

Burlington Design Advisory Board

645 Pine Street
Burlington, VT 05401
www.burlingtonvt.gov/DPI/DAB
Phone: (802) 865-7188

Ron Wanamaker
Emily Morse
Jay White
Jack Qualey
Gabriel Stadecker
Kathleen Ryan, Alt
Michael Alvanos, Alt



DESIGN ADVISORY BOARD Tuesday, October 25, 2022 3:00 PM

Remote and In Person (at 645 Pine Street) Meeting

Please click the link below to join the webinar:

<https://us02web.zoom.us/j/87155655137?pwd=ZEdGaGhxeFpRNDJQcFJrNWkvb1Vudz09>

Webinar ID: 871 5565 5137

Passcode: 796731

Or Telephone: US: +1 312 626 6799 or +1 929 205 6099 or +1 301 715 8592 or +1 346 248 7799 or +1 669 900 6833 or +1 253 215 8782

Agenda

Session I – 3:00 PM – 3:30 PM

ZP-22-466; 187 South Champlain Street (CIVIC, Ward 5S) City DPW Parks and Recreation Department / Max Madalinski

Renovations to City Pocket Park including replacement and relocation of playground with associated grading, installation of park lighting with associated electrical, installation of tables, benches, and bike racks, and construction of concrete walkway and seating area. (Project Manager, Mary O'Neil)

Session II – 3:30 PM – 4:00 PM

ZP-22-546; 52 Institute Road (RCO-RG, Ward 4N) City School Department / Joe Weith

Demolish and remediate existing high school and construct new 250,000 square foot high school/technical center. (Project Manager, Mary O'Neil)

Session III – 4:00 PM – 4:30 PM

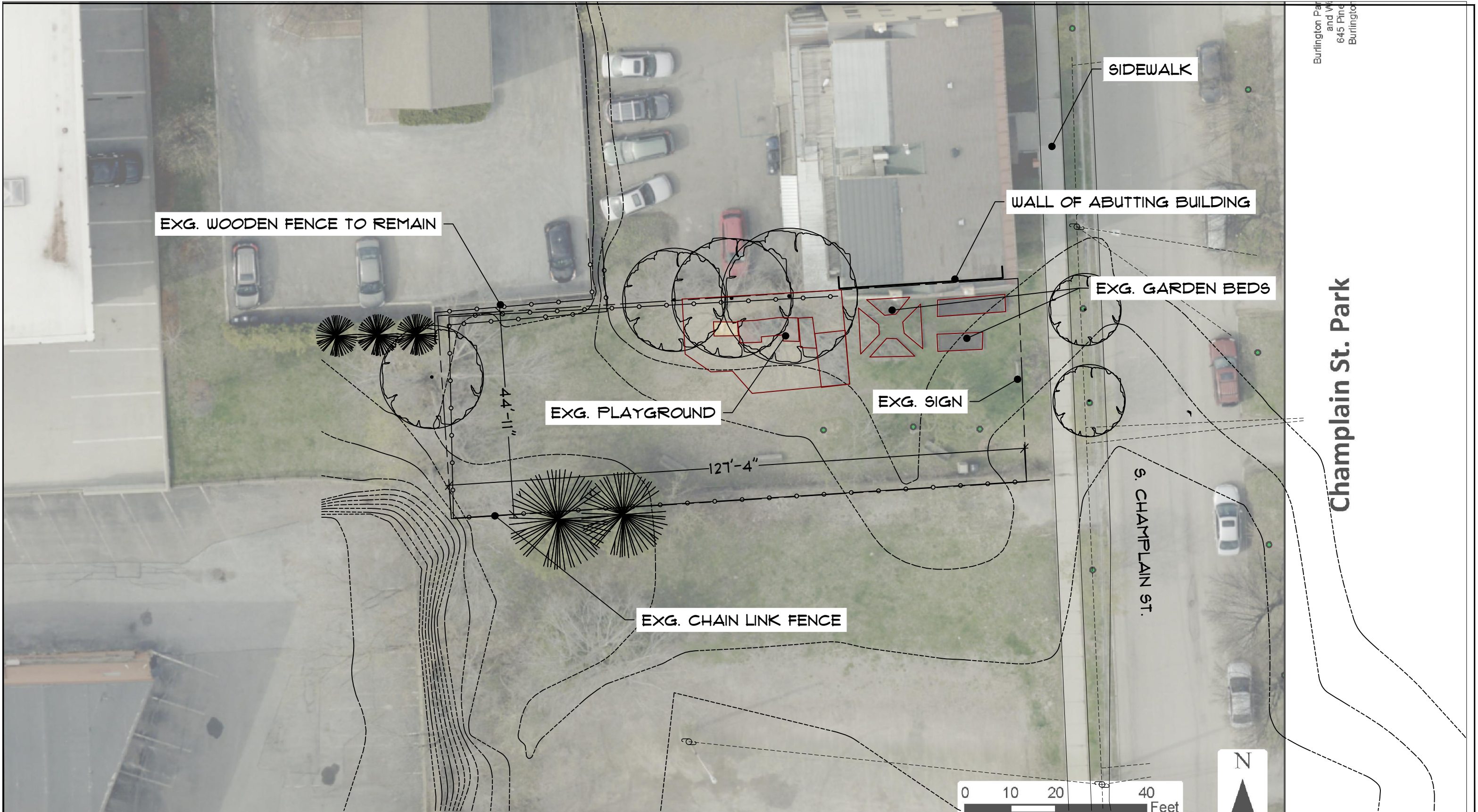
ZP-22-528; 447 Main Street (RL, Ward 6S) Jeremy Dressler & Jane Seymour / Marcus Gonzalez

Proposed demolition of existing carriage house to construct a new accessory structure. (Project Manager, Mary O'Neil)

The programs and services of the City of Burlington are accessible to people with disabilities. Individuals who require special arrangements to participate are encouraged to contact the Department of Permitting & Inspections at least 72 hours in advance so that proper accommodations can be arranged. For information call 865-7188.

Non-Discrimination

The City of Burlington will not tolerate unlawful harassment or discrimination on the basis of political or religious affiliation, race, color, national origin, place of birth, ancestry, age, sex, sexual orientation, gender identity, marital status, veteran status, disability, HIV positive status, crime victim status or genetic information. The City is also committed to providing proper access to services, facilities, and employment opportunities. For accessibility information or alternative formats, please contact Human Resources Department at (802) 540-2505.



Burlington Park
and Waterfront
645 Pine Street
Burlington, VT 05401

Champlain St. Park

20

0

20

40

SCALE: 1" = 20'

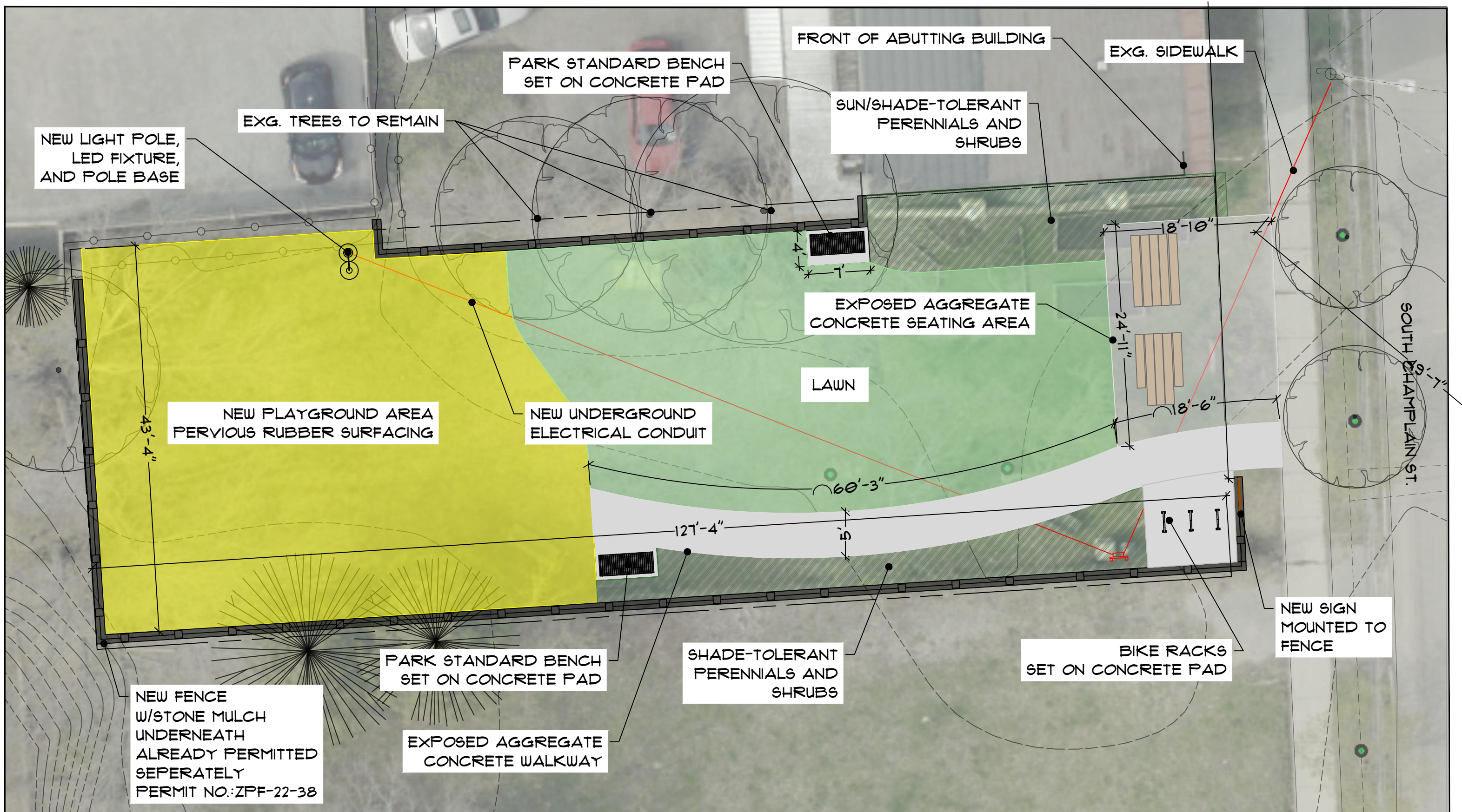
EXG. CONDITIONS

Champlain St. Park Rehab

187 South Champlain St, Burlington, VT 05401

**BURLINGTON
PARKS
RECREATION
WATERFRONT**
645 PINE STREET, SUITE B
BURLINGTON, VT 05401
(802) 864-0123

DESIGNED MWM	SCALE 1"=20'
DRAWN MWM	
DATE 9/29/22	DRAWING NO. SHEET 1 OF 4



NET NEW IMPERVIOUS:
995 SF
17% LOT COVERAGE

PER 14.3.6-G POCKET PARKS OF THE
BURLINGTON COMPREHENSIVE
DEVELOPMENT ORDINANCE,
THERE ARE NO REQUIRED SETBACKS
FOR STRUCTURES

NEW PLAYGROUND AREA
PERVIOUS RUBBER SURFACING
SET ON 9" WASHED STONE BASE

SEATING AREA
442 SF

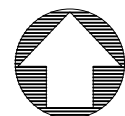
FURNISHING PADS
160 SF

WALKWAY
393 SF

SOUTH CHAMPLAIN ST.



IMPERVIOUS COVERAGE



Champlain St. Park Rehab

187 South Champlain St, Burlington, VT 05401

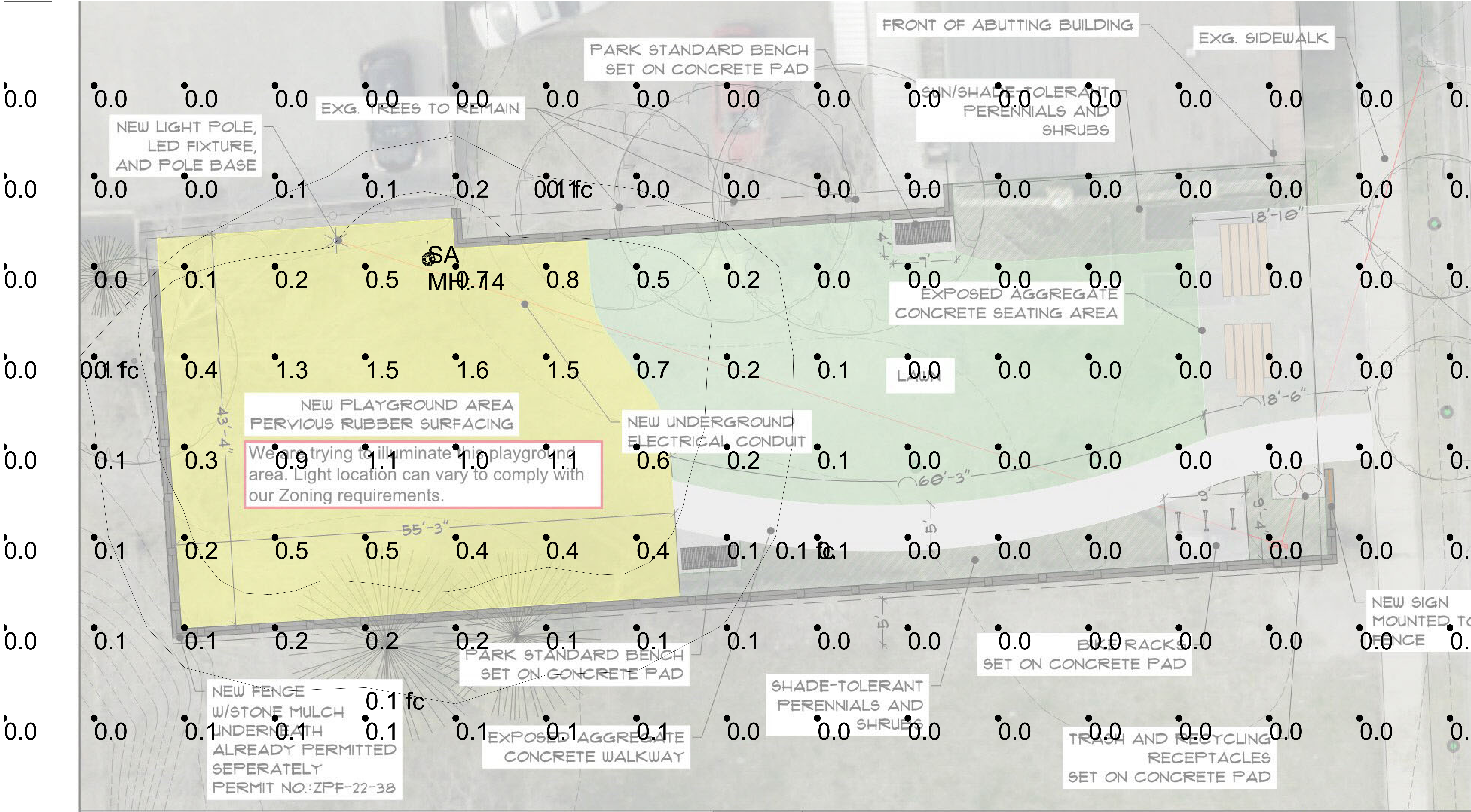
**BURLINGTON
PARKS
RECREATION
WATERFRONT**
645 PINE STREET, SUITE B
BURLINGTON, VT 05401
(802) 864-0123

DESIGNED MWM	
DRAWN MWM	SCALE 1"=20'
	DRAWING NO.
DATE 9/29/22	SHEET 3 OF 4

Calculation Summary					
Label	Avg	Max	Min	Avg/Min	Max/Min
SITE	0.15	1.6	0.0	N.A.	N.A.

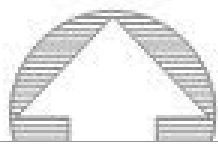
Luminaire Schedule (note fixture catalogue numbers are not complete)					
Type	Qty	Lum. Lumens	LLF	Lum. Watts	Description
SA	1	2493	0.900	40	UCM2-ANG-36L-325-3K7-4W-HS

- NOTES:
- 1) EXACT MOUNTING DETAILS TO BE DETERMINED AT JOBSITE BY OTHERS.
 - 2) CALCULATIONS MAY OR MAY NOT SHOW THE EFFECT OF SHADOWING CAUSED BY BUILDINGS AND OBJECTS WITHIN THE CALCULATED SPACE OR IN THE SITE AREA.
 - 3) READINGS SHOWN ARE INITIAL HORIZONTAL FOOTCANDLES ON A FLAT SITE WITHOUT REFLECTIONS OR OBSTRUCTIONS UNLESS OTHERWISE INDICATED.
 - 4) THIS CALCULATION IS BASED ON LIMITED INFORMATION SUPPLIED BY OTHERS TO SWANEY LIGHTING ASSOCIATES AND STANDARD ASSUMPTIONS OF THE SPACE AND/OR SITE.
 - 5) CONFORMANCE TO CODES AND OTHER LOCAL REQUIREMENTS AS DETERMINED BY THE AHJ ARE THE RESPONSIBILITY OF THE OWNER AND/OR THE OWNER'S REPRESENTATIVE.
 - 6) THIS LAYOUT DRAWING MUST BE COORDINATED WITH THE SITE LOCATION FOR CORRECT FIXTURE ORIENTATION.
 - 7) DOCUMENTS PRINTED OR PLOTTED FROM ELECTRONIC FILES MAY APPEAR AT OTHER THAN THE DESIRED OR ASSUMED GRAPHIC SCALES. IT IS THE RESPONSIBILITY OF THE RECIPIENT TO VERIFY THAT THE PRINTED OR PLOTTED-TO-SCALE DRAWING IS PRINTED TO SCALE.



PLAN VIEW

OVERALL SITE PLAN



Champlain St. Park Rehab



DESIGN
MAY
DRAW
MAY

NOTICE: THIS DRAWING IS THE EXCLUSIVE PROPERTY OF SWANEY LIGHTING ASSOCIATES, INC. AND IS NOT TO BE REPRODUCED, COPIED, OR TRANSMITTED IN ANY FORM OR BY ANY MEANS, ELECTRONIC OR MECHANICAL, WITHOUT THE WRITTEN PERMISSION OF SWANEY LIGHTING ASSOCIATES, INC. THIS DRAWING IS TO BE USED FOR NO PURPOSE OTHER THAN AS DETAILED INFORMATION CONCERNING THE OPERATION OF UNITS INDICATED. THIS DRAWING IS TO BE USED FOR NO PURPOSE OTHER THAN AS DETAILED INFORMATION CONCERNING THE OPERATION OF UNITS INDICATED. THIS DRAWING IS TO BE USED FOR NO PURPOSE OTHER THAN AS DETAILED INFORMATION CONCERNING THE OPERATION OF UNITS INDICATED. THIS DRAWING IS TO BE USED FOR NO PURPOSE OTHER THAN AS DETAILED INFORMATION CONCERNING THE OPERATION OF UNITS INDICATED.

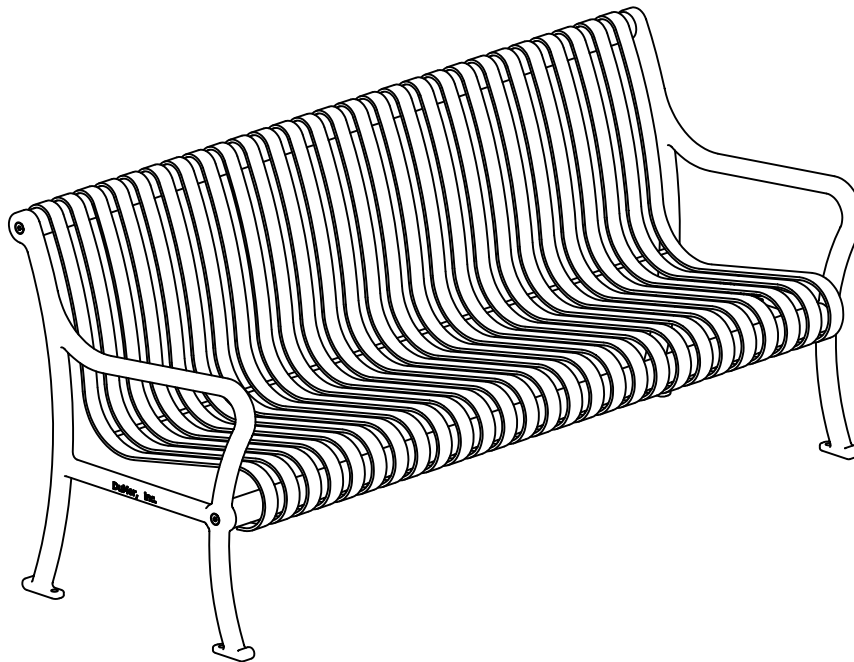
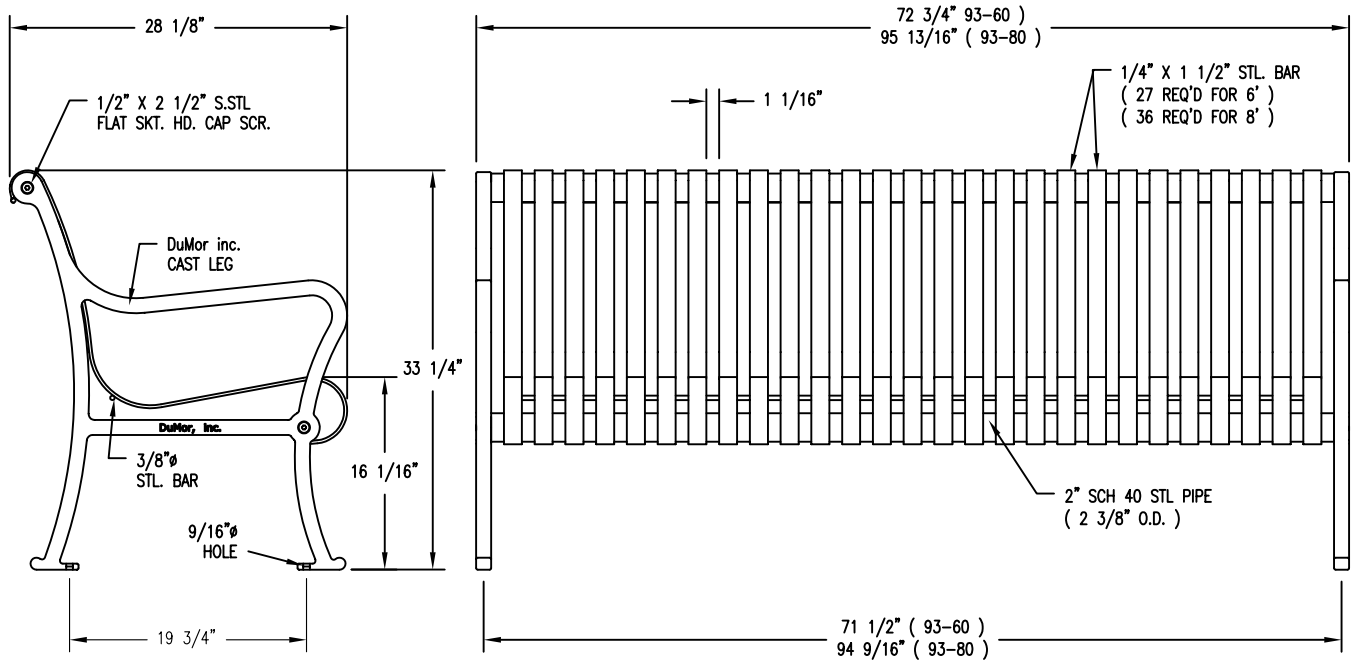
GENERATED FOR:
BURLINGTON PARKS
SCALE: NOT TO SCALE
Page 1 of 1

CHAMPLAIN ST PARK
BURLINGTON, VT
SITE LIGHTING LAYOUT



Park site 9-22-22.AGI

GENERATED BY SWANEY LIGHTING, SCARBOROUGH ME - 207-883-7100 - swaneylighting.com



NOTES:

- 1.) ALL STL. MEMBERS COATED W/ ZINC RICH EPOXY THEN FINISHED W/ POLYESTER POWDER COATING.
- 2.) 1/2" x 3 3/4" EXPANSION ANCHOR BOLTS PROVIDED
- 3.) BENCH IS SHIPPED UNASSEMBLED.

Color: Black

LENGTH OPTIONS

- ☒ 6' BENCH
☐ 8' BENCH

DuMor, inc.
P.O. Box 142 Mifflintown, PA 17059-0142

SCALE : NONE
DATE DRAWN : 3/22/94
DRAWN BY : AH
DATE REV. : 5/7/08
REV. BY : AH

TITLE :

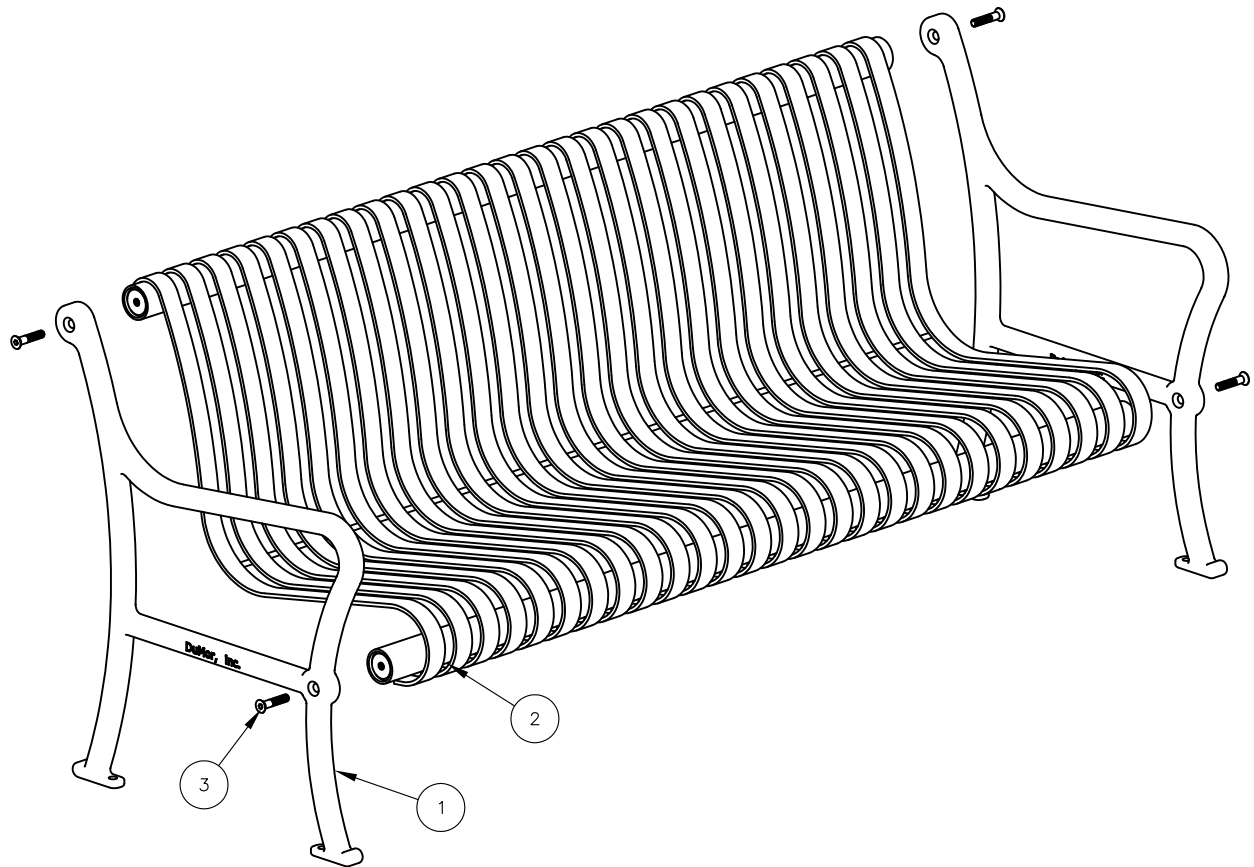
BENCH

REV.
G

DRAWING
NUMBER

93 SERIES

SHEET
1 OF 2



NOTE:

- 1.) DURING ASSEMBLY PROCEDURE;
DO NOT COMPLETELY TIGHTEN HARDWARE.
- 2.) THE ACTUAL PARTS WILL NOT BE NUMBERED:
NUMBERS ONLY APPLY TO DRAWING.

STEP 1:

- USE 2 - PCS. CAST SUPPORT (1)
 1 - PC. 6' ALL STL SEAT ASSEMBLY (2)
 4 - PCS. 1/2" X 2 1/2" FLT. SKT. HD. CAP SCR. (3)
 ATTACH CAST SUPPORT (1) TO 6' ALL STL SEAT ASSEMBLY
 (2) USING HARDWARE (3). TIGHTEN TO SNUG FIT.

STEP 2:

UPON COMPLETION OF BENCH ASSEMBLY SQUARE ALL
 COMPONENTS THEN TIGHTEN ALL HARDWARE.

STEP 3:

MOUNT AND ANCHOR AS SPECIFIED.

ITEM	QTY	PART NO	DESCRIPTION
1	2	0-93-00-02	CAST IRON BENCH SUPPORT
2	1	0-93-60	6' STL SEAT ASSEMBLY
3	4	1-12-065	1/2" X 2 1/2" FLT SKT HD CAP SCR


DuMor, inc.
 P.O. Box 142 Mifflintown, PA 17059-0142

SCALE : NONE
 DATE DRAWN : 3/22/94
 DRAWN BY : AWH
 DATE REV. : 5/7/08
 REV. BY : AH

TITLE :

BENCH ASSEMBLY

REV.
G

DRAWING
NUMBER

93 SERIES

SHEET
2 OF 2



Sign Description

Small Park Identification Signage are used to identify inner city parks where the medium park identification signage can not be sited, or is determined to not visually fit the environment. This size identification panel should be located at the major entries to the parks, and were possible mounted to the left of the entry, in cases where the mounting conditions can not Various conditions may exist for implementation of these signs, fabricators must complete survey for locations and provide recommendations for mounting based on existing conditions.

Messaging should be limited to the park's name only, and if possible limited to a single line of text, and set in title case.

Material Specifications

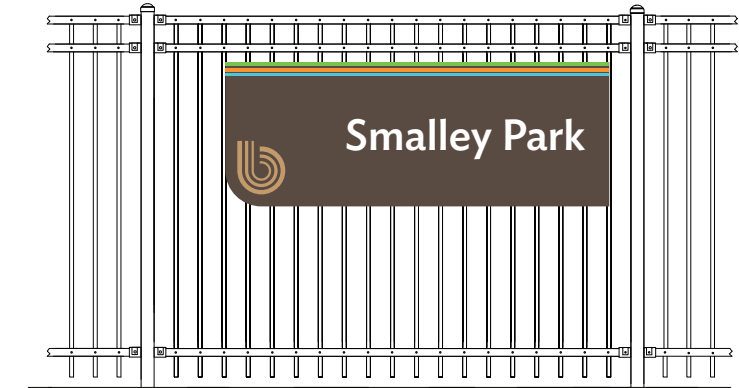
Panel
1/2" pan formed, or fabricated aluminum panel mounted to rail with angle and tamper resistant mechanical fasteners. Panel painted or powdercoated C4, with C5 Logo, and C1, C2, C3 Rules.

Alternate a 1/4" thick solid aluminum panel may be implemented for this sign type. Mechanical fasteners must be tamper resistant, and not penetrate the sign face. All hardware must be painted to match sign base color C1.

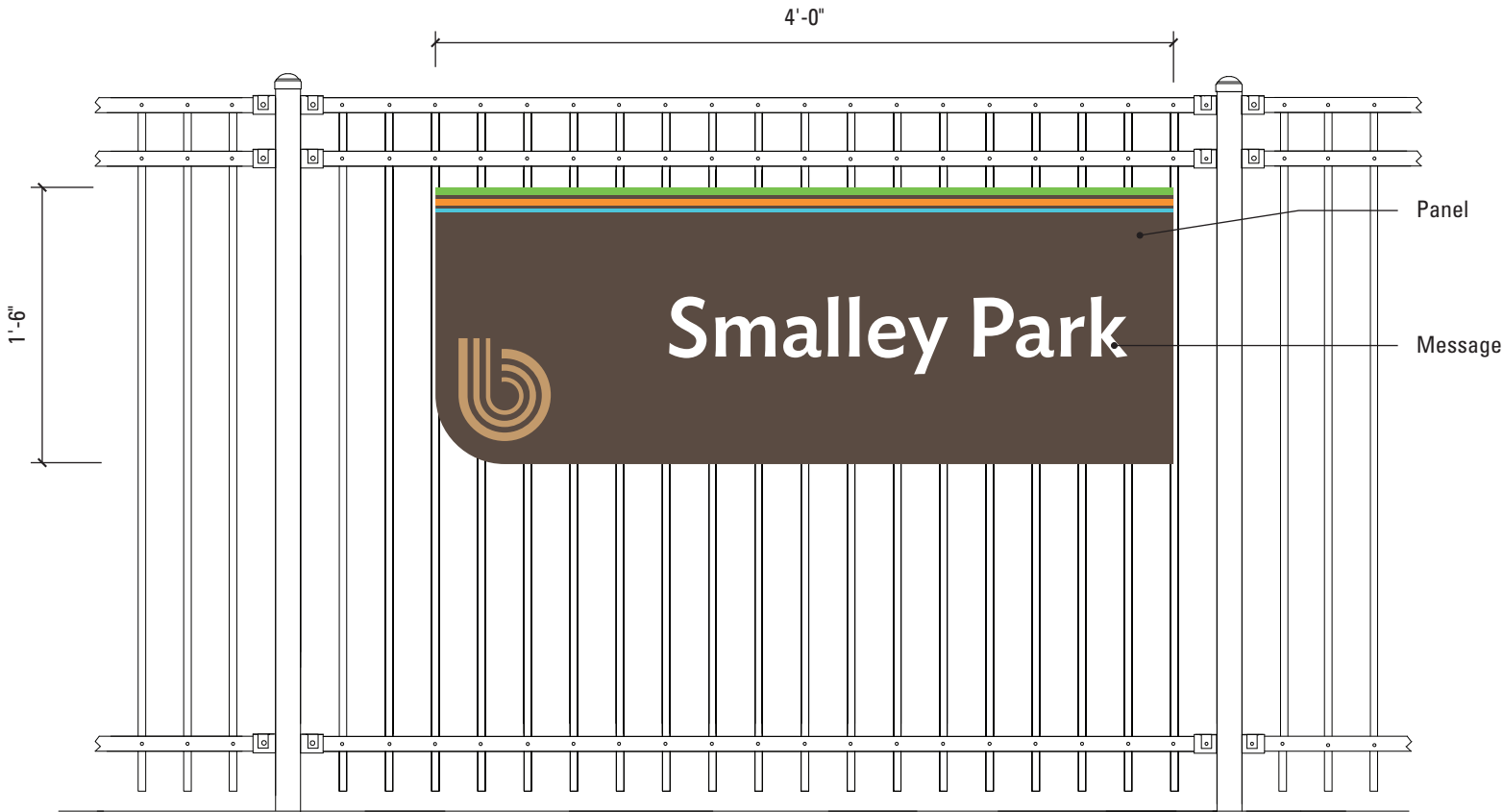
Message
Applied C6 Vinyl set in Ideal Sans Medium



1 Top
Scale: 1" = 1' - 0"



2 Front
Scale: 1/2" = 1' - 0"



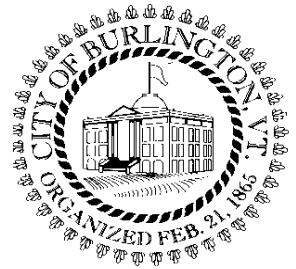
3 Front Detail
Scale: 1" = 1' - 0"

PARK IDENTIFICATION: SMALL

Department of Permitting and Inspections

Zoning Division
645 Pine Street
Burlington, VT 05401
www.burlingtonvt.gov/pz
Phone: (802) 865-7188
Fax: (802) 865-7195

*William Ward, Director
Scott Gustin, AICP, CFM, Principal Planner
Mary O'Neil, AICP, Principal Planner
Ryan Morrison, Associate Planner
Joseph Cava, Planning Technician
Celeste Crowley, Permit Administrator
Theodore Miles, Zoning Specialist*



MEMORANDUM

To: The Design Advisory Board
From: Mary O'Neil, AICP, Principal Planner
RE: 52 Institute Road, ZP22-546
Date: October 25, 2022

File: ZP-22-546
Location: 52 Institute Road (BHS/BTC)
Zone: I BHS overlay **Ward:** 4N
Parking District: MMMU
Date application accepted: October 4, 2022
Applicant/ Owner: Joe Weith, White and Burke / Burlington School District
Request: Demolish and remediate existing high school and construct new 250,000 square foot high school/technical center.



Background:

- **Zoning Permit ZP-22-7;** DRB Sketch Plan Review; Demolish existing high school and technical center and construct a new 268,500 sf. high school and technical center. September 2022.

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- **Zoning Permit 21-0583CA**; Expansion and renovation of Burlington High School and Burlington Technical Center. Request for a parking waiver and a five year project timeline. February, 2021.
- **Zoning Review 20-0194SP**; Sketch Plan review for renovations to BHS. September 1, 2020.
- **Zoning Permit 15-0982CA**; addition of storage shed. April 2015.
- **Zoning Permit 13-0291CA**; installation of rooftop condensing units on Buildings A and B. June 2013.
- **Zoning Permit 13-1037CA**; replace existing HVAC system with new heat pump system and condenser on roof of Building A. May 2013.
- **Zoning Permit 13-0053CA**; install new shed in north east portion of property. July 2012.
- **Non-Applicability of Zoning Permit Requirements 12-0558NA**; installation of photovoltaic system, Certificate of Public Good. November 2011.
- **Zoning Permit 11-1123CA**; install condensing unit on the side of F building at BHS. July 2011.
- **Zoning Permit 10-0850CA**; two new Energy Recovery Units on roof of A Building at Burlington High School. June 2010.
- **Zoning Permit 09-616CA**; Renovations to existing press box including new membrane roof covering, roof access hatch, ladder, and safety rail. March 2009.
- **Zoning Permit 09-321SN**; Electronic sign to be added to previously approved sign. October 2008.
- **Zoning Permit 09-241CA**; Relocate solar array from building side to flat roof of building with new rack mounting structure. September 2008.
- **Zoning Permit 09-137SN**; freestanding sign for Burlington High School. August 2008.
- **Zoning Permit 08-549SN**; one freestanding, internally lit, metal sign for Burlington High School. Application **denied**, February 2008.
- **Zoning Permit 06-457CA**; construction of 3,200 square foot building to house wood chip boiler system for existing high school. March 2006.
- **Zoning Permit 06-452CA**; redevelopment of high school athletic fields, parking, new service and entrance buildings and new sewage pump station. February 2006.
- **Zoning Permit 05-305CCA**; amended plan for building-mounted solar panels at BHS. Reduction from six panels to four. Child of permit 05-058CA. November 2004.
- **Zoning Permit 05-058CA**; Install 6 solar panels attaching to a pole located approximately 35 ft. off the SE corner of building A. July 2004.
- **Zoning Permit 04-723CA**; remove old green house. Enclose with walls, new roof and windows. July 2004.

- **Zoning Permit 00-028;** Installation of two metal halide flood lights on existing poles to illuminate the existing press box for the high school athletic field. July 1999.
- **Zoning Permit 99-186;** Amend previously approved bleacher system at the Burlington High School track to include a press box. October 1998.
- **Zoning Permit 98-305;** Replace existing steel and wood bleachers with new on the east and west sides of the Burlington High School track. Proposal includes installation of a slab on the east side (Portable units on the west). January 1998.
- **Zoning Permit 98-074;** Installation of a handicapped access ramp on the front of the existing Burlington high school. Materials to be painted metal (Dark green and concrete). August 1997.
- **Zoning Permit 97-033;** Add nonilluminated message board section under the existing freestanding sign for Burlington High School. Location on North Avenue and height and overall size to remain the same. July 1996.
- **Zoning Permit 87-678 / COA 87-215;** building three bay one-story garage for storage of aircraft parts for school program. January 1988.
- **Zoning Permit 87-320;** change an existing window on west side to exterior door to provide egress to new classroom. June 1987.
- **Zoning Permit 82-435;** construct bus shelter on the site of a removed bus shelter. September 1982.

Overview: A zoning permit was approved in February 2021 to allow renovation and expansion of Burlington High School; however after high levels of polychlorinated biphenyls, or PCBs were identified within building materials, students were moved to a former department store downtown, and technical classes dispersed throughout the city. Burlington School District now seeks approval for demolition of the existing high school, and construction of a new high school / technical center on the existing site.

The project development is subject to limited municipal review per **VSA §4413:**

Limitations on municipal bylaws

- (a) *The following uses may be regulated only with respect to **location, size, height, building bulk, yards, courts, setbacks, density of buildings, off-street parking, loading facilities, traffic, noise, lighting, landscaping, and screening requirements**, and only to the extent that regulations do not have the effect of interfering with the intended function use:*
- (1) ***State or community owned and operated institutions and facilities.***
 - (2) ***Public and private schools and other educational institutions certified by the state department of education.***

A zoning amendment (ZA 22-05) relative to re-zoning the site as an Overlay within the Institutional Zoning District was warned July 28, 2022 and adopted August 15, 2022. The Zoning District is now Institutional Core Campus Overlay (ICC-BHS).

BSD's target open date for the new BHS/BTC is August 2025. Below is the preliminary project timeline:

• Building demolition and remediation:	January 2023 – September 2023
• Foundation and site construction:	May 2023 – August 2025
• Building construction:	August 2023 – August 2025
• Target building occupancy:	August 2025

Due to the complexity and size of this reconstruction project, the applicant team requests approval of a permit life of four (4) years.

Article 6: Development Review Standards

Part 1: Land Division Design Standards

No land division is proposed. Not applicable.

Part 2: Site Plan Design Standards

Sec. 6.2.2 Review Standards

(a) Protection of Important Natural Features:

A study was commissioned of Gilman and Briggs Environmental Consultants to update one completed for an earlier application. A comparison of the two plans shows that the current plan has two alterations in regard to any intrusions into the forested area:

1. addition of a maintenance shed at the forest line above the upper parking lots, and
2. Deletion of a proposed salt shed a little east of that area.

Both analyses included a list of identified plant and tree species, with mapping to indicate both rare and endangered species. Areas of tree removal are depicted on plan WS2 Overlay District Natural Resource Protection. Trees will be removed within an area of 2,835 square feet of the Natural Resources Protection zone and within 1,320 square feet of the Natural Resources Protection Buffer zone. The ultimate examination resulted in a determination of no impact relative to the area of construction, a recommendation to limit tree clearing, and a return to a vegetative state within the outline of C Building. The overall project, including the Gilman & Briggs Environmental Plan, is scheduled for review by the Conservation Board 11.7.2022.

(b) Topographical Alterations:

Overall, the introduction of stormwater features (gravel wetlands) will result in site modifications.

Areas where the project potentially impacts existing slopes of 30% or more are depicted on Sheet WS2 Slope Analysis Proposed.

The project has been designed in a manner where steep slopes greater than 40% are proposed to be employed as a means of minimizing earth disturbance. Slopes greater than 30% have been avoided except where subsurface groundwater conditions are favorable for the long-term stability of the unconsolidated soils. Specifically, some areas have been graded at 3:1 and will be temporarily stabilized with the use of erosion control matting until vegetation with a suitable root mass has been established. For excavation into bedrock, the side slopes shall be no steeper than 6 vertical to 1 horizontal to reduce cyclical dislodgement of rock from the exposed face. In some areas 2H:1V slopes may be employed with the use of angular stone substrate as a means of minimizing sloughing of saturated soil surfaces.

The project will be subject to the newly adopted Steep Slopes amendment, and included within review of Article 5, 5.2.4 (b), at the DRB.

(c) Protection of Important Public Views:

There are no protected views from or through this site. Not applicable.

(d) Protection of Important Cultural Resources:

Not applicable.

(e) Supporting the Use of Renewable Energy Resources:

The new BHS/BTC building will use a renewable primary heating system as required by Burlington Ordinance Chapter 8 Article 5. The building's heating, cooling, and domestic hot water will be provided by electric heat pumps connected via heat exchanger to an open-loop ground source (i.e., geothermal) heat pump loop. This system is designed to provide all anticipated heating and cooling needs for the project. This proposed system is based upon the confirmation of substantial water flows on site from a test well and design phase energy modeling of the building. The building enclosure performance will exceed VT CBES 2020 standards, with a particular focus on air tightness. Building and equipment performance values have been optimized through the energy modeling process.

