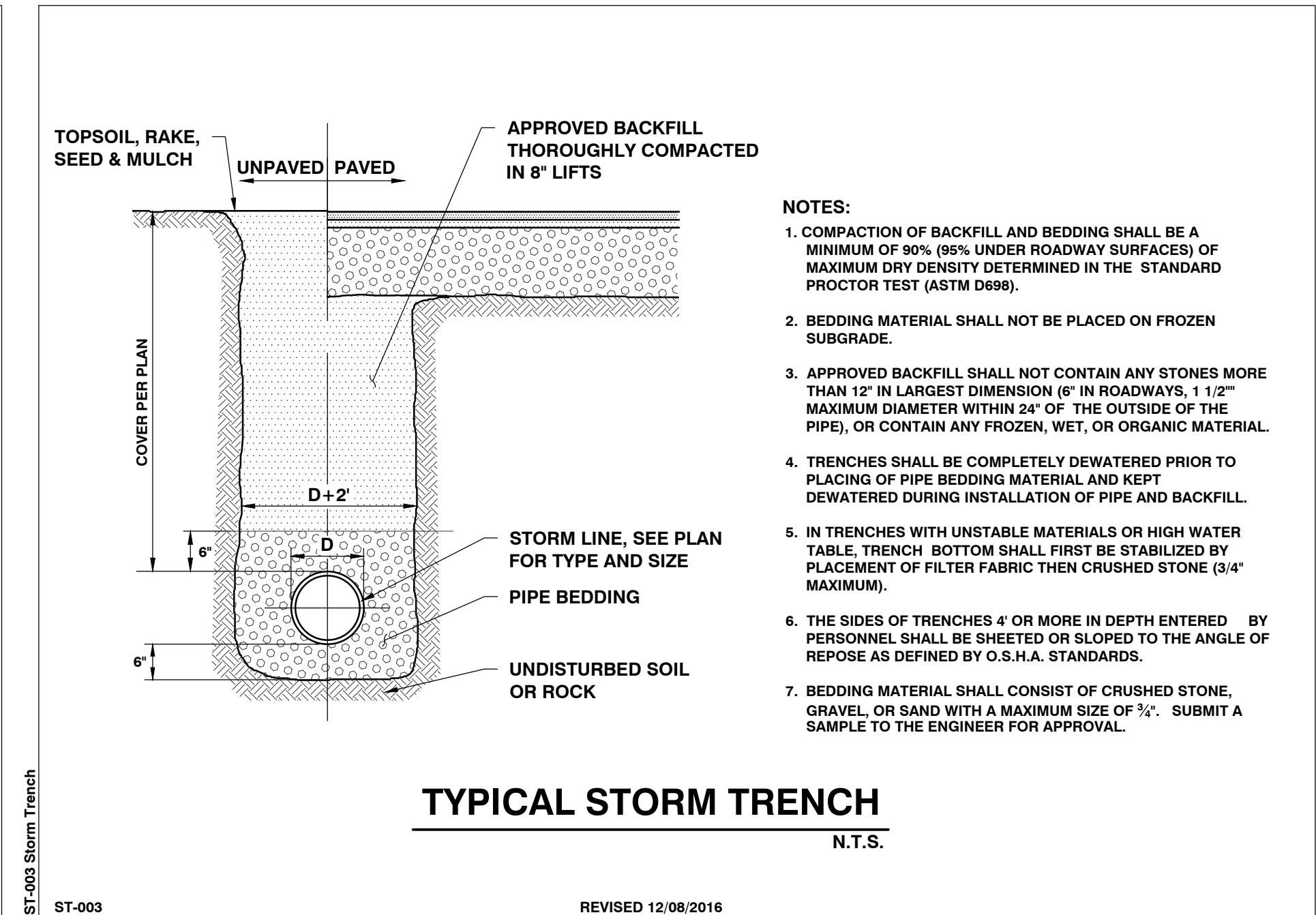
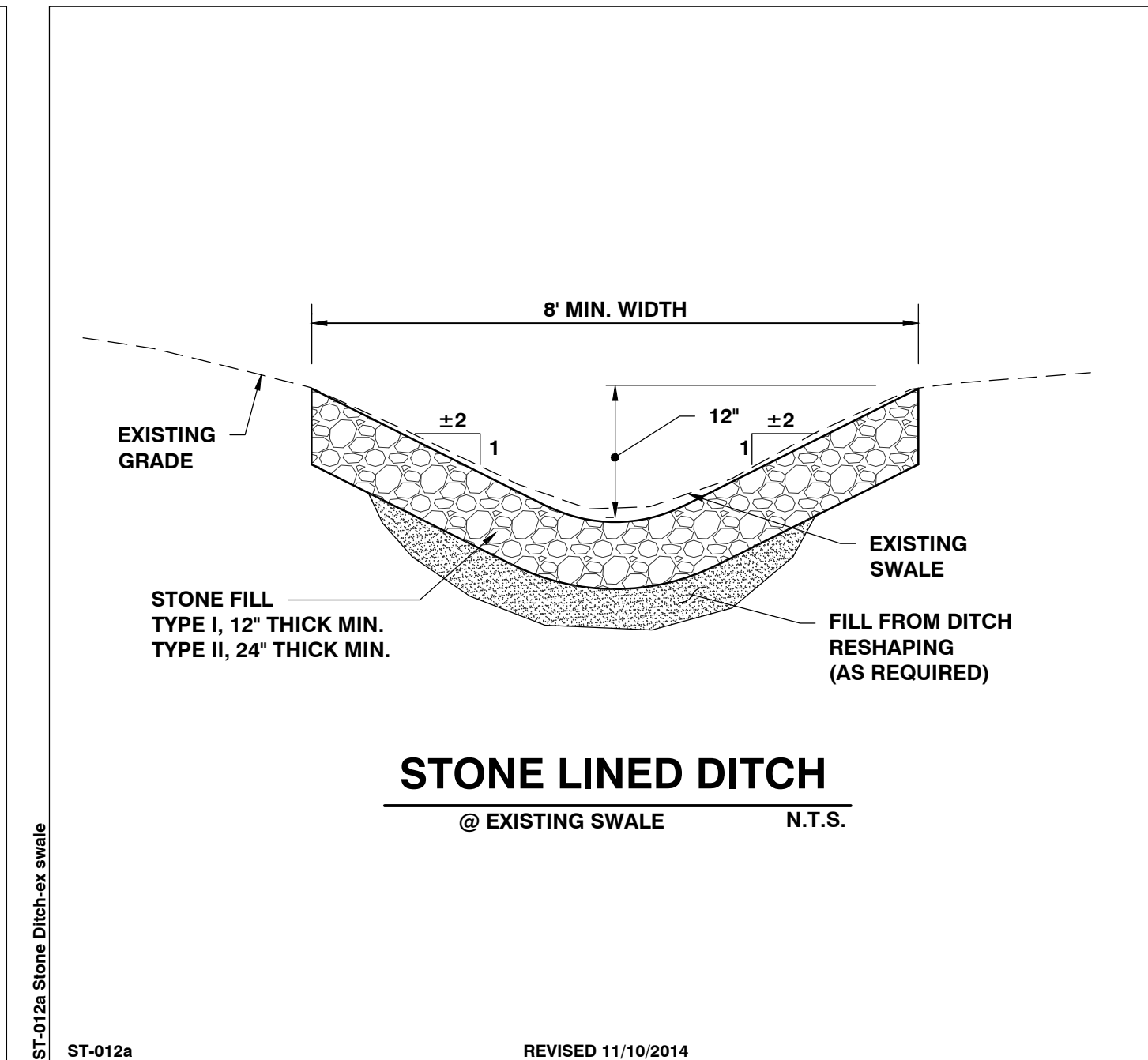
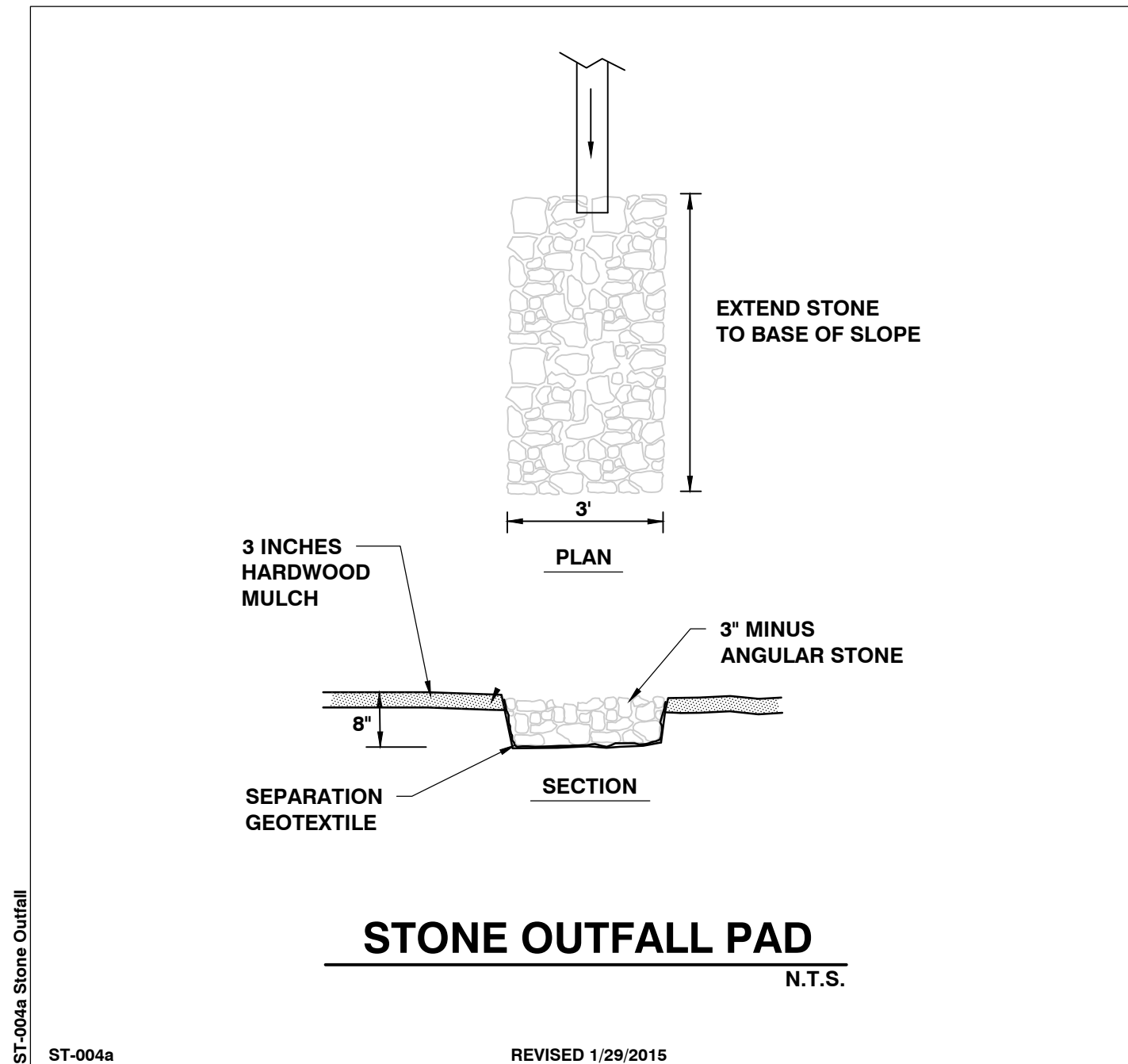
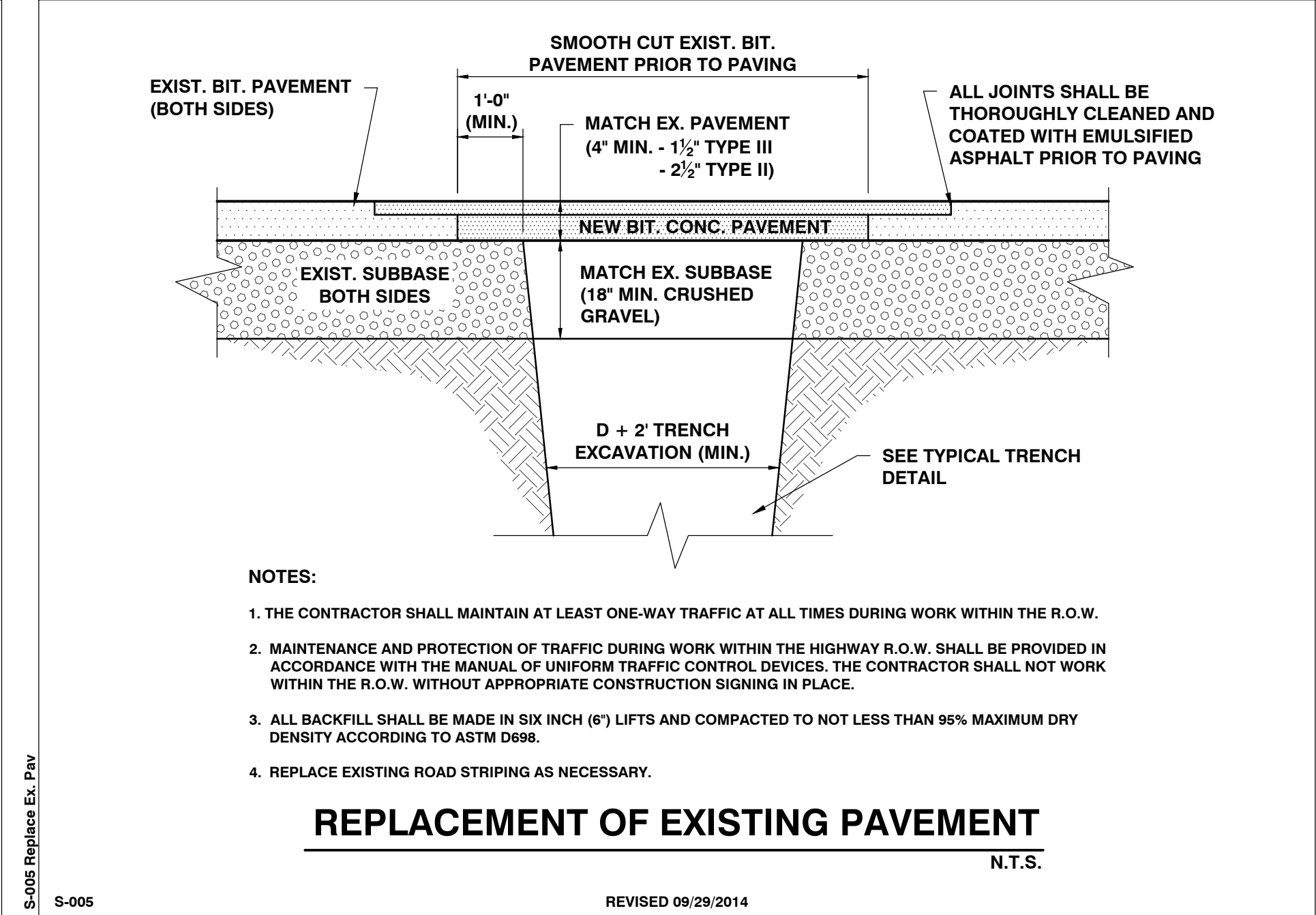
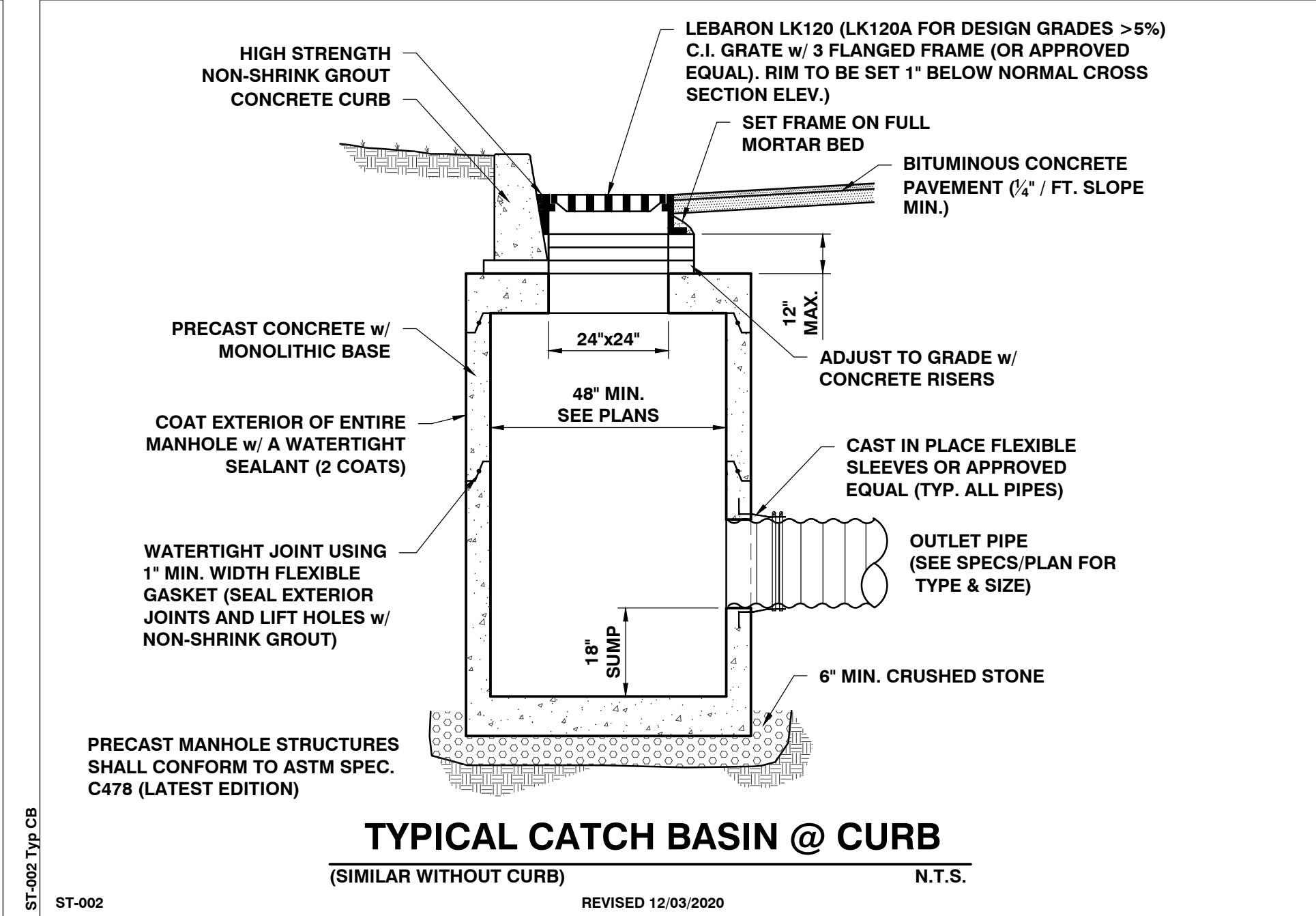
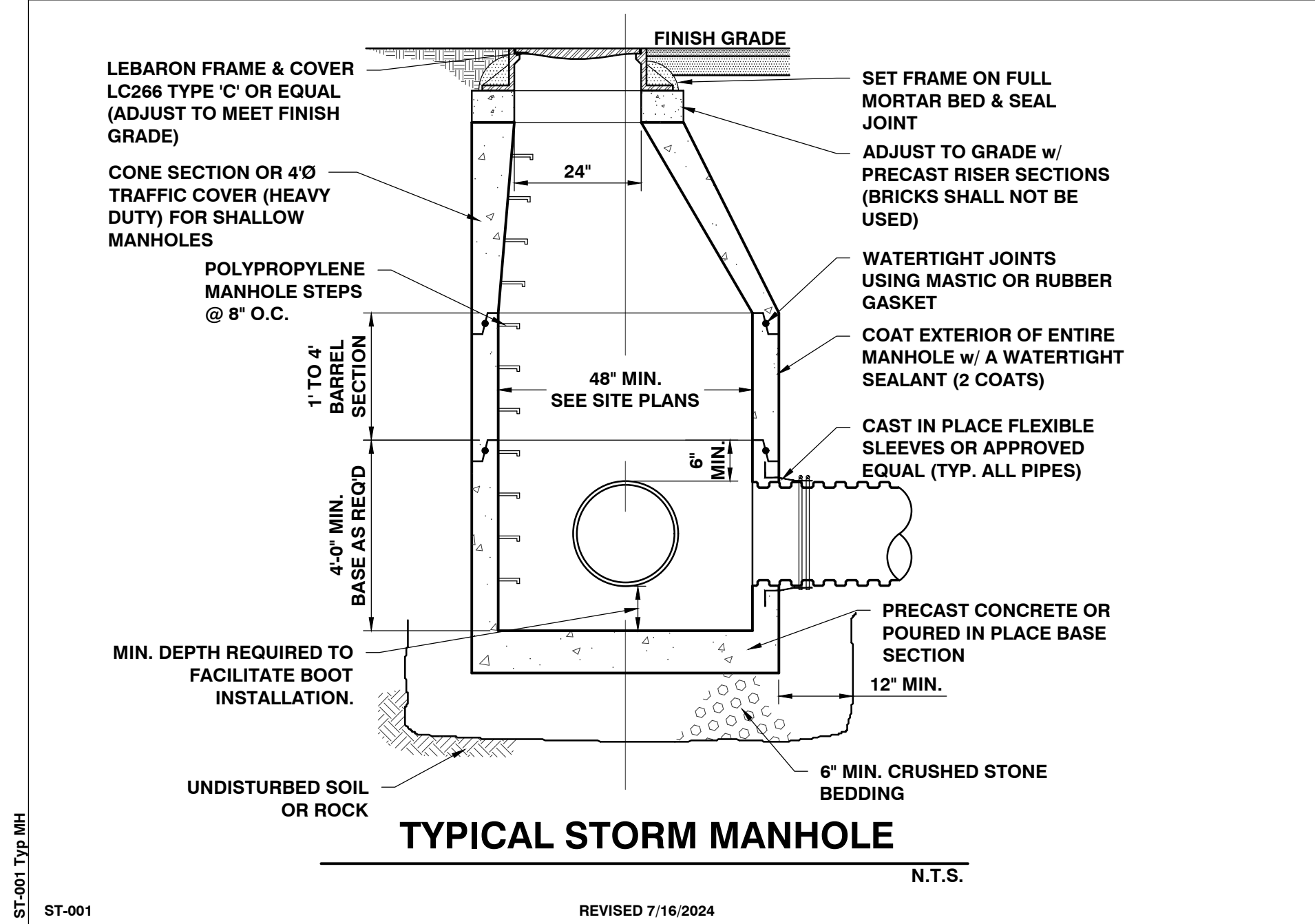
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PROJ. NO.
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DRAWING NUMBER