The roof is arranged and structured to support solar photovoltaic arrays and infrastructure will be put in place to support BSD's plan to arrange for installation of solar PV by a third-party on the building's roof through a power purchase agreement. The BHS/BTC project is registered as a LEED project and the intent is to obtain LEED Certification. No part of this application precludes the use of wind, water, solar, geothermal, or other renewable energy resources. The applicant will continue to refine and optimize energy and materials performance throughout the design and construction process. **Affirmative finding.**

(f) Brownfield Sites:

The site is not listed on the Vermont DEC list of identified Brownfields.

Extensive testing of building materials and soils for hazardous materials has been conducted on the property. Hazardous materials have been detected on site including asbestos, lead, PCBs, and polyaromatic hydrocarbons (PAHs) in the soils that exceed EPA and VTDEC standards. Testing and analysis determined that the most cost-effective approach to remediating hazardous materials is to fully demolish the buildings and dispose of all material as PCB bulk product waste.

Therefore, demolition and removal of the buildings is a necessary component of the overall remediation plan. BSD has been working closely with the Vermont Department of Environmental Conservation ("VTDEC") and EPA and is currently preparing a corrective action plan (CAP) that will require approval of both VTDEC and EPA.

Remediation of hazardous materials will consist of the following:

- Accessible asbestos containing materials (ACM) will be removed prior to demolition of the buildings.

- The interiors of Buildings A – G will be abated prior to demolition activities.
- There will likely be select remediation of PCB building materials on the exterior of the building including joint and door caulking.
- The entire buildings will be demolished and disposed of as PCB bulk product waste.
- Soil remediation will include select soil excavation and disposal to satisfy VTDEC and EPA regulations.

The abatement, remediation, and demolition will require the following regulatory agency permits and approvals to facilitate completion of the project:

- Site Investigation Report for hazardous building materials (PCBs) to be approved by VTDEC Sites Management Section (SMS).
- Site Investigation Report for soil materials to be approved by VTDEC SMS.
- Compliance with Vermont Department of Health lead and ACM regulations.
- Corrective Action Plan (CAP) for hazardous building materials (PCBs) and soil remediation to be approved by VTDEC SMS. This includes public notice and final decision.
- Corrective Action Construction Completion Report to be prepared for completed hazardous building materials (PCBs) and soil remediation.
- Performance based disposal of PCBs in accordance with the EPA 40 CFR section 761.61(b). This includes proper EPA notification and closure requirements.

(g) Provide for nature's events:

Special attention shall be accorded to stormwater runoff so that neighboring properties and/or the public stormwater drainage system are not adversely affected. All development and site disturbance shall follow applicable city and state erosion and stormwater management guidelines in accordance with the requirements of Art 5, Sec 5.5.3.

Design features which address the effects of rain, snow, and ice at building entrances, and to provisions for snow and ice removal or storage from circulation areas shall also be incorporated.

The proposed stormwater management system will use a Regenerative Conveyance System (RCS) to provide centralized stormwater treatment and detention for the new school facilities. This system consists of a series of stepped pools and stone grade change structures with underlying filter and infiltration materials to provide improved water quality treatment. The system will handle stormwater flows from Institute Road, the lands to the north and a small portion of the athletic field impervious surfaces. The RCS system will be located south of Institute Road and west of the sports stadium. It will also correct the current state of disrepair of the existing stormwater outfall which is severely undermined and has partially collapsed.

Details of the stormwater modeling, drainage maps, testing, operation and maintenance, and erosion control are provided in the Stormwater – EPSC Package and are shown on the Civil plans (sheets C2.1 – C2.5, C4.0 and C4.1).

To provide the most efficient treatment of the runoff from the school property, a system has been developed where the clean stormwater runoff from the Arms Forest area to the north will be intercepted and conveyed separately around the treatment facility.

The stormwater facilities have been designed to address the “3-Acre Rule” requirements recently adopted by the State for all of the redeveloped portion of the property.

The project will be required to satisfy all Chapter 26 requirements, with written approval of the City Stormwater program.

Design features which address the effects of rain, snow, and ice at building entrances, and to provisions for snow and ice removal or storage from circulation areas shall also be incorporated.

Improvements to building entrances will assure enhanced shelter for students and staff.

Burlington School District maintains an active snow removal program for all their facilities.

Affirmative finding as conditioned.



North elevation, BHS proposed

(h) Building Location and Orientation:

The building will continue to front Institute Road, with enhanced building elevation design to create a street face toward North Avenue. Additionally and due to the location of parking, another defined front is proposed on the north elevation. Redevelopment will continue to emphasize and enrich the existing orientation to the street.

(i) Vehicular Access:

Normal access will continue as existing off Institute Road, with both a drop-off arc in front of the school (Institute Road) and an extended access northward for entrance to BTC, surface parking and bus turnaround.

(j) Pedestrian Access:

Much greater circulation will be afforded with the plan, Pedestrian paths original off North Avenue in several locations; leading students/staff to either the rear (north) access or the south (Institute Road) entrance. Paths circle the site, connecting to the BTC entrance on the west, the parking areas, and greenhouse.



New pedestrian walks are annotated as  on the above site plan.

(k) Accessibility for the Handicapped:

A principal accomplishment of this redevelopment is to achieve access throughout the complex and across the campus. 10 HCParking spaces are provided in the top two surface parking lots, and two near the (Institute Road) main entrance.

There are no accessible parking spaces at the BTC entrance, and should be considered. Overall ADA access compliance is under the jurisdiction of Burlington's building inspector.

(l) Parking and Circulation:

Collectively, the BHS/BTC campus will provide a total of 362 vehicular parking spaces. The north parcel (52 Institute Road) proposes 218 permanent parking stalls, with 144 spaces south of Institute Road. Utilizing the amended Parking Standards warned under ZA-20-04¹, the proposal acknowledges a maximum parking limitation of 1,275 spaces when other uses (performing arts center, indoor and outdoor recreation) are considered, and a maximum of 385 spaces for secondary school use. The proposed parking falls within allowable limits.

Section 4.4.4 states: *Where parking is provided onsite, it is intended to be hidden behind, to the side, within, or underneath structures.*

New surface parking at 52 Institute Road (north side of Institute Road) is proposed to the rear of the building (side of BTC). There are a limited number of parking spaces in the entrance arc along Institute Road; these are intended for short term, visitor and additional handicap parking. These parking spaces do not adhere to the *behind/next to/underneath* guidance, there is some facility to be considered relative to proximity to the use. Handicap accessible parking is understandable; the DRB was comfortable at Sketch Plan Review of the proposed 20 parking places in front of the building for the specific uses noted.

A loading dock is noted on the west elevation, near the BTC entrance.

As now within the Multi Modal Mixed Use Parking District, a Transportation Demand Management Plan is required.

As provided in the Vehicle and Bicycle Parking Table, the CDO requires a minimum of **480** bicycle parking spaces. The applicant has submitted that, based on actual parking counts conducted at the Downtown BHS and other published guidelines for bicycle parking for schools of this size, the required bicycle count is excessive. The bicycle parking demand study conducted by VHB in fall, 2022 determined a peak parking demand of 0.03 spaces per enrolled student. Applying this standard to the estimated student capacity of the new school indicates that 48 bicycle parking spaces would be sufficient for the proposed BHS/BTC. LEED guidelines for bicycle parking have been employed through their certification checklists

And based on LEED guidelines, a total of 134 bicycle parking spaces would adequately serve the proposed project. With that guidance, the BHS/BTC project is proposing to provide **136** bicycle parking spaces, with 80 of those to be long term (enclosed) spaces and 56 to be short term spaces. A similar bicycle parking waiver proposal met with approval in Sketch Plan Review.

(m) Landscaping and Fences:

Detailed landscaping plans are provided in L-101, L-102, L-103 and L-104.

New pedestrian walkways provide opportunities to link students with planned outdoor space and courtyards, bike storage, an outdoor amphitheatre, stone benches and multiple building entries.

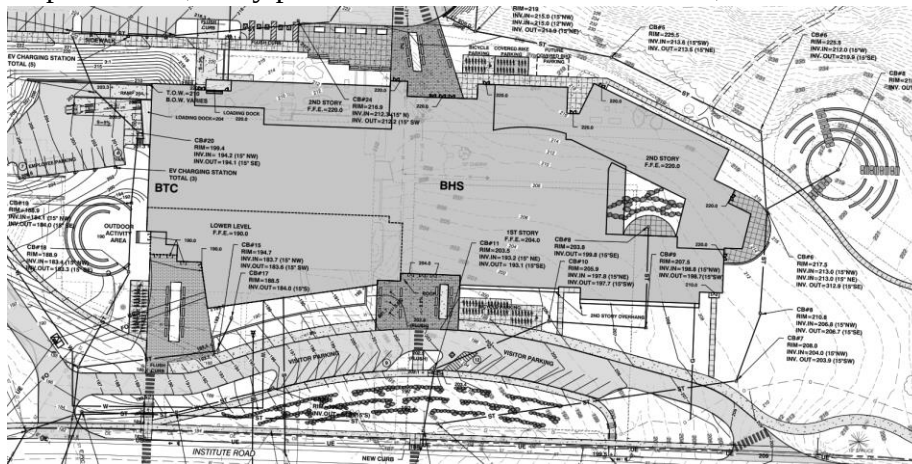
A greenhouse is located north of the upper parking lot, with raised planter beds integrated into the rising grade. Bike racks are located close to a bike tuning station and covered storage.

Terraced boulder walls frame the Institute Road first floor entry.

The planting schedule (Sheets L-301, L-302, L-303 and L-304) reflects a comprehensive and thoughtful arrangement of deciduous and evergreen; ornamental, shrub and perennial landscaping. Some existing trees will be retained.

(n) Public Plazas and Open Space:

There are several areas of existing and proposed gathering space, including two outdoor amphitheatres, entry plazas on both the north and south, and areas surrounding bicycle parking



facilities. . Reference is made to Plans L-303 and L-304. Of course the existing athletic fields on the south side of Institute Road satisfy the need for active Open Space.

(o)Outdoor Lighting:

Where exterior lighting is proposed the applicant shall meet the lighting performance standards as per Sec 5.5.2.

An outdoor lighting plan, including fixture information, illumination levels, and a photometric plan has been provided. Reference is made to Plan L-400 through L-404. Parking lot lighting does not exceed 4 fc.; however readings exceed 2 fc are evident along walkways, particularly those connecting to North Avenue and those adjacent to the “A” or “C” fixtures. Some adjustment to lighting will be required to reduce light levels to meet the 2 fc maximum.

Fixtures are cut-off LED (“A”, “B”, “C” and “F”) or recessed (“G”).

The maximum mounting height of any fixture is 25’. The Lighting plans do not include an average illumination level (sidewalks) or a Max/Min uniformity ratio (parking lots) which must not exceed 20:1.

(p) Integrate infrastructure into the design:

Exterior storage areas, machinery and equipment installations, service and loading areas, utility meters and structures, mailboxes, and similar accessory structures shall utilize setbacks, plantings, enclosures and other mitigation or screening methods to minimize their auditory and visual impact on the public street and neighboring properties to the extent practicable.

Utility and service enclosures and screening shall be coordinated with the design of the principal building, and should be grouped in a service court away from public view. On-site utilities shall be place underground whenever practicable. Trash and recycling bins and dumpsters shall be located, within preferably, or behind buildings, enclosed on all four (4) sides to prevent blowing trash, and screened from public view.

Any development involving the installation of machinery or equipment which emits heat, vapor, fumes, vibration, or noise shall minimize, insofar as practicable, any adverse impact on neighboring properties and the environment pursuant to the requirements of Article 5, Part 4 Performance Standards.

An existing greenhouse will be relocated to a retaining building foundation on the west.
All new utilities shall be undergrounded.
Three dumpsters are located on the west near a loading dock. Any solid waste storage must be contained on all sides and covered to prevent blowing trash.

Part 3: Architectural Design Standards

Sec. 6.3.2 Review Standards

State Statute §4413 Limits Municipal Review per the following:

§ 4413. Limitations on municipal bylaws

*(a) The following uses may be regulated only with respect to **location, size, height, building bulk, yards, courts, setbacks, density of buildings, off-street parking, loading facilities, traffic, noise, lighting, landscaping, and screening requirements**, and only to the extent that regulations do not have the effect of interfering with the intended functional use:*

- (1) State- or community-owned and operated institutions and facilities.*
- (2) **Public and private schools and other educational institutions certified by the state department of education.***
- (3) Churches and other places of worship, convents, and parish houses.*
- (4) Public and private hospitals.*
- (5) Regional solid waste management facilities certified under 10 V.S.A. chapter 159.*
- (6) Hazardous waste management facilities for which a notice of intent to construct has been received under 10 V.S.A. § 6606a.*

(a) Relate development to its environment:

1. Massing, Height and Scale:

The proposed redevelopment of Burlington High School / Burlington Technical Center is typical in scale, massing and height of institutional buildings. Absent the buildings to be removed, athletic accessory structures and the wood chip facility, there are no other structures on the parcels.

2. Roofs and Rooflines.

Not applicable per § 4413. Limitations on municipal bylaws.

3. Building Openings

Not applicable per § 4413. Limitations on municipal bylaws.

(b) Protection of Important Architectural Resources:

Not applicable.

(c) Protection of Important Public Views:

Not applicable.

(d) Provide an active and inviting street edge:

Not applicable per § 4413. Limitations on municipal bylaws.

(e) Quality of materials:

Not applicable per § 4413. Limitations on municipal bylaws.

(f) Reduce energy utilization:

The BHS/BTC project is registered as a LEED project. From the submission narrative: *The new BHS/BTC building will use a renewable primary heating system as required by Burlington Ordinance Chapter 8 Article 5. The building's heating, cooling, and domestic hot water will be provided by electric heat pumps connected via heat exchanger to an open-loop ground source (i.e., geothermal) heat pump loop. This system is designed to provide all anticipated heating and cooling needs for the project. This proposed system is based upon the confirmation of substantial water flows on site from a test well and design phase energy modeling of the building. The building enclosure performance will exceed VT CBES 2020 standards, with a particular focus on air tightness. Building and equipment performance values have been optimized through the energy modeling process.*

The roof is arranged and structured to support solar photovoltaic arrays and infrastructure will be put in place to support BSD's plan to arrange for installation of solar PV by a third-party on the building's roof through a power purchase agreement. The BHS/BTC project is registered as a LEED project and the intent is to obtain LEED Certification. We will continue to refine and optimize energy and materials performance throughout the design and construction process.

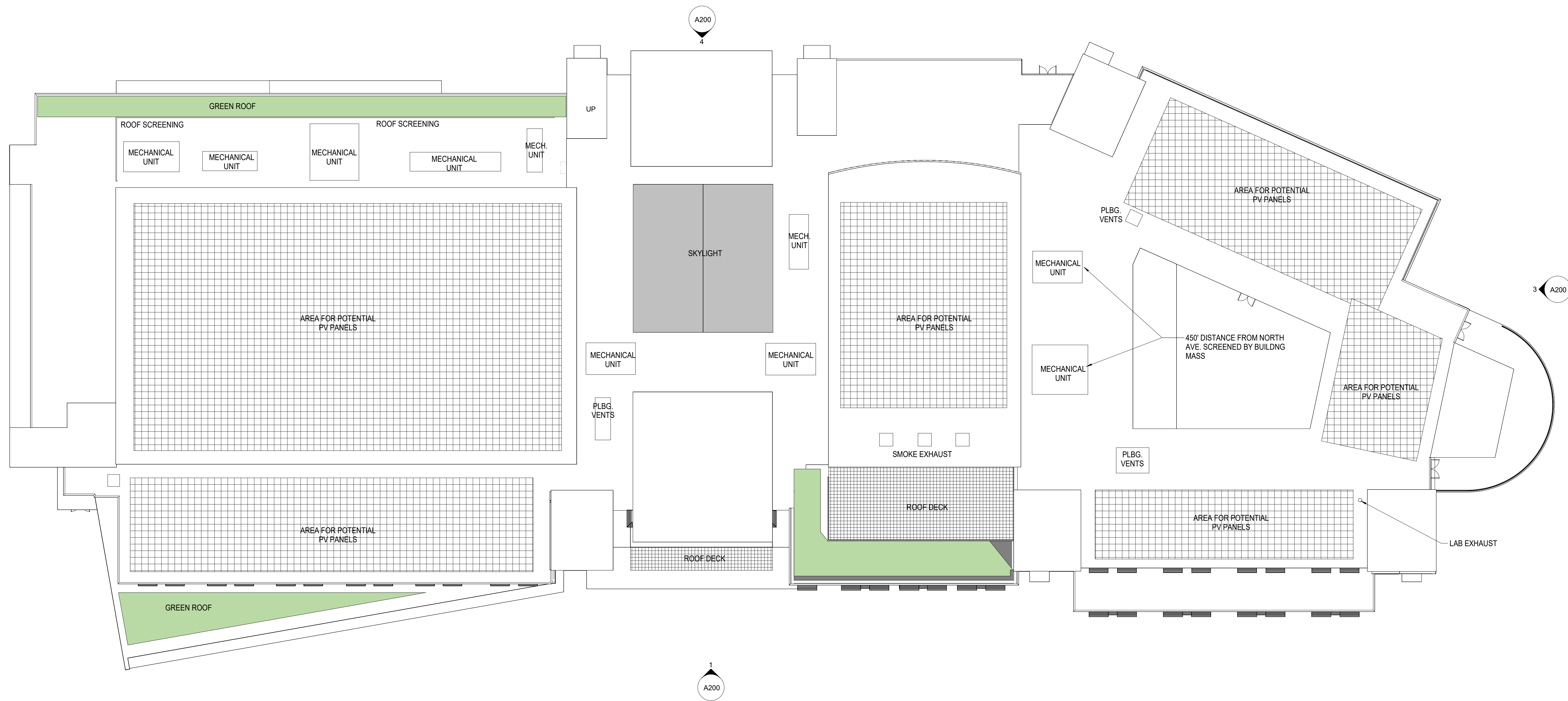
(g) Make advertising features complementary to the site:

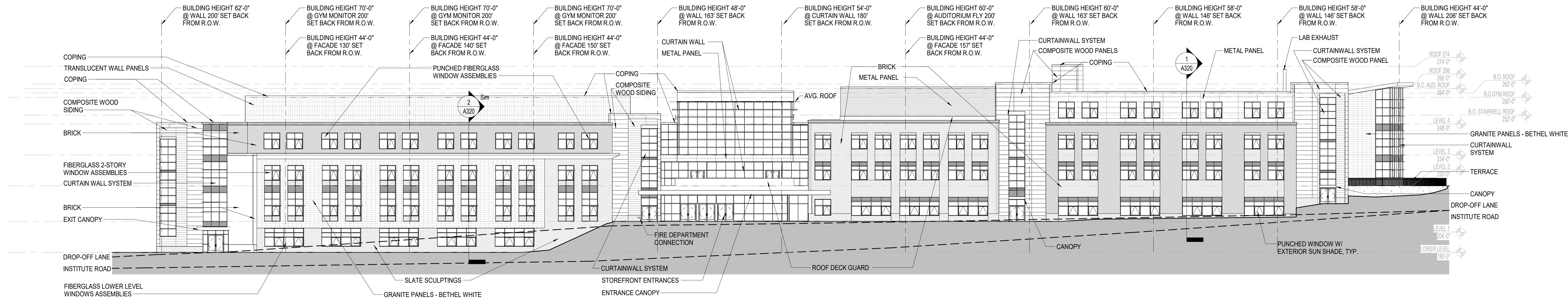
Any signage will require separate sign permitting.

(i) Make spaces secure and safe:

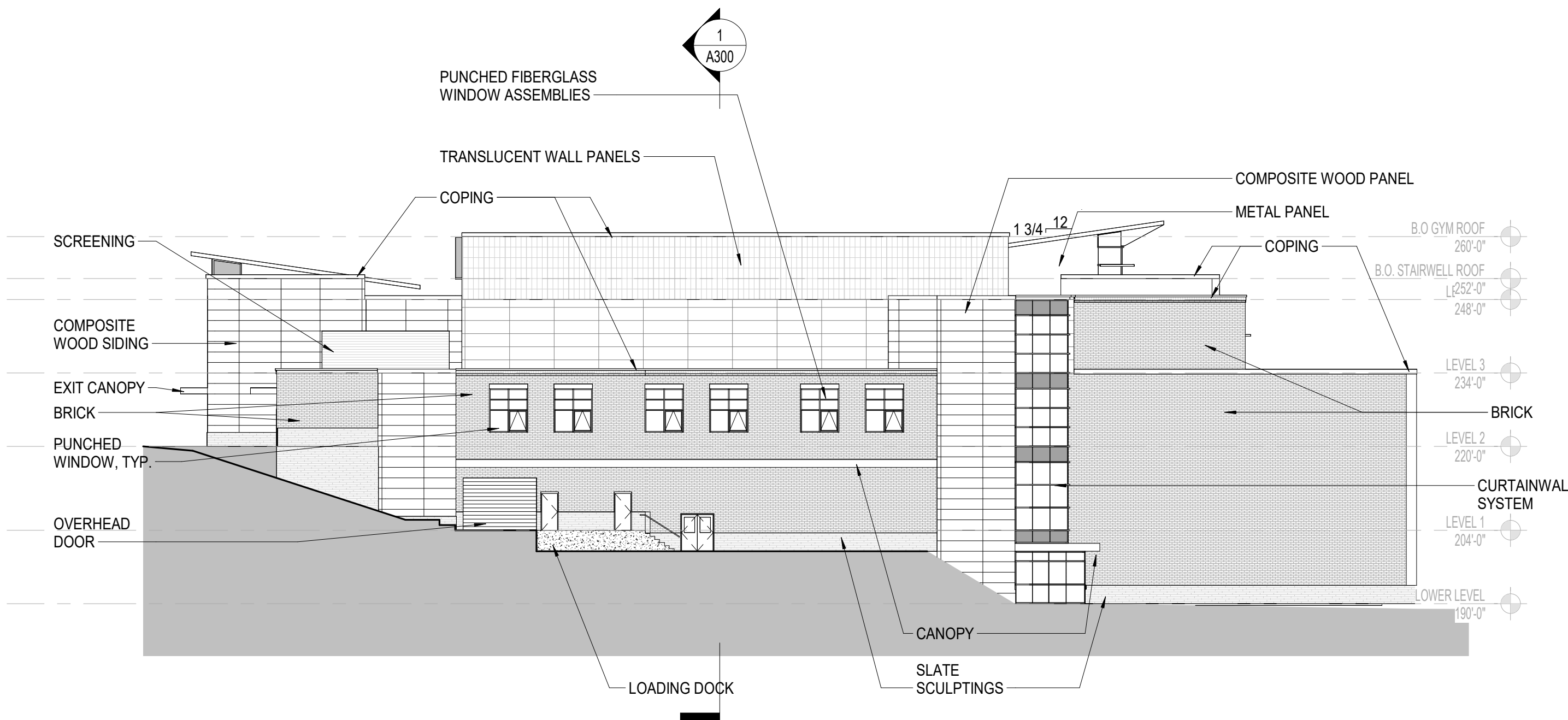
Improved staff and student safety is core to the project. The inclusion of automatic sprinkler system throughout the complex, an addressable fire alarm system, new lighting, ventilation, and improved traffic circulation and parking are all identified as safety improvements. Additionally, the site has been designed to optimize circulation for emergency vehicle access as well as first responder entrances with a stretcher-sized elevator; significantly advancing site safety.

The development is obligated to meet all applicable building and life safety code per the guidance of Burlington's building officials and fire marshal.

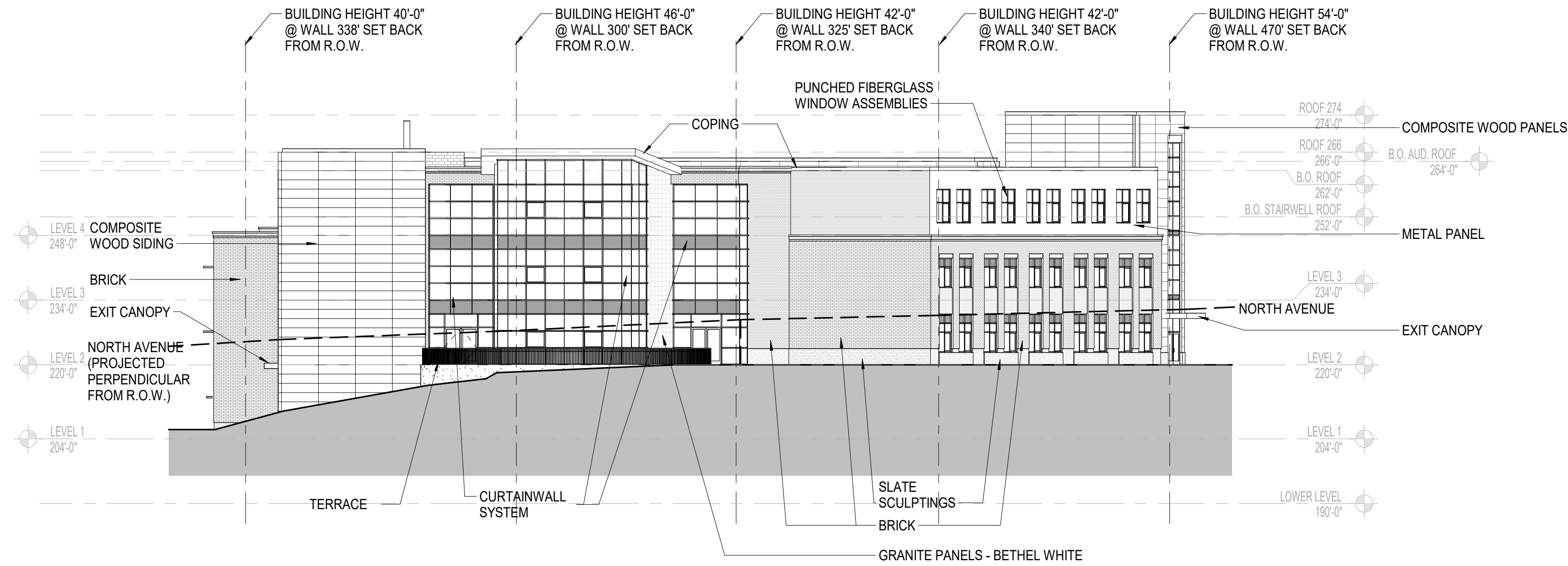




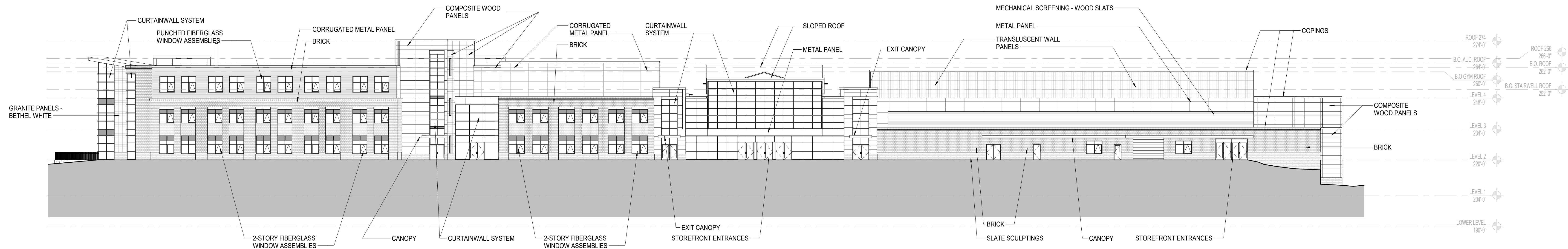
1 SOUTH ELEVATION OVERVIEW
SCALE: 1" = 20'-0"



2 WEST ELEVATION OVERVIEW
SCALE: 1" = 20'-0"



3 EAST ELEVATION OVERVIEW
SCALE: 1" = 20'-0"



4 NORTH ELEVATION OVERVIEW
SCALE: 1" = 20'-0"

BURLINGTON HIGH
SCHOOL &
BURLINGTON
TECHNICAL CENTER

BURLINGTON, VERMONT

FFF PROJECT NO:
Proj #2170
ORIGINATOR: 09/26/22 SCALE: 1" = 20'-0"
DRAWN BY: SC/NE/RC CHECKED BY: BDL
ISSUE LOG:
ZONING PERMIT

SHEET CONTENTS:
EXTERIOR
ELEVATIONS
OVERVIEW

SHEET NO:
A200
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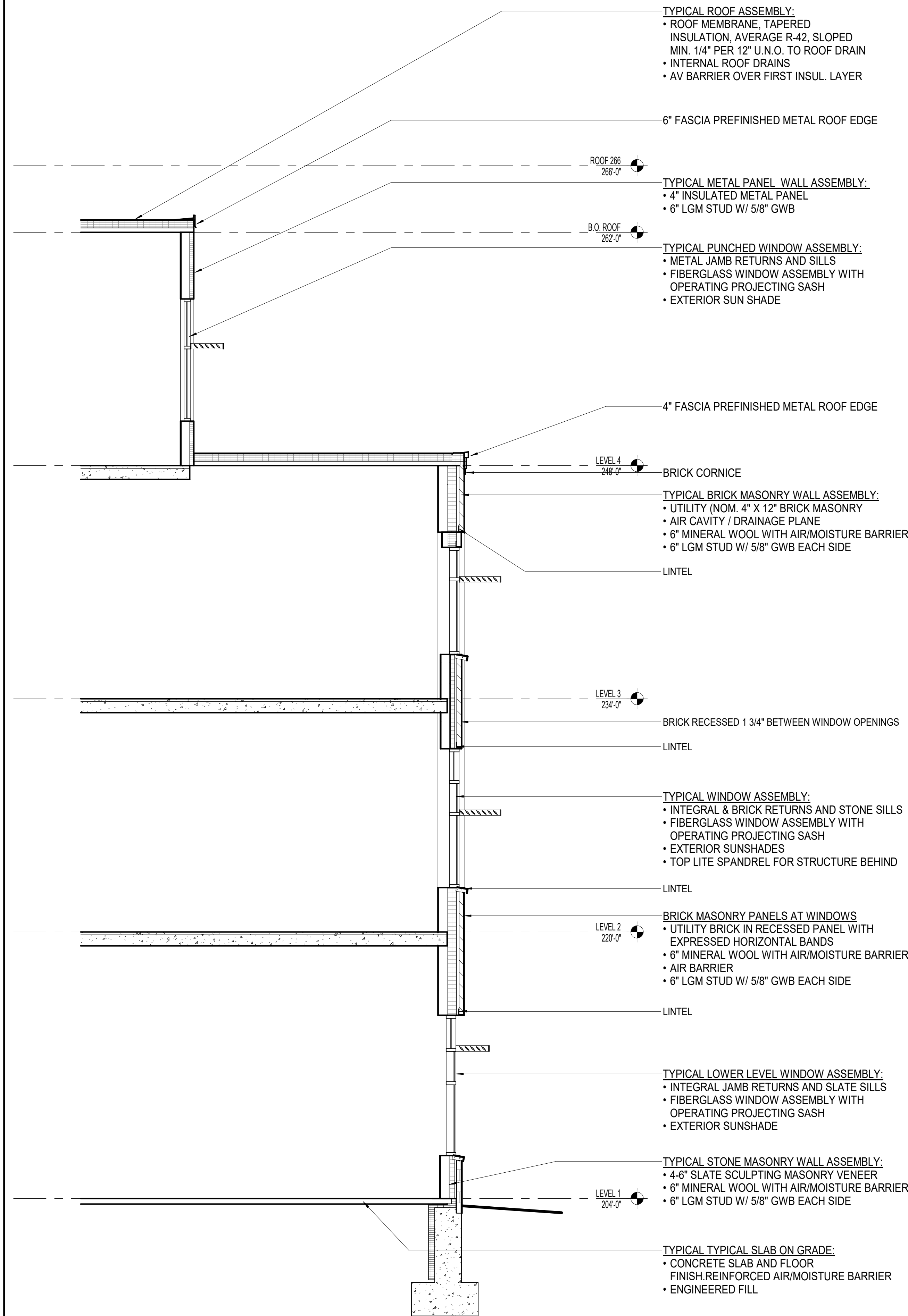
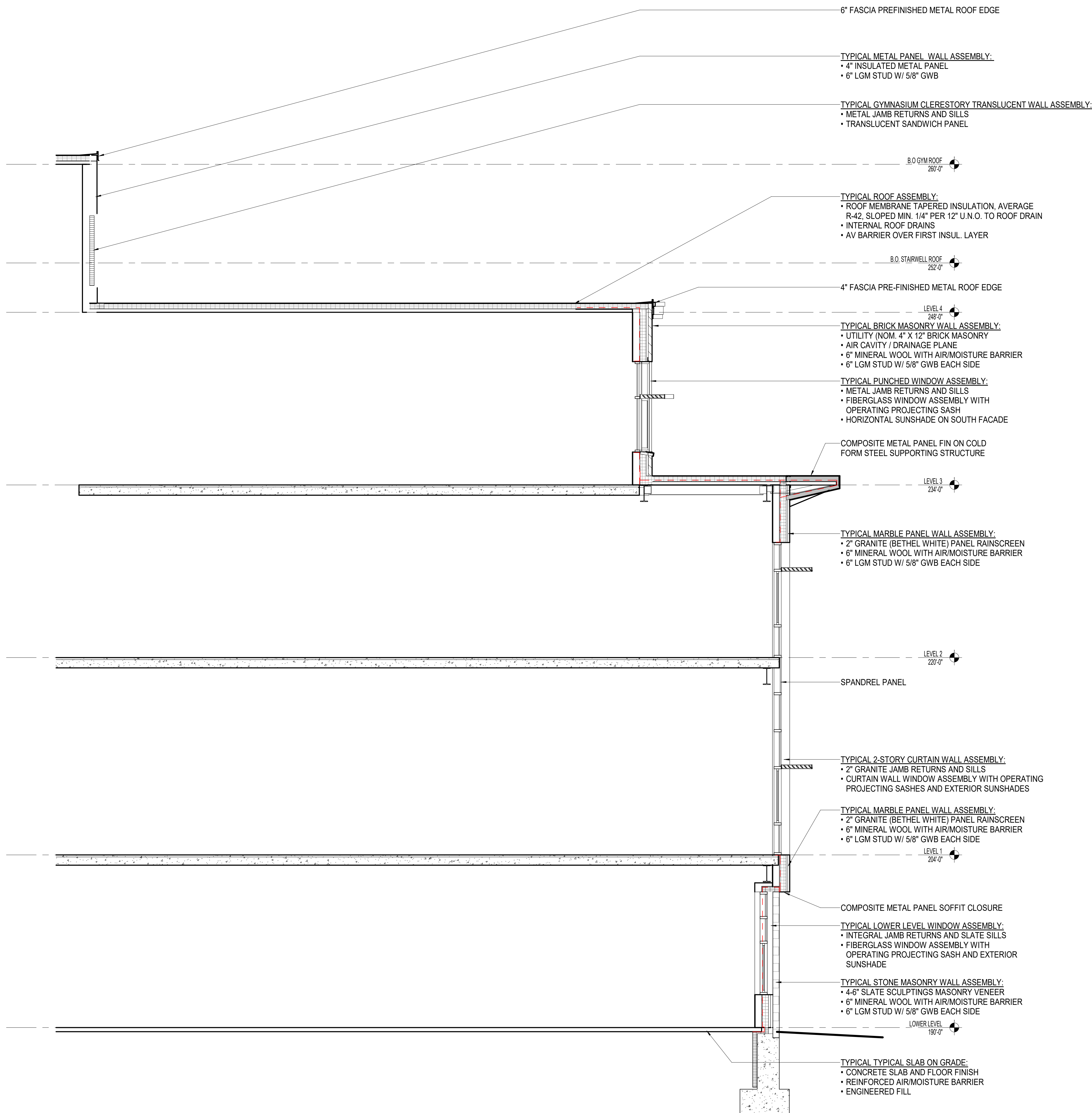
9/20/2022 2:22:07 PM

2
A320

WALL SECTION AT BTC WING
SCALE: 1/4" = 1'-0"

1
A320

WALL SECTION @ CLASSROOM WING
SCALE: 1/4" = 1'-0"



DESIGN
DEVELOPMENT
-
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DRA

Drumheller Design Associates, Inc.
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2000 Chicago Avenue, Suite 100
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802-864-4950

BURLINGTON HIGH
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BURLINGTON
TECHNICAL CENTER

BURLINGTON, VERMONT

FFF PROJECT NO:
Proj #2170

ORGANIZATION
DATE: 09/23/2022 SCALE: 1/4" = 1'-0"

DRAWN BY: SC CHECKED BY: BDL

ISSUE LOG:
ZONING PERMIT

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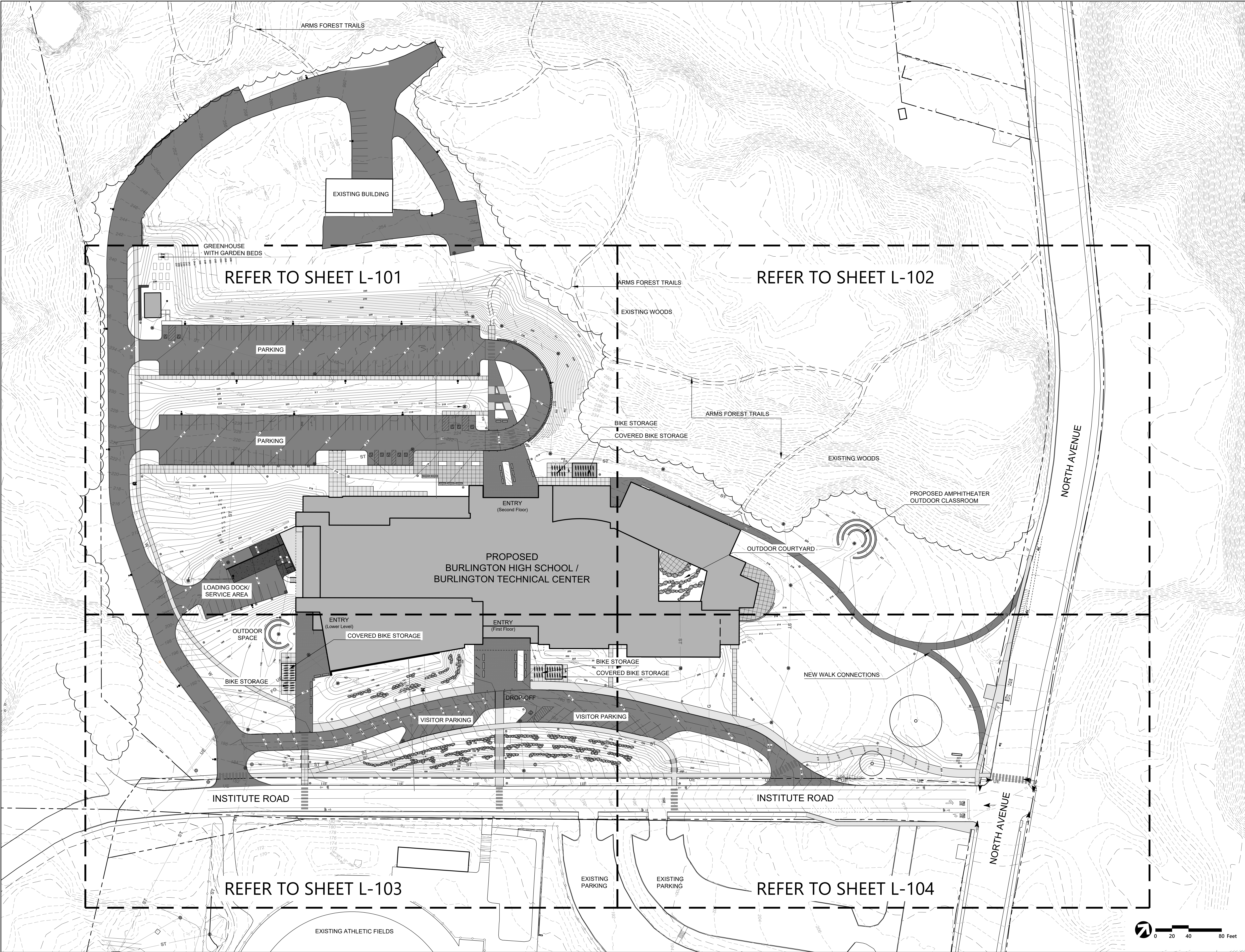
WALL SECTIONS -
TYPICAL

SHEET NO:

A320

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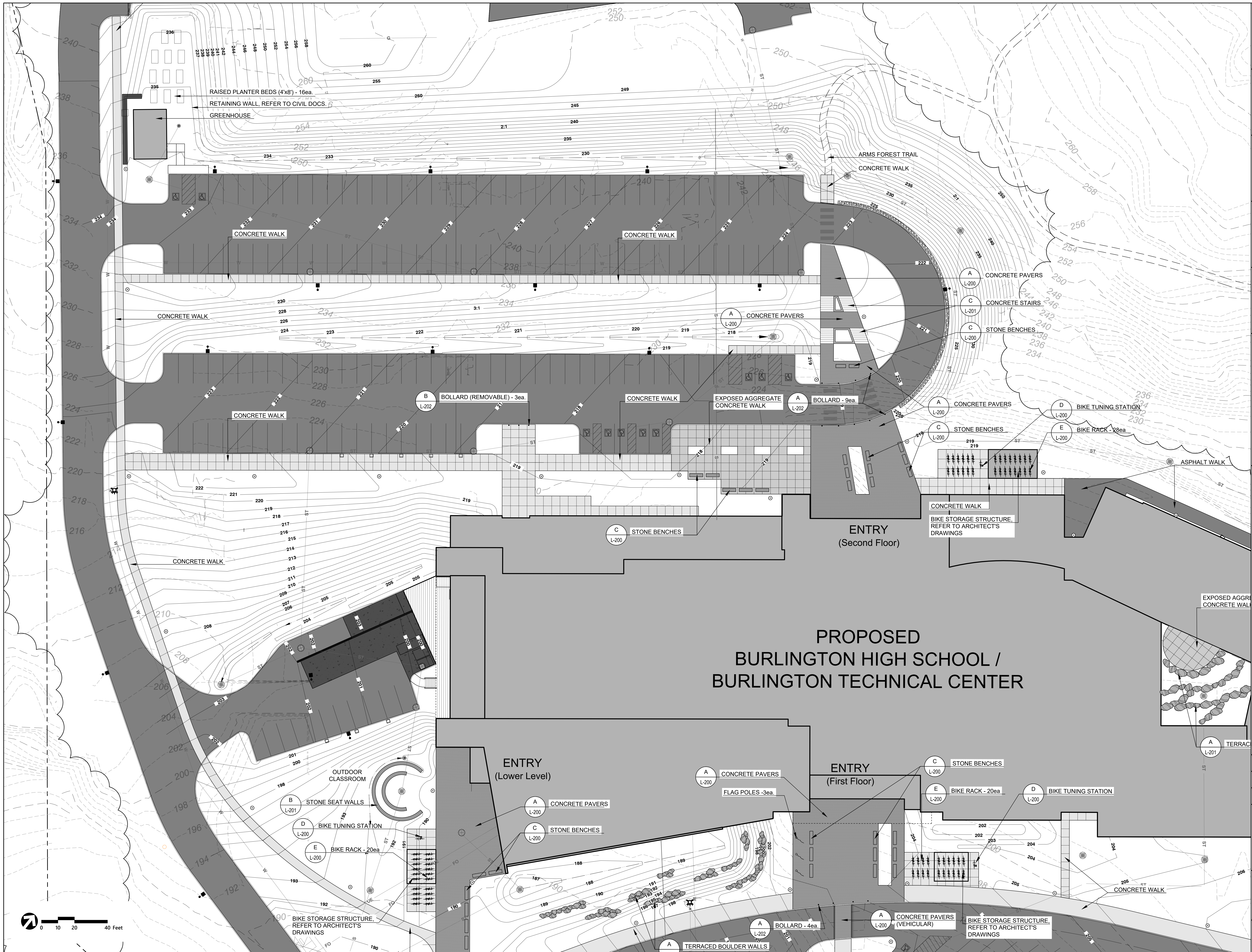
**BURLINGTON
HIGH SCHOOL
&
BURLINGTON
TECHNICAL
CENTER**

BURLINGTON, VT

11% PROJECT NO: **2170**
ORIGINATION DATE: **07/01/2022** SCALE: **1"=40'**
DRAWN BY: **JRD/MKW** CHECKED BY: **MKW**
ISSUE LOG:
Zoning Permit 08/30/22

SHEET CONTAINS:
**OVERALL
LANDSCAPE
LAYOUT PLAN**

SHEET NO:
L-100



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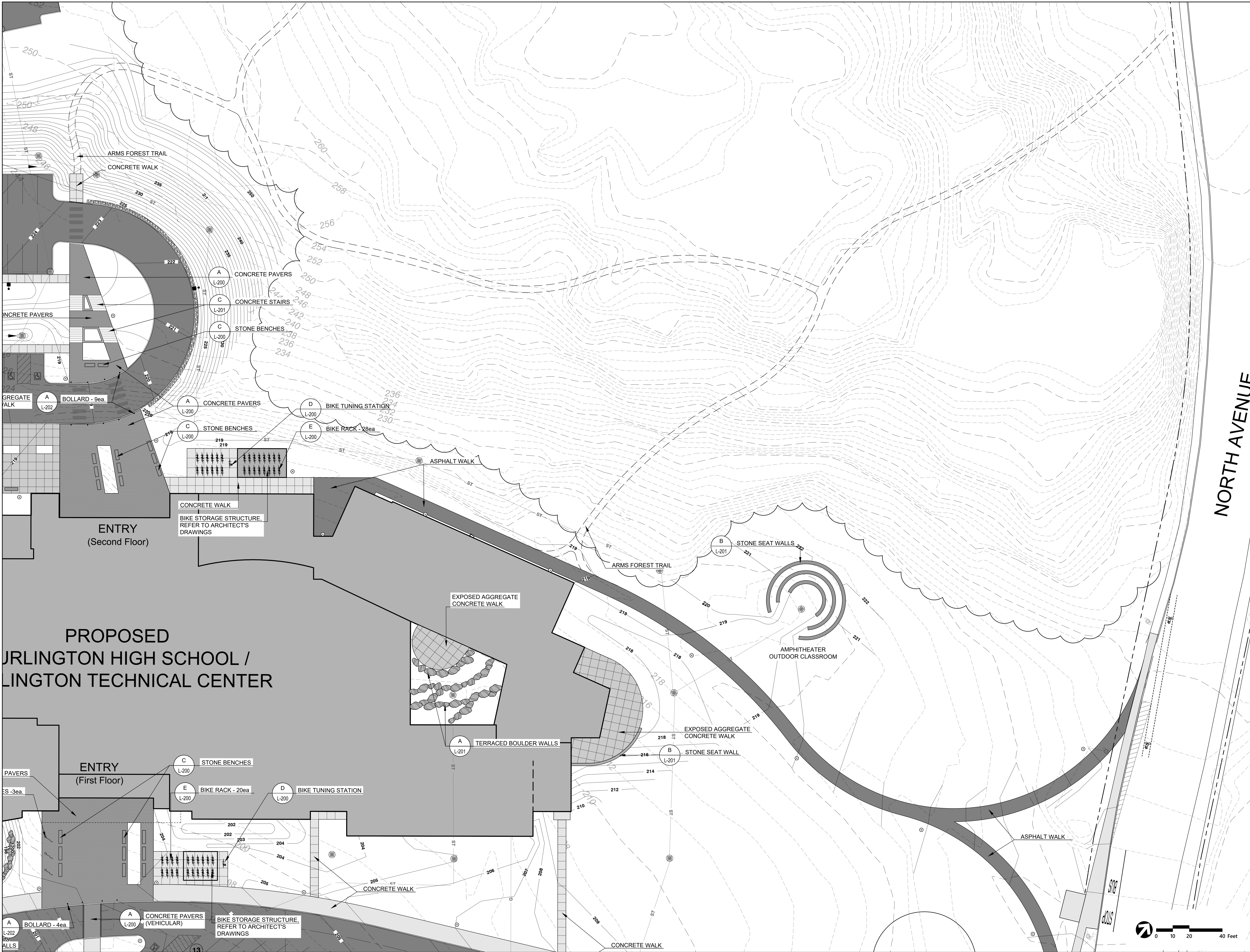
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CENTER

BURLINGTON, VT

111 PROJECT NO: 2170
ORIGINATION DATE: 07/01/2022 SCALE: 1"=20'
DRAWN BY: JRD/MKW CHECKED BY: MKW
ISSUE LOG:
Zoning Permit 09/30/22

SHEET CONTAINS:
LANDSCAPE
LAYOUT PLAN

SHEET NO:
L-101



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BURLINGTON, VT

PROJECT NO: 2170

ORIGINATION DATE: 07/01/2022

DRAWN BY: JRD/MKW

ISSUE LOG:
Zoning Permit

SCALE: 1"=20'

CHECKED BY: MKW

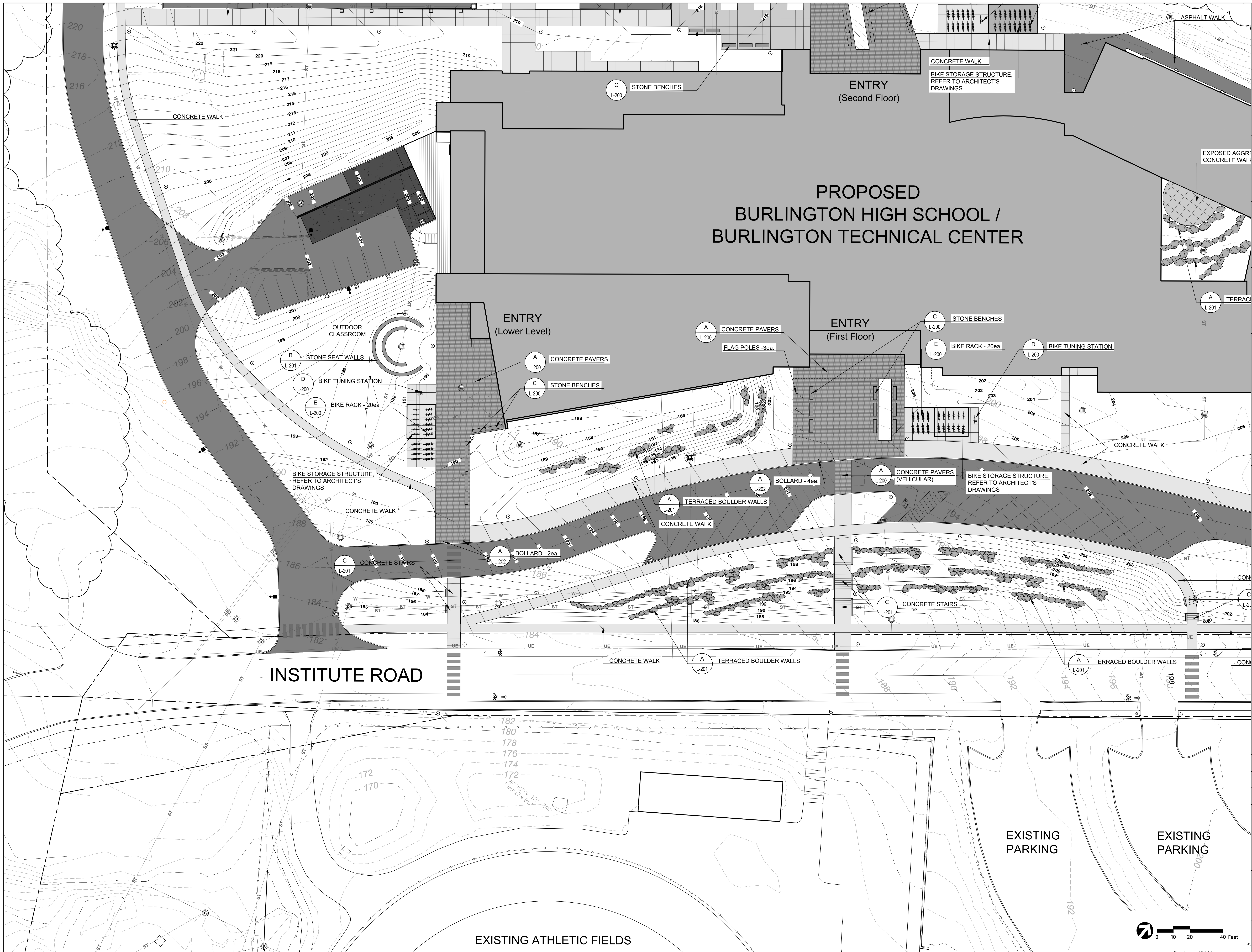
09/30/22

SHEET CONTENTS:

LANDSCAPE
LAYOUT PLAN

SHEET NO: L-102

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BURLINGTON HIGH SCHOOL & BURLINGTON TECHNICAL CENTER

BURLINGTON, VT

111 PROJECT NO: **2170**

ORIGINATION DATE: **07/01/2022** SCALE: **1"=20'**

DRAWN BY: **JRD/MKW** CHECKED BY: **MKW**

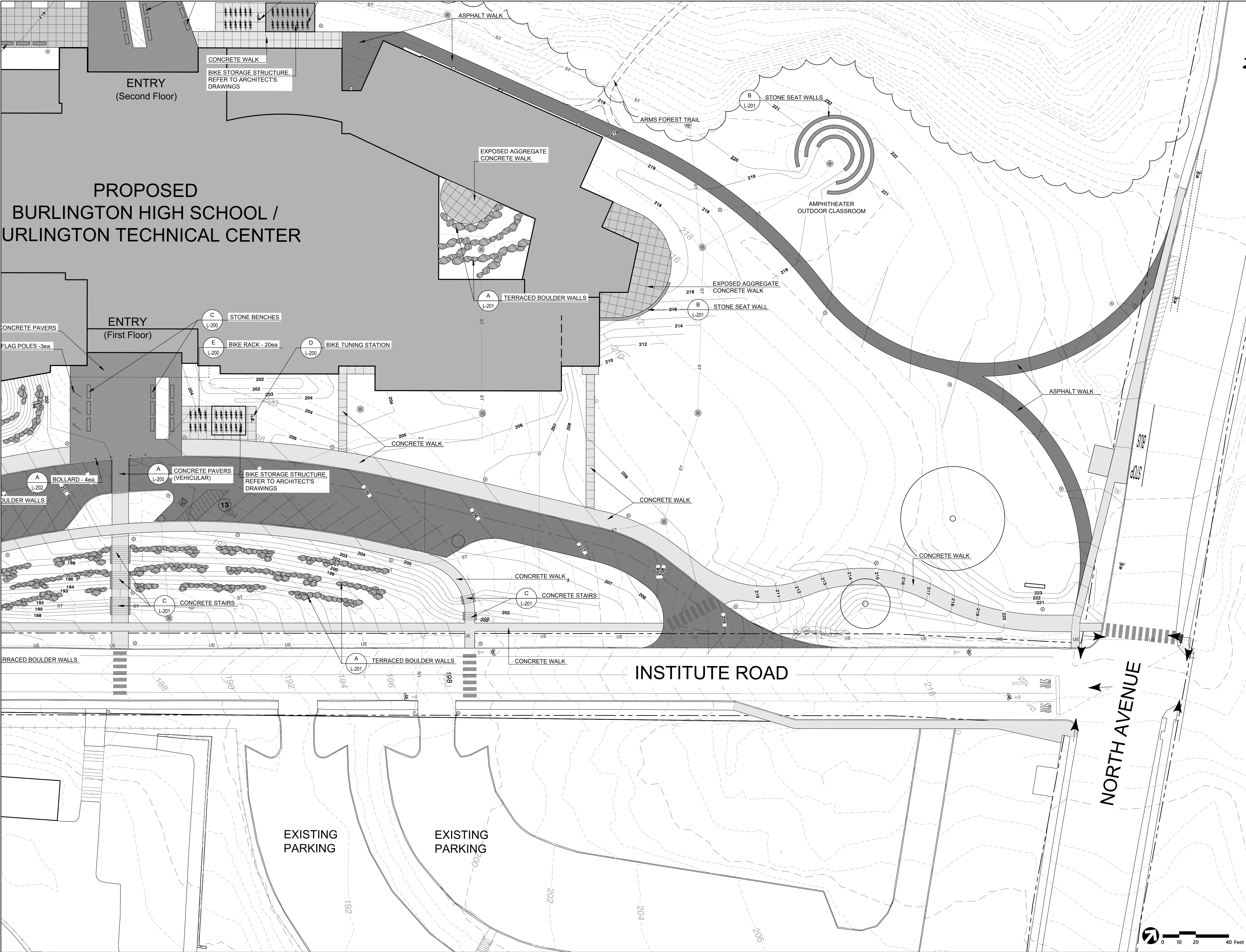
ISSUE LOG:
Zoning Permit 09/30/22

SHEET CONTAINS:

LANDSCAPE LAYOUT PLAN

SHEET NO: **L-103**

0 10 20 40 Feet



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PROJECT NO: 2170

ORIGINATION DATE: 07/01/2022

DRAWN BY: JRD/MKW

ISSUE LOG:
Zoning Permit

SCALE: 1"=20'

CHECKED BY: MKW

09/30/22

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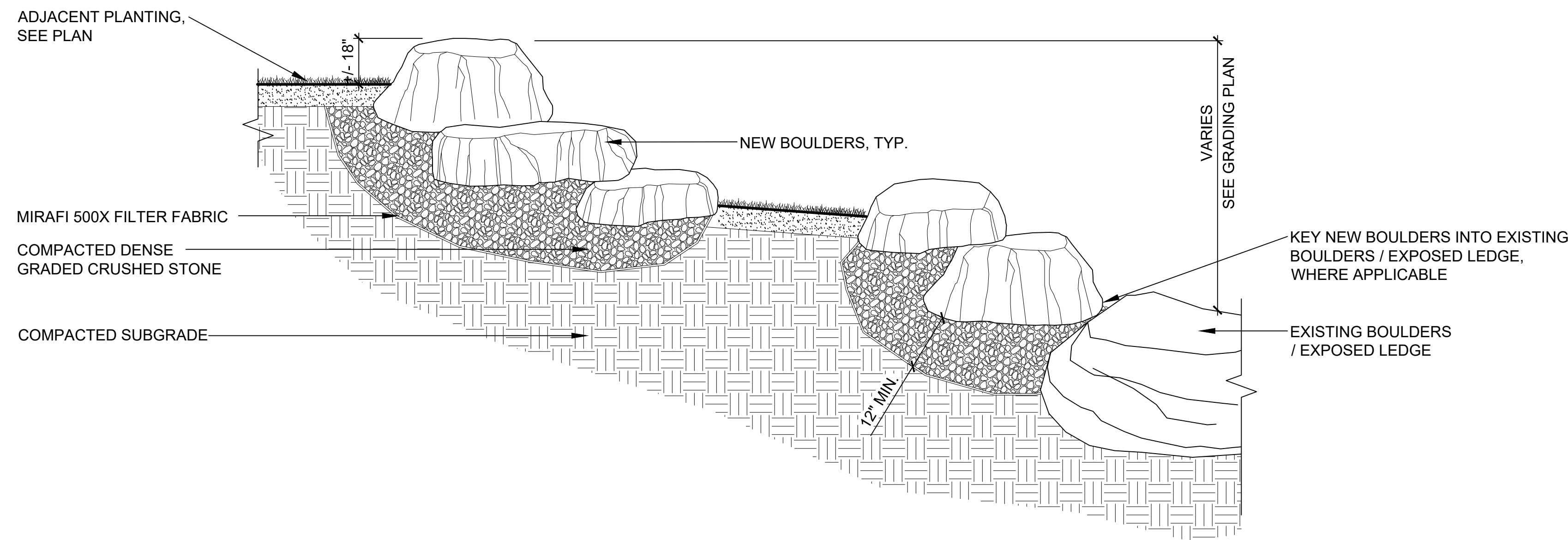
LANDSCAPE LAYOUT PLAN

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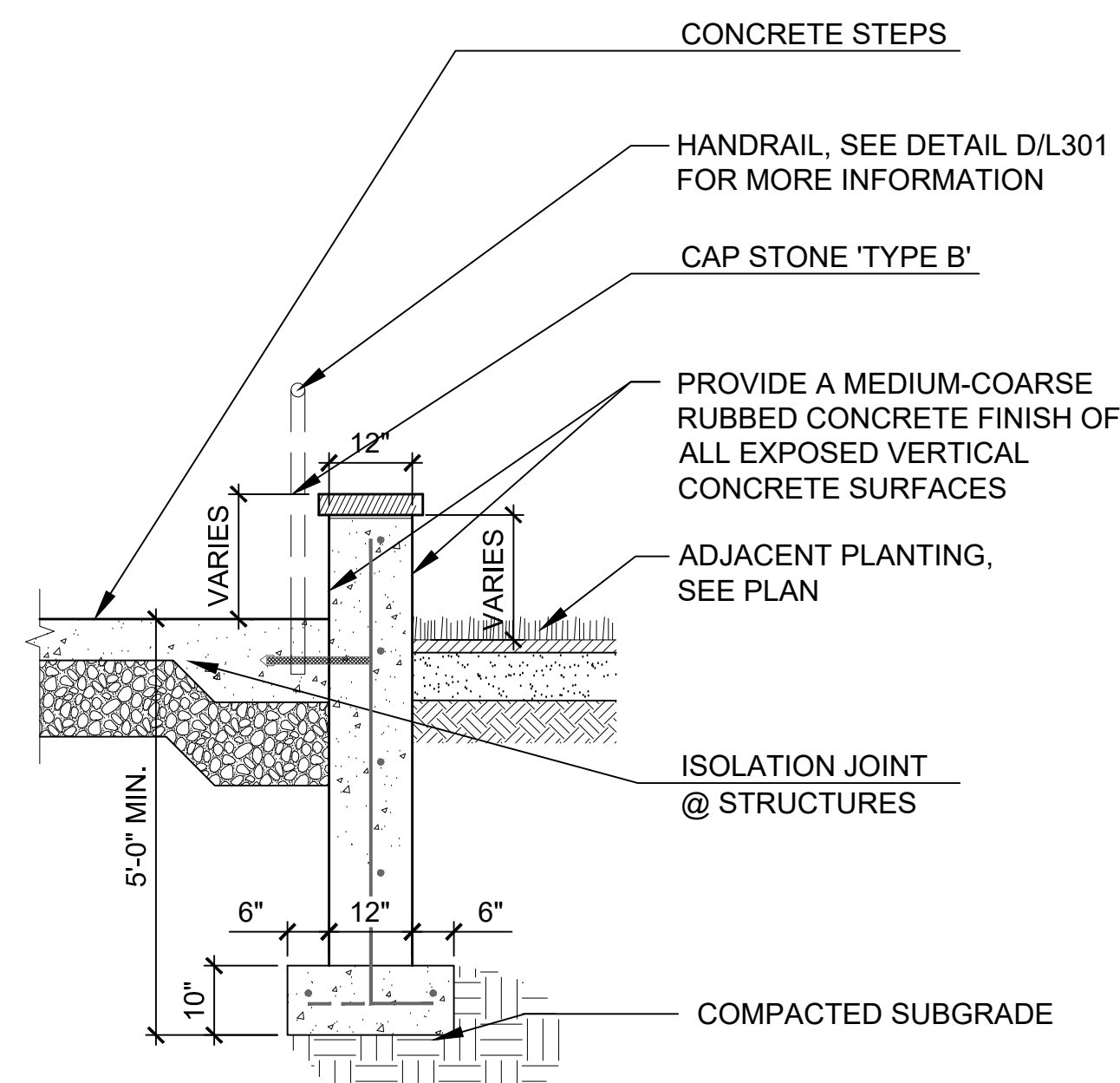
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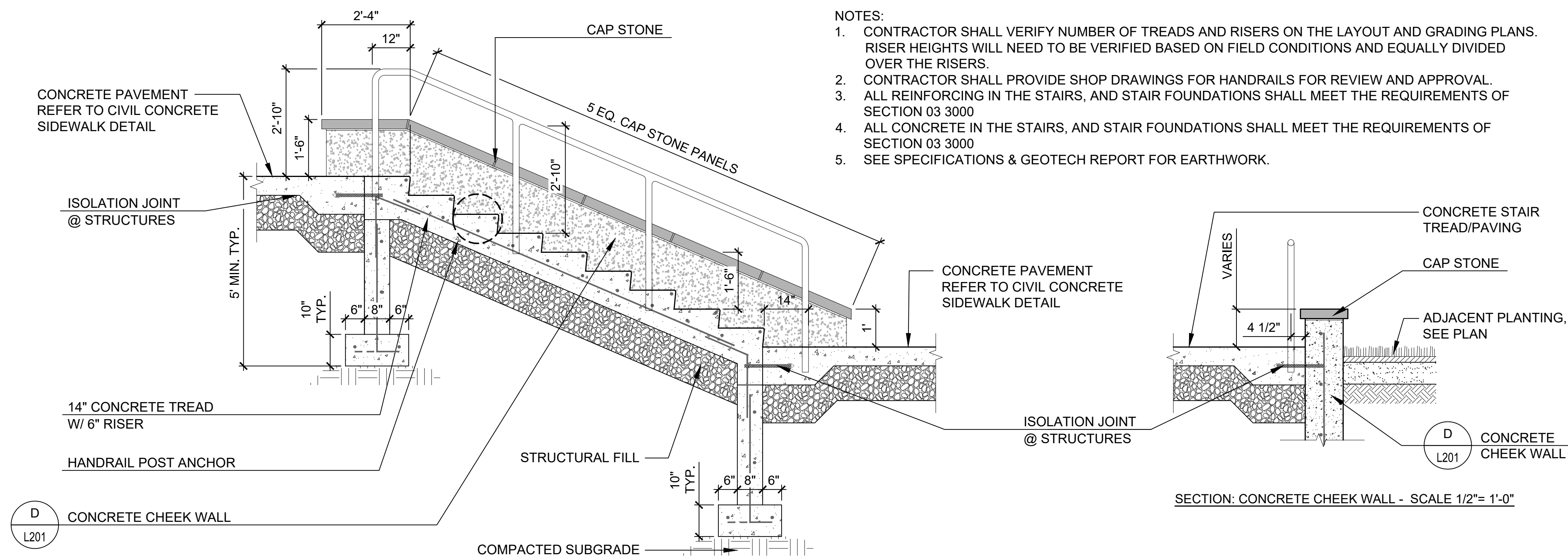
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A TERRACED BOULDER WALL
SCALE 1/2" = 1'-0"



D SECTION: CONCRETE CHEEK WALL
SCALE: 1/2" = 1'-0"



C SECTION: CONCRETE STEPS
SCALE: 1/2" = 1'-0"

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BURLINGTON, VT

111 PROJECT NO: 2170

ORIGINATION DATE: 07/01/2022 SCALE: AS NOTED

DRAWN BY: JRD/MKW CHECKED BY: MKW

ISSUE LOG: Zoning Permit 08/30/22

D L201 CONCRETE CHEEK WALL

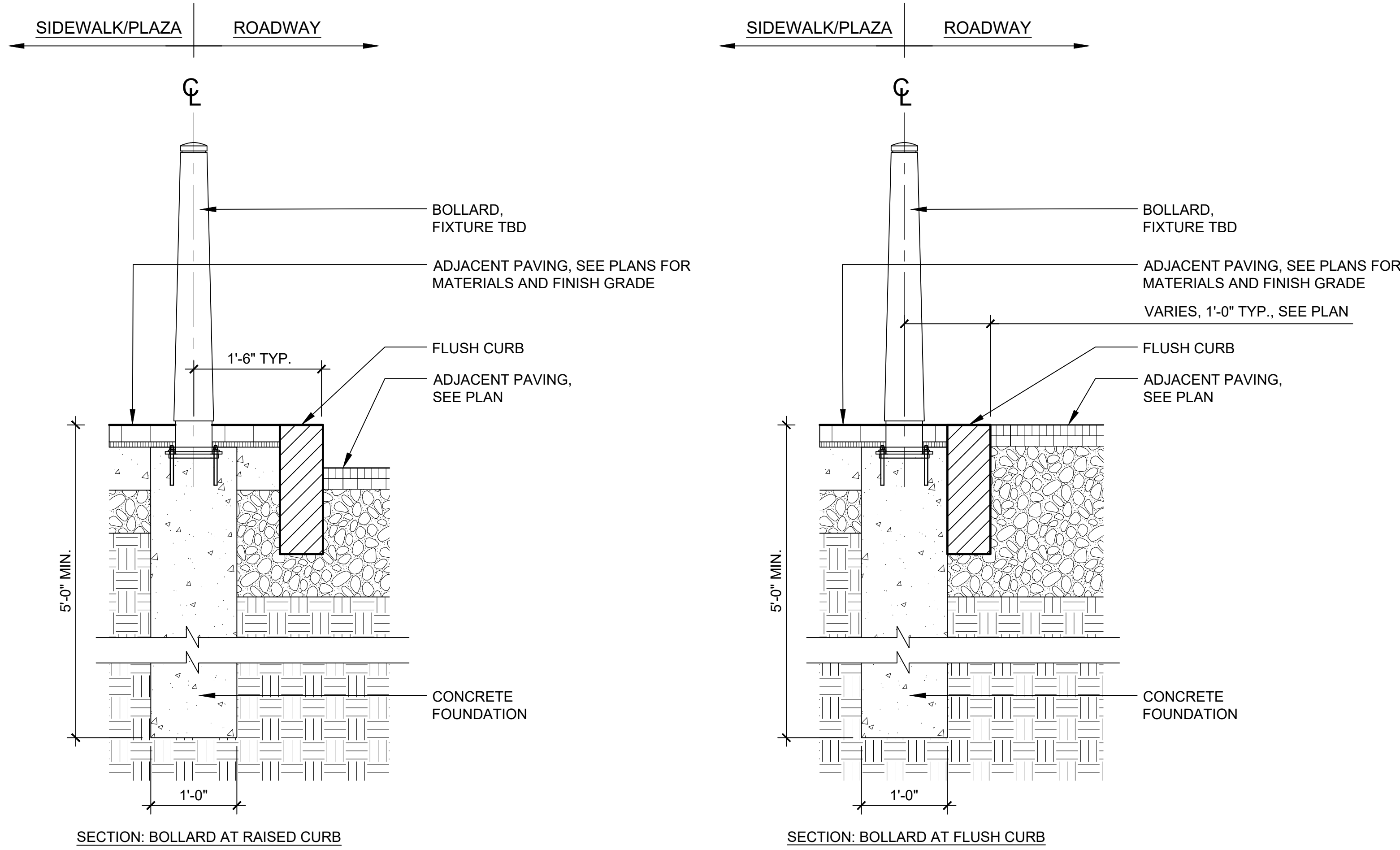
SHEET CONTENTS:

LANDSCAPE
DETAILS

SHEET NO:

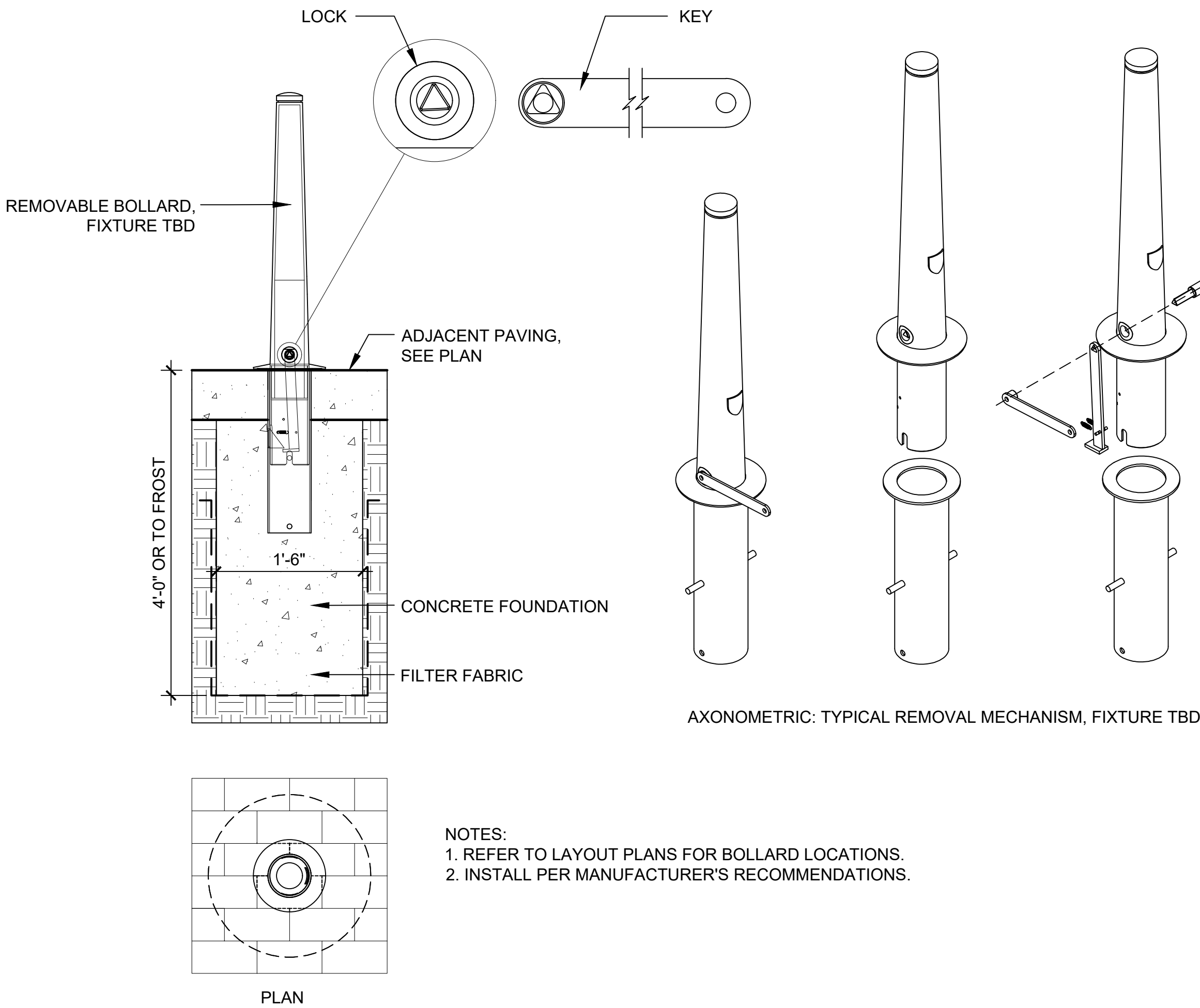
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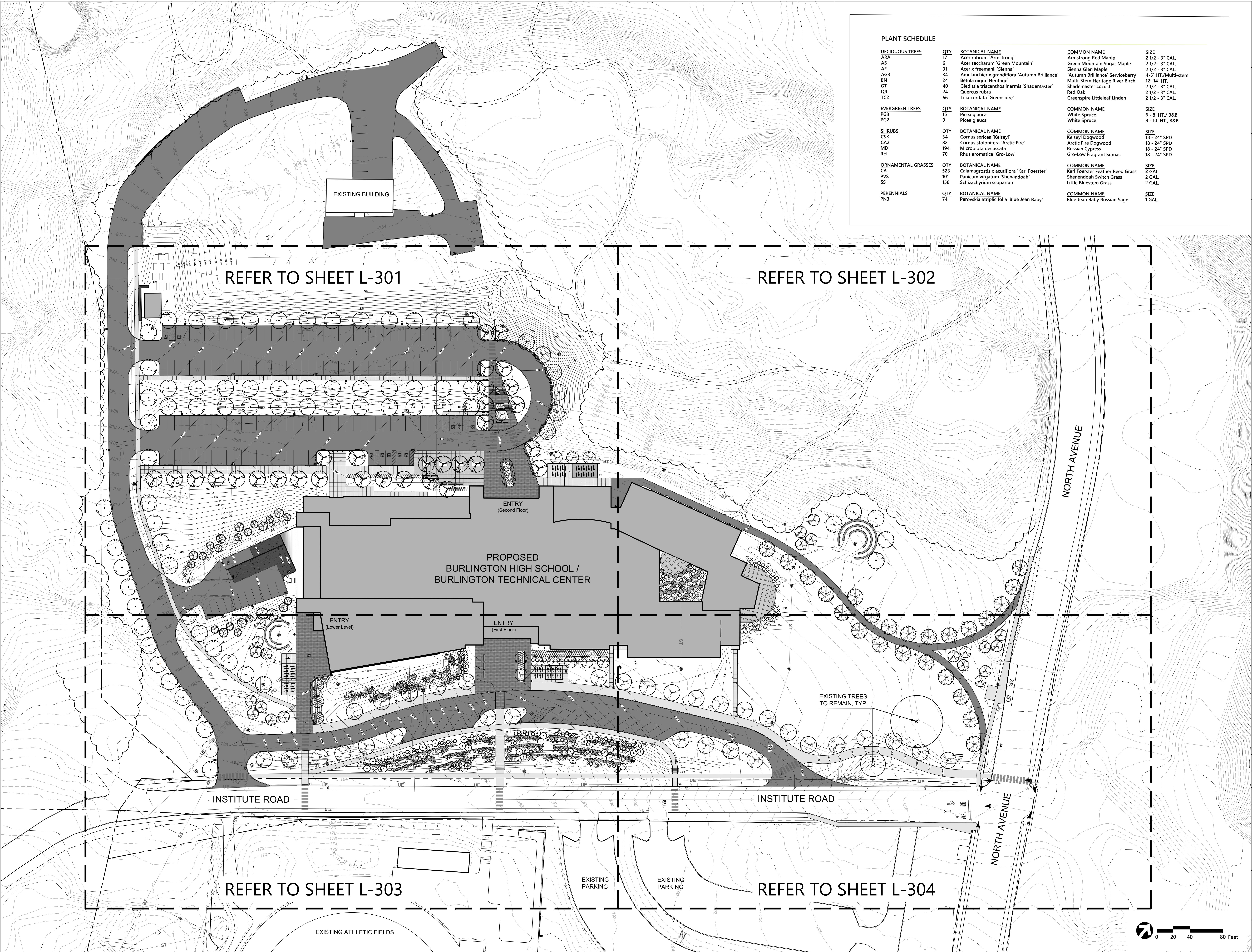


NOTES:
1. REFER TO LAYOUT PLANS FOR BOLLARD LOCATIONS.
2. INSTALL PER MANUFACTURER'S RECOMMENDATIONS.

A BOLLARD - FIXED
SCALE N.T.S.



B BOLLARD - REMOVABLE
SCALE N.T.S.



PLANT SCHEDULE			
DECIDUOUS TREES			
ARA	QTY 17	BOTANICAL NAME	COMMON NAME
AS	6	Acer rubrum 'Armstrong'	Armstrong Red Maple
AF	31	Acer saccharum 'Green Mountain'	Green Mountain Sugar Maple
AG3	34	Acer x freemanii 'Sienna'	Sienna Glen Maple
BN	24	Amelanchier x grandiflora 'Autumn Brilliance'	'Autumn Brilliance' Serviceberry
GT	40	Betula nigra 'Heritage'	Multi-Stem Heritage River Birch
QR	24	Gleditsia triacanthos 'inermis' 'Shademaster'	Shademaster Locust
TC2	66	Quercus rubra	Red Oak
		Tilia cordata 'Greenspire'	Greenspire Littleleaf Linden
EVERGREEN TREES			
PG3	QTY 15	BOTANICAL NAME	COMMON NAME
PG2	9	Picea glauca	White Spruce
		Picea glauca	White Spruce
SHRUBS			
CSK	QTY 34	BOTANICAL NAME	COMMON NAME
CA2	82	Cornus sericea 'Kelsey'	Kelsey Dogwood
MD	194	Cornus stolonifera 'Arctic Fire'	Arctic Fire Dogwood
RH	70	Microbiota decussata	Russian Cypress
		Rhus aromatica 'Gro-Low'	Gro-Low Fragrant Sumac
ORNAMENTAL GRASSES			
CA	QTY 523	BOTANICAL NAME	COMMON NAME
PVS	101	Calamagrostis x acutiflora 'Karl Foerster'	Karl Foerster Feather Reed Grass
SS	158	Panicum virgatum 'Shenandoah'	Shenandoah Switch Grass
		Schizachyrium scoparium	Little Bluestem Grass
PERENNIALS			
PN3	QTY 74	BOTANICAL NAME	COMMON NAME
		Perovskia atriplicifolia 'Blue Jean Baby'	Blue Jean Baby Russian Sage

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BURLINGTON HIGH SCHOOL & BURLINGTON TECHNICAL CENTER

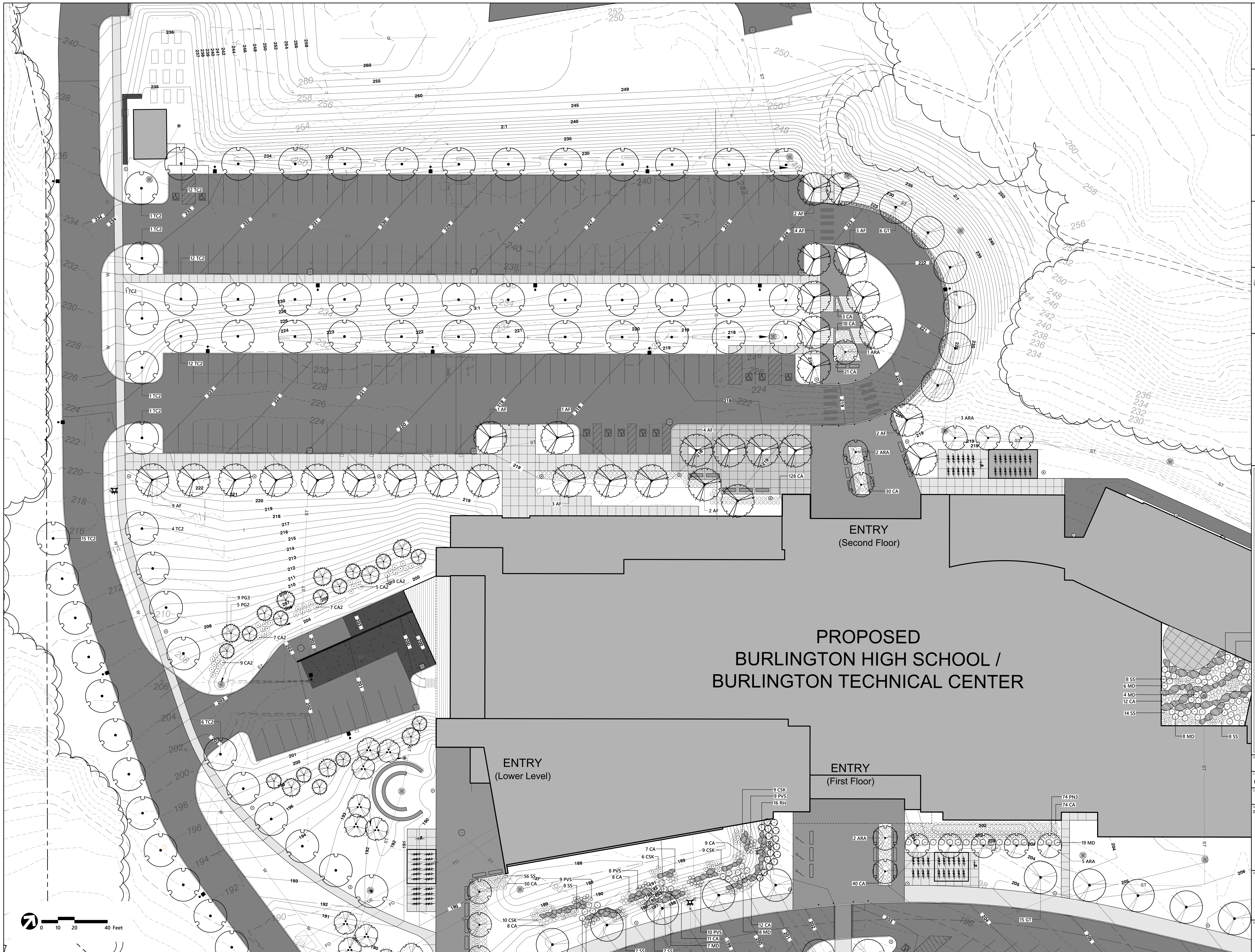
BURLINGTON, VT

111 PROJECT NO: 2170
ORIGINATION DATE: 07/01/2022
SCALE: 1"=40'
DRAWN BY: JRD/MKW
CHECKED BY: MKW
ISSUE LOG:
Zoning Permit 08/30/22

SHEET CONTAINS:
OVERALL PLANTING PLAN

SHEET NO:
L-300

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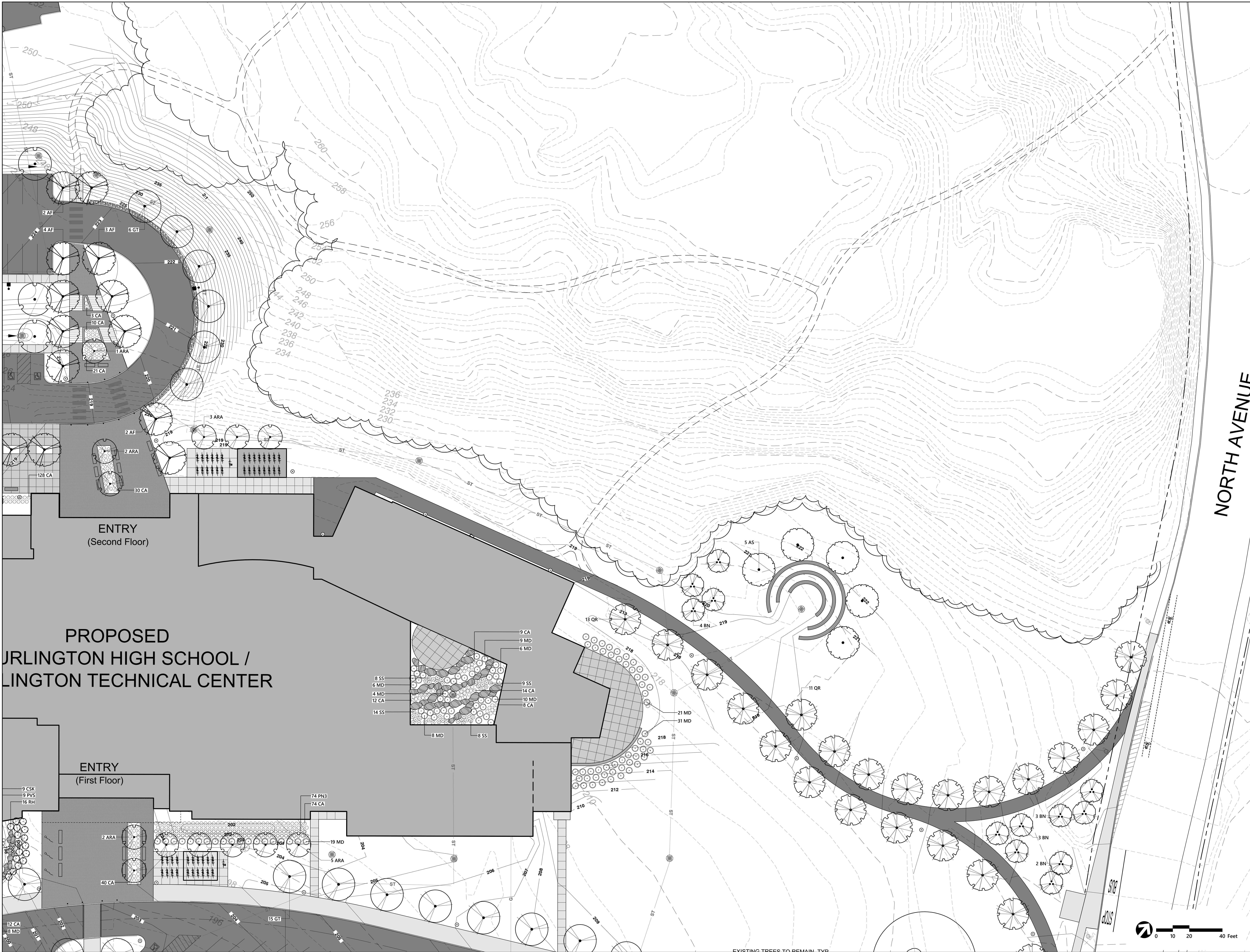
BURLINGTON HIGH SCHOOL & BURLINGTON TECHNICAL CENTER

BURLINGTON, VT

111 PROJECT NO: 2170
ORIGINATION DATE: 07/01/2022
SCALE: 1"=20'
DRAWN BY: JRD/MKW
CHECKED BY: MKW
ISSUE LOG:
Zoning Permit 08/30/22