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DATE

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SOUTHVIEW STORMWATER IMPROVEMENTS

RICHMOND, VT

MC-3500 STORMTECH CHAMBER SPECIFICATIONS

- CHAMBERS SHALL BE STORMTECH MC-3500.
- CHAMBERS SHALL BE ARCH-SHAPED AND SHALL BE MANUFACTURED FROM VIRGIN, IMPACT-MODIFIED POLYPROPYLENE COPOLYMERS.
- CHAMBERS SHALL MEET THE REQUIREMENTS OF ASTM F2418-18a, "STANDARD SPECIFICATION FOR POLYPROPYLENE (PP) CORRUGATED WALL STORMWATER COLLECTION CHAMBERS" CHAMBER CLASSIFICATION 45x76 DESIGNATION SS.
- CHAMBER ROWS SHALL PROVIDE CONTINUOUS, UNOBSTRUCTED INTERNAL SPACE WITH NO INTERNAL SUPPORTS THAT WOULD IMPEDE FLOW OR LIMIT ACCESS FOR INSPECTION.
- THE STRUCTURAL DESIGN OF THE CHAMBERS, THE STRUCTURAL BACKFILL, AND THE INSTALLATION REQUIREMENTS SHALL ENSURE THAT THE LOAD FACTORS SPECIFIED IN THE AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS, SECTION 12.12, ARE MET FOR: 1) LONG-DURATION DEAD LOADS AND 2) SHORT-DURATION LIVE LOADS, BASED ON THE AASHTO DESIGN TRUCK WITH CONSIDERATION FOR IMPACT AND MULTIPLE VEHICLE PRESENCES.
- CHAMBERS SHALL BE DESIGNED, TESTED AND ALLOWABLE LOAD CONFIGURATIONS DETERMINED IN ACCORDANCE WITH ASTM F2787, "STANDARD PRACTICE FOR STRUCTURAL DESIGN OF THERMOPLASTIC CORRUGATED WALL STORMWATER COLLECTION CHAMBERS". LOAD CONFIGURATIONS SHALL INCLUDE: 1) INSTANTANEOUS (1 MIN) AASHTO DESIGN TRUCK LIVE LOAD ON MINIMUM COVER 2) MAXIMUM PERMANENT (75-YR) COVER LOAD AND 3) ALLOWABLE COVER WITH PARKED (1-WEEK) AASHTO DESIGN TRUCK.
- REQUIREMENTS FOR HANDLING AND INSTALLATION:
 - TO MAINTAIN THE WIDTH OF CHAMBERS DURING SHIPPING AND HANDLING, CHAMBERS SHALL HAVE INTEGRAL, INTERLOCKING STACKING LUGS.
 - TO ENSURE A SECURE JOINT DURING INSTALLATION AND BACKFILL, THE HEIGHT OF THE CHAMBER JOINT SHALL NOT BE LESS THAN 3".
 - TO ENSURE THE INTEGRITY OF THE ARCH SHAPE DURING INSTALLATION, a) THE ARCH STIFFNESS CONSTANT AS DEFINED IN SECTION 8.2.8 OF ASTM F2418 SHALL BE GREATER THAN OR EQUAL TO 500 LBS/IN/IN, AND b) TO RESIST CHAMBER DEFORMATION DURING INSTALLATION AT ELEVATED TEMPERATURES (ABOVE 73° F / 23° C), CHAMBERS SHALL BE PRODUCED FROM REFLECTIVE GOLD OR YELLOW COLORS.
- ONLY CHAMBERS THAT ARE ALLOWED, UPON REQUEST BY THE SITE DESIGN ENGINEER OR OWNER, THE CHAMBER MANUFACTURER SHALL SUBMIT A STRUCTURAL EVALUATION FOR APPROVAL BEFORE DELIVERING CHAMBERS TO THE PROJECT SITE AS FOLLOWS:
 - THE STRUCTURAL EVALUATION SHALL BE SEALED BY A REGISTERED PROFESSIONAL ENGINEER.
 - THE STRUCTURAL EVALUATION SHALL DEMONSTRATE THAT THE SAFETY FACTORS ARE GREATER THAN OR EQUAL TO 1.85 FOR DEAD LOAD AND 1.75 FOR LIVE LOAD, THE MINIMUM REQUIRED BY ASTM F2787 AND BY SECTIONS 3 AND 12.12 OF THE AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS FOR THERMOPLASTIC PIPE.
 - THE TEST DERIVED CREEP MODULUS AS SPECIFIED IN ASTM F2418 SHALL BE USED FOR PERMANENT DEAD LOAD DESIGN EXCEPT THAT IT SHALL BE THE 75-YEAR MODULUS USED FOR DESIGN.
- CHAMBERS AND END CAPS SHALL BE PRODUCED AT AN ISO 9001 CERTIFIED MANUFACTURING FACILITY.