SHEET CONTENTS:
PLANTING PLAN

SHEET NO: L-301
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Suite 200
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BURLINGTON HIGH SCHOOL & BURLINGTON TECHNICAL CENTER

BURLINGTON, VT

111 PROJECT NO: 2170

ORIGINATION DATE: 07/01/2022 SCALE: 1"=20'

DRAWN BY: JRD/MKW CHECKED BY: MKW

ISSUE LOG:
Zoning Permit 08/30/22

SHEET CONTENTS:

PLANTING PLAN

SHEET NO: L-302

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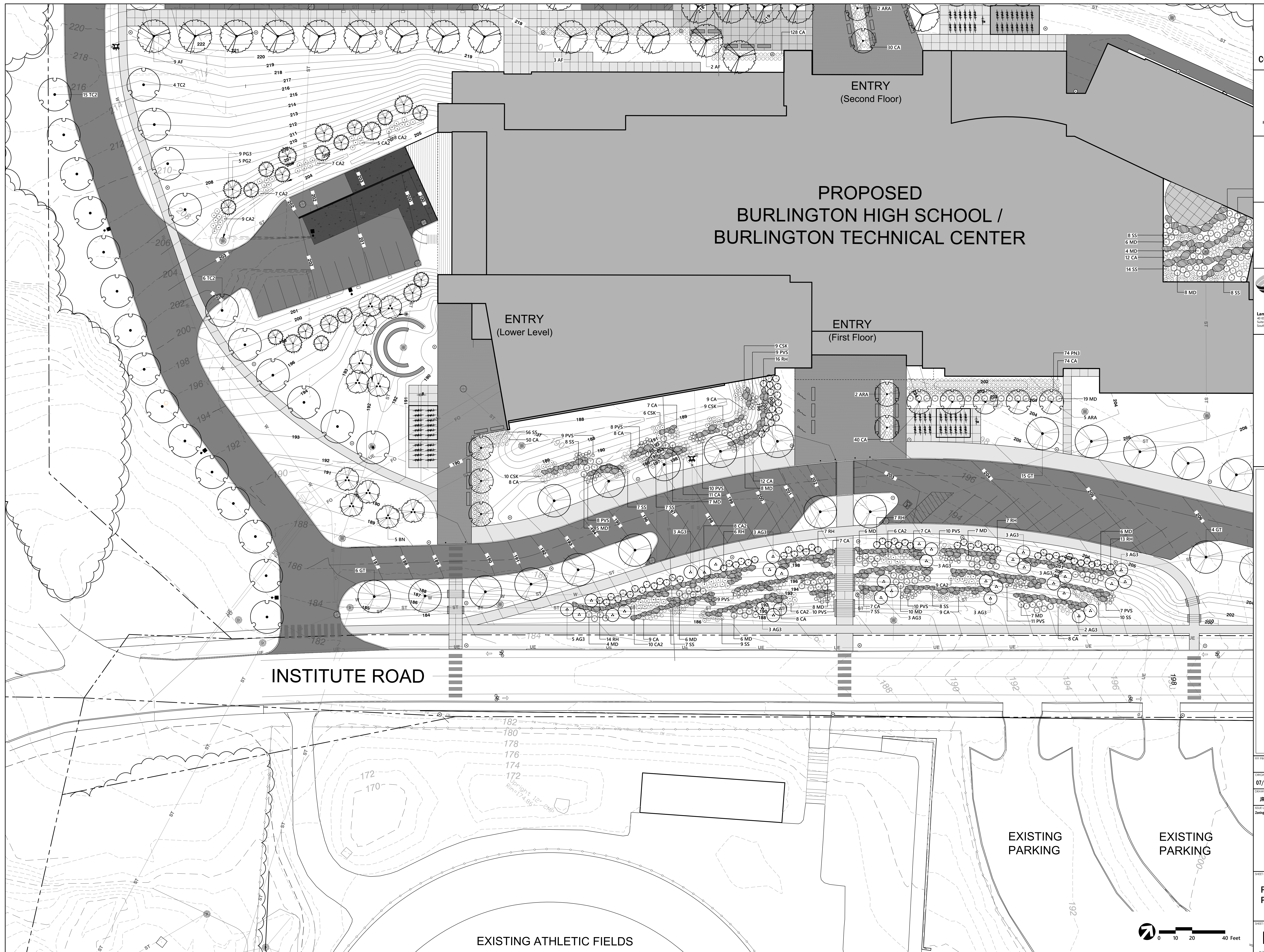
**BURLINGTON
HIGH SCHOOL
&
BURLINGTON
TECHNICAL
CENTER**

BURLINGTON, VT

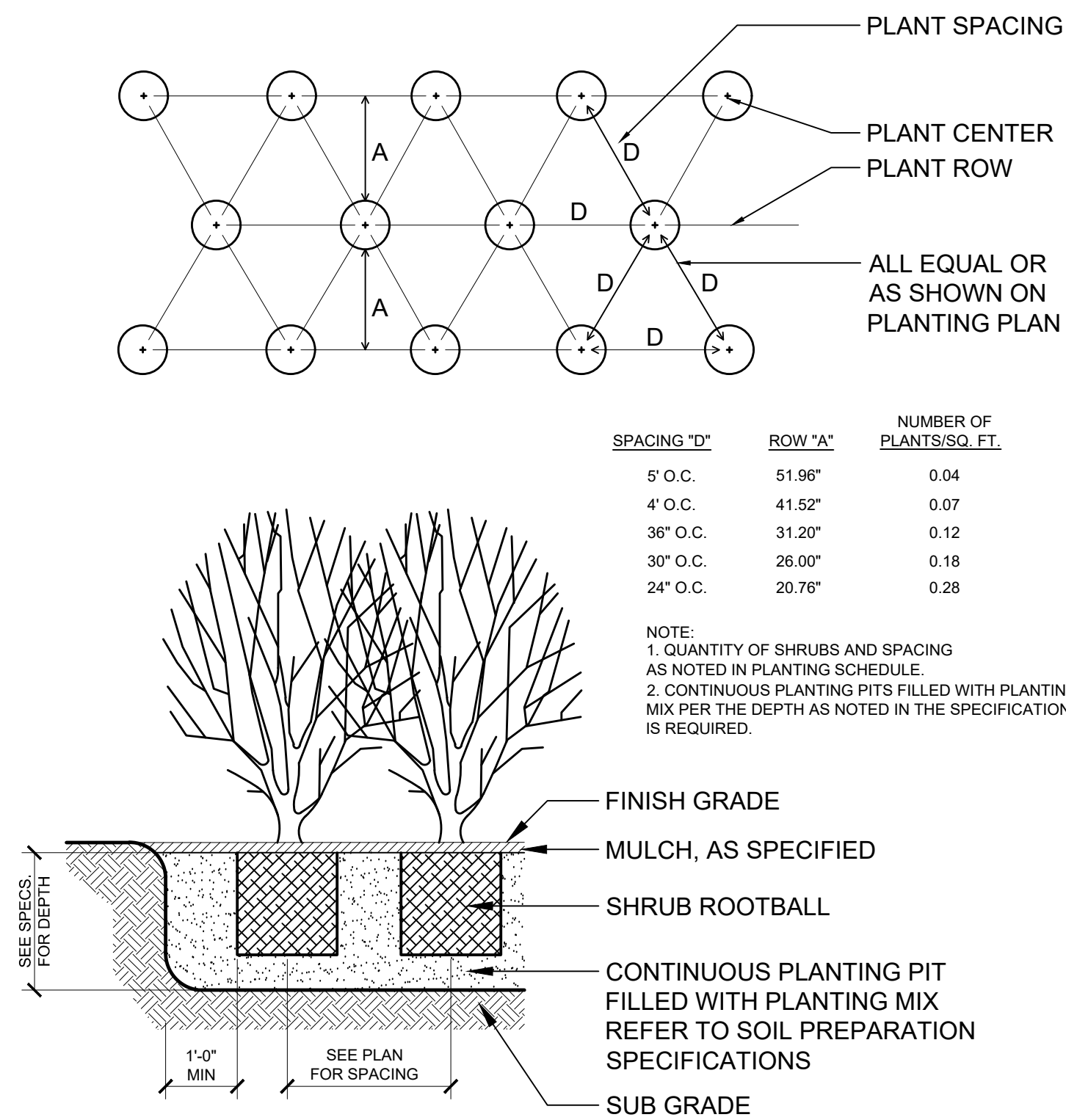
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ISSUANCE DATE: 01/2022	SCALE: 1"=20'
DRAWN BY: ED/MKW	CHECKED BY: MKW
DATE: 09/30/2021	

PLANTING PLAN

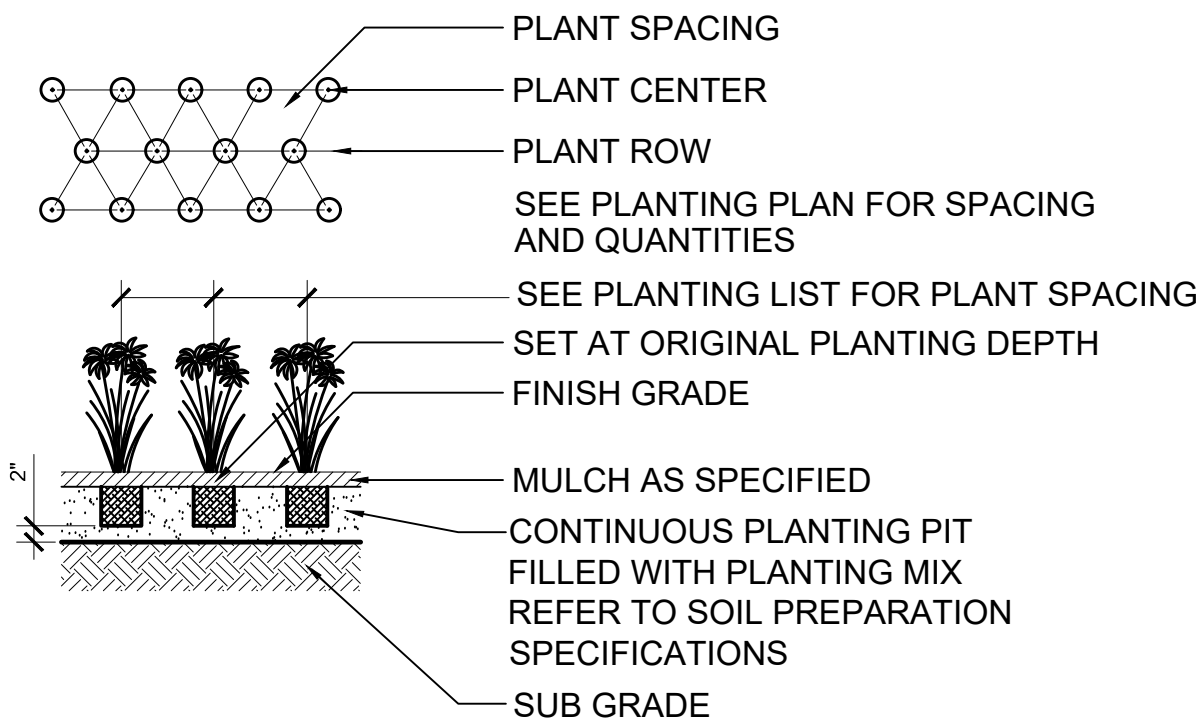
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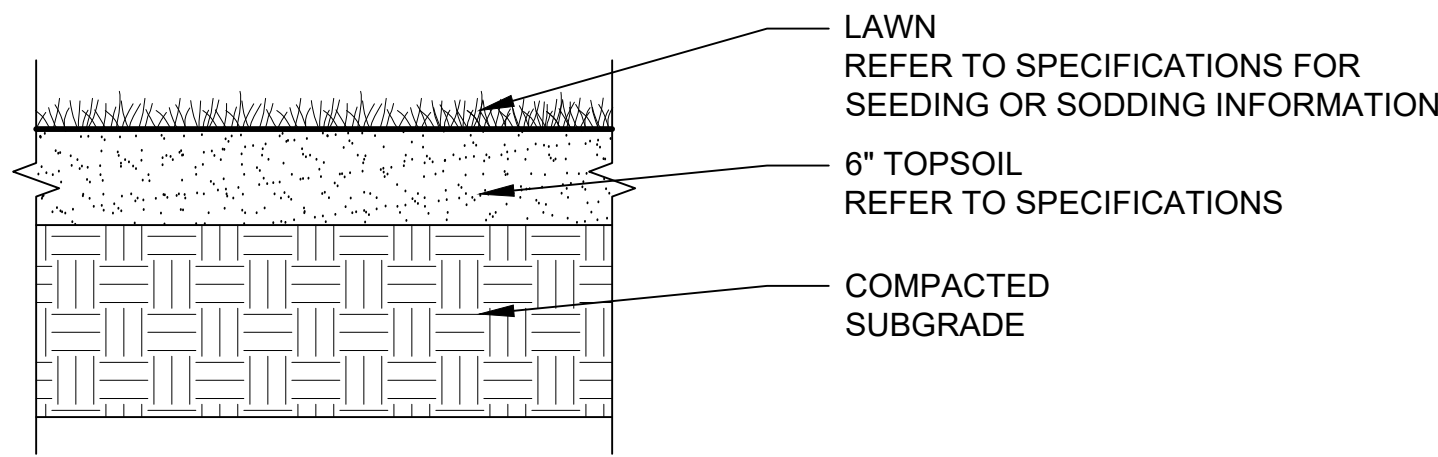
-304



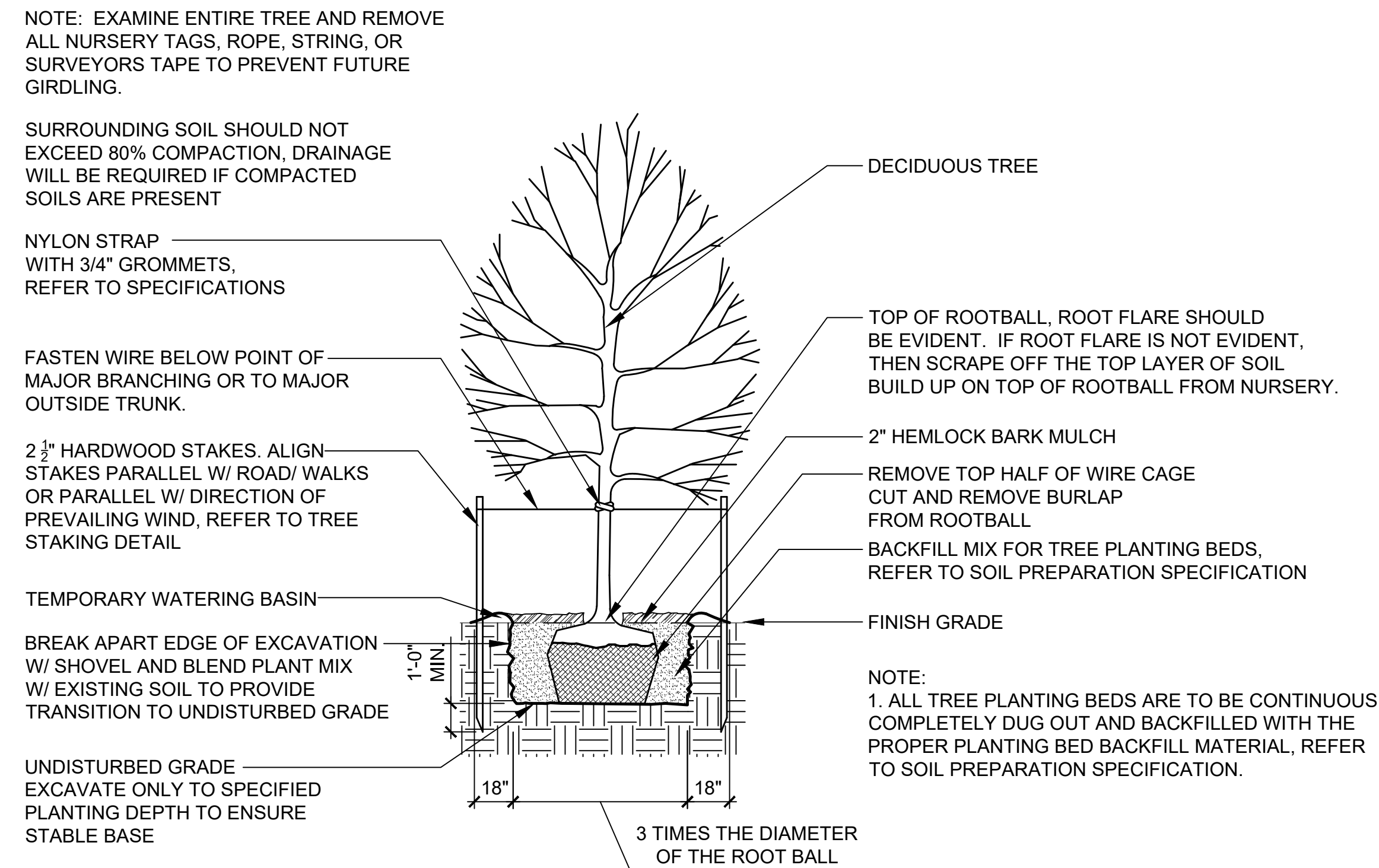
D SHRUB PLANTING
SCALE: 1/2" = 1'-0"



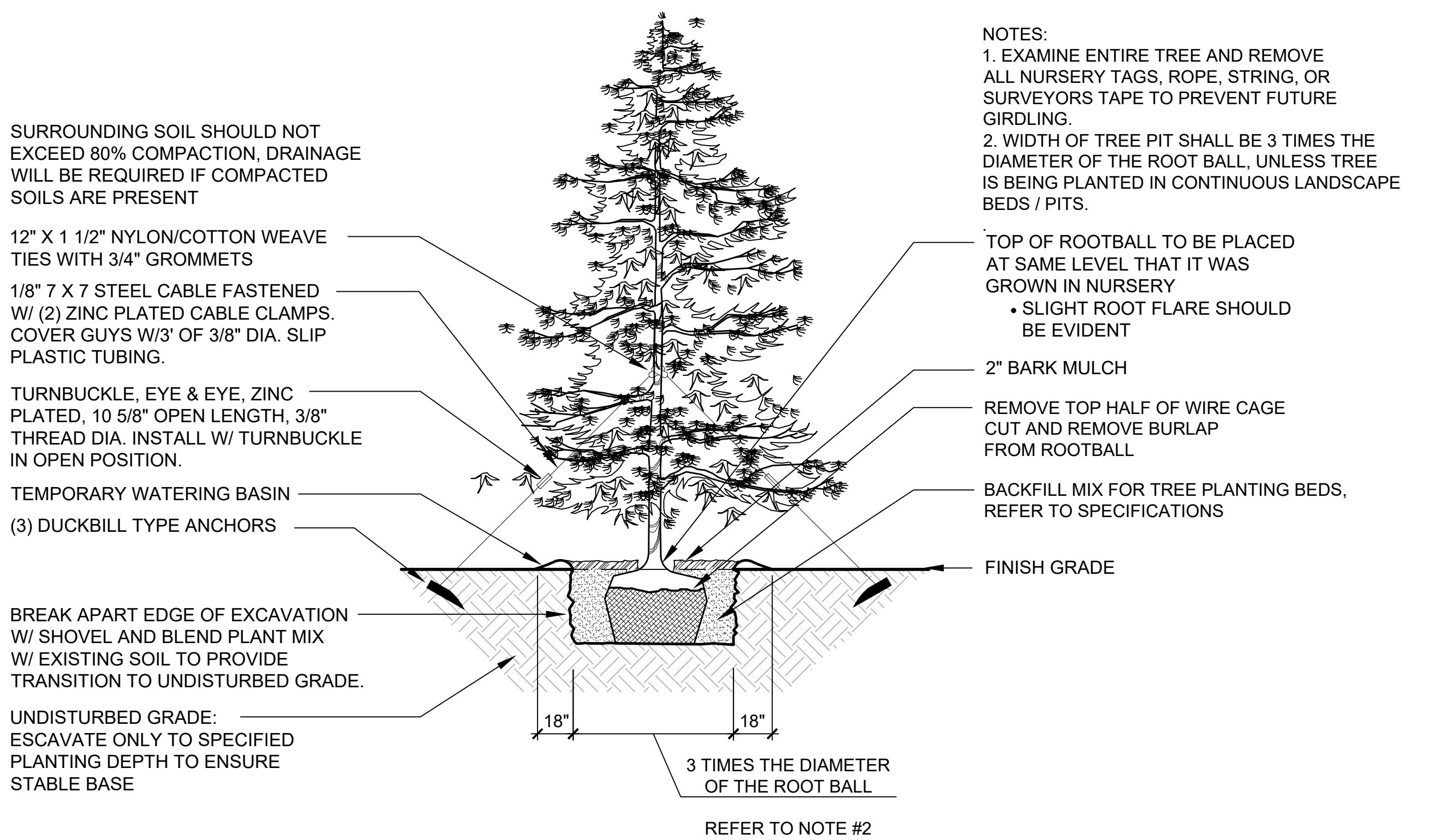
E PERENNIAL PLANTING
SCALE: 1/2" = 1'-0"



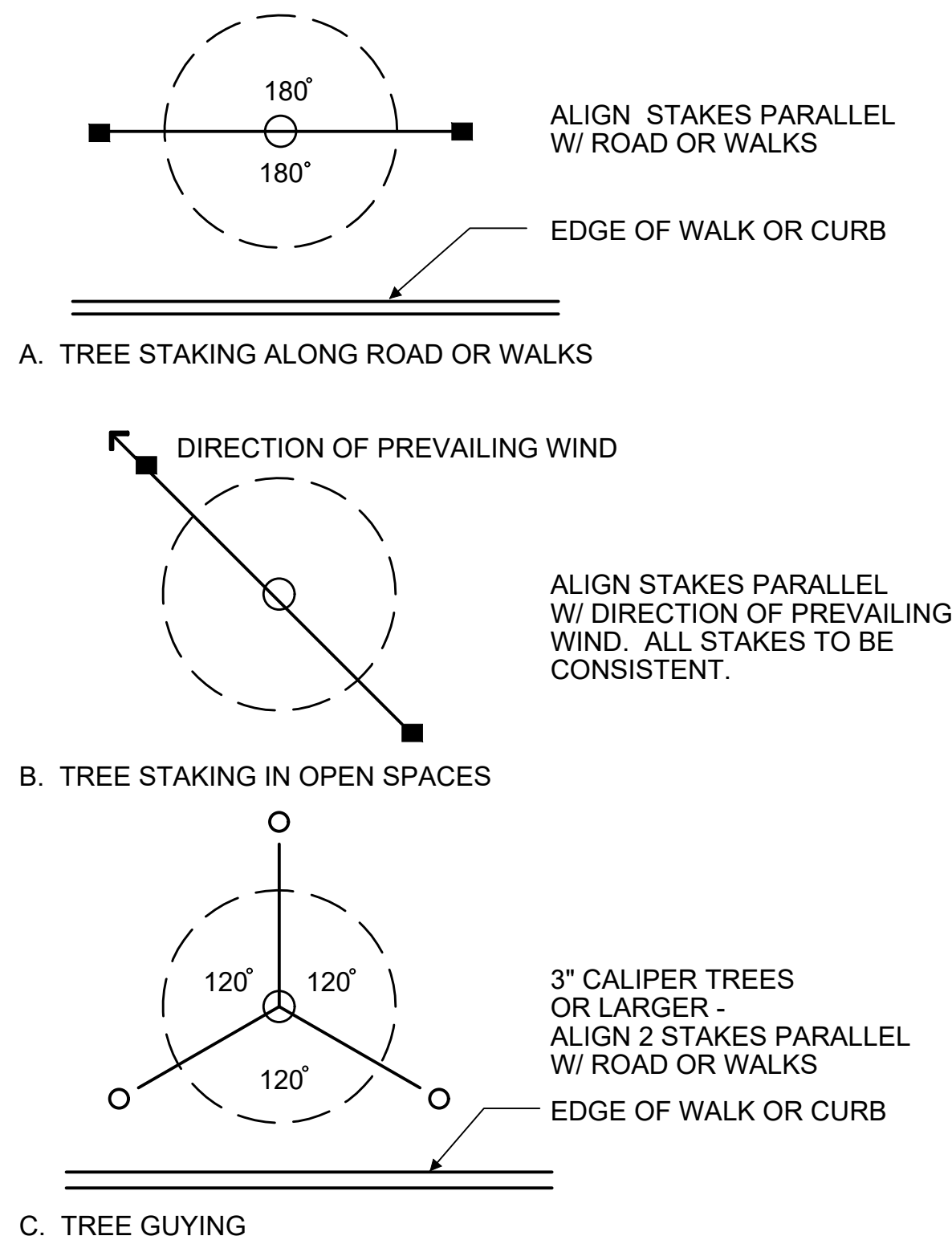
F LAWN
SCALE 1" = 1'-0" p-lawn.dwg



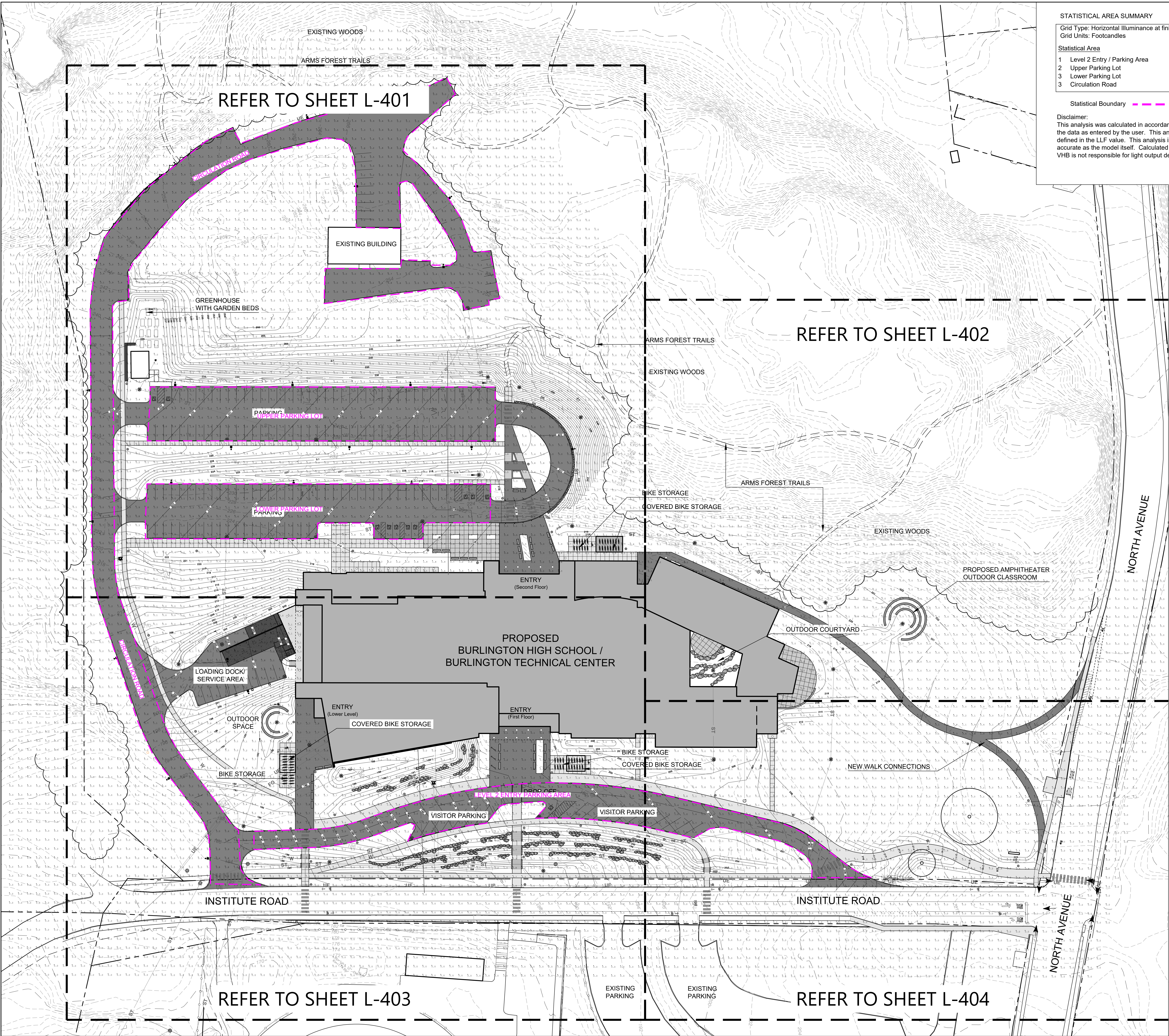
A TREE PLANTING
SCALE 1/4" = 1'-0"



B EVERGREEN PLANTING
SCALE 1/4" = 1'-0"



C TREE STAKING LAYOUT
NO SCALE p-stake.dwg



STATISTICAL AREA SUMMARY					
Grid Type: Horizontal Illuminance at finish grade. Grid Units: Footcandles					
Statistical Area	Avg	Max	Min	Avg/Min	Max/Min
1 Level 2 Entry / Parking Area	1.44	3.90	0.20	7.20	19.50
2 Upper Parking Lot	1.99	3.40	0.10	19.90	34.00
3 Lower Parking Lot	1.59	3.30	0.20	7.95	16.50
3 Circulation Road	1.65	3.50	0.00	N.A.	N.A.

Statistical Boundary - - - - -

Disclaimer:
This analysis was calculated in accordance with published IES calculation methods and procedures with the data as entered by the user. This analysis is based on tested IES photometric data, light loss factors as defined in the LLF value. This analysis is a mathematical model of real life situations, and it can be only as accurate as the model itself. Calculated values may vary from actual measurements in certain situations. VHB is not responsible for light output deviations due to light source, or other variables.

LIGHT FIXTURE AND POLE SPECIFICATIONS

Fixture A Manufacturer: Fixture: Optics: Mounting: Light Engine: Color Temperature: Finish: Options: Mounting Height: Voltage:	Selux SACL - Saturn Cutoff LED R3 1 5G700 3,000K SV (Silver) DM, PCT 16-feet 120-277V
Fixture B Manufacturer: Fixture: Optics: Mounting: Light Engine: Color Temperature: Finish: Options: Mounting Height: Voltage:	Selux SACL - Saturn Cutoff LED R5R 1 5G700 3,000K SV (Silver) DM, PCT 16-feet 120-277V
Fixture C Manufacturer: Fixture: Optics: Mounting: Light Engine: Color Temperature: Finish: Options: Mounting Height: Voltage:	Selux SACL - Saturn Cutoff LED R3 1 5G450 3,000K SV (Silver) DM, PCT 12-feet 120-277V
Fixture D Manufacturer: Fixture: LED Engine: Color Temperature: Distribution: Configuration: Finish: Pole Height: Voltage:	Beacon Lighting VP-Micro Strike Size 2 - 320L-145 3,000k Type 3 Single Black Matte Textured 25-feet 120-277V
Fixture E Manufacturer: Fixture: LED Engine: Color Temperature: Distribution: Configuration: Finish: Pole Height: Voltage:	Beacon Lighting VP-Micro Strike Size 2 - 320L-145 3,000k Type 4 Wide Single Black Matte Textured 25-feet 120-277V
Fixture F Manufacturer: Fixture: Optics: Mounting: Light Engine: Color Temperature: Finish: Options: Mounting Height: Voltage:	Selux SACL - Saturn Cutoff LED R3 1 5G450 3,000K SV (Silver) DM, PCT Wall Mounted - 12-feet 120-277V
Fixture G Manufacturer: Fixture: Optics: Lumens: Color Temperature: Mounting Height:	Prescolite LFR-6RD Wide 1,000 3,000K Canopy Mounted varies 8-feet to 12-feet

SCHEMATIC DESIGN

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Landscape Architecture
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Suite 200
South Burlington, VT 05403

BURLINGTON HIGH SCHOOL & BURLINGTON TECHNICAL CENTER

BURLINGTON, VT

11% PROJECT NO: 2170

ORIGINATION DATE: 07/01/2022 SCALE: 1"=40'

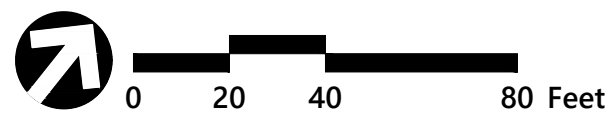
DRAWN BY: JRD/MKW CHECKED BY: MKW

ISSUE LOG:
Zoning Permit 08/30/22

SHEET CONTENTS:
OVERALL LANDSCAPE LIGHTING PLAN

SHEET NO: L-400

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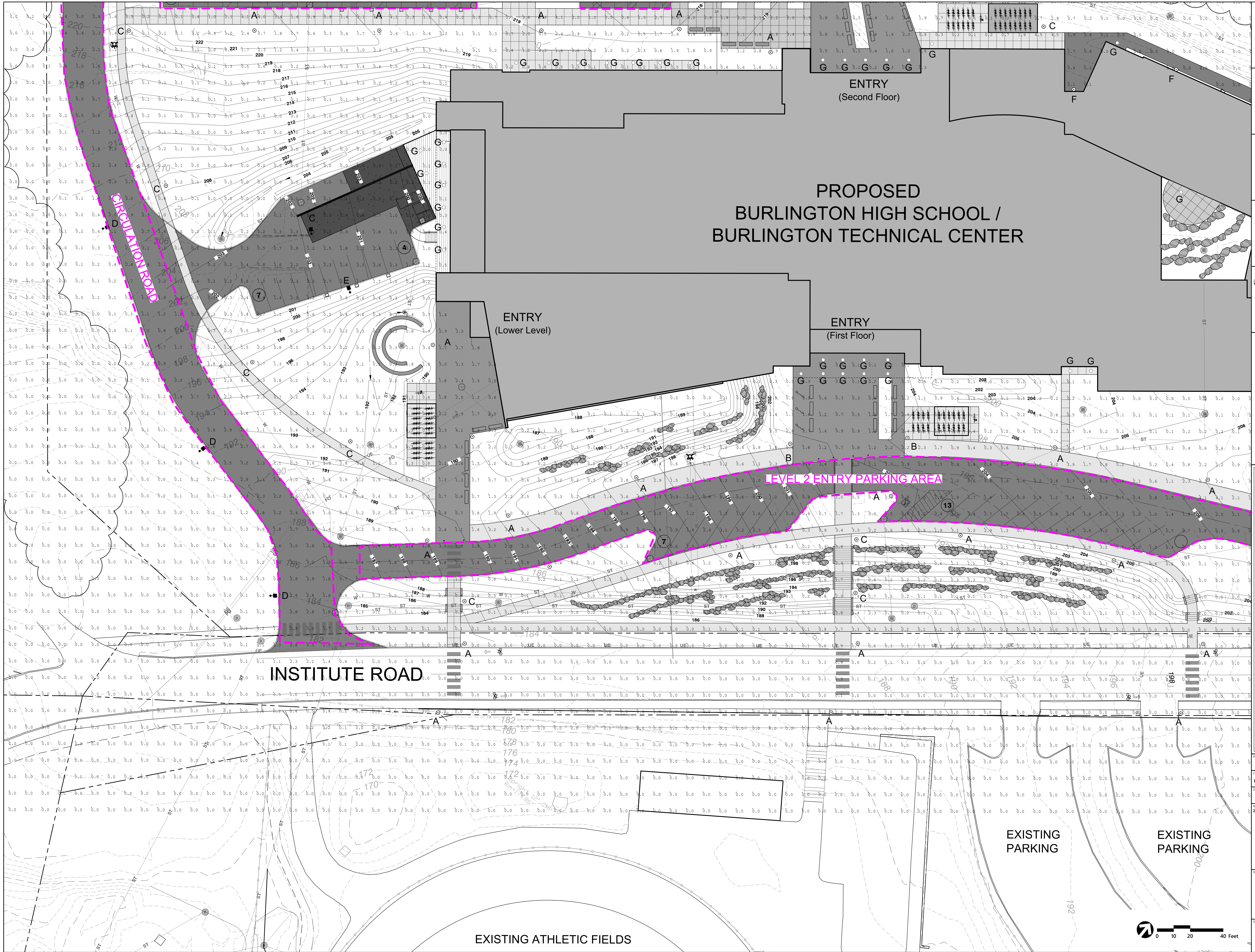
BURLINGTON
HIGH SCHOOL
&
BURLINGTON
TECHNICAL
CENTER

BURLINGTON, VT

PROJECT NO: 2170
ORIGIN DATE: 07/01/2022
DRAWN BY: JRD/MKW
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ISSUE LOG:
Zoning Permit 08/30/22

LANDSCAPE
LIGHTING
PLAN

SHEET NO:
L-402



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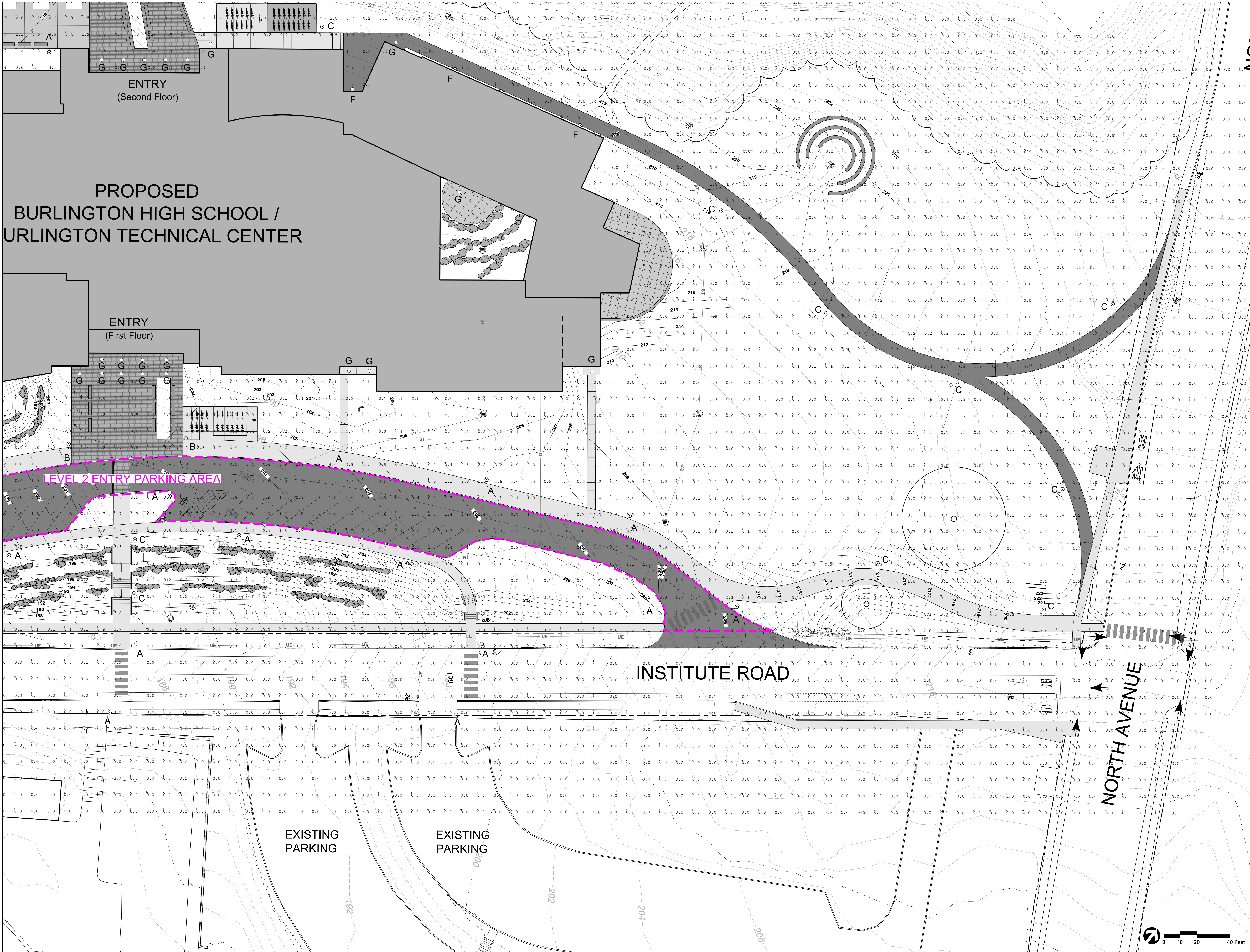
Landscape Architecture
40 Oak Drive, Building 100
Suite 200
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BURLINGTON HIGH SCHOOL & BURLINGTON TECHNICAL CENTER

BURLINGTON, VT

PROJECT NO:	2170
DATE:	07/01/2022
DRAWN BY:	JRD/MKW
CHECKED BY:	MKW
ISSUE LOG:	08/30/22
Notes:	Zoning Permit

SHEET NO: **L-403**



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BURLINGTON
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&
BURLINGTON
TECHNICAL
CENTER

BURLINGTON, VT

111 PROJECT NO: 2170

ORIGINATION DATE: 07/01/2022

DRAWN BY: JRD/MKW

ISSUE LOG:
Zoning Permit

SCALE: 1"=20'

CHECKED BY: MKW

08/30/22

SHEET NO. L-404

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SHEET CONTENTS:
LANDSCAPE LIGHTING PLAN

Erosion Prevention and Sediment Control Program

Construction Stormwater Discharge

The development of a new mixed use project by BC Community Housing is to be permitted as a Moderate Risk site under the State of Vermont Construction General Permit (CGP# 3-9020) for Discharges of Stormwater from Construction Sites issued for this project.

Parties associated with the issuance and implementation of the requirements set forth in the General Permit and the details within this document include:

- State of Vermont Department of Environmental Conservation, Water Quality Division (State)
- State of Vermont Environmental Commission (Act 250)
- On-Site Plan Coordinator (OSPC)
- Engineer (E)
- Site Owner (Owner)
- Site Erosion Prevention and Sediment Control Plan Designer (EPSC Designer)
- Owner's Builder/Contractor (Contractor)

This permit has the goal of minimizing discharges of sediment—laden water from the site by implementing appropriate best management practices (BMP's) during construction an stabilization of the site.

The Contractor will be responsible for ensuring compliance with all construction stormwater permit conditions within the entire project construction area.

Groundwater Dewatering

If dewatering of trenches, pits or other excavations is required during construction, the groundwater will be pumped to a suitable setting facility approved by the engineer and the VT DEC.

Inspection Program

The inspection responsibilities of the Contractor and the On-Site Plan Coordinator (OSC) are outlined in the chart below:

Feature	Daily	Weekly	After Rain Event
Storm Sewer Inlets	C	OSPC,	C, OSPC
Silt Fence	C	OSPC,	C, OSPC
Check Dams	C	OSPC,	C, OSPC
Construction Fencing	C	OSPC,	C, OSPC
Construction Entrance	C	OSPC,	C, OSPC
Stabilized Areas	C	OSPC,	C, OSPC
Report	C	OSPC,	OSPC

Cambrian Rise Erosion Protection and Sediment Control Narrative December 31, 2016

BC Community Housing, LLC proposes a mixed use project located on the former Burlington College property situated at 325, 351 and 375 North Avenue in Burlington, Vermont.

The project proposes to create 11 Lots, construct 11 building structures containing 677 residential units, 46 hotel rooms, 45,000 SF of non-residential support/amenity space, 45,000 SF of neighborhood oriented commercial space, 1093 parking spaces, 2750 LF of public roads and private access drives and associated infrastructure.

BC Community Housing is partnering with Champlain Housing Trust and Cathedral Square Corporation in the development of affordable and elder housing as part of the project.

Existing Conditions – The 33.65 acre property is located in the north end of Burlington between North Avenue and Lake Champlain. The former railroad and existing City bike path rights-of-way bisects the narrow band of land fronting Lake Champlain at the western limits of the property from the main body of the project site.

Of the 33.65 acres of the property, approximately 19.5 acres or 58% of the property is proposed to be disturbed as part of this project.

The site is comprised of a series of terraces all comprised of sandy soils in nature. The NRCS soil mapping of the property is summarized below.

- ADA – Adams and Windsor loamy sands, 0 to 5 percent slopes – 8.5% of the site and 5.8% of the disturbed areas.
- ADB – Adams and Windsor loamy sands, 5 to 12 percent slopes – 73.1% of the site and 82.0% of the disturbed areas.
- ADD – Adams and Windsor loamy sands, 12 to 30 percent slopes – 8.3% of the site and 10.9% of the disturbed areas.
- ADE – Adams and Windsor loamy sands, 30 to 60 percent slopes – 10.0% of the site and 0.8% of the disturbed areas.