IMPORTANT - NOTES FOR THE BIDDING AND INSTALLATION OF MC-3500 CHAMBER SYSTEM

- STORMTECH MC-3500 CHAMBERS SHALL NOT BE INSTALLED UNTIL THE MANUFACTURER'S REPRESENTATIVE HAS COMPLETED A PRE-CONSTRUCTION MEETING WITH THE INSTALLERS.
- STORMTECH MC-3500 CHAMBERS SHALL BE INSTALLED IN ACCORDANCE WITH THE "STORMTECH MC-3500/MC-4500 CONSTRUCTION GUIDE".
- CHAMBERS ARE NOT TO BE BACKFILLED WITH A DOZER OR AN EXCAVATOR SITUATED OVER THE CHAMBERS. STORMTECH RECOMMENDS 3 BACKFILL METHODS:
 - STONESPOTTER LOCATED OFF THE CHAMBER BED.
 - BACKFILL AS ROWS ARE BUILT USING AN EXCAVATOR ON THE FOUNDATION STONE OR SUBGRADE.
 - BACKFILL FROM OUTSIDE THE EXCAVATION USING A LONG BOOM HOE OR EXCAVATOR.
- THE FOUNDATION STONE SHALL BE LEVELED AND COMPACTED PRIOR TO PLACING CHAMBERS.
- JOINTS BETWEEN CHAMBERS SHALL BE PROPERLY SEATED PRIOR TO PLACING STONE.
- MAINTAIN MINIMUM - 6" SPACING BETWEEN THE CHAMBER ROWS.
- INLET AND OUTLET MANIFOLDS MUST BE INSERTED A MINIMUM OF 12" (300 mm) INTO CHAMBER END CAPS.
- EMBEDMENT STONE SURROUNDING CHAMBERS MUST BE A CLEAN, CRUSHED, ANGULAR STONE MEETING THE AASHTO M43 DESIGNATION OF #3 OR #4.
- STONE MUST BE PLACED ON THE TOP CENTER OF THE CHAMBER TO ANCHOR THE CHAMBERS IN PLACE AND PRESERVE ROW SPACING.
- THE CONTRACTOR MUST REPORT ANY DISCREPANCIES WITH CHAMBER FOUNDATION MATERIALS BEARING CAPACITIES TO THE SITE DESIGN ENGINEER.
- ADS RECOMMENDS THE USE OF "FLEXSTORM CATCH IT" INSERTS DURING CONSTRUCTION FOR ALL INLETS TO PROTECT THE SUBSURFACE STORMWATER MANAGEMENT SYSTEM FROM CONSTRUCTION SITE RUNOFF.

NOTES FOR CONSTRUCTION EQUIPMENT

- STORMTECH MC-3500 CHAMBERS SHALL BE INSTALLED IN ACCORDANCE WITH THE "STORMTECH MC-3500/MC-4500 CONSTRUCTION GUIDE".
- THE USE OF EQUIPMENT OVER MC-3500 CHAMBERS IS LIMITED:
 - NO EQUIPMENT IS ALLOWED ON BARE CHAMBERS.
 - NO RUBBER Tired LOADER, DUMP TRUCK, OR EXCAVATORS ARE ALLOWED UNTIL PROPER FILL DEPTHS ARE REACHED IN ACCORDANCE WITH THE "STORMTECH MC-3500/MC-4500 CONSTRUCTION GUIDE".
 - WEIGHT LIMITS FOR CONSTRUCTION EQUIPMENT CAN BE FOUND IN THE "STORMTECH MC-3500/MC-4500 CONSTRUCTION GUIDE".
- FULL 36" (900 mm) OF STABILIZED COVER MATERIALS OVER THE CHAMBERS IS REQUIRED FOR DUMP TRUCK TRAVEL OR DUMPING.

USE OF A DOZER TO PUSH EMBEDMENT STONE BETWEEN THE ROWS OF CHAMBERS MAY CAUSE DAMAGE TO CHAMBERS AND IS NOT AN ACCEPTABLE BACKFILL METHOD. ANY CHAMBERS DAMAGED BY USING THE "DUMP AND PUSH" METHOD ARE NOT COVERED UNDER THE STORMTECH STANDARD WARRANTY.

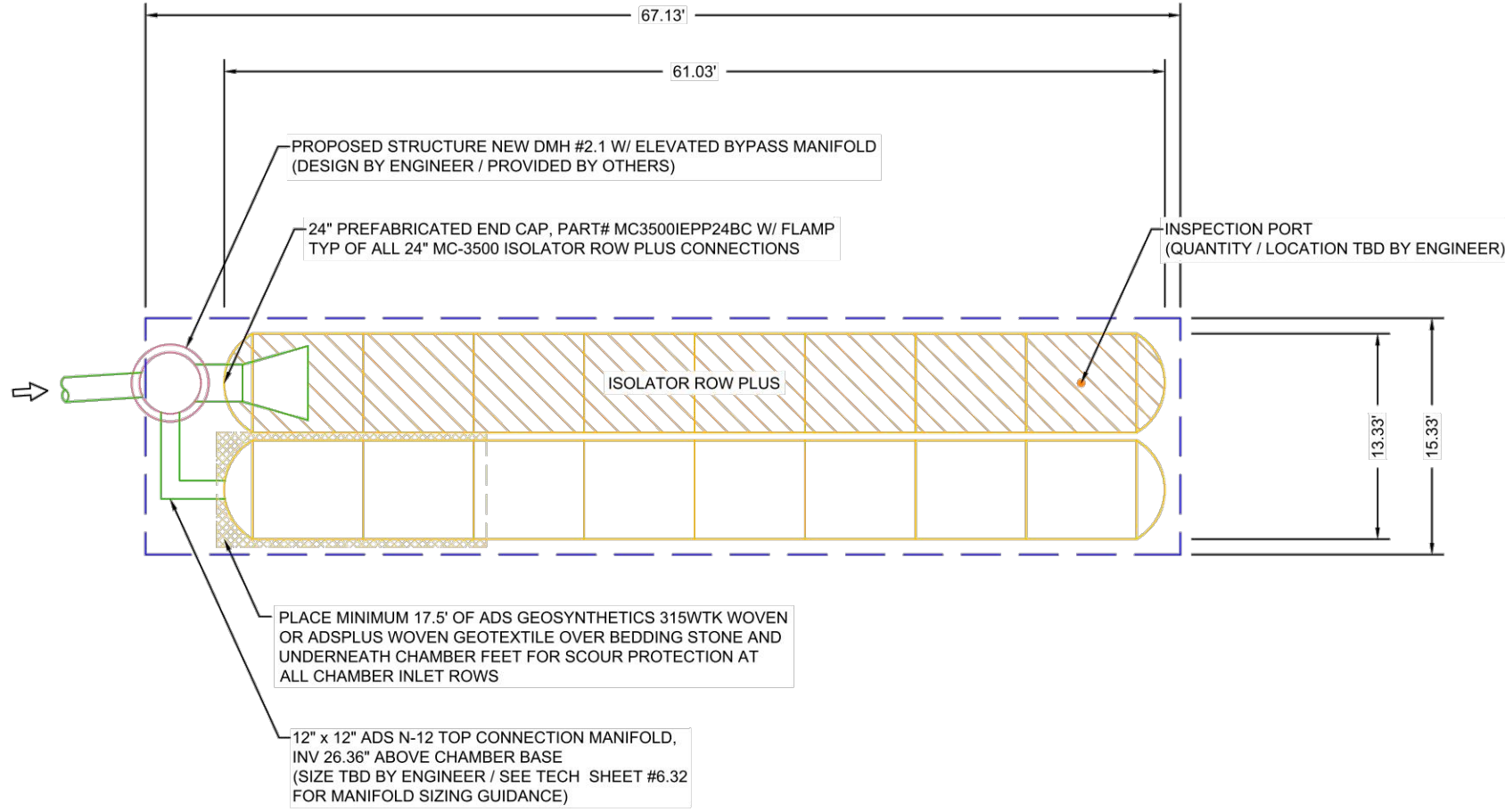
CONTACT STORMTECH AT 1-888-892-2694 WITH ANY QUESTIONS ON INSTALLATION REQUIREMENTS OR WEIGHT LIMITS FOR CONSTRUCTION EQUIPMENT.

CONCEPTUAL LAYOUT - CHAMBER A

(18) STORMTECH MC-3500 CHAMBERS
(4) STORMTECH MC-3500 END CAPS
INSTALLED WITH 12" COVER STONE, 9" BASE STONE, 12" SAND FILTER, 30% VOIDS (STONE/SAND)
INSTALLED SYSTEM VOLUME: 3280 CF
AREA OF SYSTEM: 1029 FT²
PERIMETER OF SYSTEM: 165 FT

PROPOSED ELEVATIONS - CHAMBER A

MAXIMUM ALLOWABLE GRADE (TOP OF PAVEMENT/UNPAVED):	550.75
MINIMUM ALLOWABLE GRADE (UNPAVED WITH TRAFFIC):	544.75
MINIMUM ALLOWABLE GRADE (UNPAVED NO TRAFFIC):	544.25
MINIMUM ALLOWABLE GRADE (BASE OF FLEXIBLE PAVEMENT):	544.25
MINIMUM ALLOWABLE GRADE (TOP OF RIGID CONCRETE PAVEMENT):	544.25
TOP OF STONE:	543.75
TOP OF CHAMBER:	542.75
12" TOP CONNECTION INVERT:	541.20
24" BOTTOM (ISOLATOR ROW PLUS) CONNECTION INVERT:	539.17
BOTTOM OF CHAMBER:	539.00
BOTTOM OF STONE:	538.25
BOTTOM OF SAND FILTER LAYER:	537.25



SAND FILTER NOTES

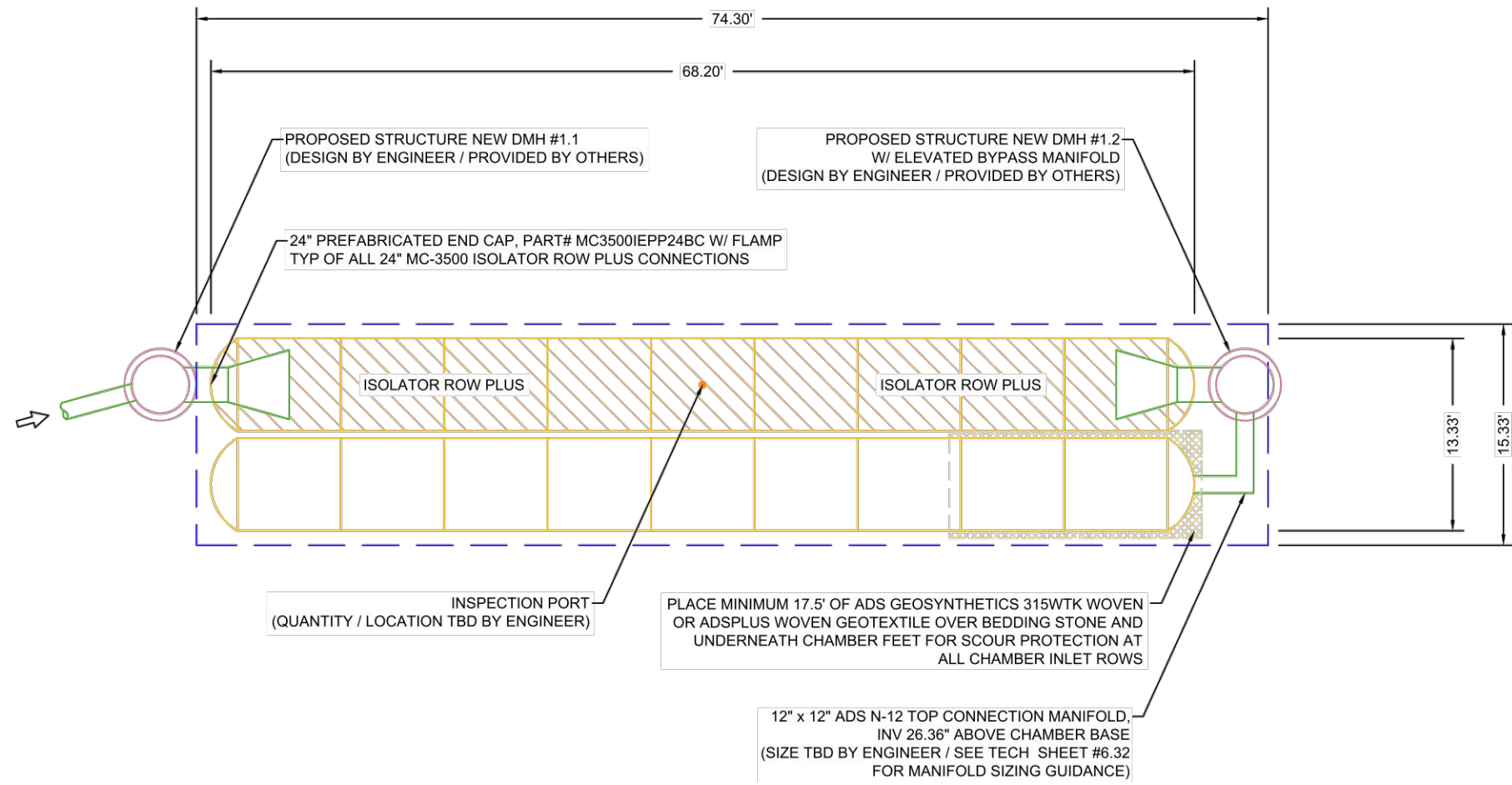
- SAND FILL PLACED UNDER STORMTECH CHAMBER SYSTEMS MUST BE PROPERLY SPECIFIED AND COMPACTED SUCH THAT THE STRUCTURAL REQUIREMENTS SPECIFIED IN THE STORMTECH DESIGN MANUAL ARE MET.
- STRUCTURAL BEDDING STONE AND SEPARATION GEOTEXTILE IS REQUIRED OVER SAND FILL AND MUST BE INSTALLED AS PER THE STORMTECH DESIGN MANUAL.
- STORMTECH DOES NOT DESIGN SAND FILTER SYSTEMS AND CANNOT PROVIDE TECHNICAL INFORMATION ON HYDRAULIC PERFORMANCE, FILTER LONGEVITY, OR EFFECTIVENESS OF SAND FILTERS.

CONCEPTUAL LAYOUT - CHAMBER B

(18) STORMTECH MC-3500 CHAMBERS
(4) STORMTECH MC-3500 END CAPS
INSTALLED WITH 12" COVER STONE, 9" BASE STONE, 12" SAND FILTER, 30% VOIDS (STONE/SAND)
INSTALLED SYSTEM VOLUME: 3648 CF
AREA OF SYSTEM: 1139 FT²
PERIMETER OF SYSTEM: 179 FT

PROPOSED ELEVATIONS - CHAMBER B

MAXIMUM ALLOWABLE GRADE (TOP OF PAVEMENT/UNPAVED):	600.00
MINIMUM ALLOWABLE GRADE (UNPAVED WITH TRAFFIC):	594.00
MINIMUM ALLOWABLE GRADE (UNPAVED NO TRAFFIC):	593.50
MINIMUM ALLOWABLE GRADE (BASE OF FLEXIBLE PAVEMENT):	593.50
MINIMUM ALLOWABLE GRADE (TOP OF RIGID CONCRETE PAVEMENT):	593.50
TOP OF STONE:	593.00
TOP OF CHAMBER:	592.00
12" TOP CONNECTION INVERT:	590.45
24" BOTTOM (ISOLATOR ROW PLUS) CONNECTION INVERT:	588.42
BOTTOM OF CHAMBER:	588.25
BOTTOM OF STONE:	587.50
BOTTOM OF SAND FILTER LAYER:	586.50



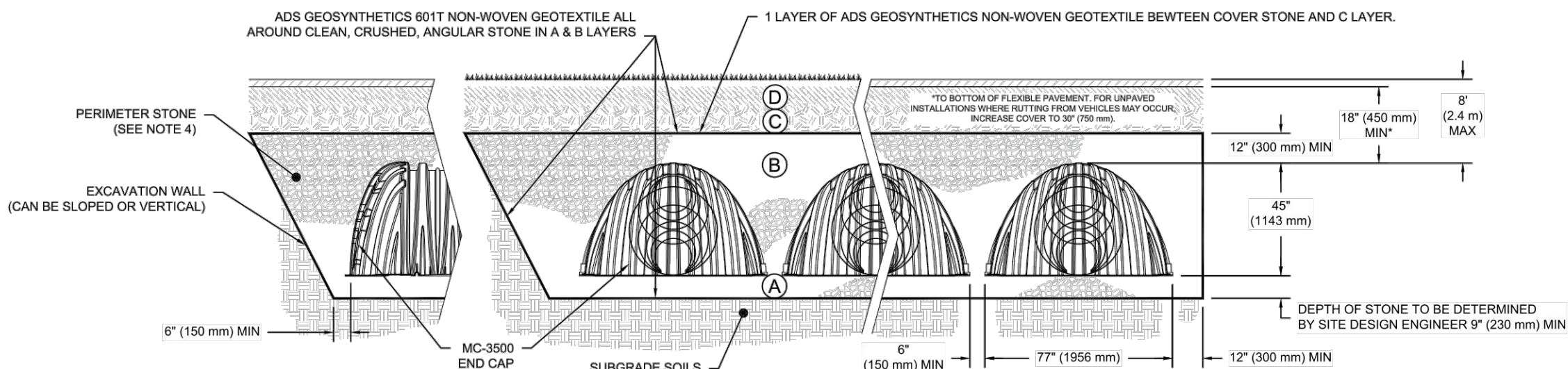
SAND FILTER NOTES

- SAND FILL PLACED UNDER STORMTECH CHAMBER SYSTEMS MUST BE PROPERLY SPECIFIED AND COMPACTED SUCH THAT THE STRUCTURAL REQUIREMENTS SPECIFIED IN THE STORMTECH DESIGN MANUAL ARE MET.
- STRUCTURAL BEDDING STONE AND SEPARATION GEOTEXTILE IS REQUIRED OVER SAND FILL AND MUST BE INSTALLED AS PER THE STORMTECH DESIGN MANUAL.
- STORMTECH DOES NOT DESIGN SAND FILTER SYSTEMS AND CANNOT PROVIDE TECHNICAL INFORMATION ON HYDRAULIC PERFORMANCE, FILTER LONGEVITY, OR EFFECTIVENESS OF SAND FILTERS.

ACCEPTABLE FILL MATERIALS: STORMTECH MC-3500 CHAMBER SYSTEMS

MATERIAL LOCATION	DESCRIPTION	AASHTO MATERIAL CLASSIFICATIONS	COMPACTION / DENSITY REQUIREMENT
D	FINAL FILL: FILL MATERIAL FOR LAYER 'D' STARTS FROM THE TOP OF THE 'C' LAYER TO THE BOTTOM OF FLEXIBLE PAVEMENT OR UNPAVED FINISHED GRADE ABOVE. NOTE THAT PAVEMENT SUBBASE MAY BE PART OF THE 'D' LAYER.	N/A	PREPARE PER SITE DESIGN ENGINEER'S PLANS. PAVED INSTALLATIONS MAY HAVE STRINGENT PLANS AND PREPARATION REQUIREMENTS.
C	INITIAL FILL: FILL MATERIAL FOR LAYER 'C' STARTS FROM THE TOP OF THE EMBEDMENT STONE ('B' LAYER) TO 24" (600 mm) ABOVE THE TOP OF THE CHAMBER. NOTE THAT PAVEMENT SUBBASE MAY BE A PART OF THE 'C' LAYER.	AASHTO M145 ¹ A-1, A-2-4, A-3 OR AASHTO M43 ¹ 3, 307, 4, 467, 5, 56, 57, 6, 67, 68, 7, 78, 8, 89, 9, 10	BEGIN COMPACTIONS AFTER 24" (600 mm) OF MATERIAL OVER THE CHAMBERS IS REACHED. COMPACT ADDITIONAL LAYERS IN 12" (300 mm) MAX LIFTS TO A MIN. 95% PROCTOR DENSITY FOR WELL GRADED MATERIAL, AND 90% RELATIVE DENSITY FOR PROCESSED AGGREGATE MATERIALS.
B	EMBEDMENT STONE: FILL SURROUNDING THE CHAMBERS FROM THE FOUNDATION STONE ('A' LAYER) TO THE 'C' LAYER ABOVE.	AASHTO M43 ¹ 3, 4	NO COMPACTION REQUIRED.
A	FOUNDATION STONE: FILL BELOW CHAMBERS FROM THE SUBGRADE UP TO THE FOOT (BOTTOM) OF THE CHAMBER.	AASHTO M43 ¹ 3, 4	PLATE COMPACT OR ROLL TO ACHIEVE A FLAT SURFACE. ^{2,3}

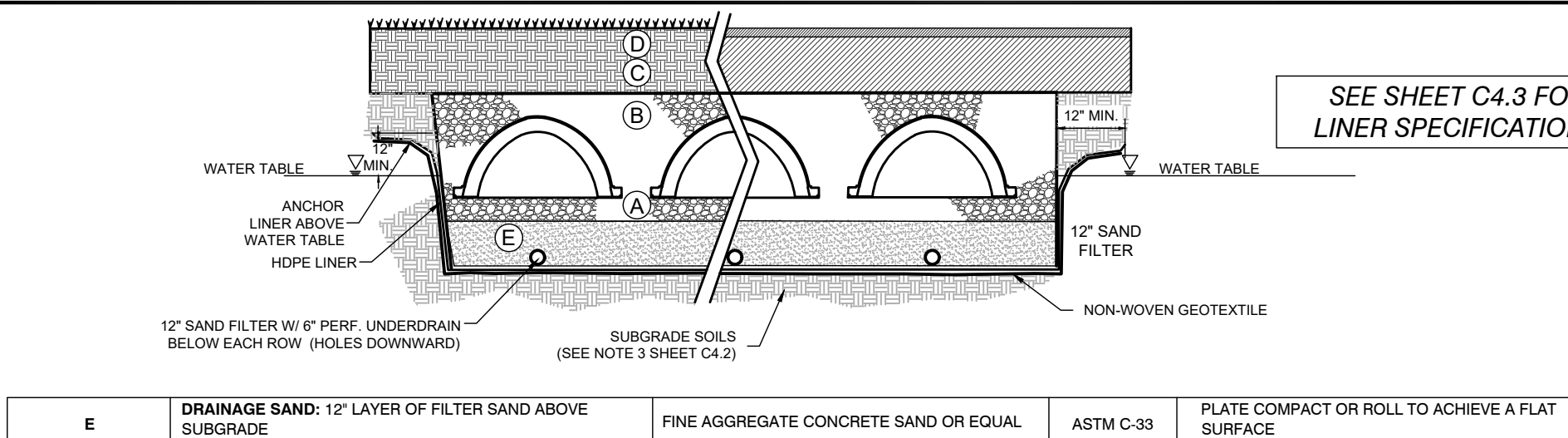
- PLEASE NOTE:
- THE LISTED AASHTO DESIGNATIONS ARE FOR GRADATIONS ONLY. THE STONE MUST ALSO BE CLEAN, CRUSHED, ANGULAR. FOR EXAMPLE, A SPECIFICATION FOR #4 STONE WOULD STATE: "CLEAN, CRUSHED, ANGULAR NO. 4 (AASHTO M43) STONE".
 - STORMTECH COMPACTION REQUIREMENTS ARE MET FOR 'A' LOCATION MATERIALS WHEN PLACED AND COMPACTED IN 9" (230 mm) (MAX) LIFTS USING TWO FULL COVERAGES WITH A VIBRATORY COMPACTOR.
 - WHERE INFILTRATION SURFACES MAY BE COMPROMISED BY COMPACTION, FOR STANDARD DESIGN LOAD CONDITIONS, A FLAT SURFACE MAY BE ACHIEVED BY RAKING OR DRAGGING WITHOUT COMPACTION EQUIPMENT. FOR SPECIAL LOAD DESIGNS, CONTACT STORMTECH FOR COMPACTION REQUIREMENTS.
 - ONCE LAYER 'C' IS PLACED, ANY SOIL/MATERIAL CAN BE PLACED IN LAYER 'D' UP TO THE FINISHED GRADE. MOST PAVEMENT SUBBASE SOILS CAN BE USED TO REPLACE THE MATERIAL REQUIREMENTS OF LAYER 'C' OR 'D' AT THE SITE DESIGN ENGINEER'S DISCRETION.



SEE ENGINEER'S CROSS-SECTION FOR SUBSURFACE SAND FILTER LAYOUT & DETAILS

NOTES:

- CHAMBERS SHALL MEET THE REQUIREMENTS OF ASTM F2418-18a, "STANDARD SPECIFICATION FOR POLYPROPYLENE (PP) CORRUGATED WALL STORMWATER COLLECTION CHAMBERS" CHAMBER CLASSIFICATION 45x76 DESIGNATION SS.
- MC-3500 CHAMBERS SHALL BE DESIGNED IN ACCORDANCE WITH ASTM F2787 "STANDARD PRACTICE FOR STRUCTURAL DESIGN OF THERMOPLASTIC CORRUGATED WALL STORMWATER COLLECTION CHAMBERS".
- THE SITE DESIGN ENGINEER IS RESPONSIBLE FOR ASSESSING THE BEARING RESISTANCE (ALLOWABLE BEARING CAPACITY) OF THE SUBGRADE SOILS AND THE DEPTH OF FOUNDATION STONE WITH CONSIDERATION FOR THE RANGE OF EXPECTED SOIL MOISTURE CONDITIONS.
- PERIMETER STONE MUST BE EXTENDED HORIZONTALLY TO THE EXCAVATION WALL FOR BOTH VERTICAL AND SLOPED EXCAVATION WALLS.
- REQUIREMENTS FOR HANDLING AND INSTALLATION:
 - TO MAINTAIN THE WIDTH OF CHAMBERS DURING SHIPPING AND HANDLING, CHAMBERS SHALL HAVE INTEGRAL, INTERLOCKING STACKING LUGS.
 - TO ENSURE A SECURE JOINT DURING INSTALLATION AND BACKFILL, THE HEIGHT OF THE CHAMBER JOINT SHALL NOT BE LESS THAN 3".
 - TO ENSURE THE INTEGRITY OF THE ARCH SHAPE DURING INSTALLATION, a) THE ARCH STIFFNESS CONSTANT AS DEFINED IN SECTION 8.2.8 OF ASTM F2418 SHALL BE GREATER THAN OR EQUAL TO 500 LBS/IN/IN, AND b) TO RESIST CHAMBER DEFORMATION DURING INSTALLATION AT ELEVATED TEMPERATURES (ABOVE 73° F / 23° C), CHAMBERS SHALL BE PRODUCED FROM REFLECTIVE GOLD OR YELLOW COLORS.



SAND FILTER AND UNDERDRAIN DETAIL

N.T.S.

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RICHMOND VERMONT

PROJECT:

SOUTHVIEW
STORMWATER
IMPROVEMENTS

RICHMOND, VT

DATE	CHECKED	REVISION

STORMTECH
DETAILS

DATE

05/27/2026

SCALE

AS SHOWN

PROJ. NO.