All of the soils on the site have been identified through the NRCS WebSoil Survey to have a K value of 0.15. Due to the very low erosion potential and permeability of the soils, there are no Class II or Class III wetlands or drainage located within the main body of the proposed areas of disturbance.

The only drainages located on the property are located at the far west end of the property adjacent to or in association with the steep bluff leading down to the bike path.

The only Class III wetlands within the property limits are located at the far western portion of the site immediately upgradient of the two existing culverts that cross under the existing bike path.

Large portions of the proposed development area are currently in open meadow while approximately ¼ of the proposed development area is wooded. The main development site will be buffered by 12 acres of lands transferred to the City for use as park lands.

The Appendix A scoring did not take advantage of the fact that 95% of the site will benefit from 200' feet of vegetative buffer as there is one component of the project, the replacement of the existing culvert that will bring earth disturbance activities within 50–feet of a receiving water (Lake Champlain) or a wetland.

The topographical mapping for the property was developed from field survey which also located the specimen trees within the perimeter green space areas of the project to be retained.

Areas of Concern – The primary areas of concern for the management of EPSC include (These are depicted on Sheet C6.0):

1. The steep slope located immediately west of the existing buildings.
2. The Class III wetland where the culvert upgrade is to occur.
3. The protection of the trees to be retained along the exterior portion of the property and specifically those along the north border which are subject to a Development Agreement with the City.
4. The drainages located at the far west side of the property.

Phasing – The project is proposed to be constructed in Phases beginning in 2026 and, market forces permitting, to be completed in the Spring of 2023. The individual phasing limits are depicted on Sheets C6.10 – C6.15.

The phasing generally begins closest to North Avenue and extends westerly down the slope. Supporting road and utility infrastructure will be constructed with a top down approach as a means of minimizing the amount of disturbance. Most of the phases include earth disturbance activities that range from 2.1 to 4.9 acres in size. The first phase represents the largest amount of disturbance at any one time as it includes multiple partners (Lake Champlain Housing) and supporting infrastructure (construction laydown area) in this phase. The estimate total area of disturbance is 9.7 acres with the requirement that no more than five (5) acres can be disturbed at any one time.

Best Management Practices– The project will use a series of surface water diversion to not only protect those areas under construction but to also temporarily convey stormwater from these sites to a series of stormwater treatment facilities. Each facility will be designed to provide sediment trap removal capacity before sending the water to an infiltration facility. The goal being to collect and manage stormwater before it reaches the previously described drainages.

Sediment Basin – The initial phase of the project will require the use of a sediment basin (Basin A) to comply with the contributory watershed sizing requirements for the project. With the understanding that this facility is designed to double as an infiltration basin, the normal vertical pipe outlet has been replaced with infiltrative capacity through the bottom of the main body of the pond. The emergency outlet will be sized to accommodate the 10–year design storm for the conditions draining to the structure.

Discharge Point and Conveyance – The project has been designed so as to match the operational stormwater 10–year peak event from the property. For storm events greater than the 10–year design storm, additional runoff from the site is expected beyond the match of existing conditions. As a means of protecting the existing steep slope drainages, the project proposes to extend a 36" storm drain line from the project limits down to Lake Champlain. This is the only discharge point for the project.

Based upon the proposed drain inlet locations, this conveyance will include a drainage area of approximately 30 acres.

Project Characteristics – The average slope of the areas of disturbance is 8%.

The project proposes to impact less than 1,000 SF of the Class 3 wetlands adjacent to the existing 24" culvert t be replaced. Normally, this would be a non-reporting activity to the US Army Corps of Engineers, however, as the project proposes the installation of flexible armor from the plunge pool across the beach to the lake edge at an elevation below 98.0, a permit from the USACE will be required.

The project will require the import of approximately 50,000 CY of borrow materials. This material in anticipated to come from existing operating sand pits and supplemental permitting is not projected.

Preconstruction measures will include the use of construction fencing to demarcate the limits of disturbance along those areas where sensitive features are present (e.g. wetlands or tree retention areas), construction flagging for the remaining areas, Construction access (entrances road and laydown areas) stabilization, surveyed tree clearing limits and silt fence. These areas are shown on Sheets C6.1 – C6.4 and C6.10 – C6.16

The on-site temporary measures will include the use of contained sites (e.g. foundation excavation, utility trenching), inlet protection, temporary stabilization of disturbed surfaces through the use of hay mulch.

The temporary off-site measures (outside of specific phase areas) to be employed will include the previously discussed diversion swales and stormwater management facilities. These are shown on Sheets C6.11 – C6.16

The permanent on-site measures to be used to stabilize the site will include, flat roofs, paved roads, concrete walkways, hardscape common areas, lawn and slopes planted with the appropriate grass types. These are shown on Sheets C6.1 – C6.4.

The permanent off-site measures will include the use of a concrete pipe for the overflow conveyance from the project site to the lake, the use of a plunge pool at the outlet of the culvert and a flexible armor from the plunge pool, across the beach and to the lake. These are depicted on Sheet C6.1.

The project will require that within 7 days of initial disturbance that soils be permanently or temporarily stabilized through the use of hay mulch, ECM, or a crushed stone surface unless these areas are part of an on-going earth disturbance activity or are located within a contained area.

Winter Construction – Winter construction activities are proposed for the project and as such are subject to special measures to be employed between October 15 and April 15. This work will likely entail utility installation, excavating and backfilling of buildings. The winter construction requirements are specifically outlined on Sheet C6.9.

EROSION AND SEDIMENT CONTROL STRATEGY – The following techniques are anticipated to be utilized as part of the erosion and sediment control program. The timing and use of each of the techniques is further defined within the Construction Phasing of the project. But will be the responsibility of the contractor to implement on an as needed basis based upon the changing nature of the site disturbance activities only controlled by the site contractor.

1. Use rapidly germinating cover crops prior to seeding when the ground would otherwise be bare.
2. Include rapidly germinating grasses in the seed mixtures when they will not compromise the integrity of the final product.
3. Utilize hydroseeding with mulch when feasible.
4. Utilize erosion control netting or blankets, with or without seed contained in them on slopes greater than 3:1.
5. Utilizing stabilization materials or sodding areas where runoff is rapid or concentrated.
6. Limiting traffic in the vicinity of streams and wetlands and installing as few temporary crossings as possible.
7. Installing water bars (swale/berms) on slopes to and channels before it gains sufficient volume and momentum to cause scouring.

8. Using stone check dams and silt fences once the soil has begun to move.
9. Preserving existing trees and vegetation near and within buffer areas until after the site has been stabilized.
10. Controlling dust by providing parking lots with prepared surfaces, limiting traffic in all possible ways, planting stockpiles with cover crops or protective blankets, using water trucks, refraining from cultivating and smoothing seedbeds until immediately prior to seeding.

Field Protocol – Areas of special concern will be reviewed with the Contractor prior to initiating site clearing activities. These areas will be continually reviewed by the Contractor and the OSPC and any issues will be identified in the daily or weekly reports. All reports shall be distributed via e-mail to all parties in support of the efforts to address areas of concern in a timely manner.

Best Management Practices – BMP's – Examples include, but are not limited to: sediment fence, erosion control matting, seed, and mulch in accordance with the attached Construction Phasing plan and the Vermont Erosion Prevention and Sediment Control Filed Guide.

Installation Sequencing

1. Construction Staking
A. The construction limits are to be staked in the field by a qualified Surveyor.
B. The remaining clearing and site disturbance limits shall be reviewed by the Engineer prior to initiating any clearing. The Engineer shall designate specimen trees and critical vegetative cover along buffer areas that are to remain during the initial phases of construction.

2. Clearing – The clearing limits shall be demarcated in the field with continuous flagging. Construction fencing shall be installed along the edges of any stream or wetland buffer areas adjacent to or on the lot. Prior to any timber being harvested and removed from the site, a construction entrance pad shall be installed at the entrance point to the project site. Chipping of branches and other woody material is allowed but the material must be disposed of in an approved manner.

3. Inlet Protection – Ensure that BMP's are in place and functioning at catch basins, drainage swales, culvert inlets, and other areas as shown on the EPSC site plan.

4. Protection of Adjacent Sites – Install BMP's along the common lot line of adjacent sites. This would include construction fencing to help avoid unintentional encroachment onto the adjacent property and silt fence when the adjacent lot is downgraded of the construction site.

5. Protection of Construction Site – Prior to initiating earthwork on the lot, surface runoff from areas upgradient portions of the construction site shall be diverted from the proposed areas of disturbance using diversion swales, structures, sand bags, curbing, or other approved method. Protect steep exposed slopes from surface runoff by collecting runoff at the top of the slope and diverting it into a stabilized conveyance, such as a slope drain or stabilized swale.

6. Grubbing
A. Grubbing shall occur only after the erosion control measures around the downgradient perimeter of the site has been established. Those locations shall be reviewed with the Environmental Specialist and Independent Engineer. Existing topsoil shall be retained and stockpiled on site for re-use.
B. The Contractor shall remove all remaining woody material and tree stumps and dispose of them utilizing one or more of the following methods:
i. Burning, provided that permits are acquired from the State of Vermont Solid Waste Management Division and the City of South Burlington.
ii. Disposal on site within designated slope disposal areas only after an insignificant waste Disposal Permit is acquired. At these sites the following standards shall be met
a. 3' separation to the seasonal high groundwater table.
b. 100' separation to surface waters.
c. Thorough mixing of soil and woody material to minimize future settlement.
d. Covering with a minimum of four (4) feet of cover material.
iii. Chipping with on-site disposal in accordance with Item 5 or disposal off-site in accordance with State requirements.
iv. Disposal at a certified landfill facility.

C. All grubbing of woody materials shall be completed to a depth of at least 12".
D. The Contractor shall remove all medium to large stones and boulders present within the limits of disturbance including future drainage and infrastructure improvements.
i. The larger boulders shall be saved for use in retaining walls.
ii. The smaller stones may be buried in predetermined disposal sites.

7. Soil Stockpiles
A. The Contractor shall strip and stockpile as much as possible of the native topsoil for re-use during a later stage of the project.
B. Each topsoil stockpile shall be placed in locations relative of existing environmental features of the site. Special consideration shall be made to maximize the distance (minimum 100') to the nearest water course.
C. Each topsoil pile shall be surrounded on the downgradient side by a row of silt fence.
D. Any topsoil pile which is to remain in place for greater than 15 days shall be temporarily seeded with winter rye to preserve the integrity and minimize the erosion of the soil constituents and release of soluble nutrients.
E. The Contractor shall locate stockpiles on the uphill side of the disturbed areas, if possible. During windy conditions, stockpiled material shall be covered or watered appropriately to prevent wind erosion.

8. Earth Excavation/Grading
A. Mass earth placement to create the building plateau shall commence only after all remaining EPSC measures depicted on the plans are installed.
B. Surface water diversion BMP's shall employed at the high point of the site until the new drainage swale/hollow is installed.
C. The Contractor shall also limit the soil disturbance and seeding application dates to between April 16th and September 15th.

D. All exposed soils areas (not including structural fill soils or stabilized stone areas) shall be protected prior to any forecasted rain event with mulch or erosion control matting. Pin matting with wire staples in accordance with the manufacturers recommendations to ensure full bonding with soil surface.
E. Install stone check dams in grass-lined swales 50 feet on center to prevent silt from washing into the drainage system during construction. Check dams are to be removed when vegetation is established.

9. Temporary Construction Entrance – Required for entrance and egress points from the site.

10. Planting Preparation, Seed, Mulch, Germination, Maintenance
A. The preparation of the topsoil for planting includes final smoothing and removal of small stones. This work shall occur immediately prior to seedlingor placement of EC matting so as to avoid exposure to erosion damage and to reduce the amount of dust generated as part of this process.
B. Planting is to occur immediately after the topsoil preparation with special caution being given to upcoming storm events that may displace the seed/soil.
C. The planted areas shall be water regularly to protect the new plants but not over watered so as to cause excess runoff and erosion.
D. All ditches that are not stone-lined shall be topsoiled, and stabilized with erosion control matting. Any area which shows signs of erosion shall be restabilized immediately and maintained until permanent vegetation is established.
E. Maintenance:
1. All erosion control measures shall be inspected weekly and repaired and/or replaced as needed.
2. All erosion control measures shall be inspected after periods of heavy rain.
3. The stabilized road entrance shall be top dressed with additional stone should the existing stone become clogged with sediment.
4. Hay or straw mulch is subject to wind action. Mulch, where permitted) may require anchoring as the weather conditions warrant.

11. Surface Stabilization – The following stabilization methods are required:
A. Temporary stabilization – Straw mulch (during the earliest phases of the project) or erosion control matting placement is required on all non-contained disturbed areas prior to forecasted rain events.
B. Install stone check dams in drainage swales 50 feet on a center to prevent silt from washing into the drainage system during construction. Check dams shall be removed when vegetation is established.
C. Control dust through the application of water. The exact number of applications and amount shall be based upon field and weather conditions. It shall be spread in such manner and by such devices that uniform distribution is attained over the entire area on which it is ordered placed.
D. Install crushed stone apron of at least 15' width around the perimeter of the building following backfill of the foundation walls.
E. Install temporary (sacrificial) crushed stone on all access ways and laydown areas. These areas will be covered later with the roadway/parking lot base materials or with topsoil.
F. Permanent Stabilization – Required of all surfaces at the completion of construction. The Contractor will install 4" topsoil, sod, seed (where permitted), fertilize, lime, and mulch (seeded areas) the disturbed areas as soon as possible following completion of construction.

1. Use rapidly germinating cover crops prior to seeding when the ground would otherwise be bare.
2. Include rapidly germinating grasses in the seed mixtures when they will not compromise the integrity of the final product.
3. Utilize hydroseeding with mulch when feasible.

Owner/Contractor Responsibilities

1. The Owner/Contractor (O/C) is responsible for the on-going maintenance of all lot specific erosion prevention and sediment control devices and practices. Any subcontractor conducting earth disturbance activities on the project site shall review the EPSC plan and General Permit and shall complete an application and file with the State a request for Co-Permittee status.

2. Periodic inspections shall be performed in accordance with the above schedule to ensure that the erosion and sediment control measures are functioning as required. In addition to the standard periodic inspections, inspections of all of the on-site systems shall be conducted after a rain event causing stormwater to leave the site. Any problems noted during these inspections shall be corrected immediately.

3. Once construction has commenced, the O/C is responsible for the maintenance of erosion and sediment control measures protecting nearby stormwater collection systems and water courses. It is critical that sediment not be allowed to invade the receiving waters.

4. The temporary construction entrance provides a place for parking vehicles off-street and a spot where material can be off-loaded. The intent of the requirement is to provide a stable surface for parking vehicles where mud and debris is not likely to be tracked onto the street. Proper maintenance of the area is required until such time as a permanent driveway can be put into place.

5. During the entire construction process, the O/C is responsible for ensuring that mud, dirt, rocks, and other debris are not allowed to erode or be tracked onto the street system by construction vehicles. Should any mud or other debris find its way to the road system, the O/C shall take immediate steps to have it removed.

6. Maintenance – Silt Fence

A. Inspect sediment fences daily to ensure that construction activities have not impacted their operability and after each rainfall event causing runoff from the site.
B. Should the fabric of the sediment fence collapse, tear, decompose, or become ineffective, replace promptly.
C. Remove the sediment deposits as necessary to provide adequate storage volume for the next rain event and to reduce pressure on the fence. Take care to avoid damaging or undermining the fence during clean-out.
D. If the utilities are installed after BMP's have been put into place, the permit holder is responsible for control of erosion and sediment during the construction process and for ensuring that all BMP devices are re-installed per the original design.

On-Site Plan Coordinator Inspections

1. The OSPC will normally inspect erosion prevention and sediment control measures in conjunction with routine inspections. Inspections will ensure that proper placement and installation of the erosion prevention and sediment control measures are in place.
2. The first inspection will occur prior to clearing of the site to ensure that proper BMP's are in place, including proper demarcation of the clearing limits, installation of construction fencing along the stream/wetland buffer limits, and any other devices required to protect the receiving waters from sediment deposition during the clearing phase.
3. Prior to initiating grubbing and mass earth excavation, the OSPC shall inspect the site to ensure that the construction fencing, silt fence, construction entrance, and other required BMP's are in place.
4. The OSPC will conduct weekly inspections and will prepare weekly reports which are to remain on-site until final stabilization is achieved.

Additional Requirements:

1. All sediment removed from sediment control practices as part of maintenance shall be disposed of in an area that is:
a. Less than 5% slope.
b. At least 100ft from any downslope water body or conveyance to a
i. waterbody (including storm drain inlet or ditch)
c. Area shall be vegetated

2. Stabilize Exposed Soil

Purpose:

Seeding and mulching, applying erosion control matting, and hydroseeding are all methods to stabilize exposed soil. Mulches and matting protect the soil surface while grass is establishing.

Requirements:

All areas of disturbance must have temporary or permanent stabilization within 7 days of initial disturbance, as stated in the project authorization. After this time, any disturbance in the area must be stabilized at the end of each work day.

The following exceptions apply:

- Stabilization is not required if earthwork is to continue in the area within the next 24 hours and there is no precipitation forecast for the next 24 hours.
- Stabilization is not required if the work is occurring in a self-contained excavation (i.e. no outlet) with a depth of 2 feet or greater (e.g. house foundation excavation, utility trenches).

All areas of disturbance must have permanent stabilization within 48 hours of reaching final grade.

How to comply
Prepare bare soil for seeding by grading the top 3 to 6 inches of soil and removing any large rocks or debris.

Seeding Rates for Temporary Stabilization
April 15 – Sept. 15 --- Ryegrass (annual or perennial: 20 lbs/acre)
Sept. 15 – April 15 --- Winter rye: 120 lbs/acre

Seeding Rates for Final Stabilization:Choose – See Sheet C6.6

Mulching Rates
April 15 – Sept.15 --- Hay or Straw: 1 inch deep (1–2 bales/1000 s.f.)
Sept.15 – April 15 --- Hay or Straw: 2 in. deep (2–4 bales/1000 s.f.)

Erosion Control Matting
As per manufacturer's instructions

Hydroseed
As per manufacturer's instructions

3. Stabilize Soil at Final Grade

Purpose:

Stabilizing the site with seed and mulch or erosion control matting when it reaches final grade is the best way to prevent erosion while construction continues.

Requirements:

Within 48 hours of final grading, the exposed soil must be seeded and mulched or covered with erosion control matting.

How to comply:

Bring the site in sections of the site to final grade as soon as possible after construction is completed. This will reduce the need for additional sediment and erosion control measures and will reduce the total disturbed area.

For seeding and mulching rates, follow the specifications under Rule 8, Stabilizing Exposed Soil.

4. Dewatering Activities

Purpose:

Treat water pumped from dewatering activities so that it is clear when leaving the construction site.

Requirements:

Water from dewatering activities that flows off of the construction site must be clear. Water must not be pumped into storm sewers, lakes, or wetlands unless the water is clear.

How to comply:

Using rock filters or sediment filter bags on dewatering discharge hoses or pipes, discharge water into silt fence enclosures installed in vegetated areas away from waterways. Remove accumulated sediment after the water has dispersed and stabilize the area with seed and mulch.

END OF SECTION EPSC NARRATIVE

SECTION 02150 – EROSION CONTROL

PART 1 – GENERAL

1.01 SUMMARY

A. Section includes:
1. The work under this section includes but is not limited to providing all labor, equipment and materials for the installation of all required site related erosion control measures. If not otherwise directed on the plans, erosion control shall be in strict conformity with the latest revision of the "Vermont Erosion Prevention and Sediment Control Field Guide" available from the Stormwater Section of the Vermont Water Quality Division.

- B. Related sections:
1. Section 02210 – Site Earthwork
2. Section 02936 – Permanent Seeding

1.02 GENERAL NOTES

- A. The discharge of sediment laden water from the project site is prohibited. All discharged water from dewatering operations shall discharge into a temporary sedimentation basin.
- B. Contractor shall install all erosion control measures as depicted on plans and details or as recommended by the Stormwater Section of the Vermont Water Quality Division prior to any construction. Contractor shall also be responsible for inspecting and maintaining all erosion control measures until project is completed.
- C. Contractor shall also limit the soil disturbance and seeding application dates to between April 15th and September 15th. If soil disturbance occurs later than October 15th and prior to April 15th, winter erosion control measures will be necessary. Contractor shall consult with the Engineer for additional site specific winter erosion control measures.
- D. All stockpile material (topsoil, borrow, etc.) will have a silt fence constructed around the perimeter. Seed and mulch stockpiled material as soon as possible to prevent soil erosion and sedimentation off site. Locate stockpiles on the uphill side of the disturbed areas, if possible. During windy conditions, stockpiled material shall be covered or watered appropriately to prevent wind erosion.
- E. Slopes greater than 3:1 (H:V) shall have erosion control matting tight installed to stabilize the slope and reduce the erosion potential. Install matting and mulch on slopes greater than 3:1 for all areas of soil. Pin matting with wire staples 3' o.c. to ensure full bonding with soil surface. Matting shall be installed in accordance with manufacturer's recommendations.
- F. Control dust through the application of calcium chloride or water. An average application of one pound of calcium chloride per square yard of exposed area should be considered for each treatment. The exact number of applications and amount of dust controller shall be based upon field and weather conditions. It shall be spread in such manner and by such devices that uniform distribution is attained over the entire area on which it is ordered placed.

PART 2 – PRODUCTS

2.01 EROSION CONTROL NETTING

A. Jute netting shall consist of undyed and unbleached yarn woven into a uniform open plain weave mesh.

2.02 EROSION CONTROL MATTING

A. Where required on the plans or where directed by the Engineer, erosion control blankets (matting) shall be North American Green S150BN for swales and slope stabilization or approved equal, for all areas of permanent installation, and C125 and SC150 where matting is being used as temporary protection of disturbed soils until a final surface stabilization method is employed.

2.03 FILTER FABRIC

A. When filter fabric is required, it shall conform to the requirements of Mirafi 500X or approved equivalent.

2.04 CALCIUM CHLORIDE

A. Calcium chloride shall conform to the requirements of AASHTO M 144. Either regular flake calcium chloride, Type 1 or concentrated flake, pellet or other granular calcium chloride, Type 2, may be used.

2.05 WATER

A. All water used shall be clean and free of harmful amounts of oil, salt, acids, alkalis, sugar, organic matter and other substances injurious to the finished product, plant life or the establishment of vegetation.

2.06 SEDIMENT WATTLES

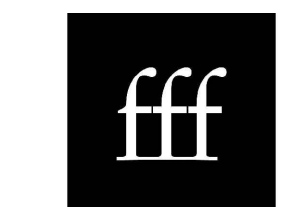
A. Sediment wattles shall be King Fibre Corporation silt trapper sediment wattles or approved equal.

2.07 POLYACRUMIDE

A. Polyacrumide (polymer) logs (blocks) shall only be used with permission from the Engineer and VT ANR Water Quality Division. Type shall be Applied Polymer Systems, inc. floc log or approved equal. The type of floc log used shall be based upon a site specific testing of the native soils.

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BURLINGTON, VT

PROJECT NO. 21255

ORIGINATOR DATE: 07/22/2022 SCALE: AS SHOWN

DRAWN BY: MAB CHECKED BY: DSM

DATE LOC: 08/23/22 09/20/22
ZONING PERMIT DRAFT
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SHEET NO. 21255

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2.08 STONE CHECK DAMS

A. Stone check dams should be constructed of 2 to 3 inch stone. Hand or mechanical placement will be necessary to achieve complete coverage of the ditch or swale and to ensure that the center of the dam is lower than the edges. The maximum contributing drainage area from any one check dam shall not exceed two acres. See the detail drawing in the Erosion Control Details Drawings for the proper installation of stone check dams.

PART 3 – EXECUTION

3.01 HAY BALE CHECK DAM AND INLET PROTECTION

A. Hay bales shall not be used to construct check dams or as a means of inlet protection.

3.02 SILT FENCES

A. The silt fences shall be constructed in accordance with the construction detail. The fence shall generally be placed 10 feet from the toe of the slope or as shown on the plans. The ends of the fence shall be placed uphill to form a horseshoe shape to trap all runoff. Silt fence shall not be placed across areas of concentrated flow.
B. The silt fences shall be inspected periodically for damage or build-up of sediments. All damaged fences shall be repaired or replaced. Sediment deposits shall be removed from the fence as they build up and be placed in an area where there is no danger of further erosion.

3.03 EROSION MATTING

A. Erosion matting shall be placed on all grass-lined ditches with profile grades exceeding 5.0% and all other areas called out on the plans, and shall be placed and maintained in accordance with the Vermont Agency of Transportation Standard Specifications Sections 654 and 755.07.

3.04 RESTORATION

A. As soon as construction is completed in a given area, it shall be topsoiled, seeded, fertilized and mulched as specified in Section 02936 – Permanent Seeding.

3.05 STABILIZED ROAD ENTRANCE

A. A stabilized pad of crushed stone located at any point where traffic will be entering or leaving the construction site to or from a public right-of-way or street or as shown on the drawings shall be constructed for the purpose of preventing the tracking of sediment onto public rights-of-way.

- B. Design Criteria:
1. Use 1.5 to 2.5 inch stone.
 2. Use 8 inch layer of stone.
 3. Stone pad shall be full width of entrance.
 4. Minimum length shall be 50 feet.

3.06 GRASS-LINED DITCHES

A. All ditches that are not stone-lined shall be topsoiled, seeded, fertilized and mulched. Any area which shows signs of erosion shall be reseeded immediately and maintained until permanent vegetation is established.

3.07 MAINTENANCE

- A. All erosion control measures shall be inspected daily and repaired and/or replaced as needed.
- B. All erosion control measures shall be inspected after periods of heavy rain.
- C. The stabilized road entrance shall be top dressed with additional stone should the existing stone become clogged with sediment.
- D. Hay or straw mulch is subject to wind action. Mulch may require anchoring as the weather conditions warrant.

3.08 STONE CHECK DAMS

- A. The drainage area of the ditch or swale being protected should not exceed 10 acres.
- B. The drainage area to any check dam shall not exceed 2 acres.
- C. The maximum height of the check dam should be 2 feet. The center of the check dam must be at least 6 inches lower than the outer edges. The maximum spacing between the dams should be such that the toe of the upstream dam is at the same elevation as the top of the downstream dam.
- D. Check dams should be installed before runoff is directed to the swale or drainage ditch.

3.09 DEWATERING METHODS

A. All dewatering methods associated with this project are to be approved by the VT DEC and the engineer prior to use.

END OF SECTION 02150

SECTION 02936 – PERMANENT SEEDING

PART 1 – GENERAL

1.01 SUMMARY

- A. Section includes:
1. Furnishing all labor, materials, and equipment to complete all seeding work as shown on the drawings and specified herein.
 2. Except where otherwise shown or specified, the Contractor shall seed all areas where new contours are shown on the drawings and all areas where existing ground cover has been disturbed by the Contractor's operations.

B. All work and materials of this Section shall conform to the applicable requirements of the VAOT Standard Specifications, Division 600.

1.02 SUBMITTALS

- A. Provide the following for approval prior to delivery to the site:
1. Supplier's Certificate of Compliance attesting that lime, fertilizer and seed meet the requirements specified.
 2. The Contractor shall provide representative topsoil samples for testing and approval, deliver samples to a public extension service agency testing laboratory, have testing report sent directly to the Engineer and pay all costs. Testing shall report on mechanical and chemical (pH soluble salts) analysis. Report shall be submitted at least one month before any loaming is to be done.

1.03 SEEDING SEASONS

A. Seeding and initial fertilizing shall be done between April 1 and June 1, between August 15 and October 15, or as permitted. Seeding shall not be done during windy weather or when the ground is frozen, excessively wet, or otherwise untiltable. If seeding is done during July or August, additional mulch material may be required by the Engineer.

PART 2 – PRODUCTS

2.01 LIME

A. Lime shall be standard, ground dolomite limestone, agricultural grade, containing a minimum of 95% of calcium and magnesium carbonates. 100% shall pass the 10 mesh sieve; minimum 90% shall pass the 20 mesh sieve; minimum 40% shall pass the 100 mesh sieve.

2.02 FERTILIZER

A. Fertilizer shall be commercial grade granular fertilizer as required for soil conditions as specified in Section 643 of the VAOT Standard Specifications. The fertilizer shall be delivered to the project in new, clean, sealed containers which bear a label fully describing the contents, the chemical analysis of each nutrient, the fertilizer grade, the net bulk, the brand and the name and address of the manufacturer. The fertilizer and labels shall conform to all existing State and Federal regulations, and shall meet the standards of the Association of Official Agricultural Chemists.

2.03 GRASS SEED

A. Provide fresh, clean, new-crop seed of the grass species, proportions and minimum percentages of purity, germination and maximum percentage of weed seed as follows:

1. Park seed shall normally be used on loam areas. This seed mixture shall conform to the following table:

Kind of Seed	Minimum Purity	Minimum Germination	Lbs/Acre
Creeping Red Fescue	96%	85%	40
Perennial Ryegrass	98%	90%	50
Kentucky Bluegrass	97%	85%	25
Redtop	95%	80%	5
TOTAL = 120			

2. Slope seed shall normally be used for all slope work, usually 3:1 or steeper and shall conform to the following table:

Kind of Seed	Minimum Purity	Minimum Germination	Lbs/Acre
Creeping Red Fescue	96%	85%	35
Perennial Ryegrass	98%	90%	30
Redtop	95%	80%	5
Alsike Clover	97%	80%	5
Birdsfoot Trefoil	98%	80%	5
TOTAL = 80			

3. Shade seed shall normally be used in shaded areas in or along the edge of wooded areas. This seed mixture shall conform to the following table:

Kind of Seed	Minimum Purity	Minimum Germination	Lbs/Acre
Creeping Red Fescue	95%	80%	30
Tall Fescue	96%	80%	20
Crownvetch	95%	80%	30
TOTAL = 80			

B. The seed mixture shall be delivered in new, clean, sealed containers. Labels and contents shall conform to all State and Federal regulations. Seed shall be subject to the testing provisions of the Association of Official Seed Analysts.

C. Seed that has become wet, moldy, or otherwise damaged will be rejected.

2.04 MULCH

- A. Mulch must be installed on all seeded areas. The following mulches are acceptable for use.
1. Hay mulch free of weeds and coarse matter at a rate of 90 pounds per 1,000 square feet.
 2. Wood fiber applied in a slurry (1/6" or longer) at a rate of 40 pounds per 1,000 square feet.

2.05 WATER

A. All water used shall be obtained from fresh water sources and shall be free from injurious chemical and other toxic substances harmful to plant life. No water which is brackish will be permitted at any time. The Contractor shall identify to the Engineer all sources of water at least two weeks prior to use. The Engineer, at his discretion, may take samples of the water at the source or from the tank at any time and have a laboratory test the samples for chemical and saline content. The Contractor shall not use any water from any source which is disapproved by the Engineer following such tests.

PART 3 – EXECUTION

3.01 PREPARATION

- A. Examine finish surfaces and grades. Do not start seeding work until unsatisfactory conditions are corrected. Perform seeding work only after planting and other work affecting ground surface has been completed.
- B. Notify Landscape Architect at least seven (7) working days prior to starting seeding.
- C. Prepare areas immediately prior to seeding as follows:
1. Loosen soil of seed areas to a minimum depth of 4".
 2. Remove stones over 1" in any diameter and sticks, roots, rubbish and extraneous matter.
 3. Remove existing weeds and grasses by pulling or tilling under.
 4. Grade areas to be seeded to a smooth, free draining even surface with a loose, moderately coarse texture.
 5. Remove ridges and fill depressions as required to drain.
 6. Restore prepared areas if eroded or disturbed prior to seeding.

3.02 SEEDING CONDITIONS

- A. Seeding shall not be done when the ground is frozen, snow covered, muddy, or in any other unsatisfactory condition for planting. No seeding operations shall be conducted under adverse weather conditions or when soil moisture conditions are unfavorable (too wet or too dry) or when winds exceed 5 MPH.
- B. Construction methods shall be those established as agronomically acceptable and feasible. The Contractor shall keep all equipment and vehicular and pedestrian traffic off areas that have been seeded to prevent excessive compaction and damage to young plants. Where such compaction has occurred, the Contractor shall rework the soil to make a suitable seed bed, then reseed and mulch such areas with the full amounts of the specified materials, at no extra expense to the Owner.
- C. Surface and seepage water should be drained or diverted from the site to prevent drowning or winter killing of the plants.
- D. All areas and parts of areas which fail to show a uniform stand of grass for any reason whatsoever shall be reseeded, and such areas and parts of areas shall be seeded repeatedly until all areas are covered with a satisfactory growth of grass.
- E. Watering is considered a necessary element for establishment and survival.
- F. Where ryegrass has been planted for temporary erosion control and has not been eliminated prior to the completion of the work, such areas shall be discd at least 3 inches deep and seeded to permanent grasses to prevent the ryegrass from reseeding and becoming competitive with and retarding development of the permanent cover.

3.02 SEEDING

A. Lime and fertilizer should be applied prior to or at the time of seeding and incorporated into the soil. Kinds and amounts of lime and fertilizer should be based on an evaluation of soil tests. When a soil test is not available, the following minimum amounts should be applied:

- Agricultural limestone, 2 tons per acre or 100 lbs. per 1,000 square feet.
- Nitrogen (N), 50 lbs. per acre or 1.1 lbs. per 1,000 square feet.
- Phosphate (P2O5), 100 lbs. per acre or 2.2 lbs. per 1,000 square feet.
- Potash (K2O), 100 lbs. per acre or 2.2 lbs. per 1,000 square feet.
- (Note: This is the equivalent of 500 lbs. per acre of 10–20–20 fertilizer or 1,000 lbs. per acre 5–10–10).

- B. Seed should be spread uniformly by the method most appropriate for the site. Methods include broadcasting and hydroseeding as follows:
1. Broadcasting: Sow seed using mechanical spreader at a rate of 4 lbs./1,000 square feet. Distribute seed evenly over entire area by sowing equal quantity in tow directions at right angles to each other. Rake seed lightly into top 1/8" of topsoil, roll lightly and water with a fine spray.
 2. Hydroseeding: Mix specified seed, fertilize and pulverize mulch in water, using equipment specifically designed for hydroseed application. Continue mixing until uniformly blended into homogenous slurry suitable for hydraulic application. Apply slurry uniformly to all areas to be seeded. Rate of application as required to obtain specified seed sowing rate.

3.03 MULCHING

- A. Mulch materials shall be spread uniformly by hand or machine at a rate of two 50 lb. bales per 1,000 square feet.
- B. Organic Mulch Anchoring – Straw or hay mulch must be anchored immediately after spreading to prevent wind blowing.

3.04 MAINTENANCE

- A. The maintenance period shall begin immediately after seeding and shall continue until acceptance.
- B. All mulches must be inspected periodically, in particular after rainstorms, to check for rill erosion. Where erosion is observed, additional mulch shall be applied. Net should be inspected after rainstorms for dislocation or failure. If washouts or breakage occur, reinstall net as necessary after repairing damage to the slope. Inspections should take place until grasses are firmly established. Grasses shall not be considered established until a ground cover is achieved which is mature enough to control soil erosion and to survive severe weather conditions. Where mulch is used in conjunction with ornamental plantings, inspect periodically throughout the year to determine if mulch is maintaining coverage of the soil surface; repair as needed.

C. Seeding areas shall be protected and maintained by watering, reseeding, mowing, weeding, rolling, insect or disease control measures, re-fertilizing and repair of washouts which are necessary.

D. The Contractor shall maintain all seeded areas until full vegetation is established.

E. All seeded areas shall be kept free from weeds and debris, such as stones, cables, baling wire, and all slopes 4:1 or less (flatter) and level turf shall be mowed in the following manner:

1. When grass reaches a height of 4–6", mow to a height of 3".
2. At least two cuttings shall be made prior to final acceptance.

F. Following mowing, all permanent seeding grass areas (mowed and unmowed) shall receive a uniform application of slow release fertilizer hydraulically placed at the rate of 10 pounds per 100 square feet.

3.05 ACCEPTANCE

A. Inspection to determine acceptance of seeded areas will be made by the Landscape Architect, upon Contractor's written request.

1. Provide notification at least ten (10) working days before requested inspection date.

B. Seeded areas will be acceptable provided all installation and maintenance requirements have been complied with and a healthy uniform lawn is established.

C. Upon acceptance, the Owner will assume maintenance.

3.06 WARRANTY

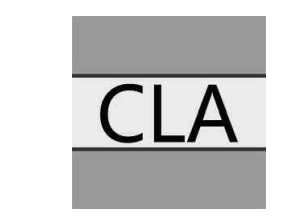
A. All seeded areas will be warranted for a period of twelve months from date of Owner's acceptance. Should any seeded areas fail to maintain full vegetation, failed areas will be refurbished until this specification is achieved at the cost of the Contractor.