25117

DRAWING NUMBER

C4.1

HDPE LINER SPECIFICATIONS PART 1 – GENERAL 1.01 SUMMARY The High–Density Polyethylene (HDPE) liner for the stormwater chambers aims to provide a robust, impermeable barrier that prevents water seepage, protects groundwater, and maintains water quality. The liner should meet all relevant environmental regulations, ensuring long–term durability and ease of installation. PART 2 – PRODUCTS 2.01 MATERIAL REQUIREMENTS a. Material Type: High–Density Polyethylene (HDPE) b. Thickness: Minimum 0.76 mm (30 mils) for primary liner, 2.0 mm (80 mils) for secondary liner (if applicable) c. UV Resistance: The liner should have UV stabilizers to withstand prolonged exposure to sunlight. d. Tear Resistance: The material must have high tear resistance to minimize damage during installation. e. Chemical Resistance: The HDPE liner should be resistant to various chemicals typically found in stormwater chambers. f. Temperature Tolerance: The liner should be able to withstand temperature fluctuations ranging from –30°C to 60°C (–22°F to 140°F). PART 3 – EXECUTION 3.01 DIMENSIONS AND INSTALLATION a. Custom Size: The liner should be custom manufactured to fit the specific dimensions of the stormwater chamber accurately. b. Overlap: The panels should have a minimum 300 mm (12 inches) overlap during installation. c. Seaming: Welding or fusion bonding should be used for seaming to create a strong, watertight connection. d. Anchoring: The liner should be anchored securely to prevent movement and potential damage. e. Cushion: Place a cushion layer beneath the liner if the subgrade particles contain sharp angular stones that could damage the liner or if particles greater than 3/8 inch. The cushion may be a 10-ounce-per–square-yard or heavier nonwoven geotextile or a layer at least 6 inches thick of soil meeting the particle size and shape requirements of the subgrade. Geotextile cushion material must meet the requirements of the Geosynthetic Research Institute (GRI) Test Method GT12(a). Follow the manufacturer’s recommendations for any additional protective measures. f. Subgrade preparation: Prepare the subgrade to conform to manufacturer’s recommendations. The subgrade materials must be free from sharp, angular stones, and the surface free from oversized particles, or any objects that could damage the liner. If angular particles are present, treat the subgrade by placing a cushion layer between the subgrade and the liner. The subgrade surface must provide a smooth, flat, and unyielding foundation for the liner. No standing water, mud, vegetation, snow, frozen subgrade, or excessive moisture may be present at the time of liner placement. g. Liner protection: Protect liners from mechanical damage from all sources, including equipment access points and agitation operations. If stormwater management plans indicate locations where agitation operations may result in abrasion or other mechanical damage to the liner, provide protective measures. Measures to ensure the integrity of the liner include increasing the liner thickness above the minimum values or providing protective ramps and aprons at agitation locations. h. Anchorage: Anchor the liner to prevent uplift due to wind or slippage down the side slope, in accordance with manufacturer’s recommendations. i. Penetrations: Install penetrations through the liner in accordance with manufacturer’s recommendations. j. Cover soil: Cover liners with a minimum of 12 inches of soil measured perpendicular to the finished surface. Do not use cover soil that contains sharp, angular stones or any objects that could damage the liner. The maximum allowable particle size of soil cover material is 3/8 inch. Use cover materials that are stable against slippage down the slope under all operational and exposure conditions, such as rapid drawdown or saturation by precipitation or snowmelt. Place cover soil within 24 hours after placement of the liner to minimize the potential for damage from various sources, including precipitation, wind, and ultraviolet light exposure. 3.02 HYDRAULIC PROPERTIES a. Permeability: The liner must have a permeability rate of less than 1x10^{–13} cm/s to minimize water seepage. b. Water Loss: The liner should have low water loss properties to maintain the stormwater chamber’s water level effectively. 3.03 DURABILITY AND LONGEVITY a. Expected Lifespan: The HDPE liner should have a minimum expected service life of 20 years. b. Abrasion Resistance: The liner should withstand potential damage from debris and animal activity. c. Puncture Resistance: It should be resistant to punctures from sharp objects typically found in the chamber environment. d. Stress Crack Resistance: The liner should demonstrate high stress crack resistance. 3.04 QUALITY CONTROL AND TESTING a. Certification: The HDPE liner must be certified to meet the required industry standards and environmental regulations. b. Testing: The manufacturer should perform testing for thickness, tensile strength, elongation, tear resistance, UV resistance, and chemical resistance. 3.05 ENVIRONMENTAL CONSIDERATIONS a. Recyclability: The liner should be recyclable at the end of its lifespan to minimize environmental impact. b. Compliance: The liner should comply with all local, state, and federal regulations related to stormwater management and environmental protection. 3.06 WARRANTY a. The HDPE liner should come with a warranty that guarantees its performance and quality for the specified lifespan. 3.07 INSTALLATION AND MAINTENANCE GUIDELINES a. The manufacturer should provide clear and comprehensive installation instructions. b. Regular inspection and maintenance guidelines should be provided to ensure the liner’s integrity over time. 3.08 PACKAGING AND DELIVERY a. The HDPE liner should be packaged securely to avoid damage during transportation and storage. It is essential to work closely with a reputable HDPE liner manufacturer to ensure all specific requirements of the stormwater chambers are met. The specifications provided above are intended as a guideline and may need customization based on the chamber’s unique conditions and engineering design.		SITE ENGINEER:  CIVIL ENGINEERING ASSOCIATES, INC. 10 MANSFIELD VIEW LANE, SOUTH BURLINGTON, VT 05403 P: 802-864-2323 FAX: 802-864-2271 web: www.cesa-vt.com COPYRIGHT © 2026 – ALL RIGHTS RESERVED STORMWATER CONSULTANT  208 FLYNN AVE SUITE 2H BURLINGTON, VT 05401 P: 802-497-2367 web: www.watershedca.com DRAWN MAB CHECKED DSM APPROVED DSM CLIENT: TOWN OF RICHMOND RICHMOND VERMONT PROJECT: SOUTHVIEW STORMWATER IMPROVEMENTS RICHMOND, VT <table><thead><tr><th>DATE</th><th>CHECKED</th><th>REVISION</th></tr></thead><tbody><tr><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td></tr></tbody></table> LINER SPECIFICATIONS DATE 05/27/2026 SCALE AS SHOWN PROJ. NO. 25117 DRAWING NUMBER C4.3	DATE	CHECKED	REVISION																											
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PROJECT COORDINATION

PART 1 – GENERAL

1.01 MEETINGS & PROJECT ACCESS

- A. The Owner shall be notified five (5) days prior to commencement of Work by the Contractor.
- B. The Contractor will coordinate with the Owner to arrange an on-site pre-construction meeting prior to commencement of any work. Job superintendents and subcontractors shall be included in this meeting.
- C. The Contractor will coordinate all phases of the Work, so as not to interfere with the normal work procedures in the area.
- D. The Contractor shall conduct his work in such a manner as to not interfere with or endanger work or traffic in areas adjacent to the construction area, except as permitted by the Owner. The Contractor shall so arrange his construction operations as to provide access for emergency vehicles and equipment to the work site at all times.

1.02 LABOR

- A. The Contractor and subcontractors will employ mechanics skilled in their respective trades.
- B. All labor will be performed in a neat and workmanlike manner.

1.03 PROTECTION OF PERSONS AND PROPERTY

- A. The Contractor shall be responsible for initiating, maintaining, and supervising all O.S.H.A. safety precautions in connection with the Work.
- B. Fire Protection: The Contractor shall take all necessary precautions to prevent fires adjacent to the Work and shall provide adequate facilities for extinguishing fires. The Contractor shall also prevent fires in project related buildings and shall prevent the spread of fires to areas outside the limits of the Work.
- C. Safety Precautions: Prior to commencement of Work, the Contractor shall be familiar with all safety regulations and practices applicable with construction operations. No additional payments will be made for equipment and procedures necessitated by these safety precautions.

1.04 CORRECTION OF WORK

- A. The Contractor shall promptly correct all Work rejected by the Owner as defective or as failing to conform to the Contract Documents. The Contractor shall bear all cost of correcting such rejected Work.

1.05 WEATHER CONDITIONS

- A. No Work shall be done when, in the opinion of the Owner, the weather is unsuitable. No concrete, earth backfill, embankment, or paving shall be placed upon frozen material. If there is delay or interruption in the Work due to weather conditions, the necessary precautions must be taken to bond new Work to old.
- B. Protection Against Water and Storm: The Contractor shall take all precautions to prevent damage to the Work by storms or by water entering the site of the Work directly or through the ground. In case of damage by storm or water, the Contractor, at his own expense, shall make repairs or replacements or rebuild such parts of the Work as the Engineer may require in order that the finished work may be completed as required by the Drawings and Specifications.

1.06 DISPOSAL OF DEBRIS

- A. All debris and excess materials, other than that which is authorized to be reused, become the property of the Contractor and shall be promptly removed from the property. The Contractor shall receive title to all debris and/or excess material. The Owner will not be responsible for any loss or damage to debris or excess material owned by the Contractor.

1.07 PROJECT LAYOUT

- A. The Contractor shall be responsible for providing all necessary survey staking.
1. Locate and protect control points before starting work on the site.
2. Preserve permanent reference points during progress of the Work.
3. Establish a minimum of two permanent benchmarks on the site, referenced to data established by survey control points.
- a. Record locations, with horizontal and vertical data, on Project Record Documents.

1.08 TESTING

- A. The Contractor is responsible for obtaining testing and inspection services.

SITE EARTHWORK

PART 1 – GENERAL

1.01 SUMMARY

- A. Section includes:
1. All excavation (unless covered in other sections of these specifications), removal and stockpile of topsoil, stabilization fabric, and other miscellaneous and appurtenant works.
2. Site filling.
3. Roadway structural sections.

1.02 PROTECTION

- A. Protect bench marks and existing structures.
- B. Protect above or below grade utilities which are to remain.

1.03 SUBMITTALS

- A. Testing laboratory reports indicating that material for backfill meets requirements of this Section.
- B. Field density test reports of site fill in place.
- C. Field density test reports for roadway structural sections in place.
- D. Stabilization Fabric: Submit copies of manufacturer's specifications and installation instructions.

PART 2 – PRODUCTS

2.01 STRUCTURAL FILL – CRUSHED GRAVEL (AOT SPEC. 704.05, FINE)

- A. All materials shall be secured from approved sources. This gravel shall consist of angular and round fragments of hard durable rock of uniform quality throughout, reasonably free from thin elongated pieces, soft or disintegrated stone, dirt, organic or other objectionable matter. This material shall meet the following grading requirements:

Sieve Designation	Percent by Weight Passing Square Mesh Sieve
2"	100
1 1/2"	90 – 100
No. 4	30 – 60
No. 100	0 – 12
No. 200	0 – 6

At least 50% by mass (weight) of the material coarser than the No. 4 sieve shall have at least one fractured face.

2.02 CRUSHED GRAVEL (AOT SPEC. 704.05, COARSE)

- A. All materials shall be secured from approved sources. This gravel shall consist of angular and round fragments of hard durable rock of uniform quality throughout, reasonably free from thin elongated pieces, soft or disintegrated stone, dirt, organic or other objectionable matter. This material shall meet the following grading requirements:

Sieve Designation	Percent by Weight Passing Square Mesh Sieve
4"	95 – 100
No. 4	25 – 50
No. 100	0 – 12
No. 200	0 – 6

At least 50% by mass (weight) of the material coarser than the No. 4 sieve shall have at least one fractured face.

2.03 COMPACTED FILL/GRANULAR BORROW

- A. All materials shall be secured from approved sources. This material shall be free of shale, clay, friable material, debris, and organic matter. This material shall meet the following grading requirements:

Sieve Designation	Percent by Weight Passing Square Mesh Sieve
3"	100
3/4"	75 – 100
No. 4	20 – 100
No. 100	0 – 20
No. 200	0 – 6

2.04 DRAINAGE COURSE (AOT SPEC. 704.16)

- A. All materials shall be secured from approved sources. Rock for drainage applications shall be produced from natural gravels or crushed quarried rock and shall consist of clean, hard, sound, and durable material. This material shall meet the following grading requirements:

Sieve Designation	Percent by Weight Passing Square Mesh Sieve
1"	100
3/4"	90 – 100
3/8"	20 – 55
No. 4	0 – 10
No. 8	0 – 10

2.05 DENSE GRADED CRUSHED STONE (AOT SPEC. 704.06)

- A. All materials shall be secured from approved sources. Dense Graded Crushed Stone shall consist of clean, hard, uniformly graded, crushed stone. It shall be sufficiently free from dirt, deleterious material, and pieces that are structurally weak. This material shall meet the following grading requirements:

Sieve Designation	Percent Finer by Weight
3 1/2"	100
3"	90 – 100
2"	75 – 100
1"	50 – 80
1/2"	30 – 60
No. 4	15 – 40
No. 200	0 – 6

Source: This material shall be obtained from crushed quarried rock sources. The area from which this material is obtained shall be stripped and cleaned before blasting.

Not more than 30% by mass (weight) of the material coarser than the No. 4 sieve shall consist of thin and/or elongated pieces.

2.06 RECYCLED ASPHALT PAVEMENT (RAP) 1 1/2" MINUS CRUSHED ASPHALT

- A. All materials shall be secured from approved sources. This material shall be free of Portland Cement and approved by the engineer prior to installation. This material shall not be mixed with gravel and shall meet the following grading requirements:

Sieve Designation	Percent by Weight Passing Square Mesh Sieve
2"	100
1 1/2"	90 – 100
No. 4	30 – 60
No. 100	0 – 12
No. 200	0 – 6

2.07 SAND BORROW AND CUSHION (AOT SPEC. 703.03)

- A. All materials shall be secured from approved sources. Sand Borrow shall consist of material reasonably free from silt, loam, clay, or organic matter. This material shall meet the following grading requirements:

Sieve Designation	Percent Finer by Weight
2"	100
1 1/2"	90 – 100
1/2"	70 – 100
No. 4	60 – 100
No. 100	0 – 20
No. 200	0 – 8

2.08 GEOTEXTILE

- A. Subsurface Drainage Geotextile: Nonwoven needle-punched geotextile, manufactured for subsurface drainage applications, made from polyolefins or polyesters; with elongation greater than 50 percent; complying with AASHTO M 288 and the following, measured per test methods referenced:

1. Survivability: Class 3; AASHTO M 288.
2. Grab Tensile Strength: 120 lbf; ASTM D 4632.
3. Tear Strength: 50 lbf; ASTM D 4533.
4. Apparent Opening Size: No. 70 sieve, maximum; ASTM D 4751.
5. Permittivity: 1.7 per second, minimum; ASTM D 4491.
6. UV Stability: 70 percent after 500 hours' exposure; ASTM D 4355.

- B. Separation Geotextile: Woven geotextile fabric, manufactured for separation applications, made from polyolefins or polyesters; with elongation less than 50 percent; complying with AASHTO M 288 and the following, measured per test methods referenced:

1. Survivability: Class 3; AASHTO M 288.
2. Grab Tensile Strength: 200 lbf; ASTM D 4632.
3. Sewn Seam Strength: 222 lbf; ASTM D 4632.
4. Tear Strength: 75 lbf; ASTM D 4533.
5. Puncture Strength: 90 lbf; ASTM D 4833.
6. Apparent Opening Size: No. 40 sieve, maximum; ASTM D 4751.
7. Permittivity: 0.02 per second, minimum; ASTM D 4491.
8. UV Stability: 50 percent after 500 hours' exposure; ASTM D 4355.
9. Weight: 4.0 oz/yd² minimum.

PART 3 – EXECUTION

3.01 PREPARATION

- A. Identify required lines, levels, contours, and datum.
- B. Identify known below grade utilities. Stake and flag locations.
- C. Maintain and protect existing utilities remaining which pass through work area.
- D. Upon discovery of unknown utility or concealed conditions, discontinue affected work; notify Engineer.

3.02 EROSION CONTROL

- A. Erosion control must be installed prior to beginning any earthwork operations.

3.03 TOPSOIL EXCAVATION

- A. Excavate topsoil from areas to be excavated, re-landscaped or regraded and stockpile in areas designated on site or as directed by the Engineer.

- B. Maintain the stockpile in a manner which will not obstruct the natural flow of drainage.

1. Maintain stockpile free from debris and trash.
2. Keep the topsoil damp to prevent dust and drying out.

3.04 SUBSOIL EXCAVATION

- A. Excavate subsoil from areas to be regraded in accordance with plans.
- B. Excavate subsoil required to accommodate site structures, construction operations, roads, and parking areas.
- C. Grade top perimeter of excavation to prevent surface water from draining into excavation.
- D. Notify engineer of unexpected subsurface conditions and discontinue affected work in area until notified to resume work.
- E. Correct areas over-excavated by error as directed by the Engineer.

3.05 DITCHES

- A. Cut accurately to the cross-sections, grades, and elevations shown.
- B. Maintain excavations free from detrimental quantities of leaves, sticks, trash, and other debris until completion of the work.

- C. Dispose of excavated materials as shown on the drawings or directed by the Engineer; except do not, in any case, deposit materials less than three feet from the edge of a ditch.