END OF SECTION 02936

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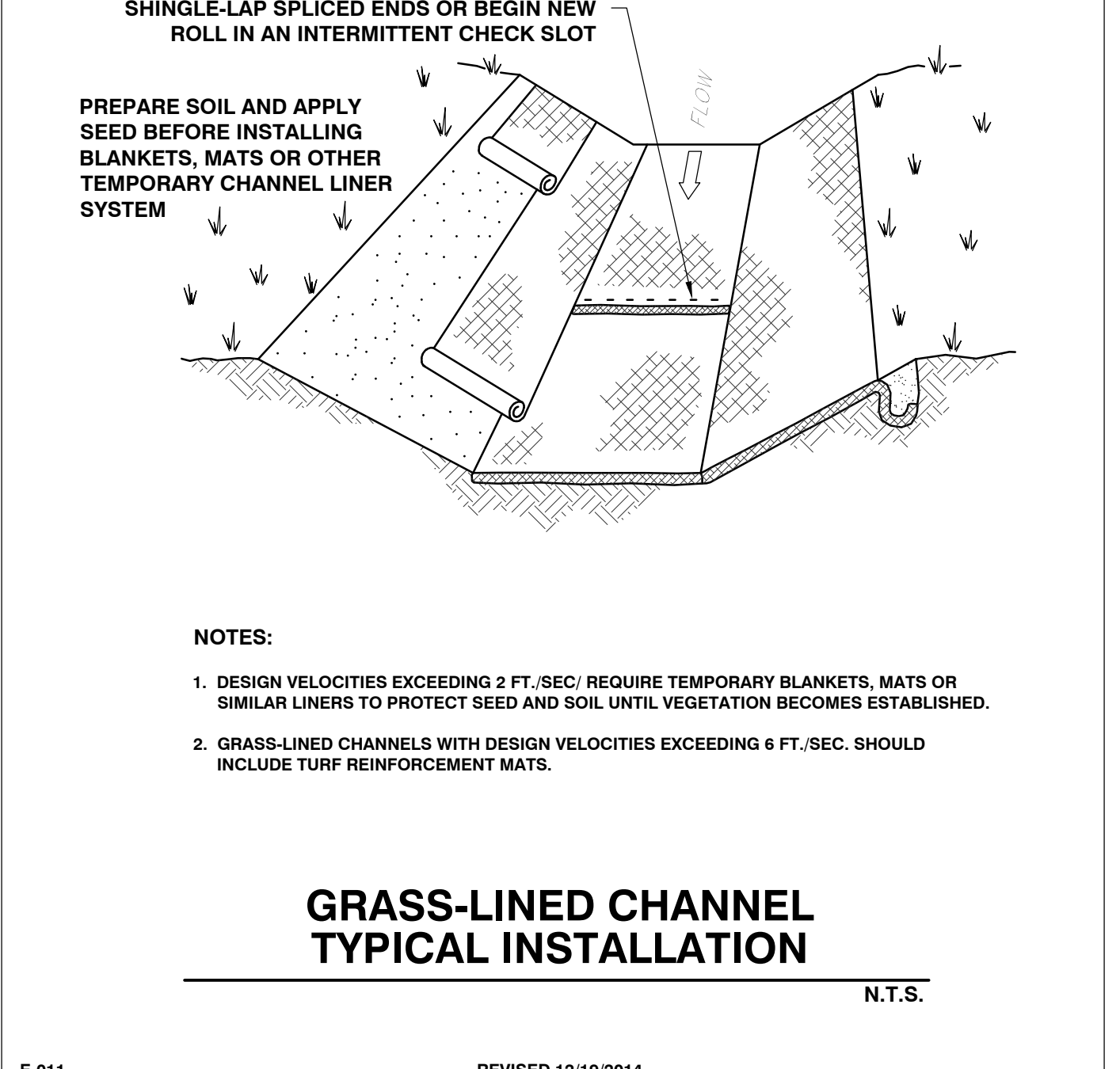
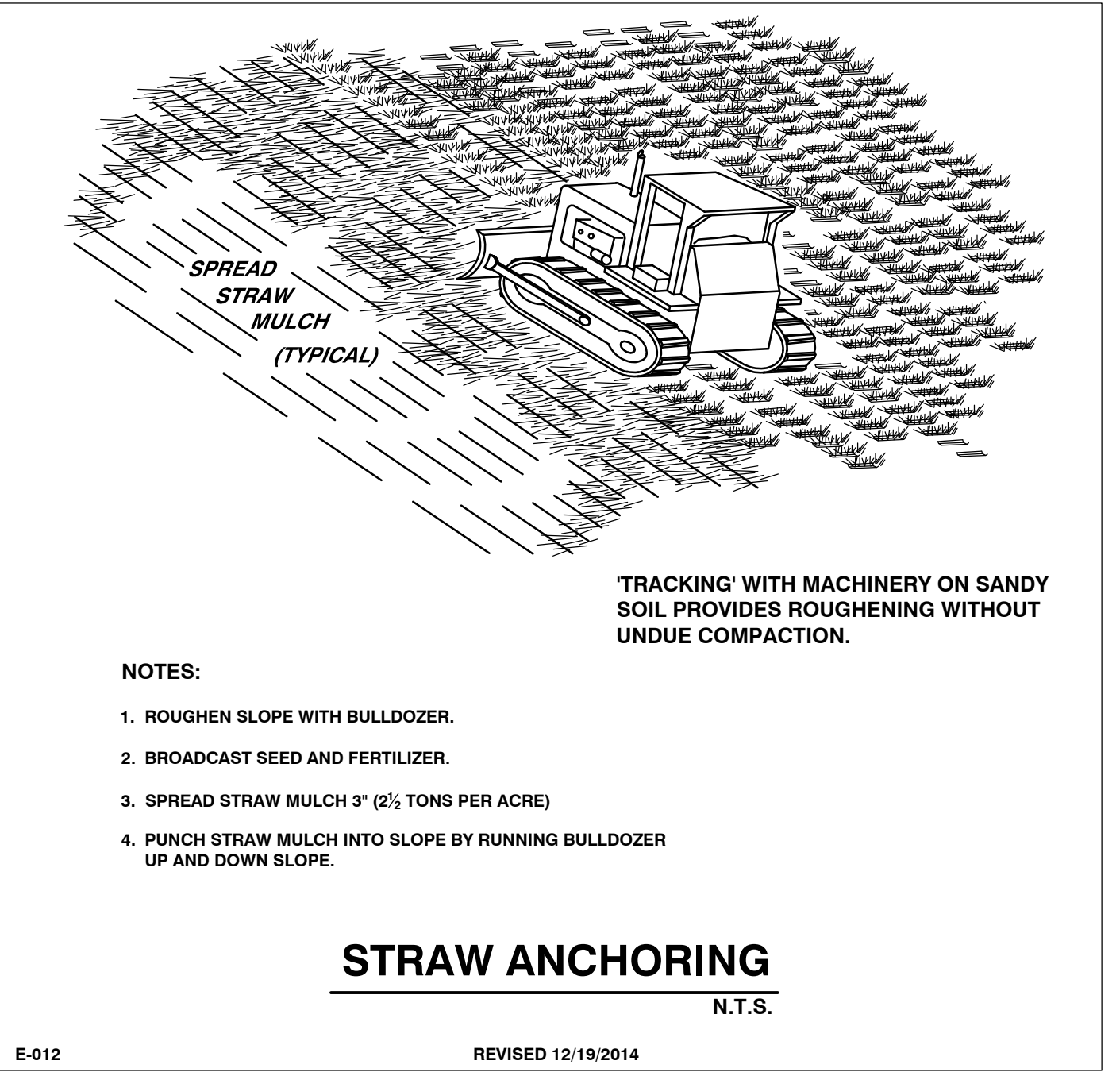
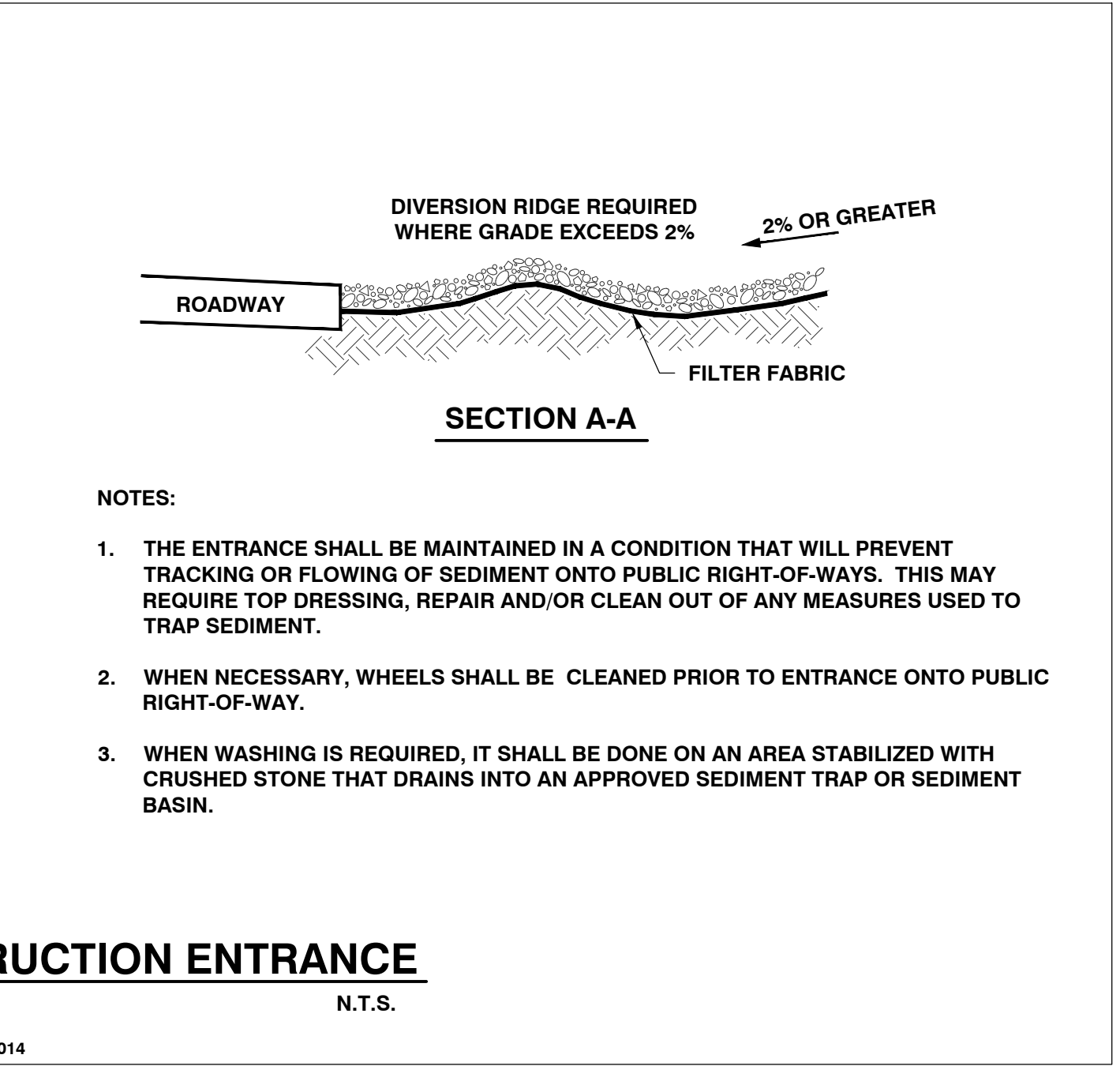
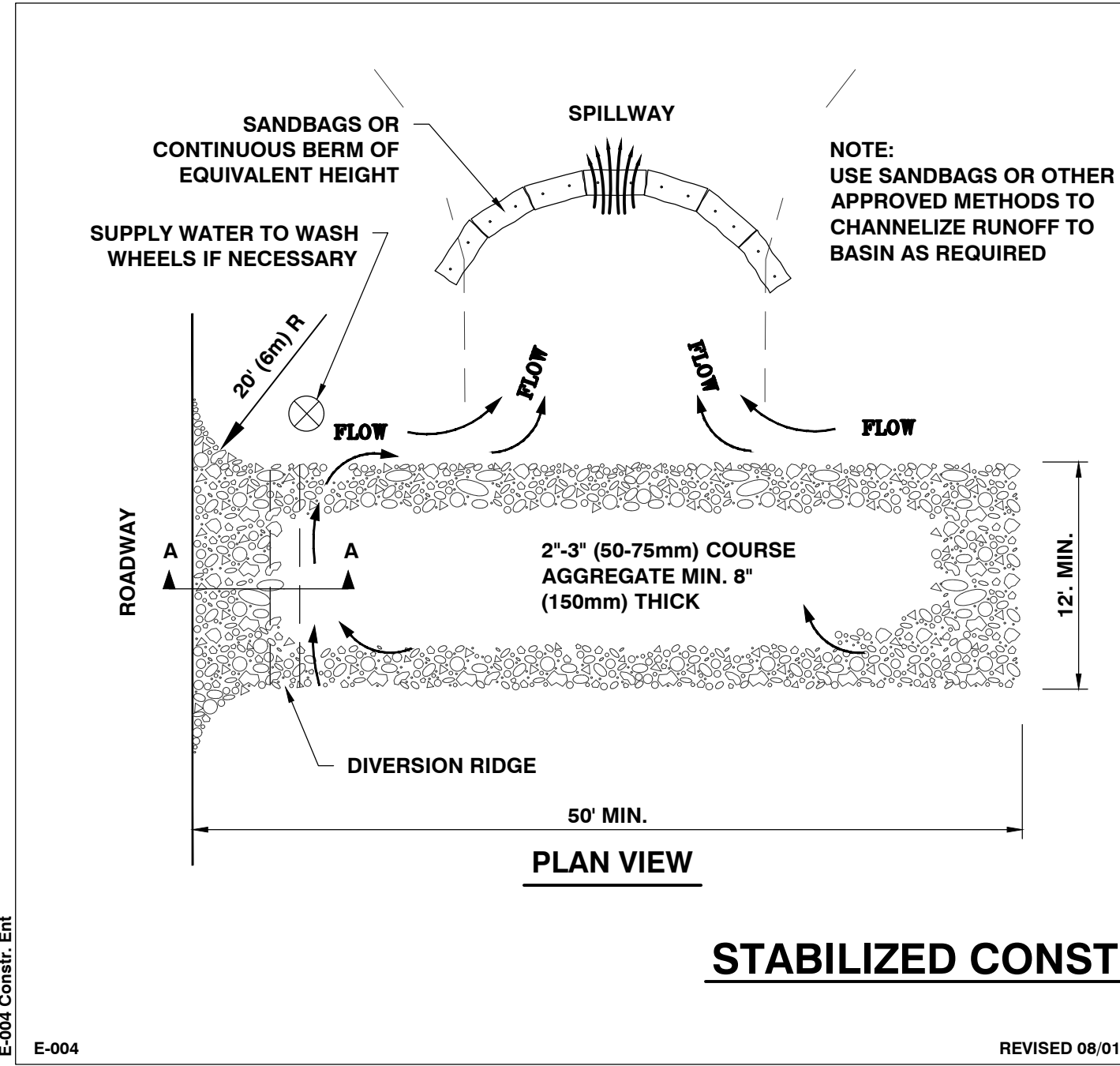
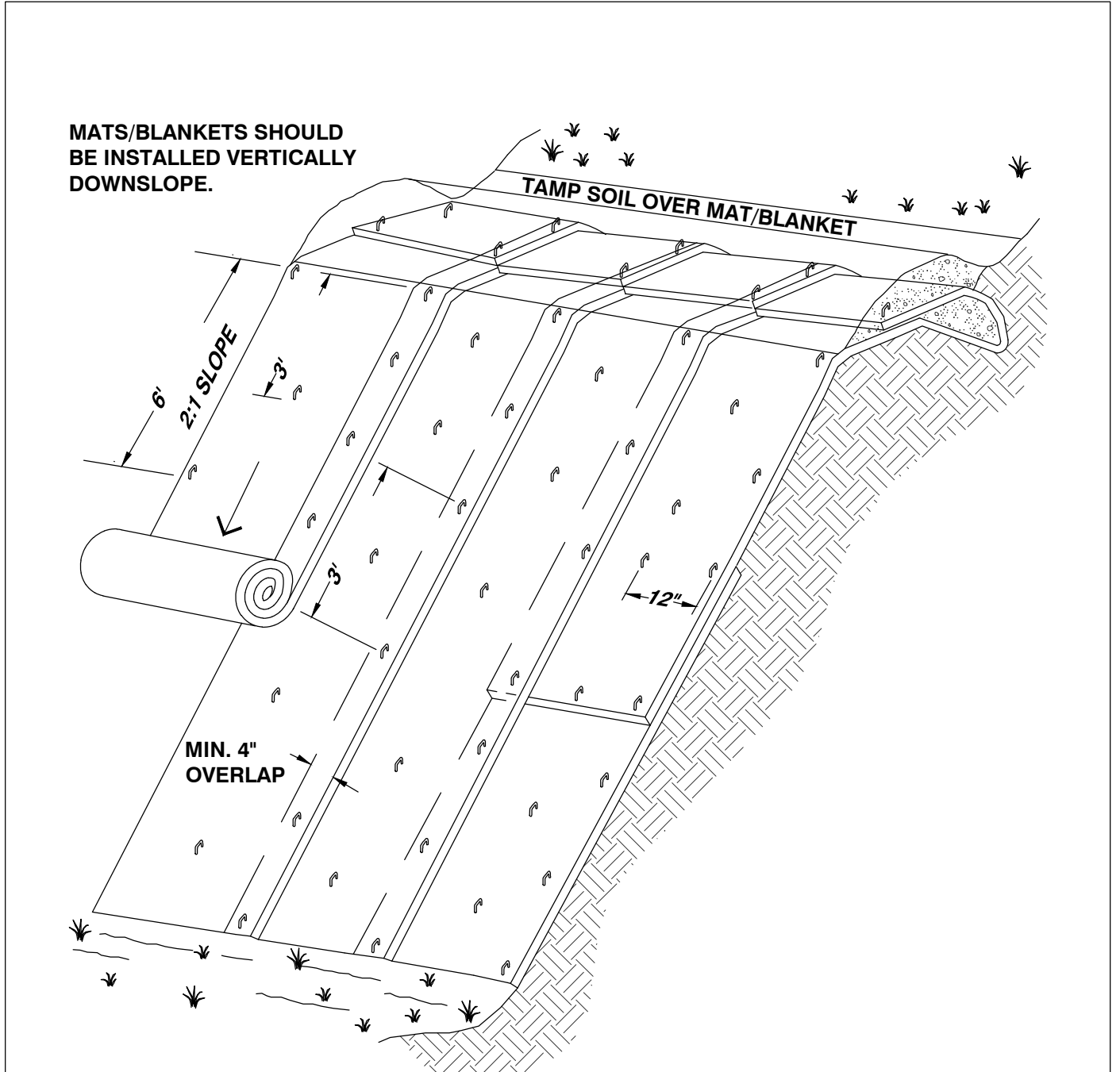
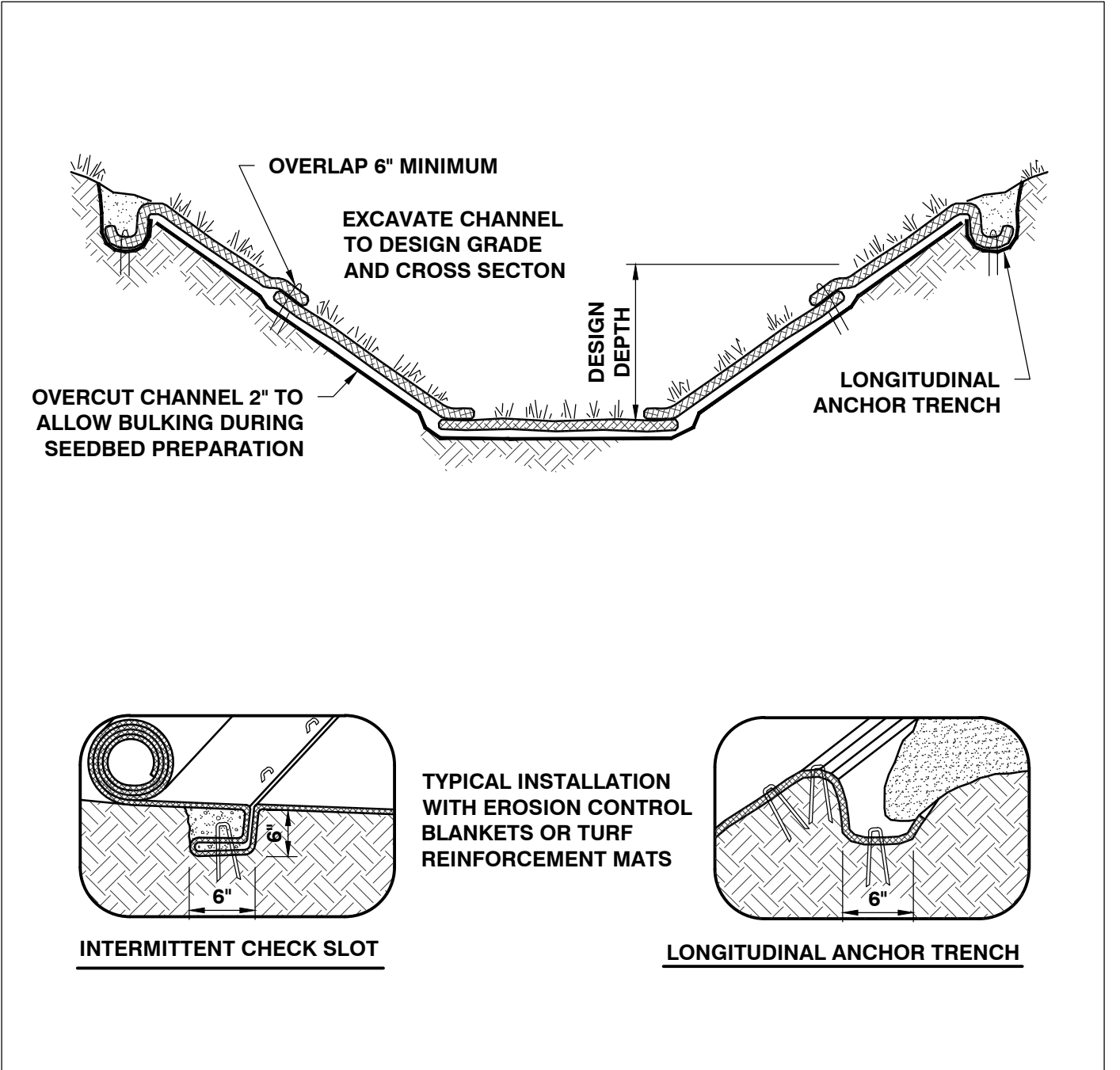
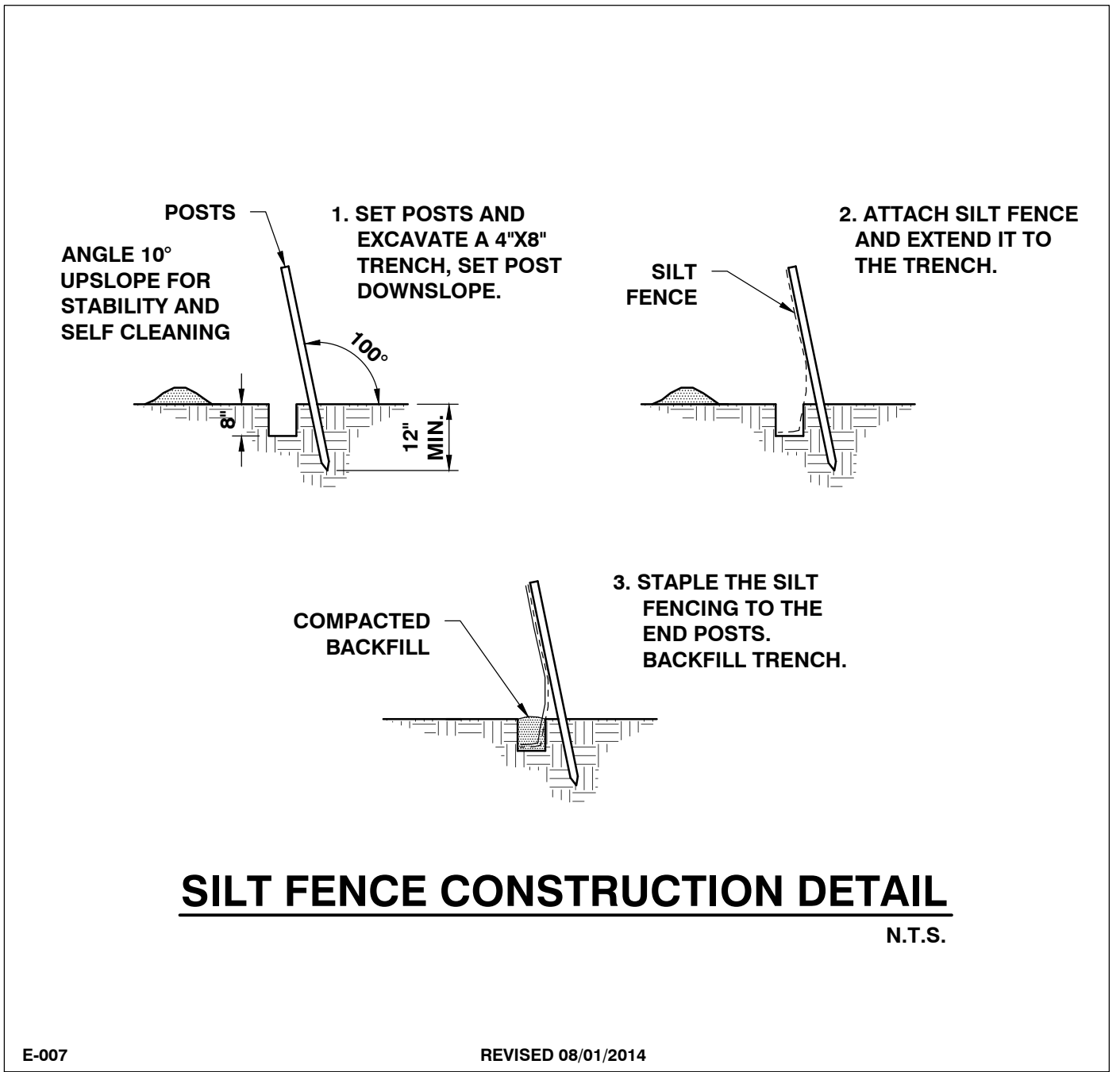
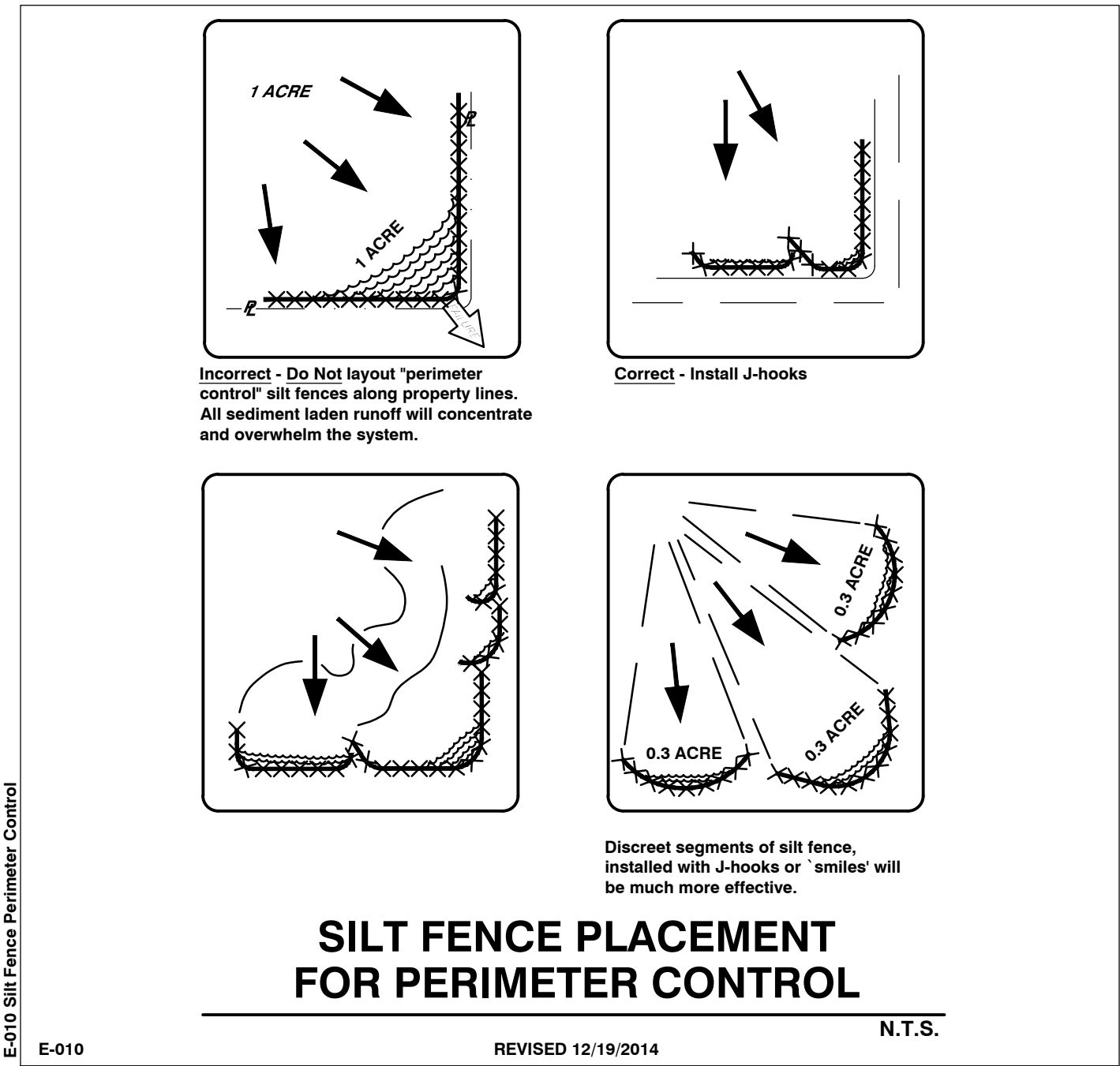
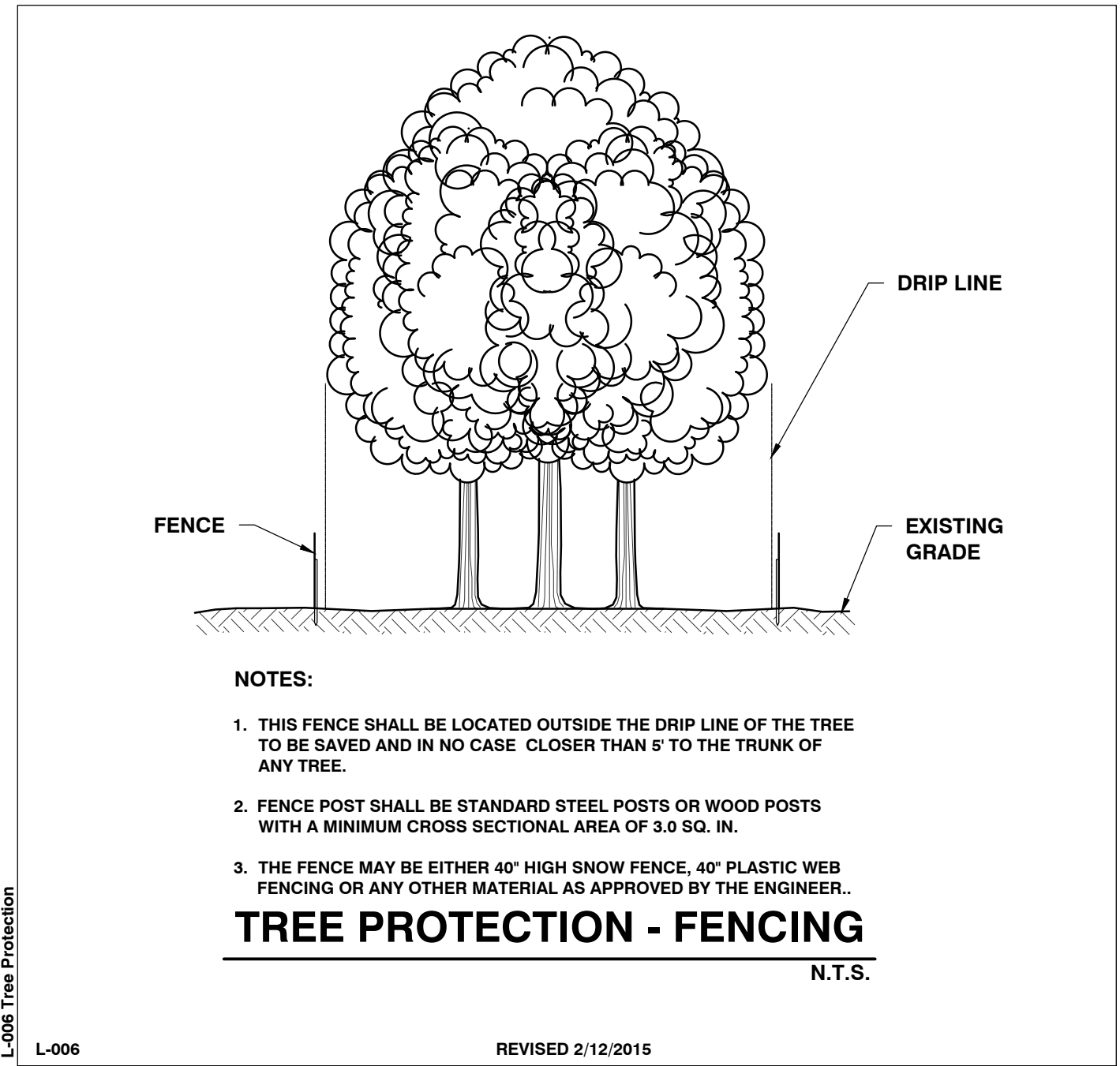
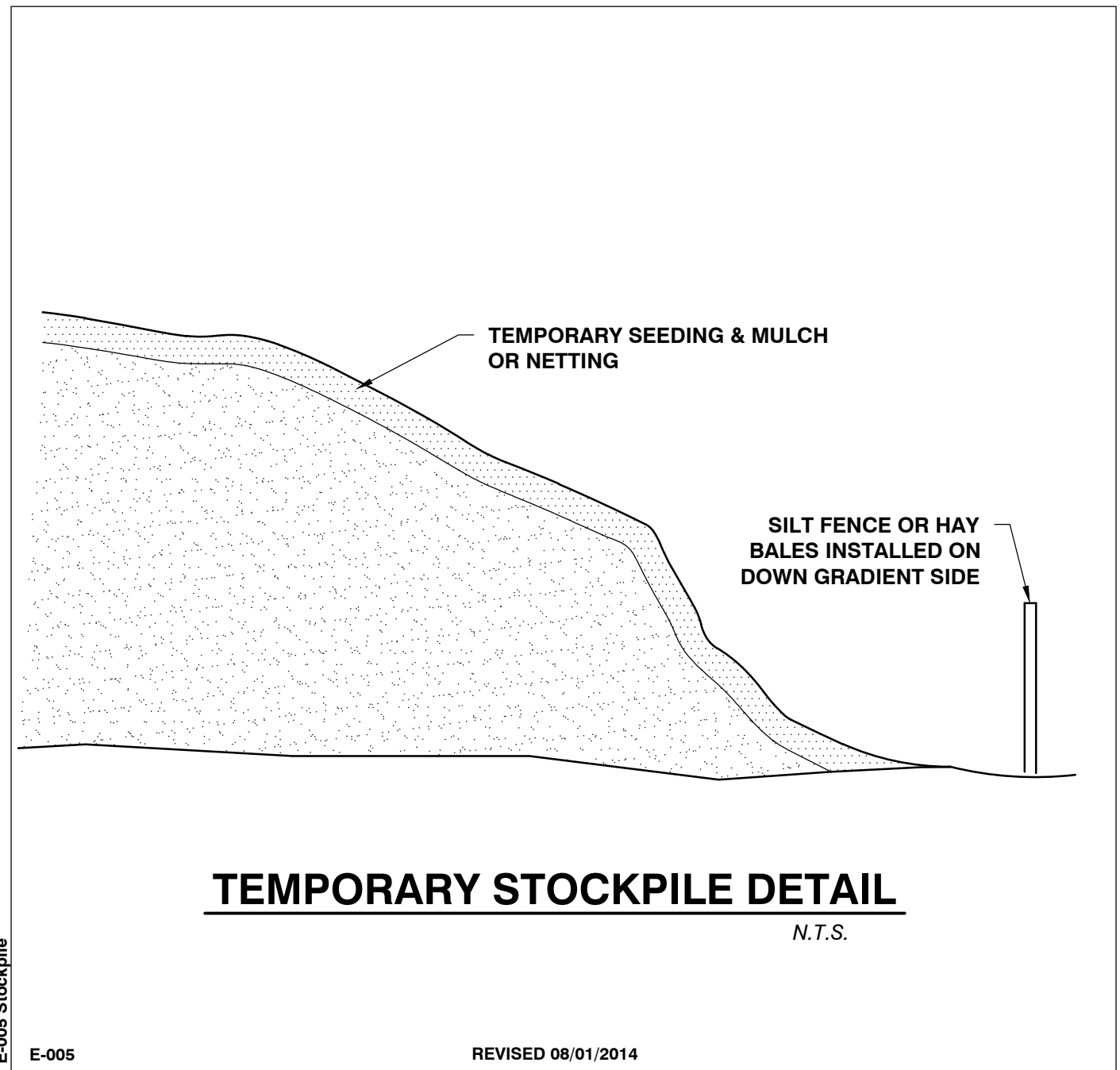
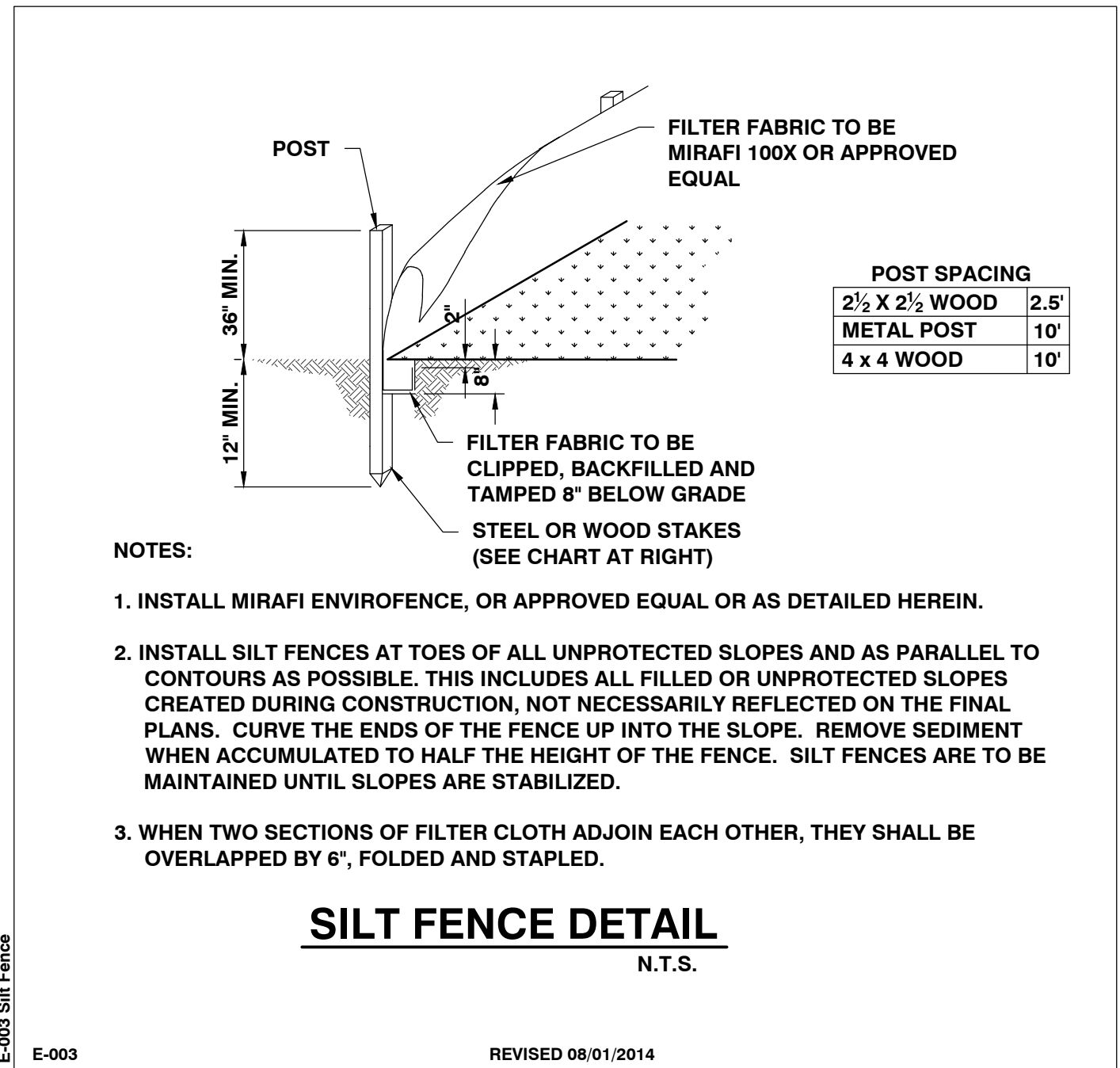
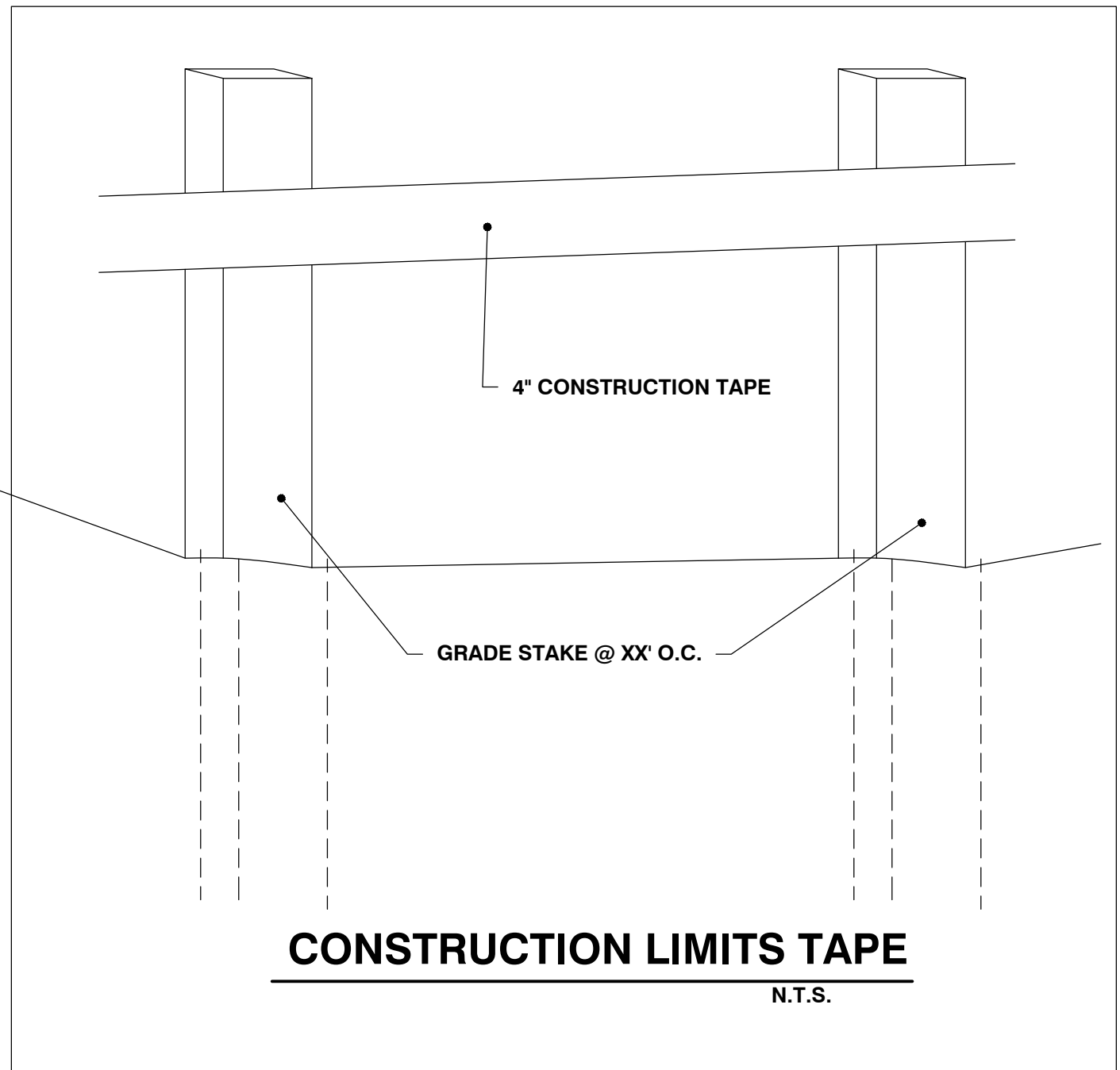
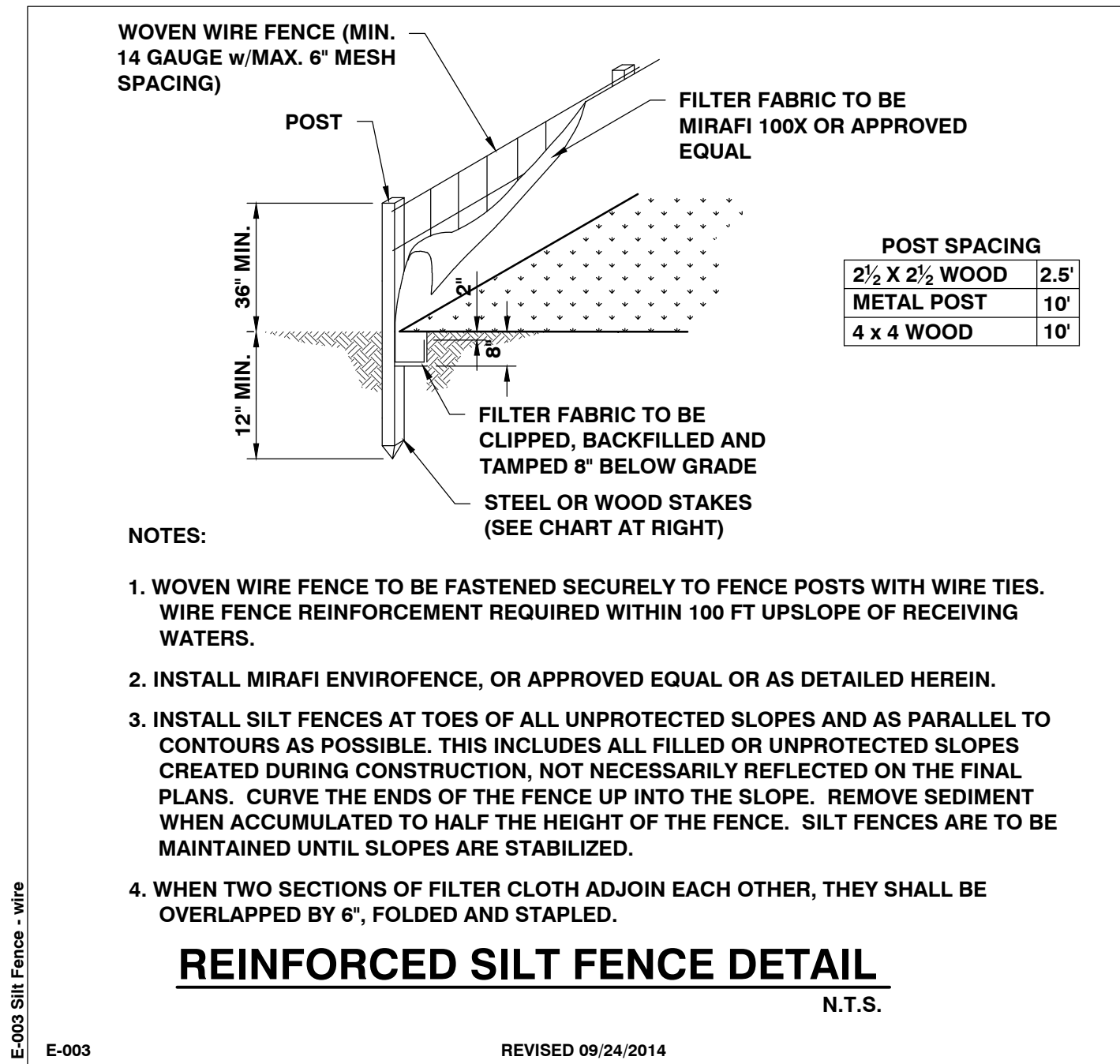
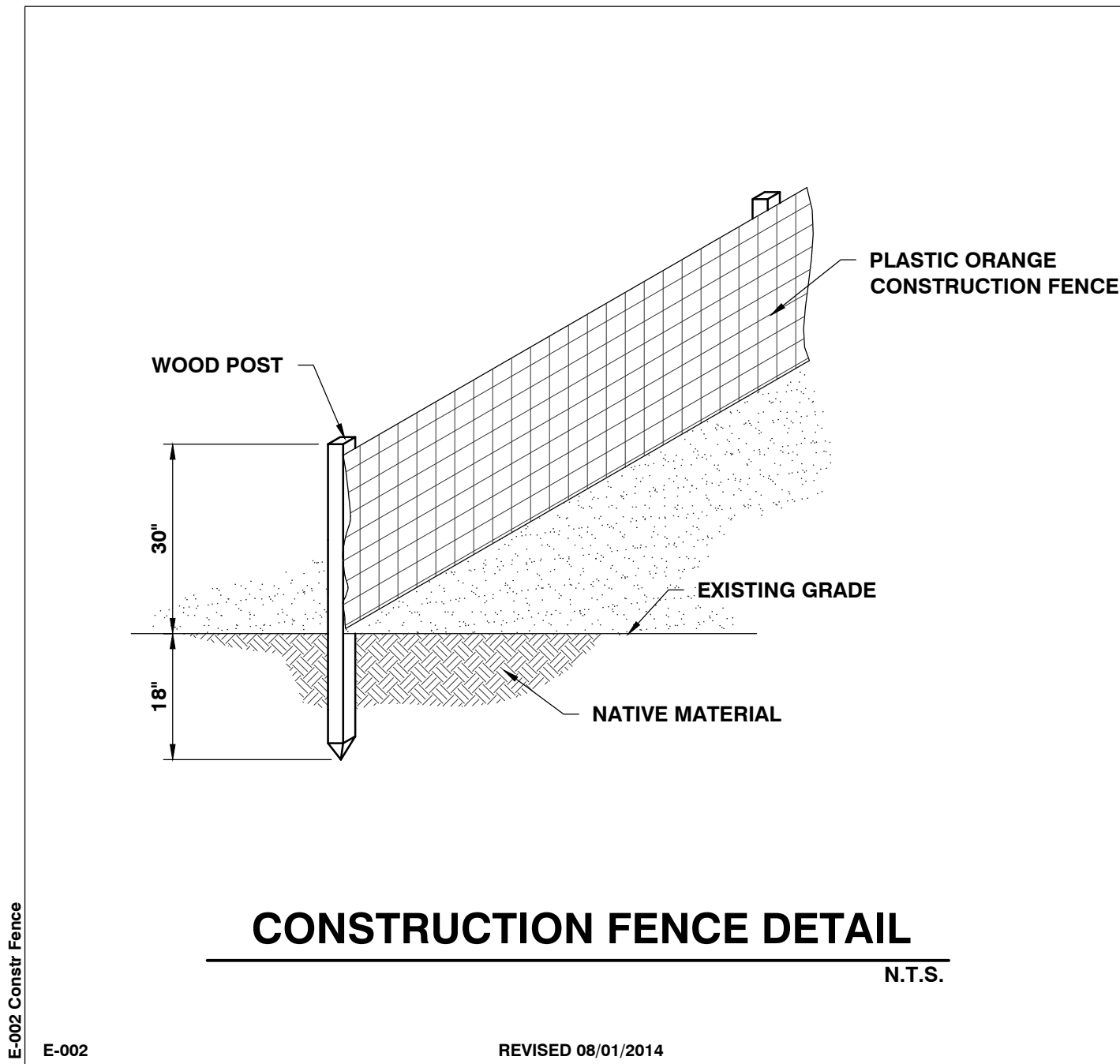
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BURLINGTON, VT

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ISSUE LOG: 200ING PERMIT DRAFT 200ING PERMIT	08/23/22 09/30/22

SHEET CONTENTS:
**EPSC
NARRATIVE**

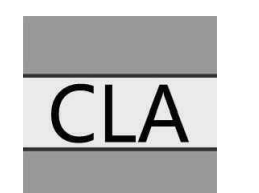
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111 PROJECT NO: 21255

ORIGINATION DATE: 07/22/2022 SCALE: AS SHOWN

DRAWN BY: MAB CHECKED BY: DSM

ISSUE LOG:
2022 PERMIT DRAFT 08/23/22
2022 PERMIT 09/30/22

SHEET CONTENTS:
EPSC DETAILS

SHEET NO:
C4.4

Winter EPSC Requirements

Introduction - Rains in late fall, thaws throughout the winter, and spring melt and rains can produce significant flows over frozen and saturated ground, greatly increasing the potential for erosion. At the same time as the erosion risk increases, the "toolbox" available to the contractor and on-site plan coordinator shrinks significantly over this period (Table 3.4 below).