3.06 ROADWAY EMBANKMENTS AND BERMS

- A. When embankments are to be made on a hillside, the slope of the original ground on which the embankments are to be constructed shall be stepped and properly drained as the fill is constructed so that adverse movements of the slopes do not occur.

- B. Any excavated rock, ledge, boulders, and stone, except where required in the construction of other items or otherwise directed, shall be used in the construction of embankments

to the extent of the project requirements and generally shall be placed so as to form the base of an embankment.

- C. Frozen material shall not be used in the construction of embankments, nor shall the embankments or successive layers of the embankments be placed upon frozen material. Placement of material other than rock shall stop when the sustained air temperature, below 32 degrees Fahrenheit, prohibits the obtaining of the required compaction. If the material is otherwise acceptable, it shall be stockpiled and reserved for future use when its condition is acceptable for use in embankments.

- D. When an embankment is to be constructed across a swamp, muck, or areas of unstable soils, the unsuitable material shall be excavated to reach soils of adequate bearing capacity and the embankment begun. Alternative methods, such as use of a stabilization fabric in place of excavation and backfill, may be utilized only after approval of same by the Engineer.

- E. Material being placed in embankments shall be placed in horizontal layers of uniform thickness across the full width of the embankment. Stumps, trees, rubbish, and other unsuitable material shall not be placed in embankments.

- F. Embankment areas shall be placed in eight-inch maximum lifts. Effective spreading equipment shall be used on each layer to obtain uniform thickness prior to compaction. Each layer shall be kept crowned to shed water to the outside edge of embankment and continuous leveling and manipulating will be required to assure uniform density. The entire area of each layer shall be uniformly compacted to at least the required minimum density by use of compaction equipment consisting of rollers, compactors, or a combination thereof. Earth-moving and other equipment not specifically manufactured for compaction purposes will not be considered as compaction equipment.

- G. All fill material shall be compacted at a moisture content suitable for obtaining the required density. In no case shall the moisture content in each layer under construction be more than three percent above the optimum moisture content and shall be less than that quantity that will cause the embankment to become unstable during compaction. Sponginess, shoving, or other displacement under heavy equipment shall be considered evidence for an engineering determination of lack of stability under this requirement, and further placement of material in the area affected shall be stopped or retarded to allow the material to stabilize.

- H. When the moisture content of the material in the layer under construction is less than the amount necessary to obtain satisfactory compaction by mechanical compaction methods, water shall be added by pressure distributors or other approved equipment. Water may also be added in excavation or borrow pits. The water shall be uniformly and thoroughly incorporated into the soil by disc, harrowing, blading, or by other approved methods. This manipulation may be omitted for sands and gravel. When the moisture content of the material is in excess of three percent above optimum moisture content, dry material shall be thoroughly incorporated into the wet material, or the wet material shall be aerated by disk, harrowing, blading, rotary mixing, or by other approved methods; or compaction of the layer of wet material shall be deferred until the layer has dried to the required moisture content by evaporation.

3.07 COMPACTION REQUIREMENTS

- A. All backfills and fills shall be compacted in even lifts (8" maximum) to attain the required densities as follows:

Location	Modified Proctor ASTM D-1557
Subgrade and Gravel for Roads and Parking Lots	95%
General Embankments	90%

ROCK AND BOULDER EXCAVATION

PART 1 – GENERAL

1.1 SUMMARY

- A. This Section includes the following:

1. Work included: Furnish all labor and equipment required for excavation, disposal and replacement of rock and boulders.
- a. All boulders within the range boundaries shown on the site plans to be removed shall be included as part of the Contractors mass rock removal.

1.2 SUBMITTALS

- A. Blasting Plan: For record purposes; approved by authorities having jurisdiction.
- B. Seismic Survey Report: For record purposes; from seismic survey agency.
- C. Preexcavation Photographs or Videotape: Show existing conditions of adjoining construction and site improvements, including finish surfaces, that might be misconstructed as damage caused by earthwork operations. Submit before earthwork begins.

1.3 QUALITY ASSURANCE

- A. Blasting: Comply with applicable requirements in NFPA 495, "Explosive Materials Code," and prepare a blasting plan reporting the following:

1. Types of explosive and sizes of charge to be used in each area of rock removal, types of blasting mats, sequence of blasting operations, and procedures that will prevent damage to site improvements and structures on Project site and adjacent properties.
2. Seismographic monitoring during blasting operations.
3. Explosive Firm: The company specializing in explosives

for disintegration of rock with a minimum of five (5) years documented experience.

- B. Seismic Survey Agency: An independent testing agency, acceptable to authorities having jurisdiction, experienced in seismic surveys and blasting procedures to perform the following services:

1. Report types of explosive and sizes of charge to be used in each area of rock removal, types of blasting mats, sequence of blasting operations, and procedures that will prevent damage to site improvements and structures on Project site and adjacent properties.

2. Seismographic monitoring during blasting operations.

3. Seismic Survey Firm: The company specializing in seismic surveys with a minimum of five (5) years documented experience.

1.4 SCHEDULING

- A. Drilling operations shall be conducted Monday through Friday, from 7:00 A.M. to 4:00 P.M.
- B. Blasting operations shall be conducted Monday through Friday, from 8:00 A.M. to 4:00 P.M.

- C. Notification: Notify adjacent property owners and residents (within 1,500') a minimum of seven (7) days in advance of all anticipated blasting operations. Explain blasting and seismic operation and schedule.

PART 2 – PRODUCTS (Not Applicable)

PART 3 – EXECUTION

3.1 EXAMINATION

- A. Pre-Blast Survey and Site Examination:

1. Conduct a pre-blast survey on all adjacent buildings and individual water systems within a distance of 1,500 feet. The survey shall include pictures and notes of all signs of distress in the buildings and verification of quality and quantity of water in all individual water systems.
2. Verify site conditions and note all subsurface irregularities, which may affect any work requiring blasting.
3. Identify required lines, levels, contours and datum.

3.2 PREPARATION

- A. Protect structures, utilities, sidewalks, pavements, and other facilities from damage caused by settlement, lateral movement, undermining, and other hazards created by blasting operations.
- B. When ledge rock or boulders are encountered, the material shall be uncovered and the Contractor shall take cross-sections of the ledge rock surface. If the Contractor uncovers ledge but fails to cross section the undisturbed material, the Contractor shall have no right-of-claim to any classification other than that allowed by the Owner.

3.3 EXPLOSIVES

- A. Explosives: Obtain written permission and all necessary permits from authorities having jurisdiction (local, state and federal) before bringing explosives to Project site or using explosives on Project site.
1. Perform blasting without damaging adjacent structures, property, or site improvements.
2. Perform blasting without weakening the bearing capacity of rock subgrade and with the least-practicable disturbance to rock to remain.

3.4 EXCAVATION, GENERAL

- A. Rock excavation includes removal and disposal of rock. Remove rock to lines and subgrade elevations indicated to permit installation of permanent construction.

3.5 UNAUTHORIZED EXCAVATION

- A. Fill unauthorized excavations under construction.

1. If rock below grade is shattered by blasting caused by holes drilled too deep, or too heavy charges of explosives, or any other circumstance due to blasting, and if such shattered rock does not provide suitable foundation, the rock shall be removed and the excavation refilled with screened gravel at the expense of the Contractor.

DRAINAGE

PART 1 – GENERAL

1.01 SUMMARY

- A. Section includes:

1. Culvert pipe and appurtenances.
2. Stone fill.
3. Drainage Structures

1.02 REFERENCES

- A. Vermont Agency of Transportation Standard Specifications, Latest Edition.

1.03 SUBMITTALS

- A. Manufacturer's technical data for:

1. Pipe and appurtenances.
2. Structures.

SITE ENGINEER:



CIVIL ENGINEERING ASSOCIATES, INC.
10 MANSFIELD VIEW LANE, SOUTH BURLINGTON, VT 05403
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STORMWATER CONSULTANT



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DSM

APPROVED

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CLIENT:

**TOWN OF
RICHMOND**

RICHMOND VERMONT

PROJECT:

**SOUTHVIEW
STORMWATER
IMPROVEMENTS**

RICHMOND, VT

DATE	CHECKED	REVISION
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SPECIFICATIONS

DATE

05/27/2026

SCALE

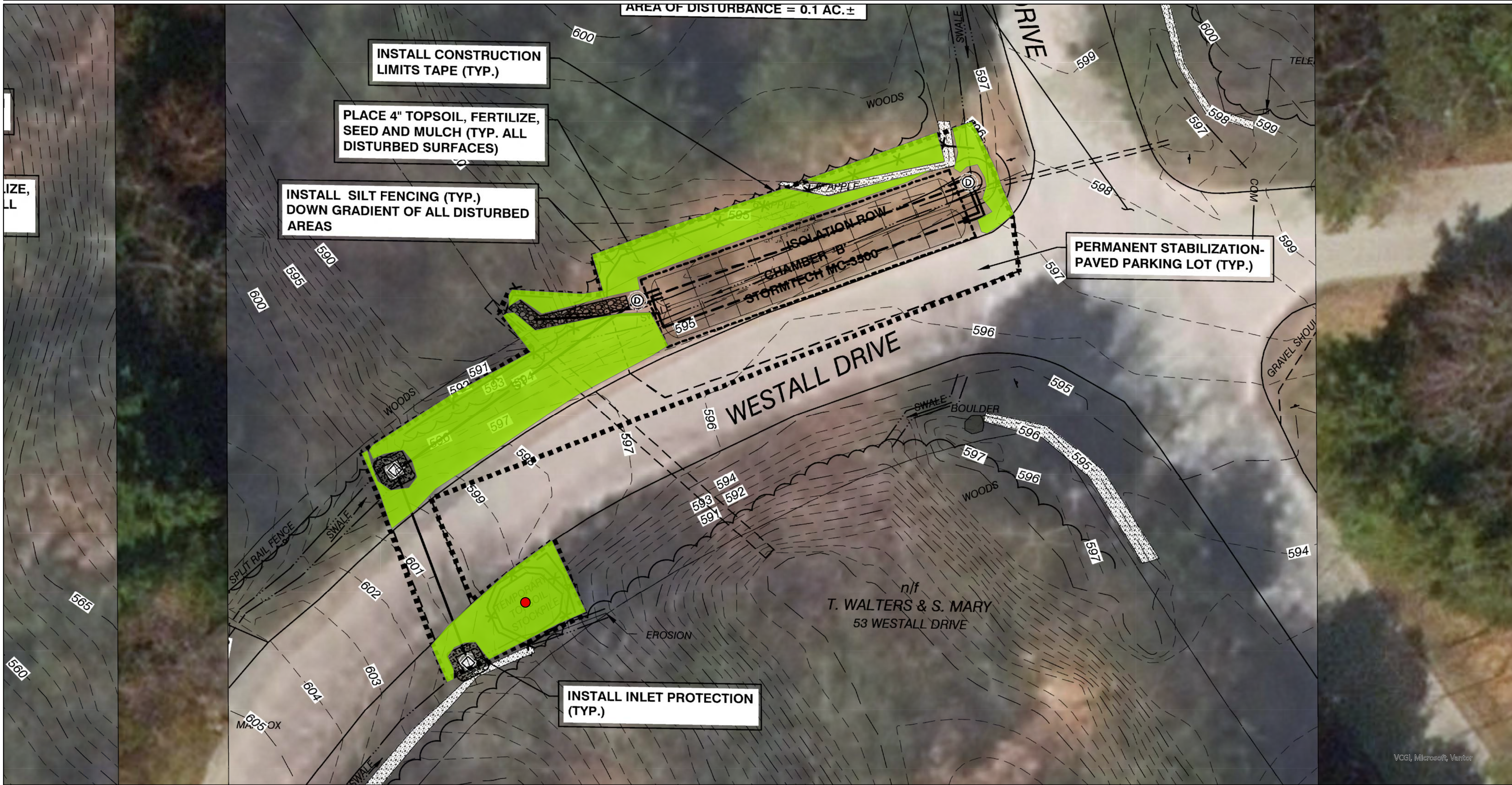
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PROJ. NO.

25117

DRAWING NUMBER

C5.0



Post Construction Conditions & Soil Quality Requirements

Southview Subdivision
Richmond, VT

The Post-Construction Soil Depth and Quality standards apply to all disturbed areas within the limits of the site which are not covered by an impervious surface, part of a structural stormwater treatment practice, or engineered as structural fill once development is complete.

Requirements

- Site must retain the duff layer and native topsoil in an undisturbed state to the maximum extent practicable.
- A topsoil layer with a minimum organic matter content of 4% dry weight in planting beds and turf areas except where tree roots limit the depth of incorporation or where native mapped soils indicate less than 4 inches of naturally occurring topsoil in the NRCS Official Soil Series Description.
- Compost or other materials used to amend soils must meet the definition of "compost" or meet the contaminant standards in the VT Solid Waste Management Rules and have a C:N ratio below 25:1. If Exceptional Quality (EQ) biosolids are used as a soil amendment, they must comprise no more than 35% of the total volume of soil and be well mixed before or during application.
- A dense and vigorous vegetative cover must be established over turf areas.

Post construction soil quality requirements shall be met by using one of or a combination of the following options:

Option 1

Leave undisturbed native vegetation and soil and protect from compaction during construction. Identify areas of the site that will not be stripped, logged, graded, or driven on. Fence off those areas to prevent impacts during construction. Failure to establish and maintain exclusionary controls around these areas during the construction phase may trigger the requirement to restore soils per option 2, 3, or 4.

Option 2

Amend existing site topsoil or subsoil in place based on the following steps:

1. Scarify or till subsoils to 4 inches of depth or to depth needed to achieve a total depth of 8 inches of uncompacted soil after calculated amount of amendment is added. Except for within the drip line of existing trees, the entire surface shall be disturbed by scarification.
2. Amend soil to meet organic content requirements based on either the pre-approved rate or the calculated rate.
 - a. Pre-Approved Rate: Place 1 inch of composted material with an organic matter content between 40 and 65% and rototill into 3 inches of soil.
 - b. Calculated Rate: Place calculated amount of composted material or approved organic material and rototill into depth of soil needed to achieve 4 inches of settled soil at 4% organic content.
3. Rake beds to smooth and remove surface rocks larger than 2 inches in diameter.
4. Water or roll to compact soil in turf areas to 85% of maximum dry density.

Option 3

All areas of pervious surfaces within the post-development drainage areas are subject to the Vermont Stormwater Treatment Standard for post-construction soil depth and quality. Soil depth and quality shall be established towards the end of construction and protected from compaction once established. Soil quality requirements shall be met by the method outlined in Subchapter 3.0 of the Vermont Stormwater Management Manual, Vermont's Stormwater Treatments Standards, described as follows:

1. Stockpile soil on site in a designated, controlled area at least 50 feet from surface waters, wetlands, floodplains, or other critical resource areas.
2. Scarify or till subgrade to a depth of 4 inches except for within the drip line of existing trees, the entire surface shall be disturbed by scarification.
3. Stockpiled topsoil shall also be amended, if needed, to meet the organic content requirements based on either the pre-approved rate or the calculated rate.
 - a. Pre-Approved Rate: Compost shall be incorporated with an organic matter content between 40 and 65% into the topsoil at a ratio of 1:3.
 - b. Calculated Rate: Incorporate composted material or proved organic material at a calculated rate to achieve 4 inches of settled soil at 4% organic content.
4. Replace stockpiled topsoil prior to planting, rake to level and remove surface rocks larger than 2 inches in diameter.

Option 4

Import topsoil mix, or other materials for mixing, including compost of sufficient organic content and depth. Follow steps outlined below.

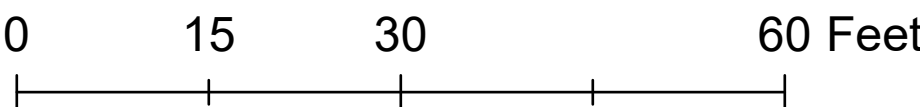
1. Scarify or till subgrade to a depth of 4 inches. Except for within the drip line of existing trees, the entire surface shall be disturbed by scarification.
2. Place 4 inches of imported topsoil mix on surface. The imported topsoil mix shall contain 4% organic matter and shall be sand or sandy loam as defined by the USDA.
3. Rake beds to smooth and remove surface rocks larger than 2 inches in diameter.
4. Water or roll to compact soil in turf areas to 85% of maximum dry density.

Soil depth and quality shall be established towards the end of construction and once established, protected from compaction, such as from large machinery, vehicle traffic, and from erosion.

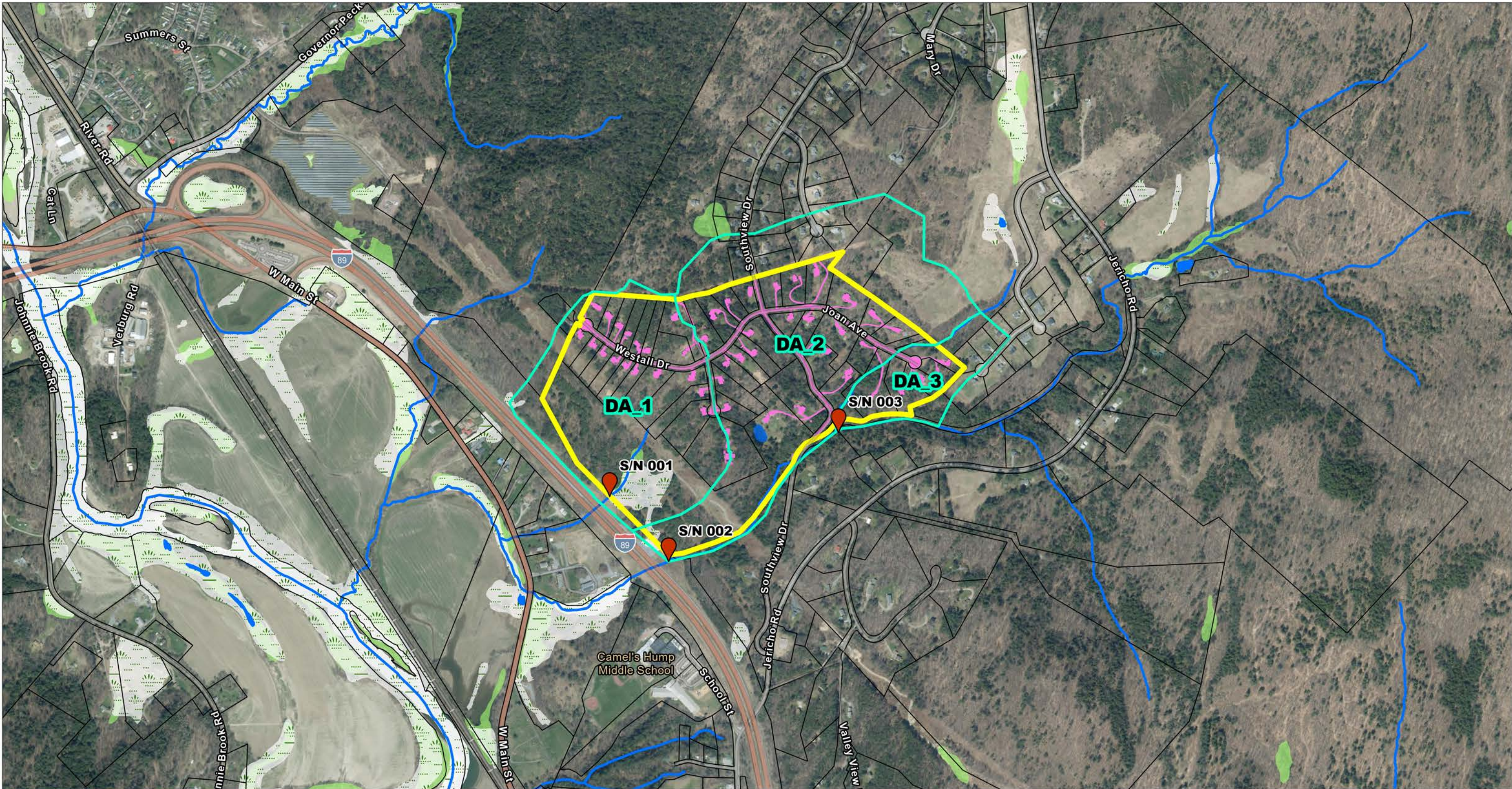
Soil test holes will be conducted to verify compliance with the PCSDQ standards. Possible soil sampling locations are shown on this sheet.

Test holes shall be excavated using only a shovel driven solely by inspector's weight and shall be at least 50 feet apart from each other

- Area Subject to Soil Standards (0.095 ac)
- Sample Soil Testing Locations (1 required)



Dated: 06/17/2026
Last Revised: 06/17/2026
Sheet: SQ - 1



Southview Subdivision Locator Map

Richmond, VT

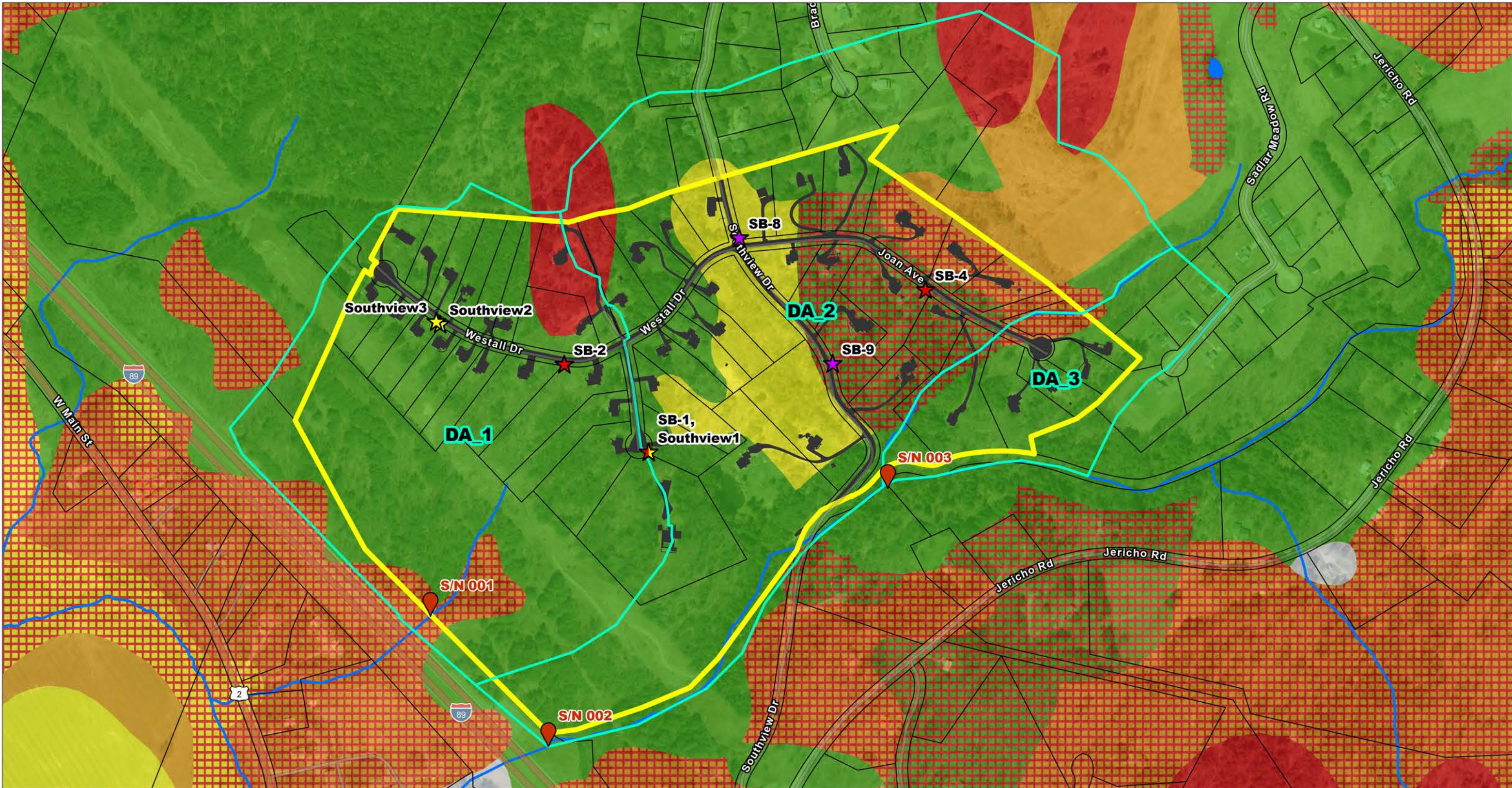
Map Date: 5/18/2026

- | | |
|-----------------------------|------------------------|
| Discharge Points | Surface Water |
| Overall Site Drainage Areas | NHD Streams |
| 3-Acre Boundary | NHD Waterbody |
| Parcel Boundaries | VSWI Wetlands Advisory |
| Impervious Surfaces | VSWI Class II Wetlands |



Scale: 1:10,000





Southview Subdivision Soil Map

Richmond, VT

Map Date: 5/18/2026

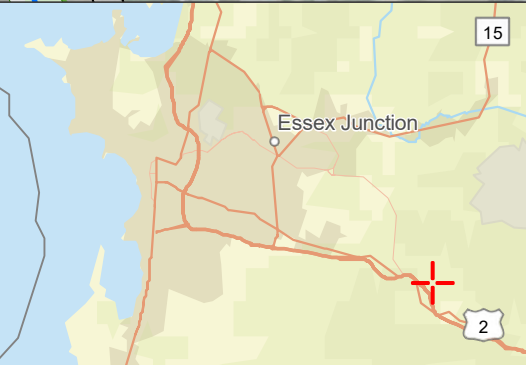
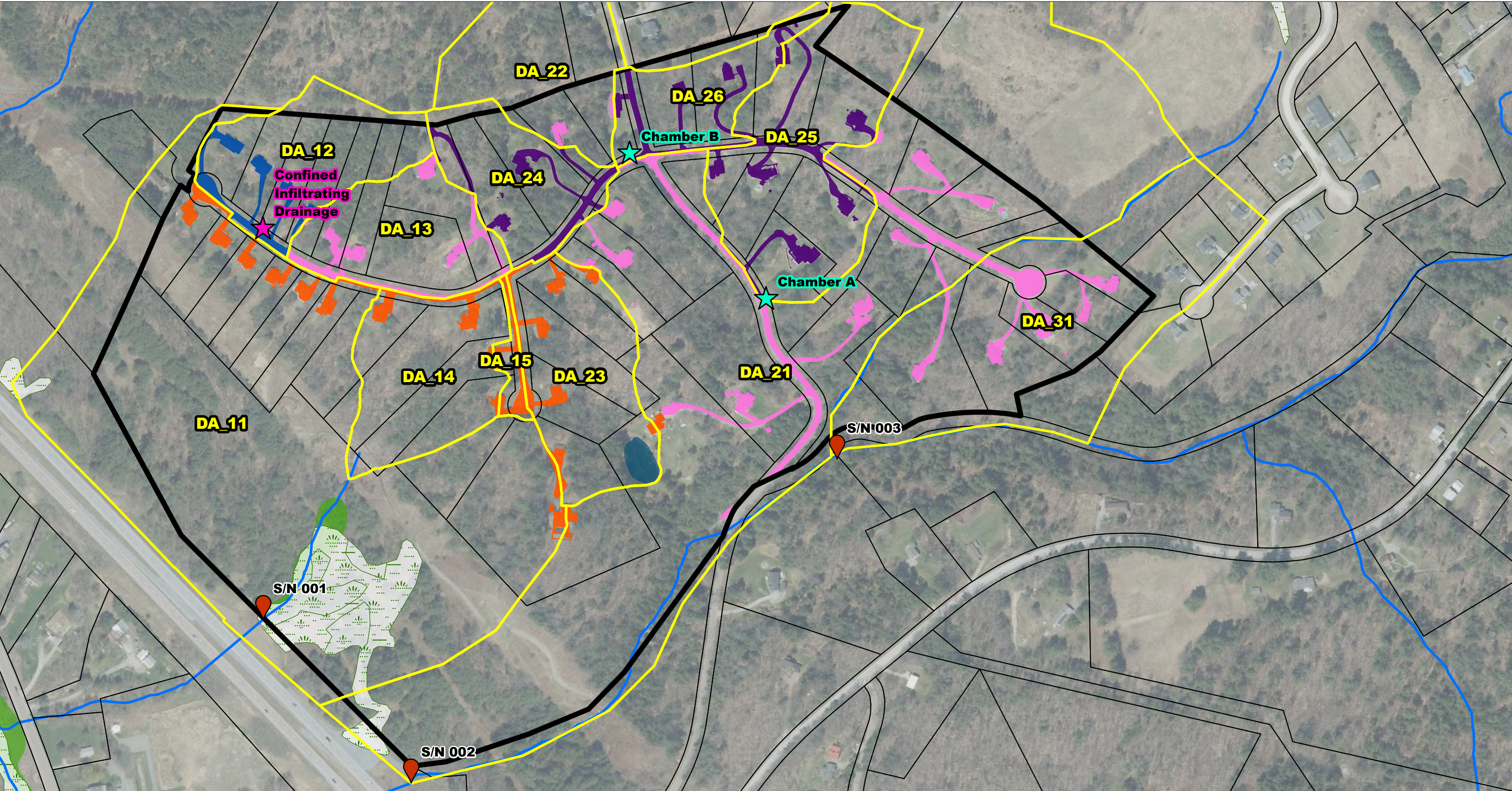
- Soil Boring & Infiltration Locations
- Date Completed
- ★ 01/15/2025
 - ★ 06/11/2025
 - ★ 04/29/2026
- Hydrologic Soil Group
- A