Table 3.4 Effects of Winter on EPSC Practices	
EPSC Measure	Effect of Winter Conditions
Vegetative Ground Cover	Cannot be established outside of growing
Hydroseeding	Stabilizers are poor in cold conditions, poor/no growth of seed over
Diversion Structures	Difficult or impossible to implement in frozen soils.
Sedimentation Basins	Must be installed pre-ground freezing. Can be overwhelmed by spring flows
Silt Fence	Difficult to install in frozen ground. Often fail during spring melt.
Erosion Blankets	Cannot be installed correctly on frozen ground. Improper installations (not keyed in) melt flows, wash away in melt flows.
Grassed line swales	Installation following ground freezing difficult, leaving unprotected concentrated flows with significant erosion potential
Impervious Stabilization	Paving, other measures cannot be completed in winter

In particular, establishing vigorous vegetation during winter construction is not possible. Based upon the activities anticipated to be undertaken during this period, the Contractor shall plan and implement the following Winter EPSC measures.

EPSC Plan Requirements for -Winter Shutdown-

For those projects that will complete earth disturbance activities prior to the winter period (October 15), the following must be implemented by the Site Contractor in coordination with the On-Site Plan Coordinator:

- For areas to be stabilized by vegetation, all seeding shall be completed no later than September 15 to ensure adequate growth and cover.
- Non-vegetative stabilization of all areas of disturbed soils without existing vegetation shall be completed no later than October 15.
- When mulch is used as a temporary means of stabilization, the rate of application shall be double that of the regular construction season rate, or roughly 2 inches of mulch with 80-90% cover. Mulch should be tracked in when weather permits or stabilized with netting or an approved tackifier.

EPSC Plan Requirements for -Winter Construction-

If construction activities involving earth disturbance continue past October 15 or begin before April 15, the following must be implemented by the Owner/Site Contractor:

- Enlarged stabilized access points to provide for snow stockpiling.
- Limits of disturbance flagging moved or replaced to reflect the boundaries of winter work.
- A snow management plan which implements the following requirements:
 - adequate storage and control of snowmelt by diverting these flows around the work area,
 - cleared snow is to be stored down gradient of all areas of disturbance
 - Storage of snow in stormwater treatment structures is prohibited.
 - All drainage structures shall be kept open and free of snow/ice.
 - buffer is to be maintained from the perimeter controls such as silt fence to allow for snow clearing and maintenance.
 - Install silt fence a minimum of 25 feet down gradient of areas of disturbance and snow storage areas. Reinforce fence in areas where snow load forces may be an issue due to site constrictions.
- In areas of disturbance within 100 feet of a receiving water, silt fence shall be reinforced or else replaced with perimeter dikes, swales, or other practices resistant to the forces of snow loads.
- All silt fence and other practices requiring earth disturbance shall be installed ahead of ground freezing.
- Where mulch is the selected stabilization measure, the mulch shall be installed at double the standard rate of mulch, or roughly 2 inches of mulch with 80-90% cover.
- Mulch should be tracked in when weather permits or stabilized with netting or an approved tackifier to prevent removal by wind.
- To ensure cover of disturbed soil in advance of a melt event, areas of disturbed soil must be stabilized at the end of each work day, with the following exceptions:
 - If no precipitation within 24 hours is forecast and work will resume in the same disturbed area within 24 hours, daily stabilization is not necessary.
 - Disturbed areas that collect and retain runoff, such as house foundations or open utility trenches.
- Directions to remove snow or ice to less than 1" thickness prior to temporary or permanent stabilization.
- Stone stabilization shall be installed a width of 10 to 20ft wide around the perimeter of buildings under construction, where construction vehicle traffic is anticipated.

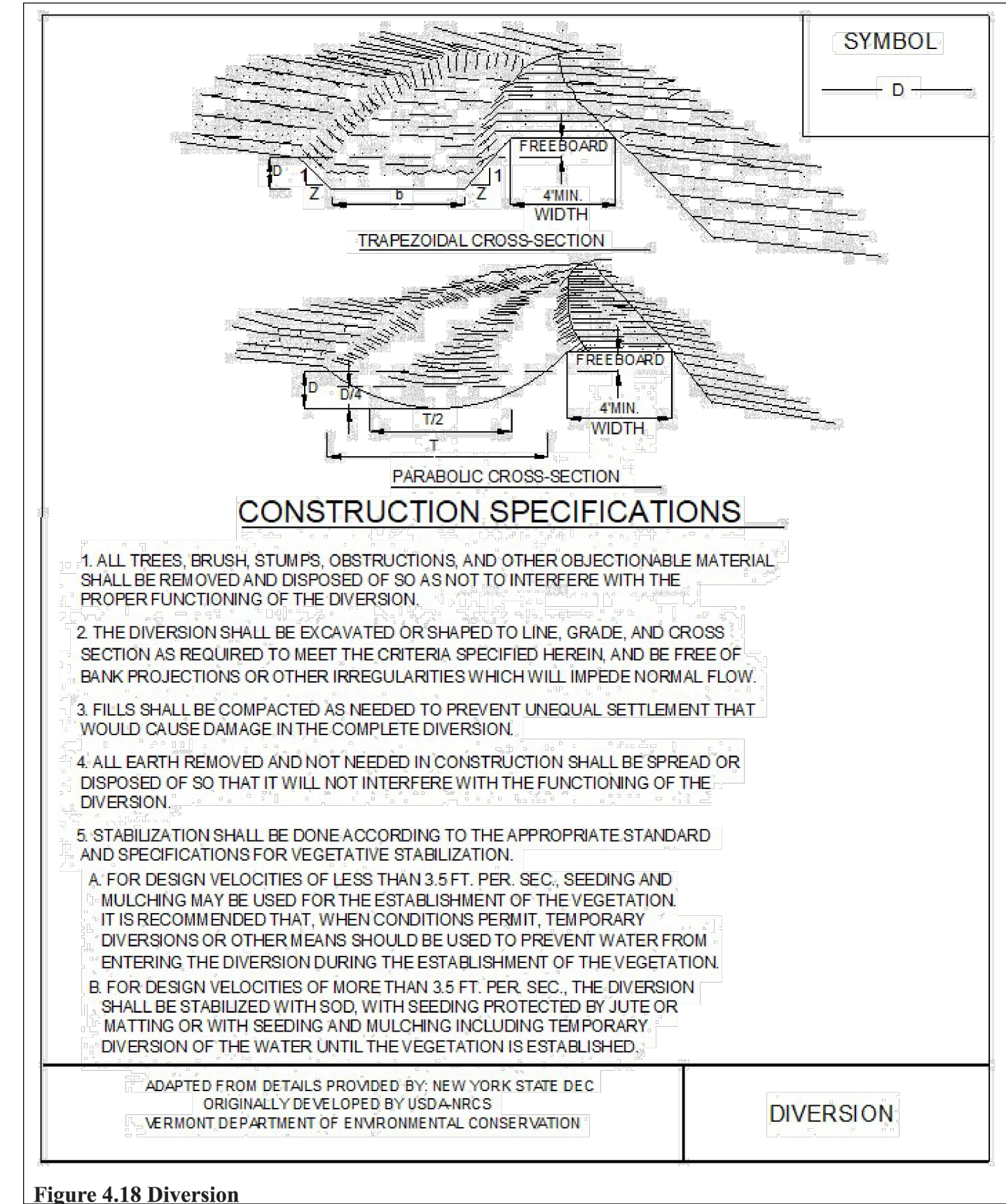
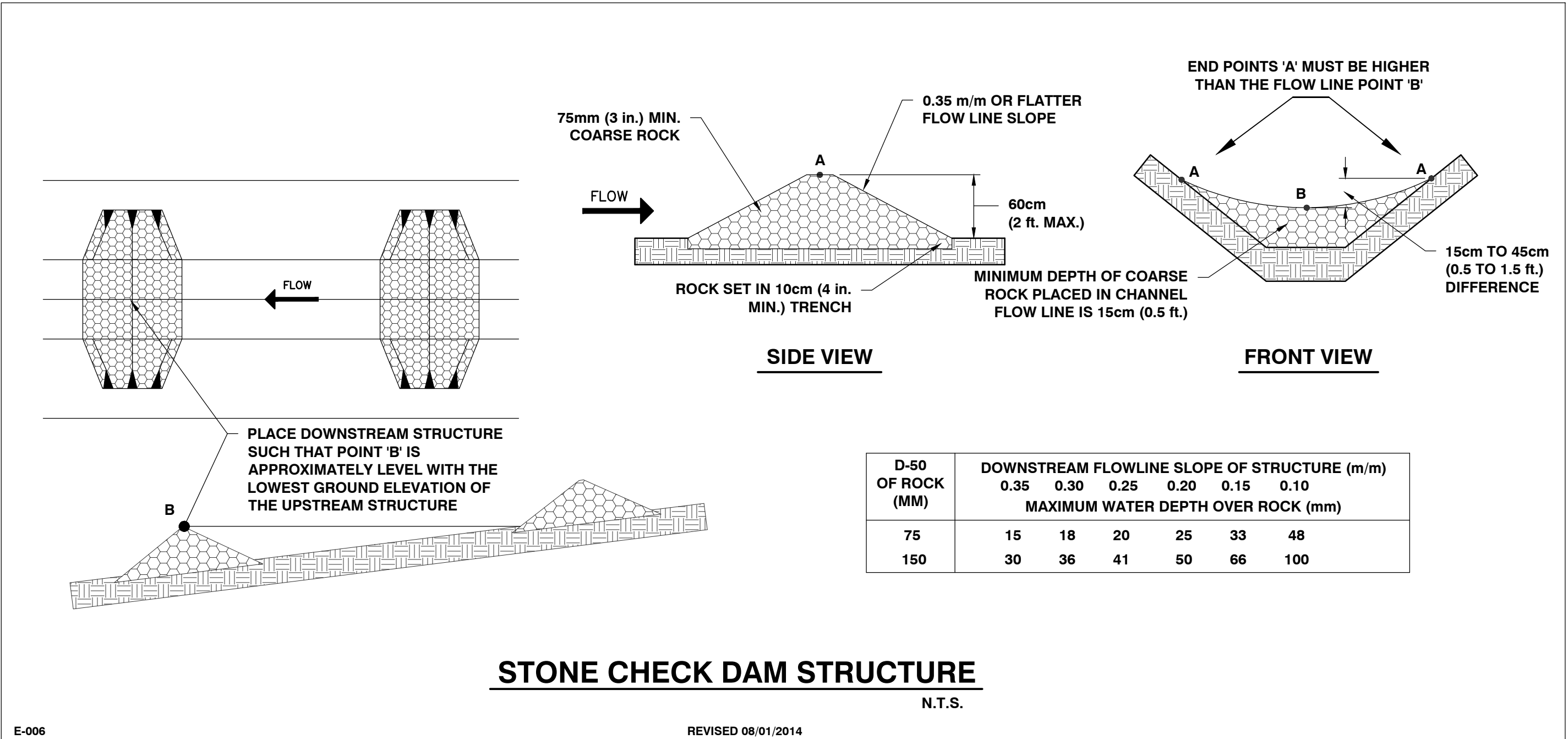
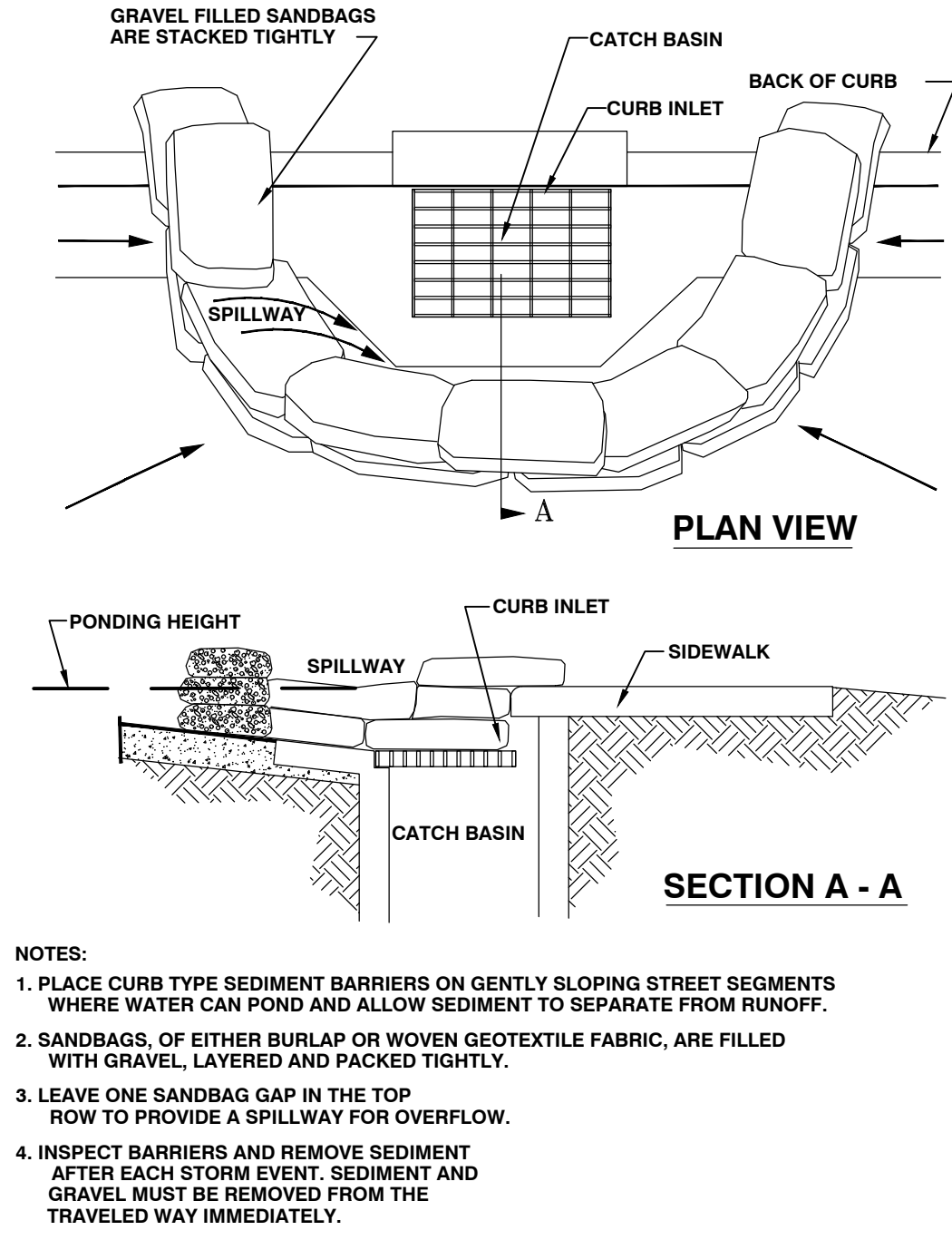
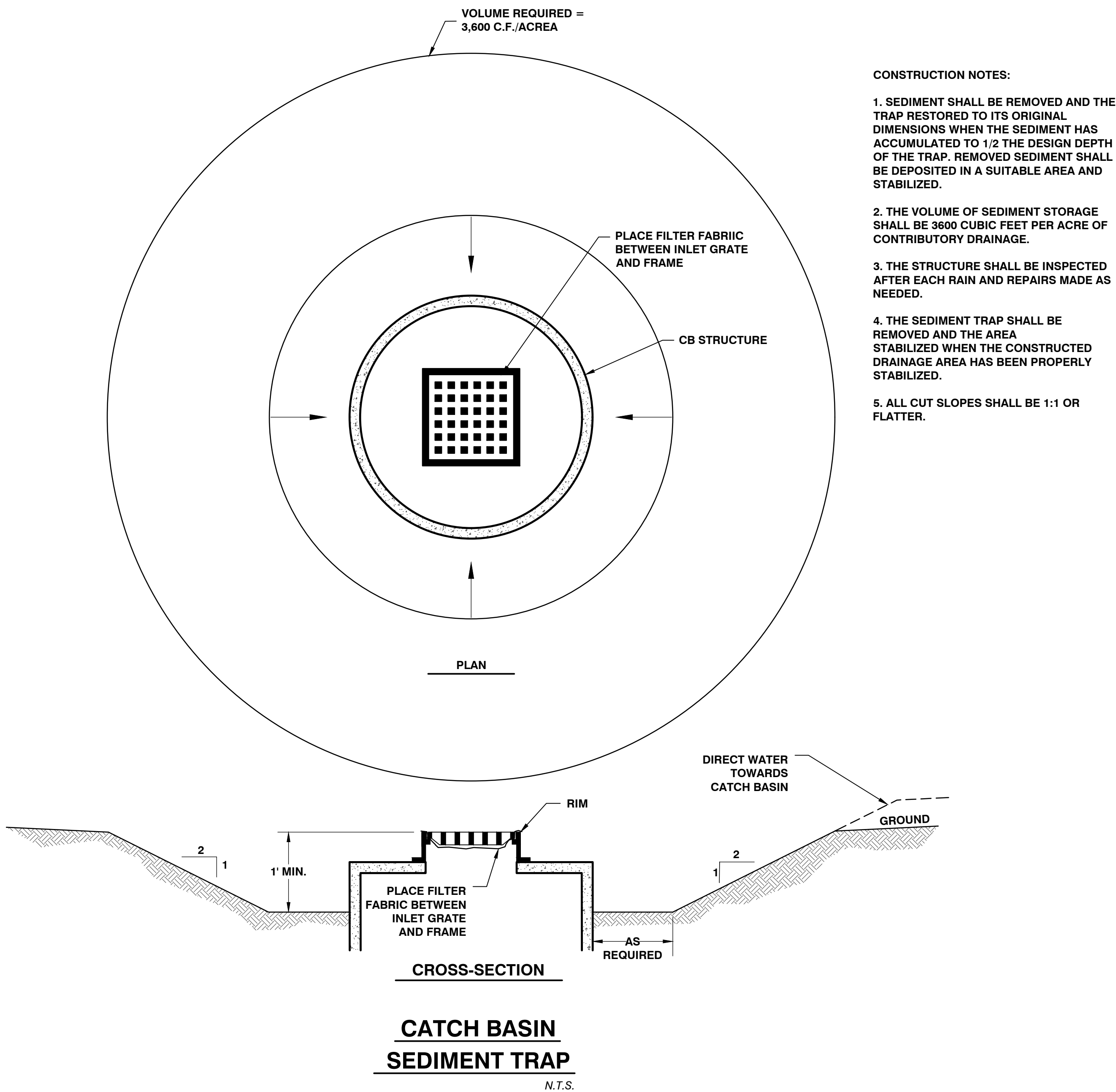
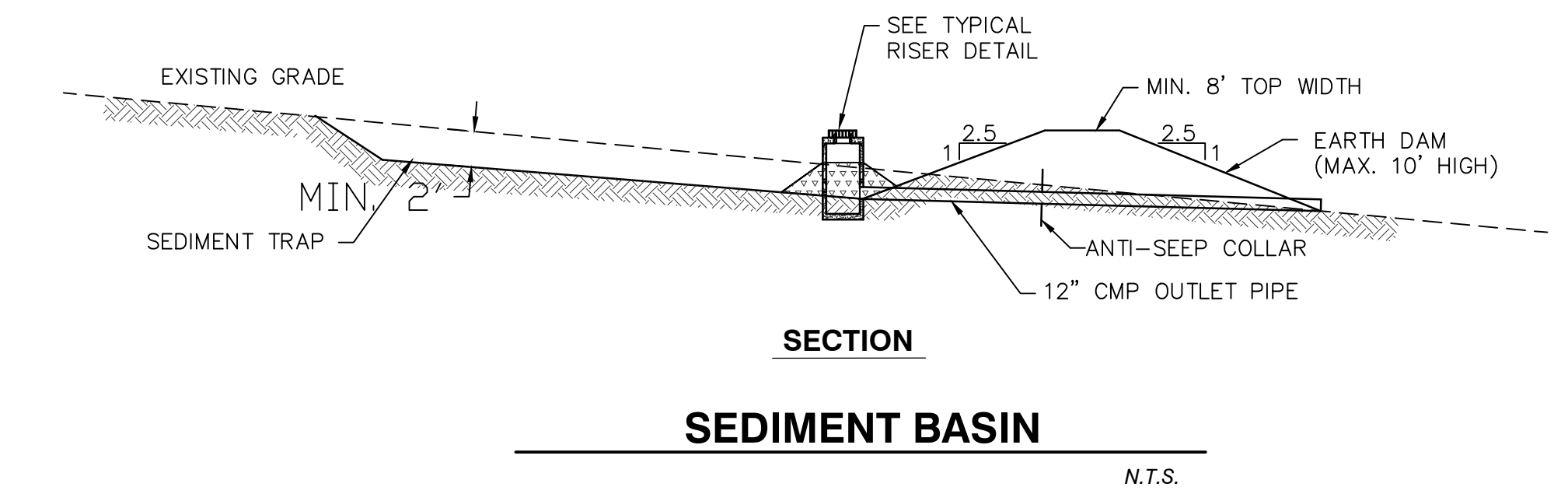
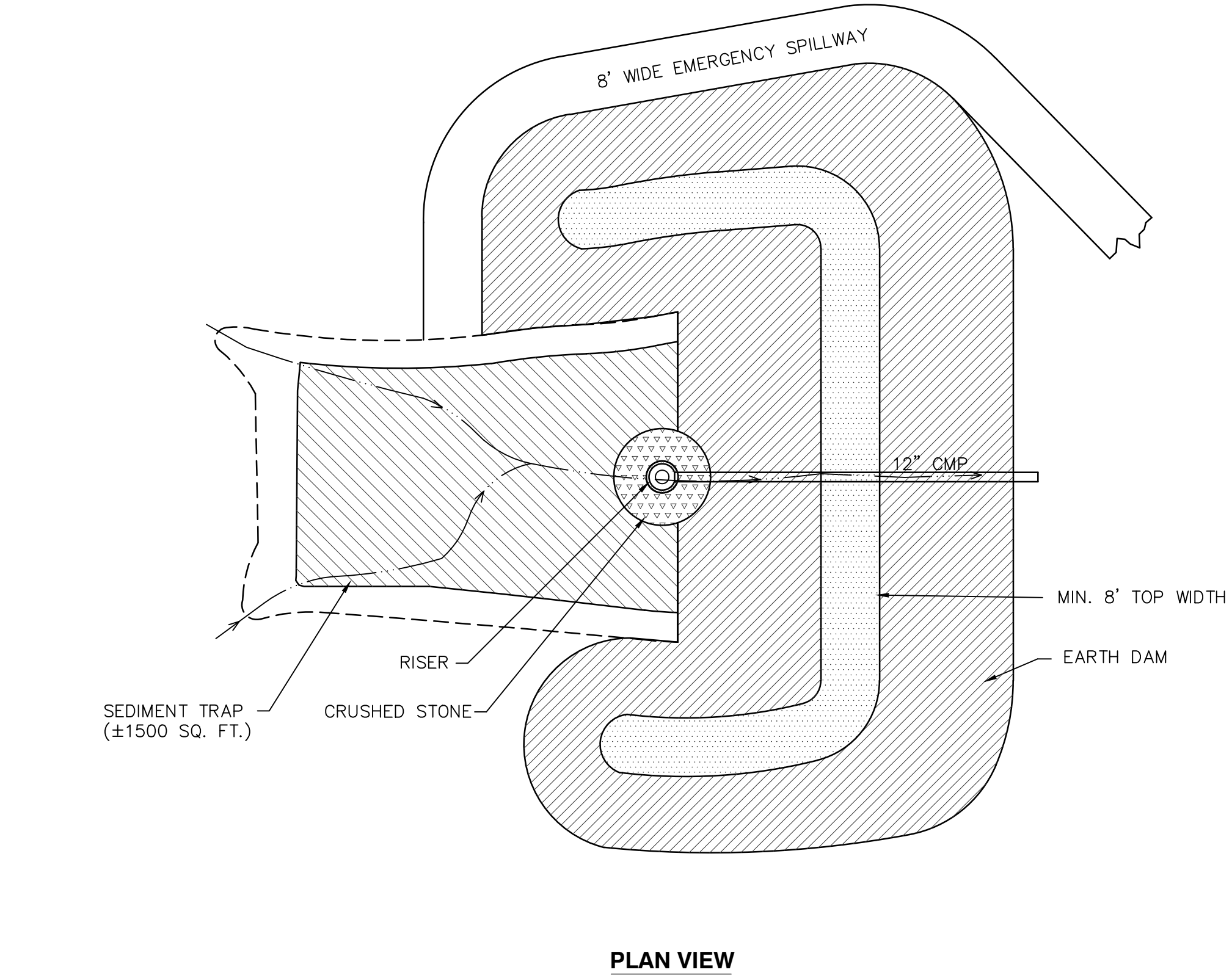
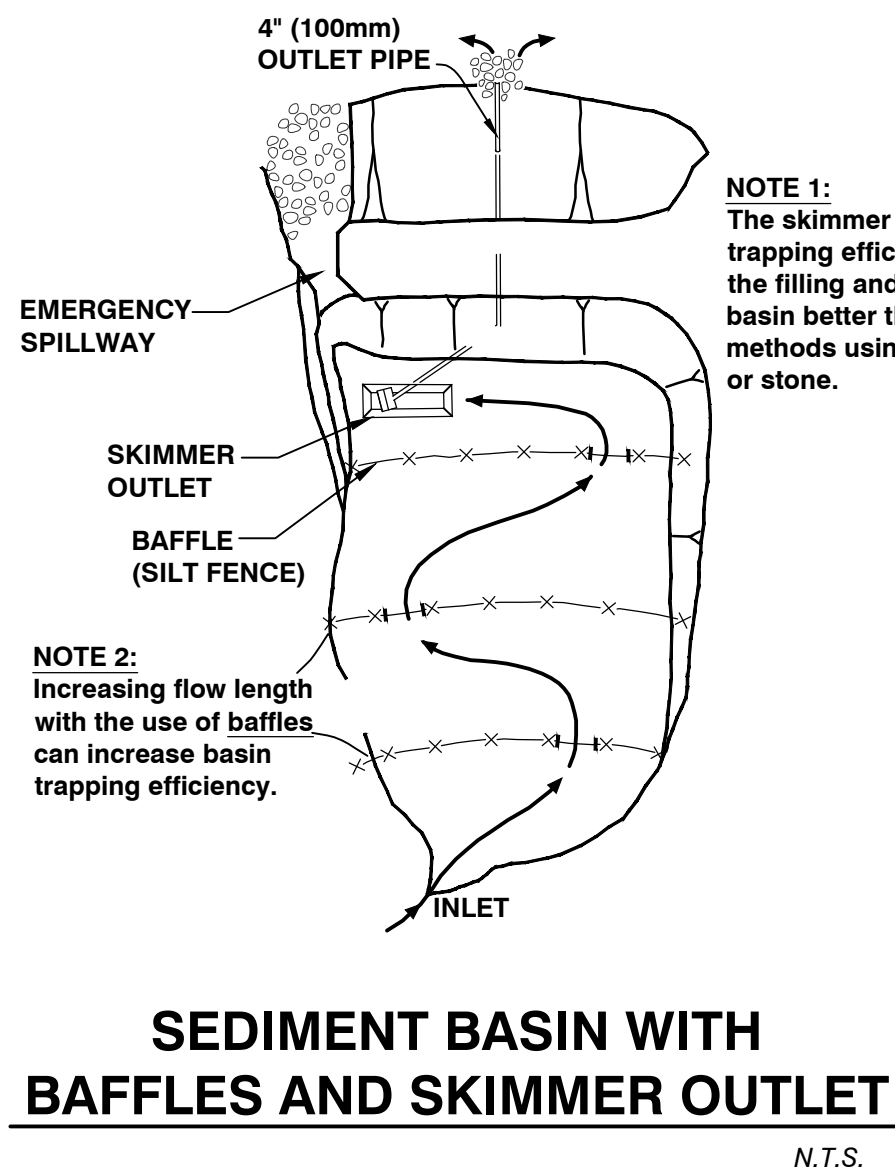
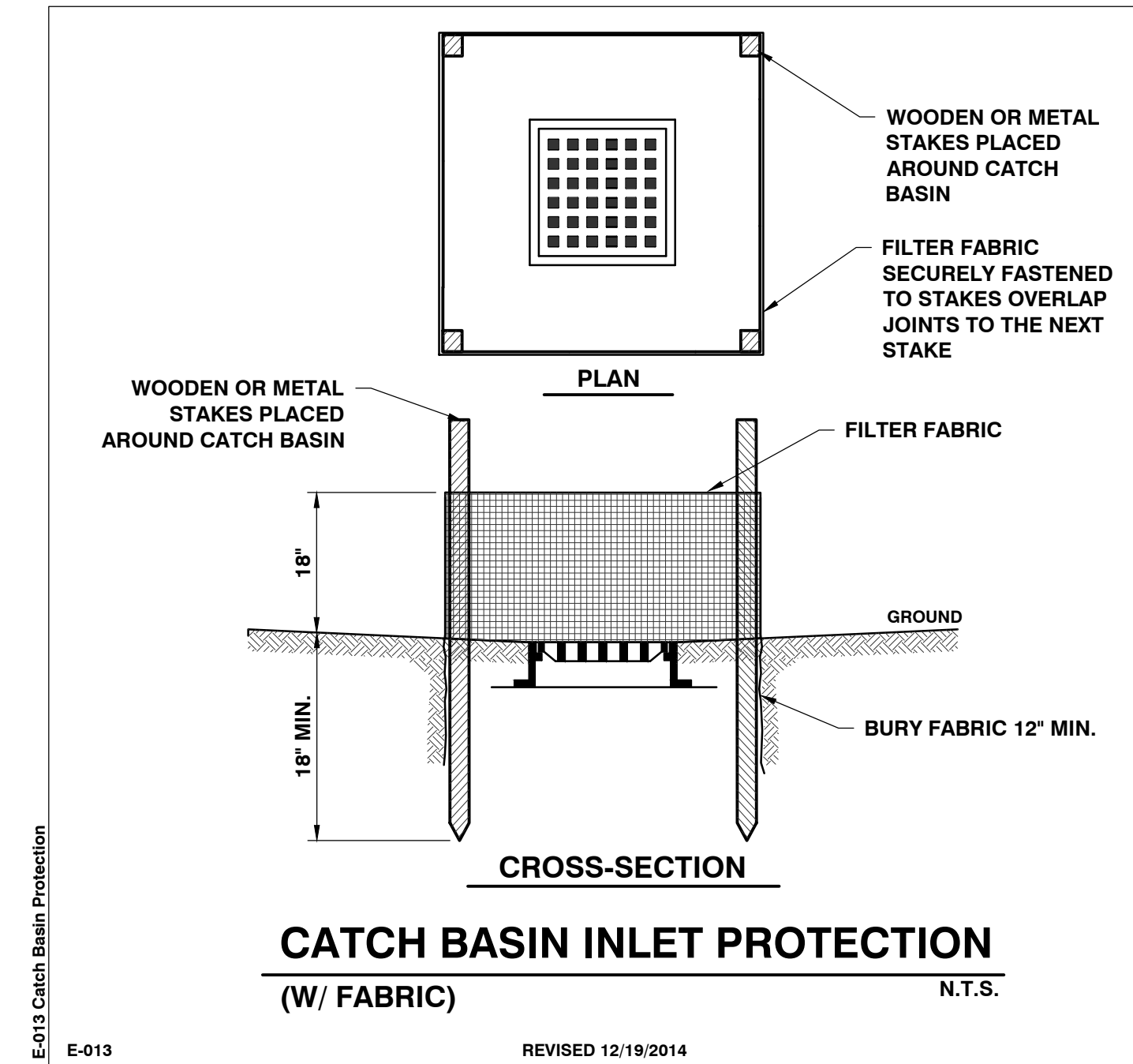