- A/D
 - B
 - B/D
 - C
 - C/D
 - D
 - Not Rated
 - Discharge Points
- Overall Site Drainage Areas
 - 3-Acre Boundary
 - Parcel Boundaries
 - Impervious Surfaces
 - Surface Water
 - NHD Streams
 - NHD Waterbody



Scale: 1:5,000





Southview Subdivision Proposed Treatment Areas

Richmond, VT

Map Date: 6/17/2026

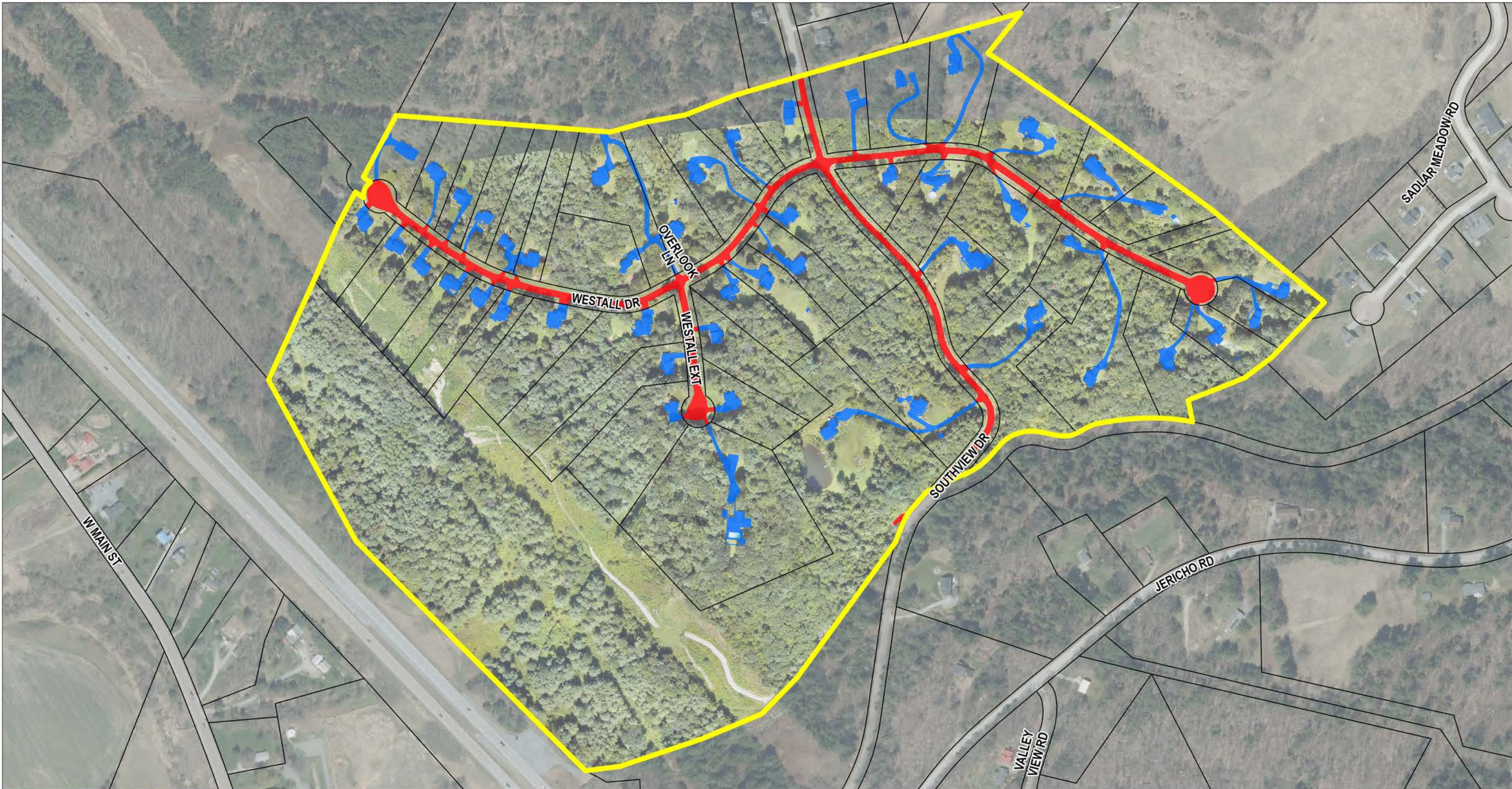
Legend

- 3-Acre Boundary
 - Parcel Boundaries
 - BMP Drainage Areas
 - Proposed Chamber Locations
 - Confined Infiltration Location
 - Discharge Points
- Impervious Surface Treatment
- 10% Impervious - Removed from WQ Calculations (2.49 ac)
 - Chambers (2.79 ac)
 - Confined Drainage (0.77 ac)
 - Untreated Jurisdictional (4.30 ac)
- Surface Water
- NHD Streams
 - Treatment Pond
 - VSWI Wetlands Advisory
 - VSWI Wetlands Class



Scale: 1:4,000





Southview Subdivision Ownership Map

Richmond, VT

Map Date: 5/18/2026

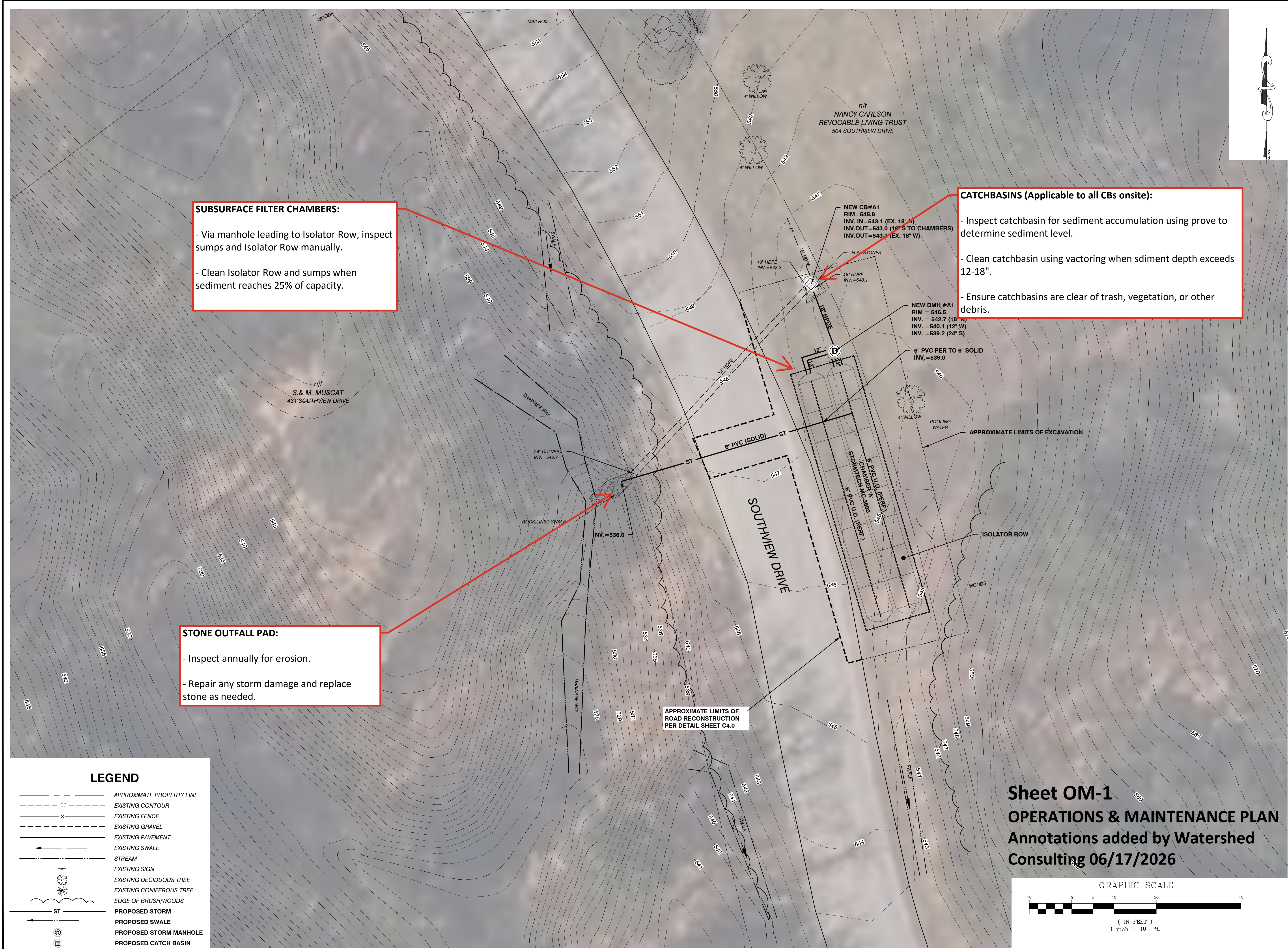
- 3-Acre Boundary
- Parcel Boundaries
- Impervious Surface Ownership
 - Privately Owned
 - Town Owned

Impervious Category	Area (Acres)
Total Impervious	10.35
Town Owned	3.75
Privately Owned	6.60



Scale: 1:4,000





SUBSURFACE FILTER CHAMBERS:

- Via manhole leading to Isolator Row, inspect sumps and Isolator Row manually.
- Clean Isolator Row and sumps when sediment reaches 25% of capacity.

STONE OUTFALL PAD:

- Inspect annually for erosion.
- Repair any storm damage and replace stone as needed.

CATCHBASINS (Applicable to all CBs onsite):

- Inspect catchbasin for sediment accumulation using prove to determine sediment level.
- Clean catchbasin using vactoring when sdiment depth exceeds 12-18".
- Ensure catchbasins are clear of trash, vegetation, or other debris.

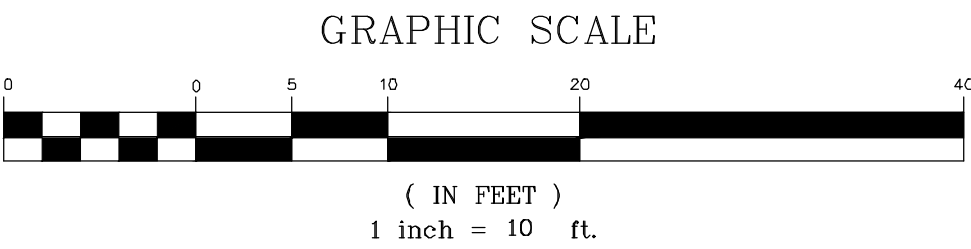
APPROXIMATE LIMITS OF ROAD RECONSTRUCTION PER DETAIL SHEET C4.0

APPROXIMATE LIMITS OF EXCAVATION

LEGEND

- APPROXIMATE PROPERTY LINE
- EXISTING CONTOUR
- EXISTING FENCE
- EXISTING GRAVEL
- EXISTING PAVEMENT
- EXISTING SWALE
- STREAM
- EXISTING SIGN
- EXISTING DECIDUOUS TREE
- EXISTING CONIFEROUS TREE
- EDGE OF BRUSH/WOODS
- PROPOSED STORM
- PROPOSED SWALE
- PROPOSED STORM MANHOLE
- PROPOSED CATCH BASIN

Sheet OM-1
OPERATIONS & MAINTENANCE PLAN
Annotations added by Watershed Consulting 06/17/2026



SITE ENGINEER:



CIVIL ENGINEERING ASSOCIATES, INC.
10 MANSFIELD VIEW LANE, SOUTH BURLINGTON, VT 05403
P: 802-864-2323 FAX: 802-864-2271 web: www.cea-vt.com
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STORMWATER CONSULTANT



208 FLYNN AVE SUITE 2H BURLINGTON, VT 05401
P: 802-497-2367 web: www.watershedca.com

DRAWN
MAB

CHECKED
DSM

APPROVED
DSM

CLIENT:

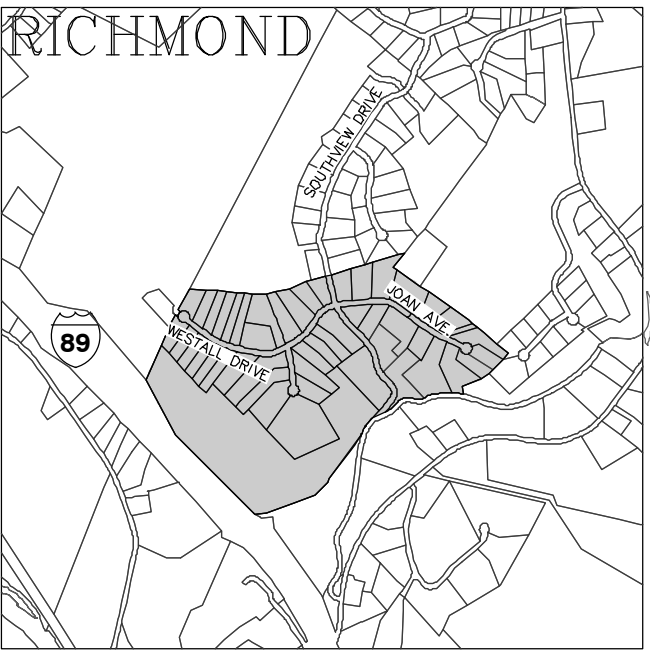
TOWN OF RICHMOND

RICHMOND VERMONT

PROJECT:

SOUTHVIEW STORMWATER IMPROVEMENTS

RICHMOND, VT



LOCATION MAP
1" = 200'

DATE	CHECKED	REVISION

PROPOSED CONDITIONS PLAN
-CHAMBER A-

DATE
05/27/2026

SCALE
1" = 10'

PROJ. NO.
25117

DRAWING NUMBER
C2.1