Figure 4.18 Diversion



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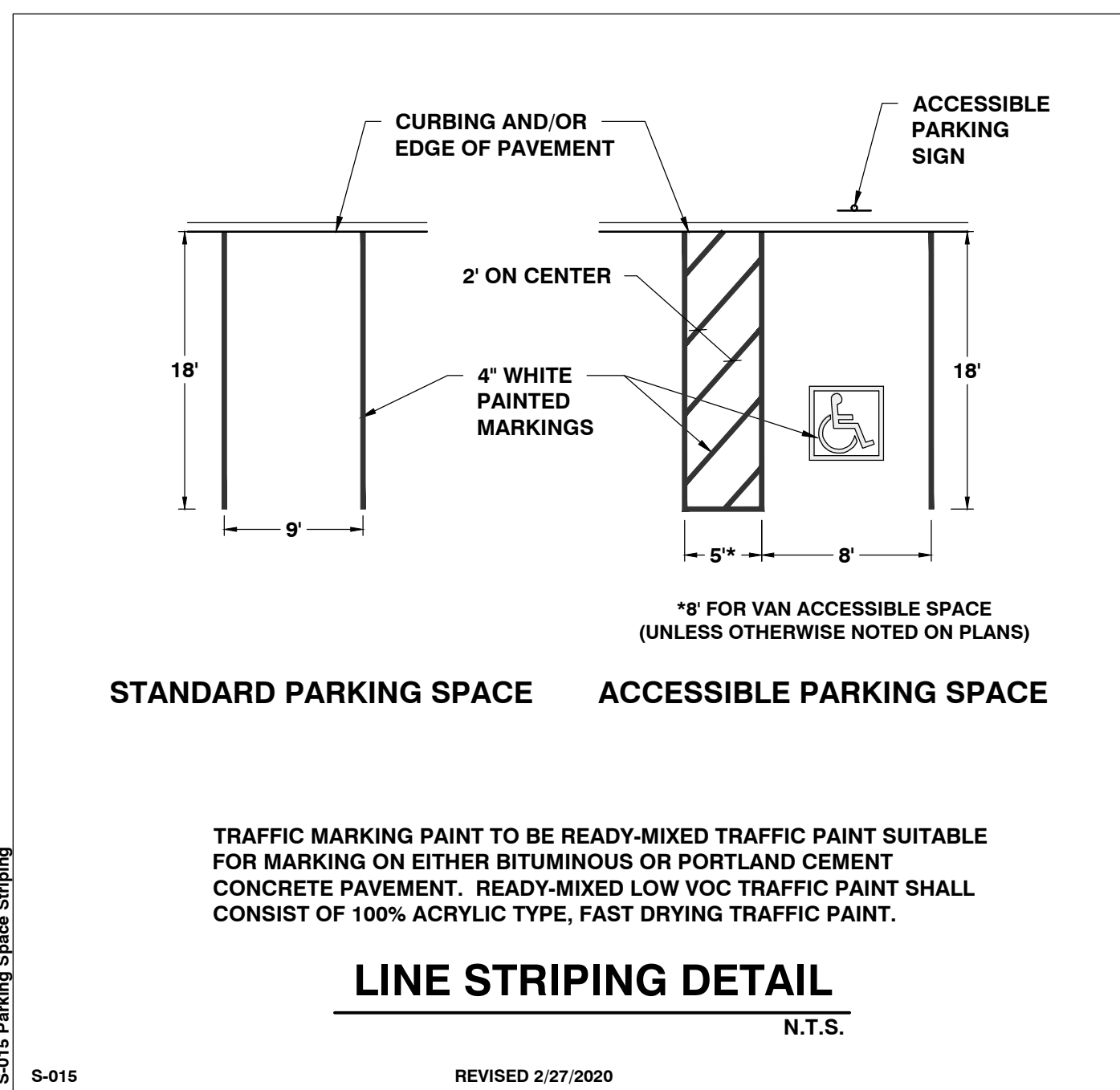
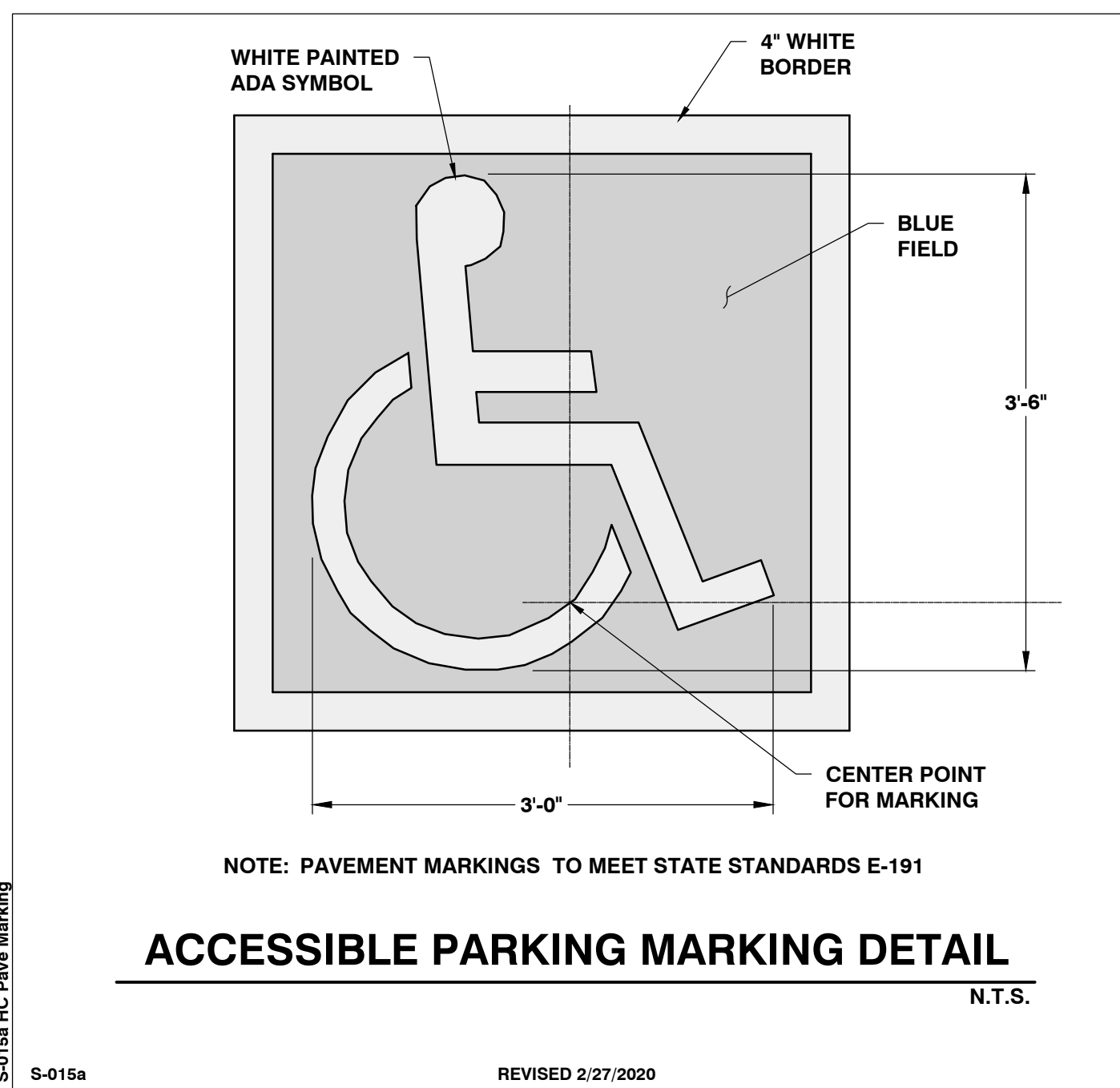
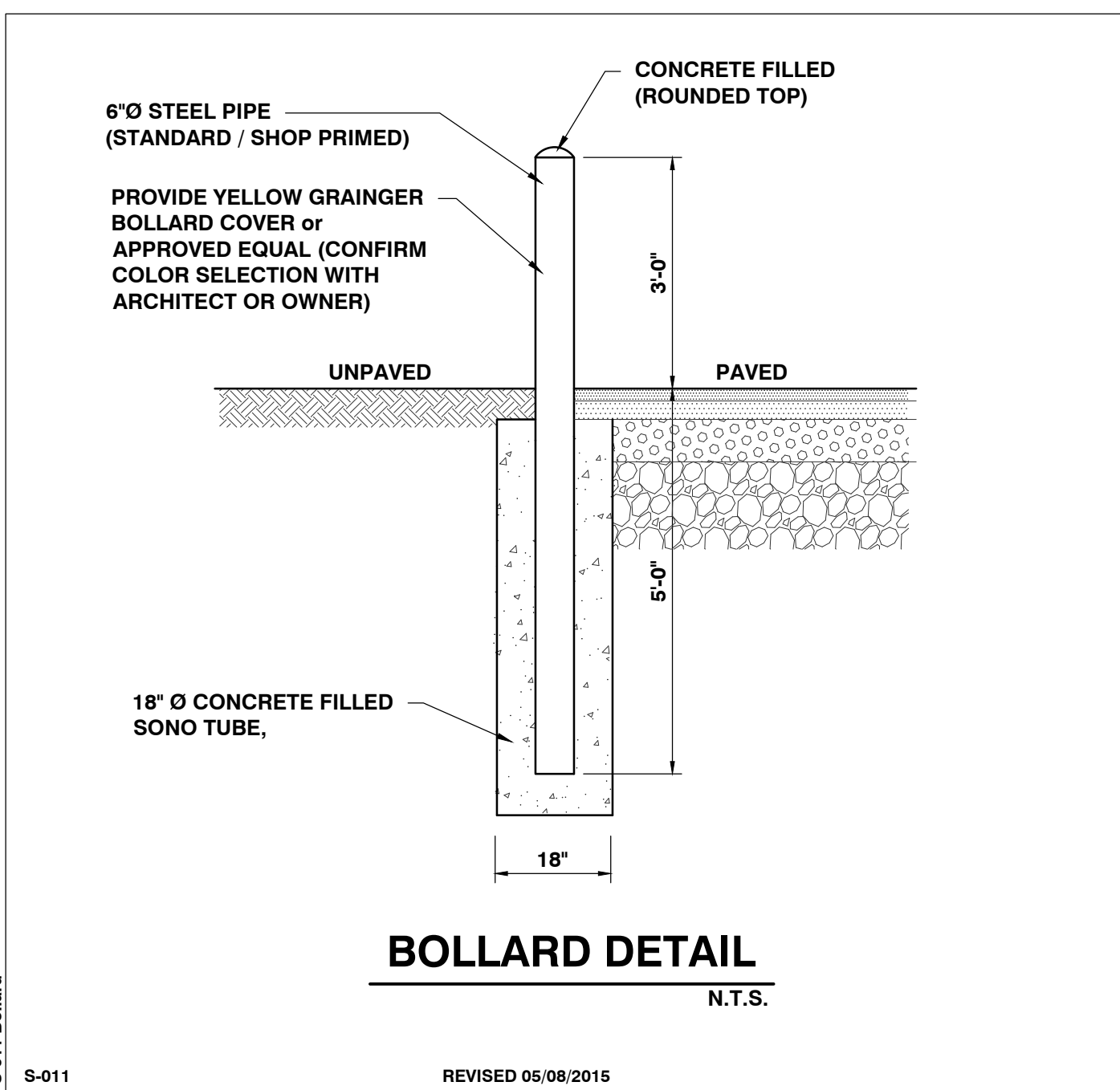
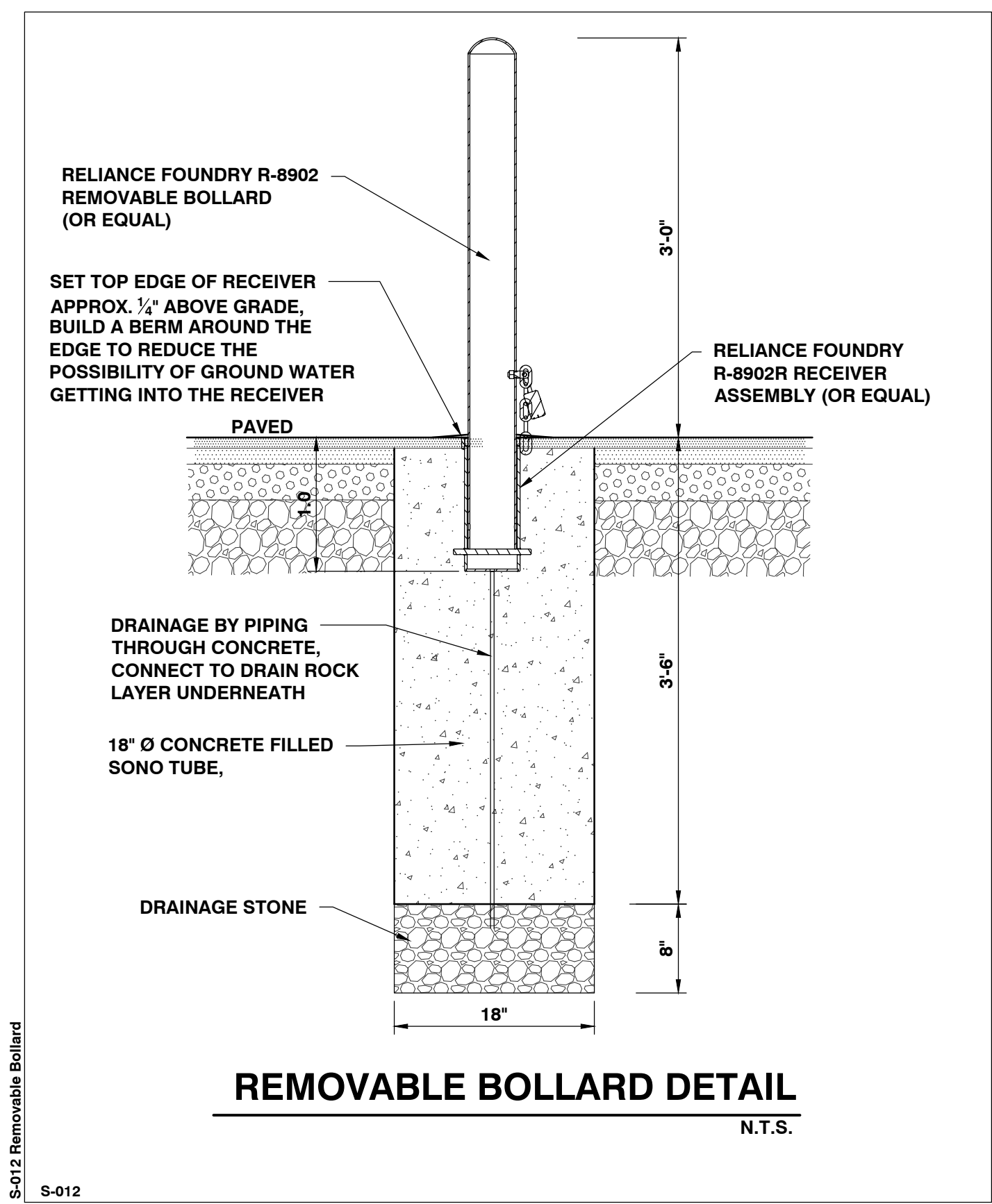
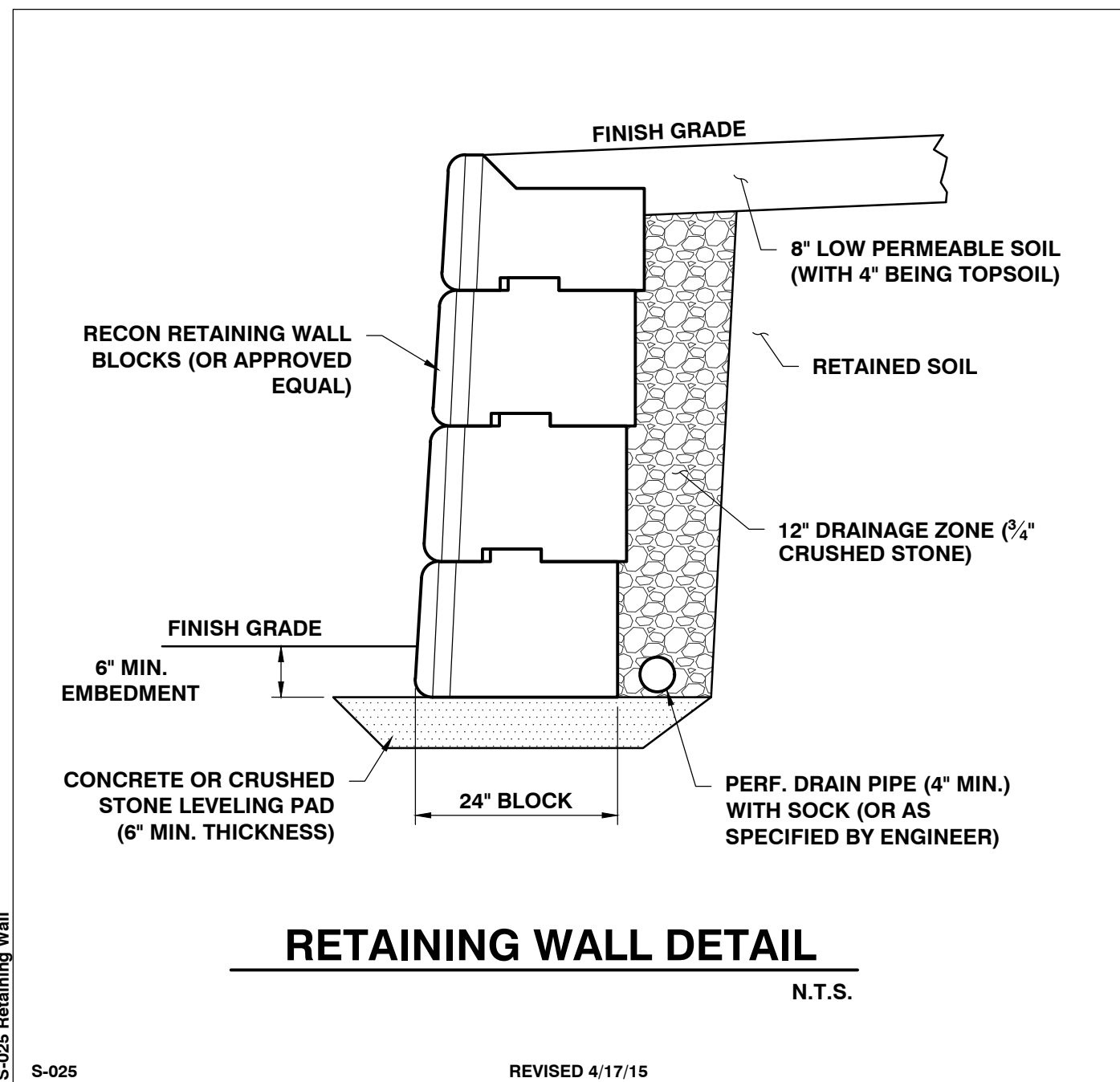
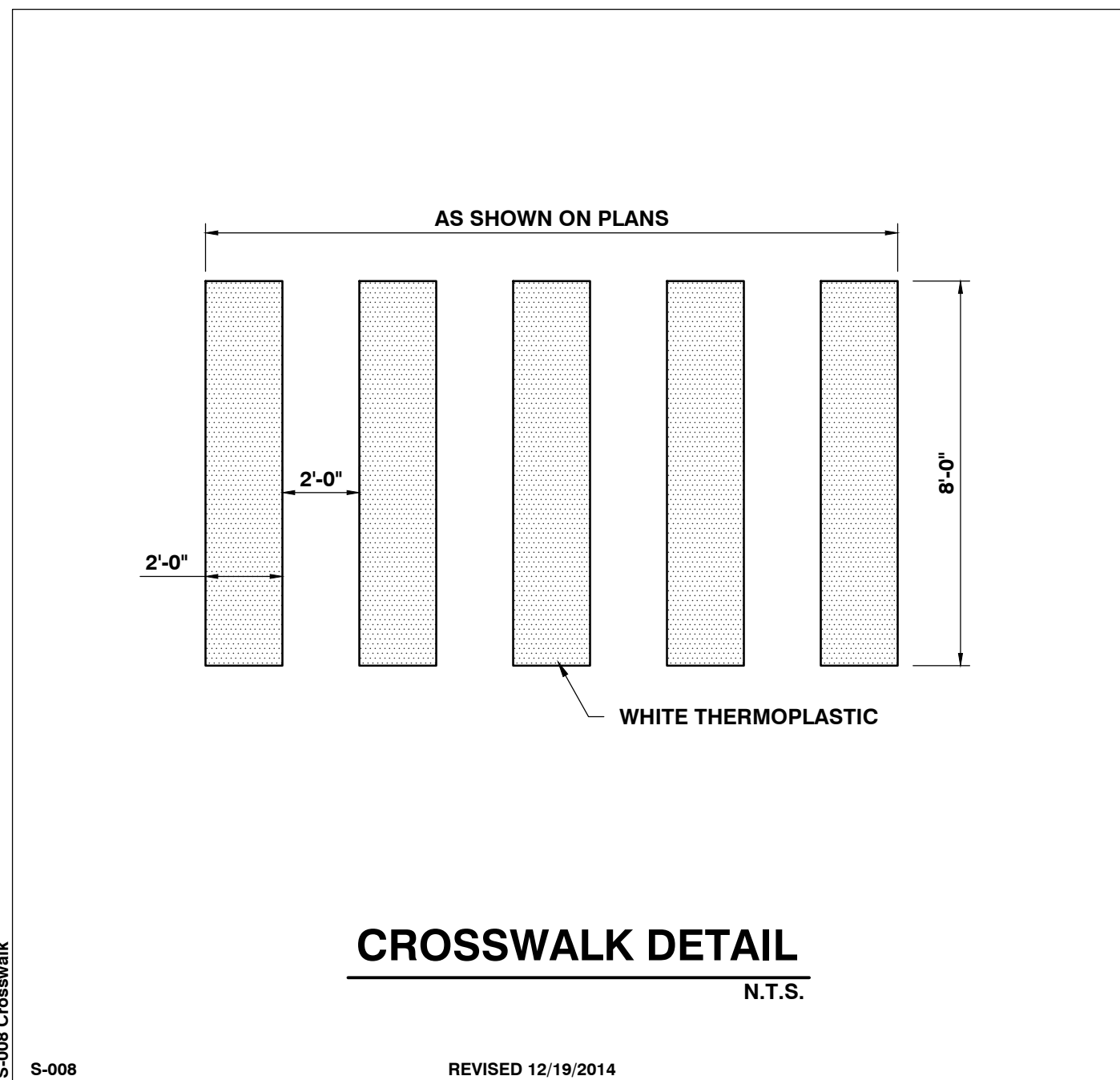
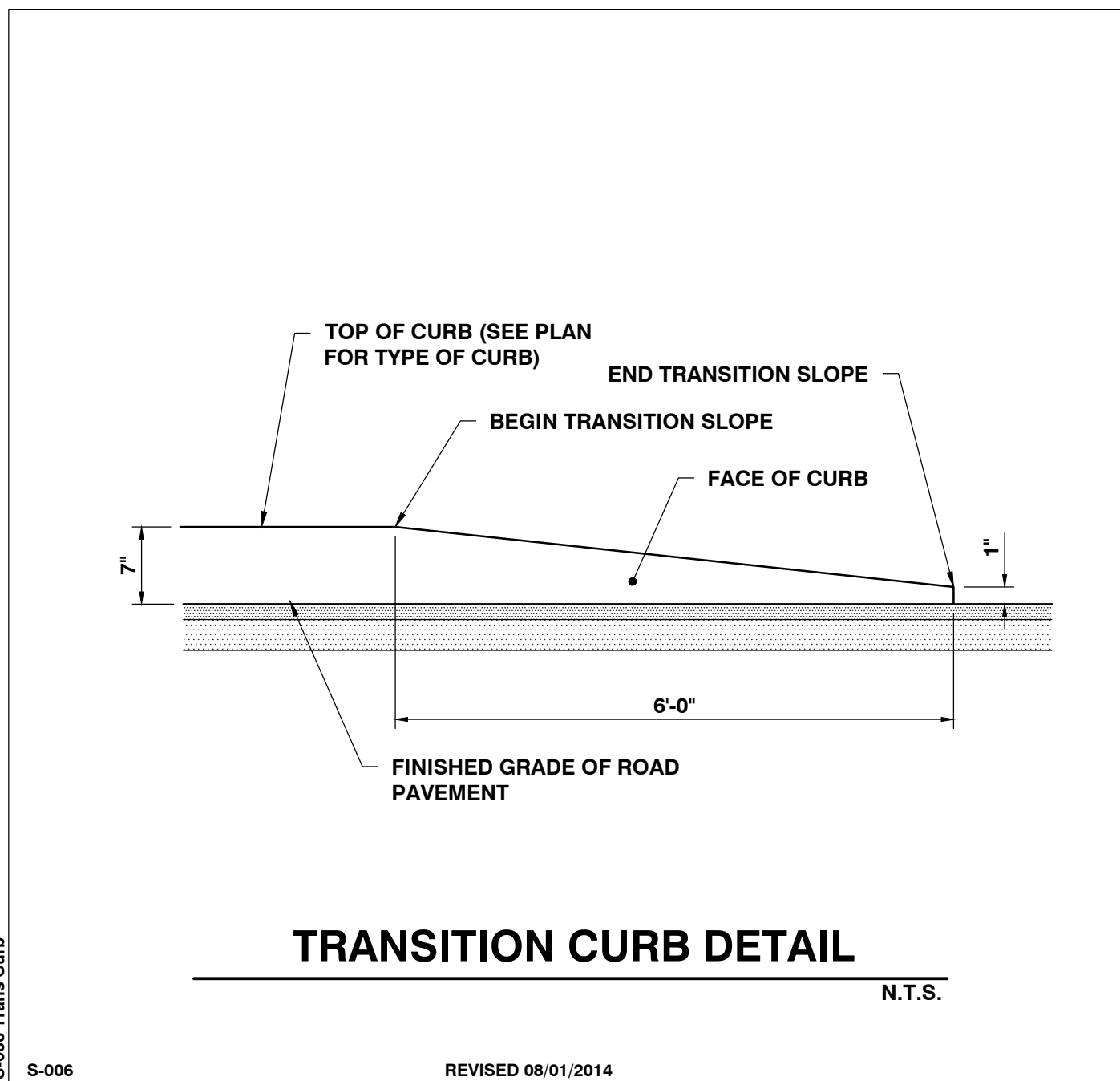
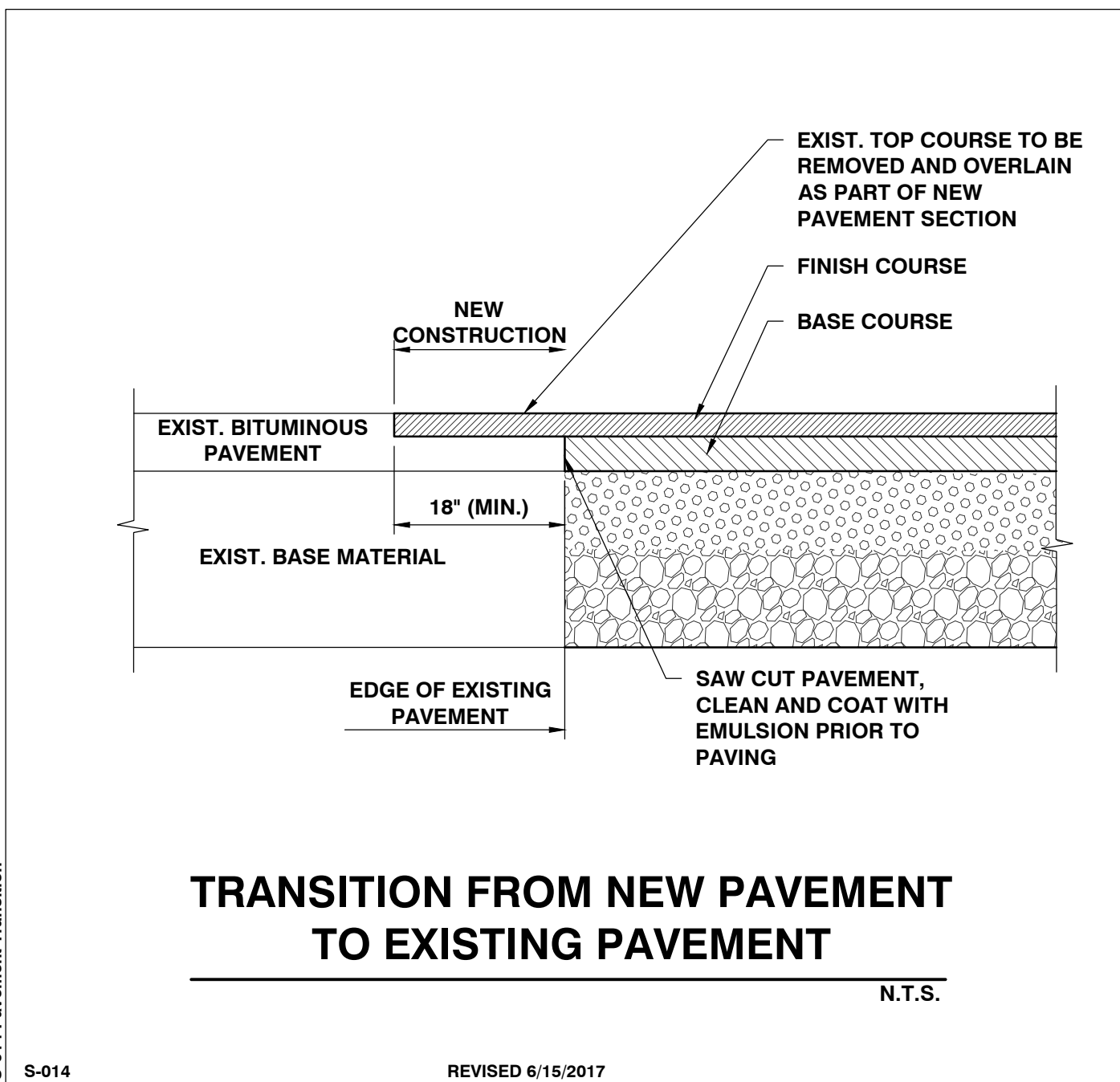
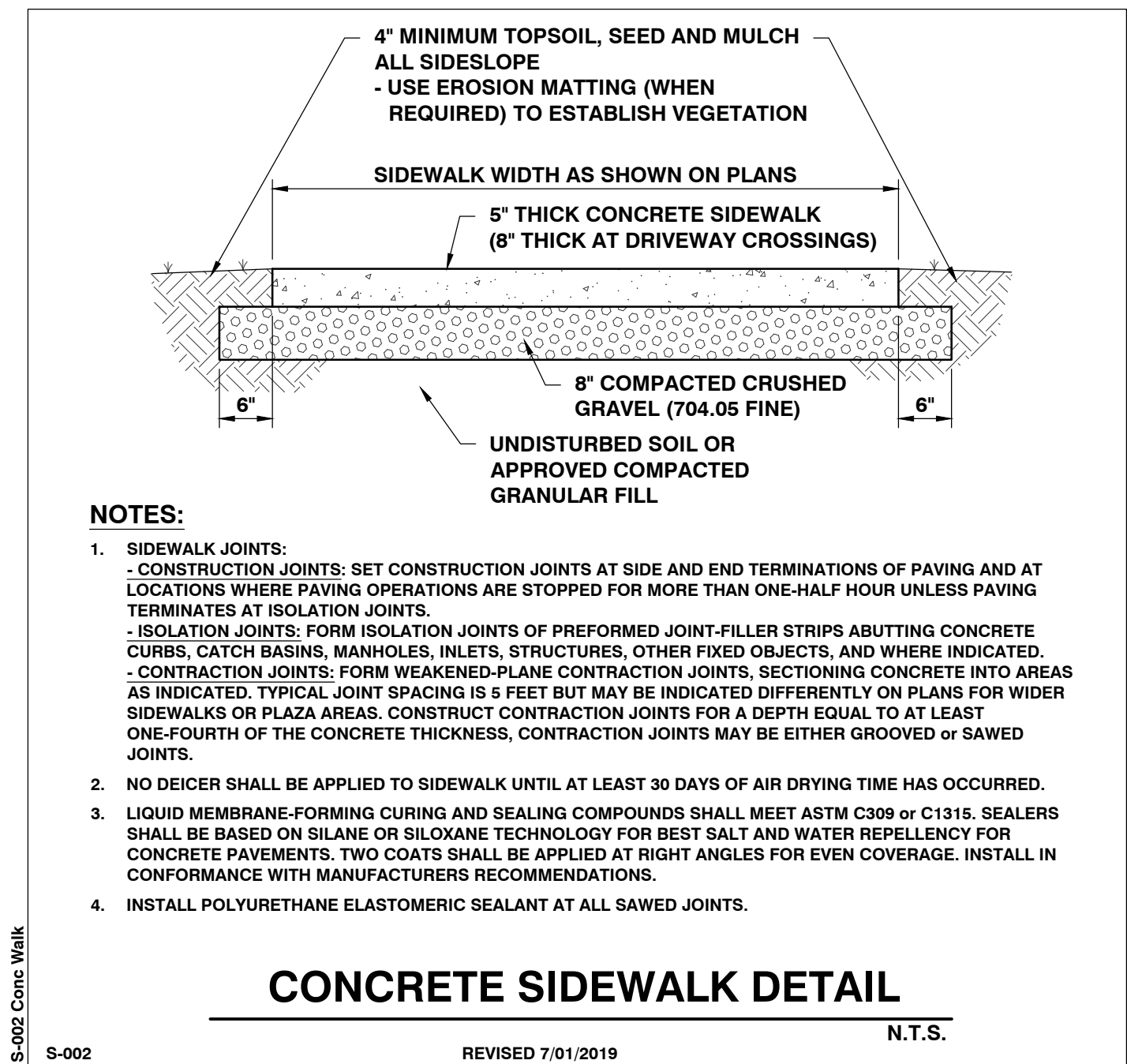
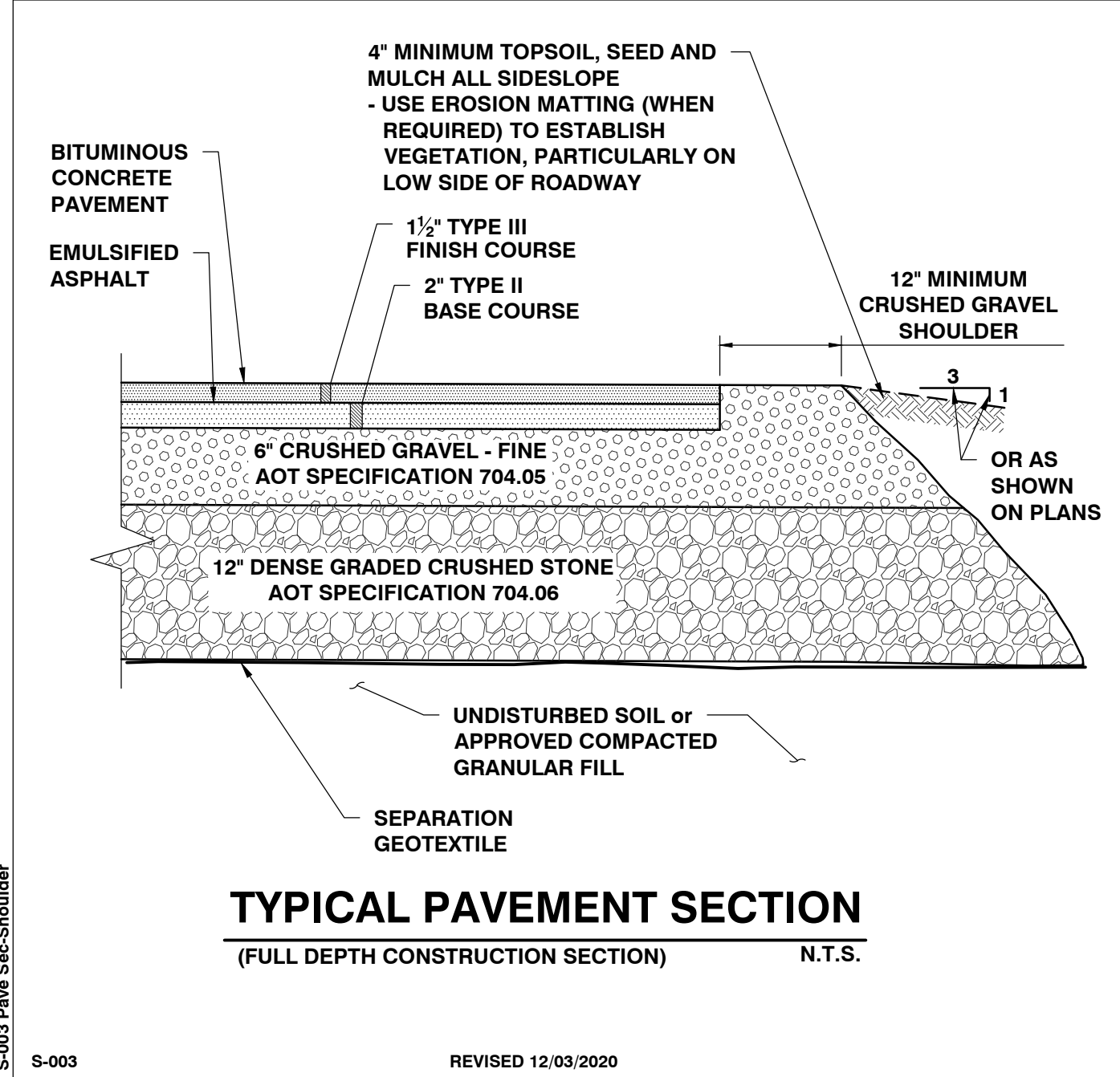
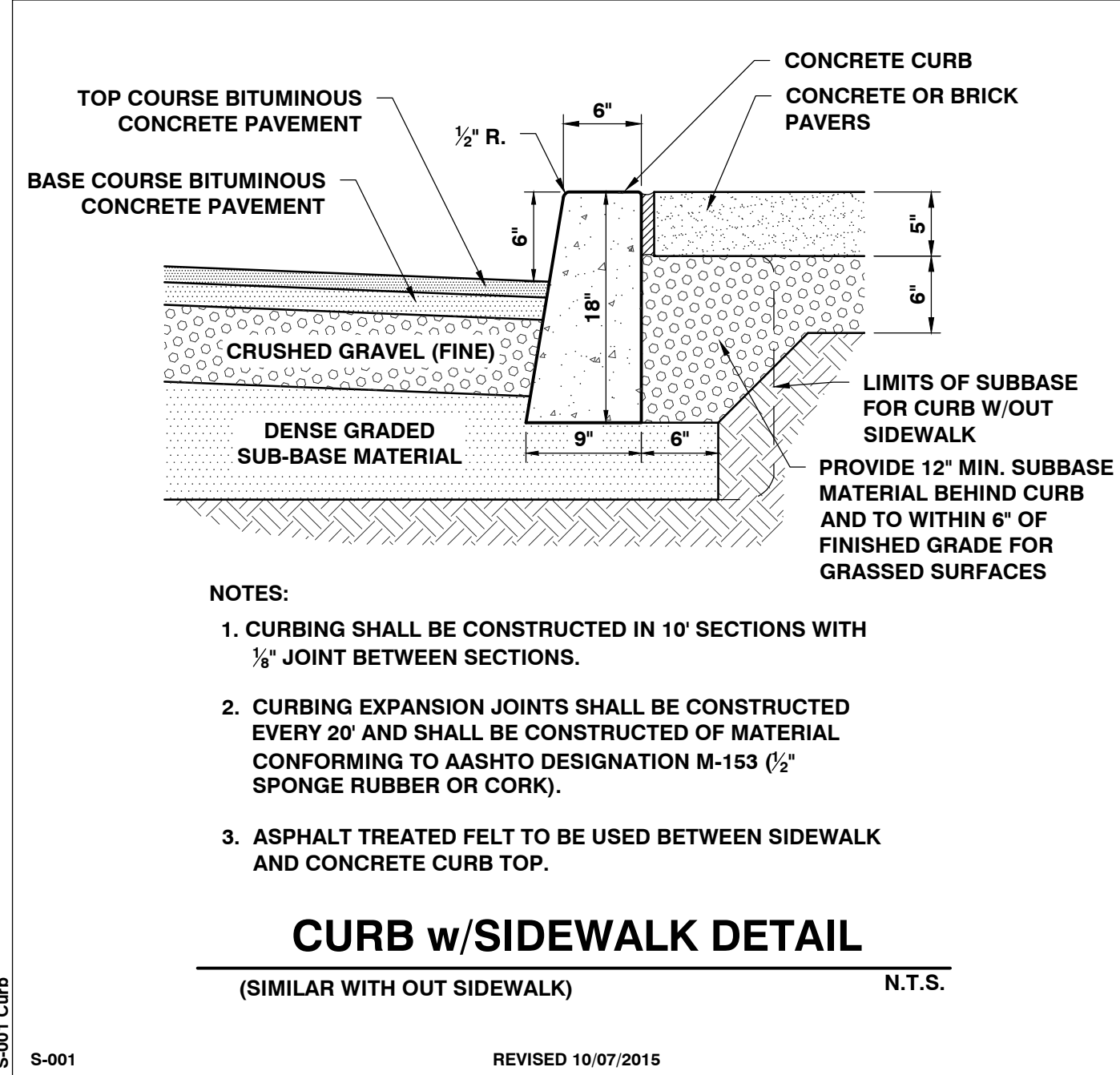
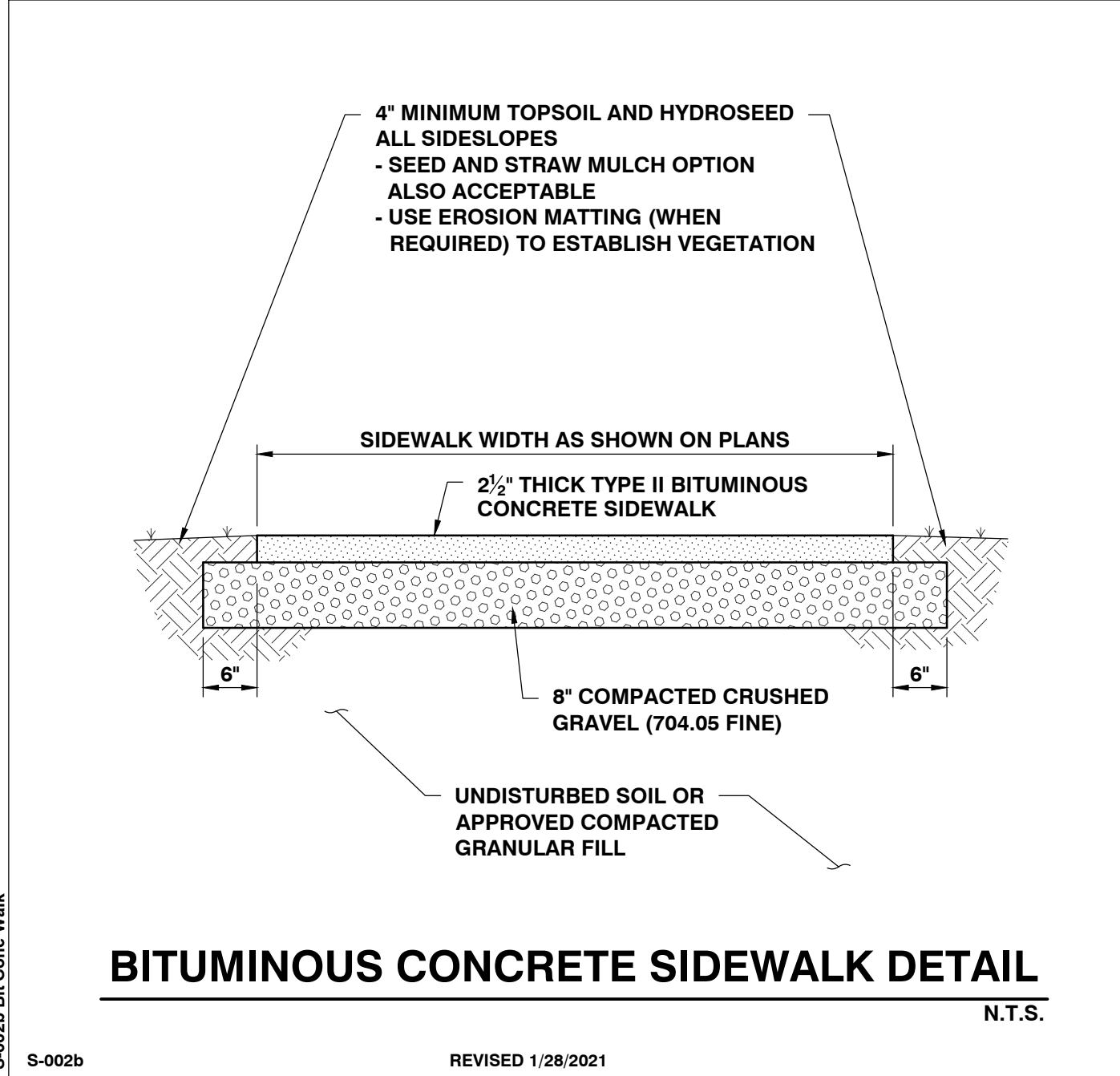
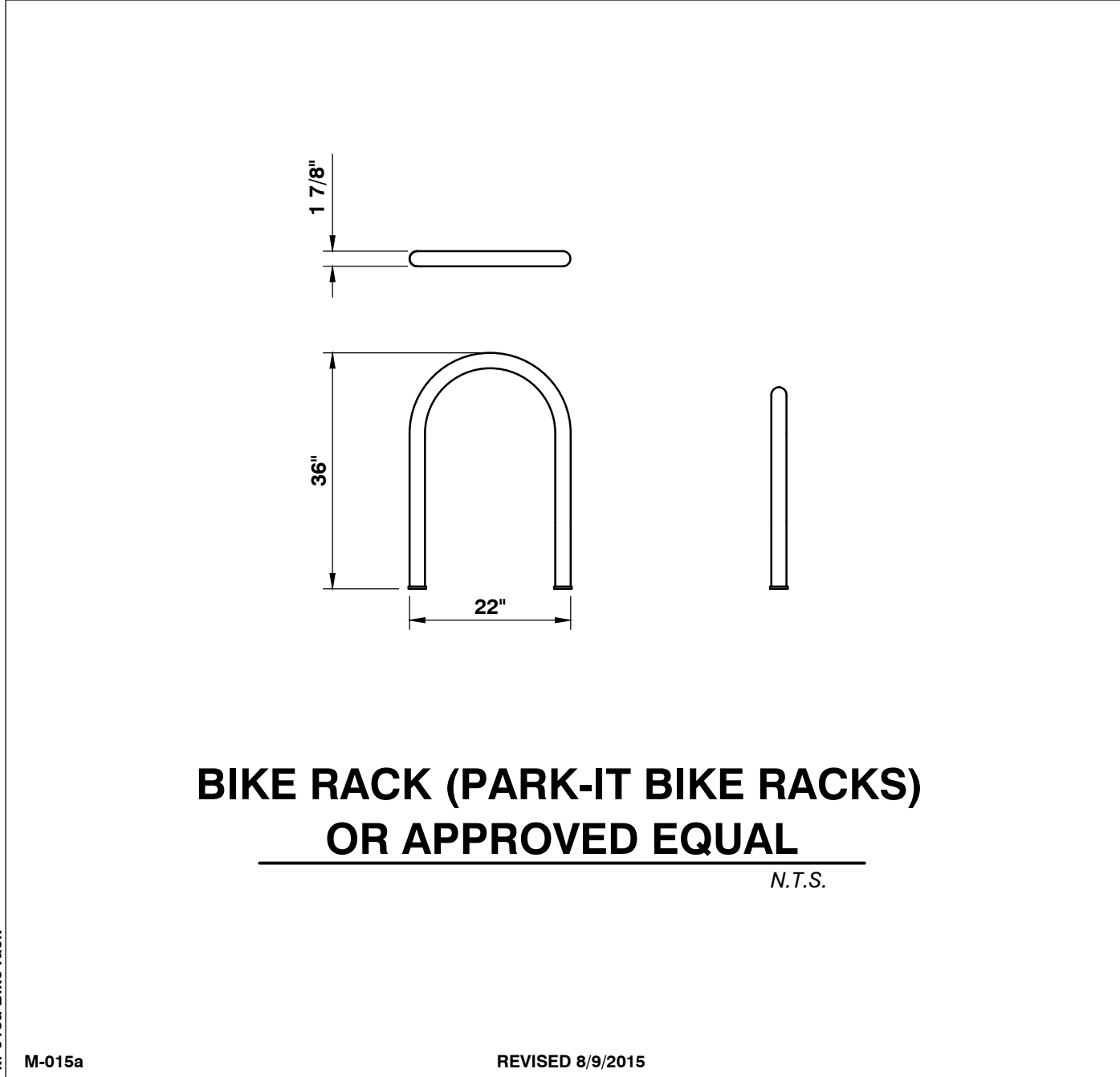
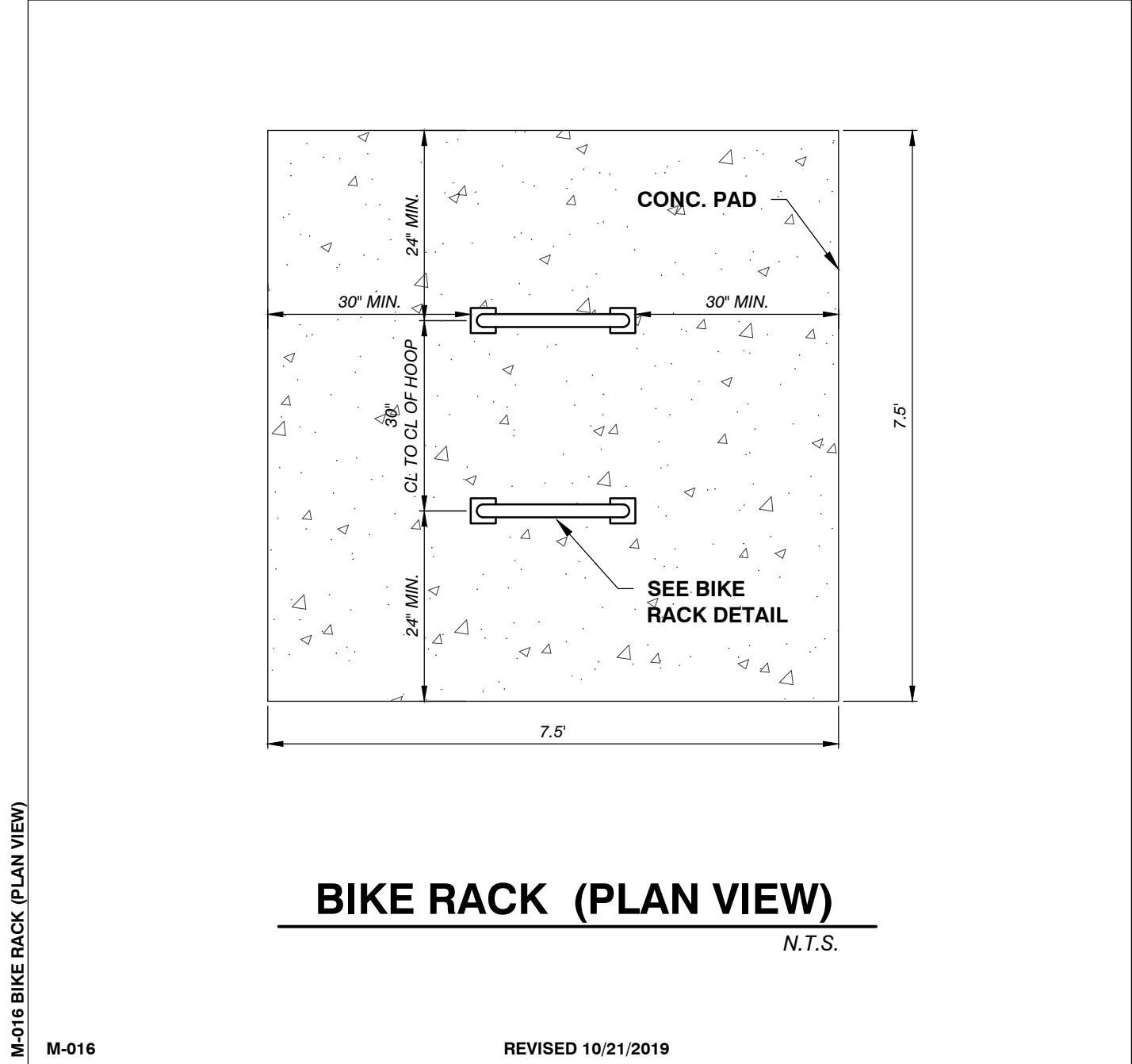
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EPSC DETAILS AND SPECIFICATIONS

SHEET NO:

C4.5

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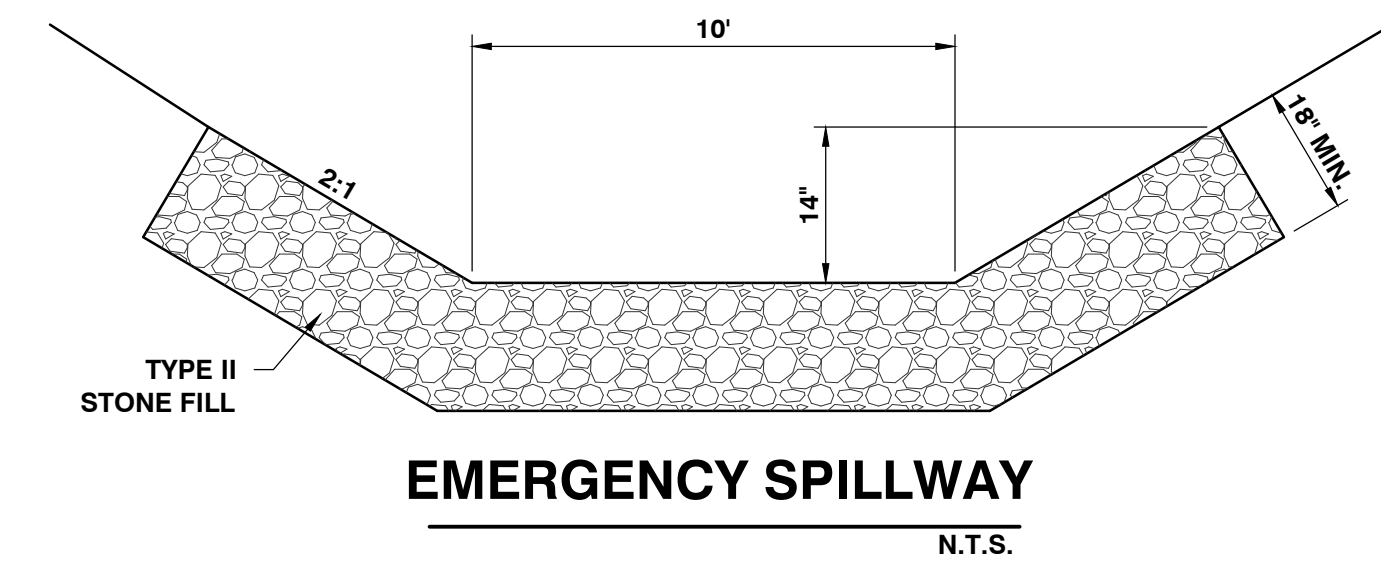
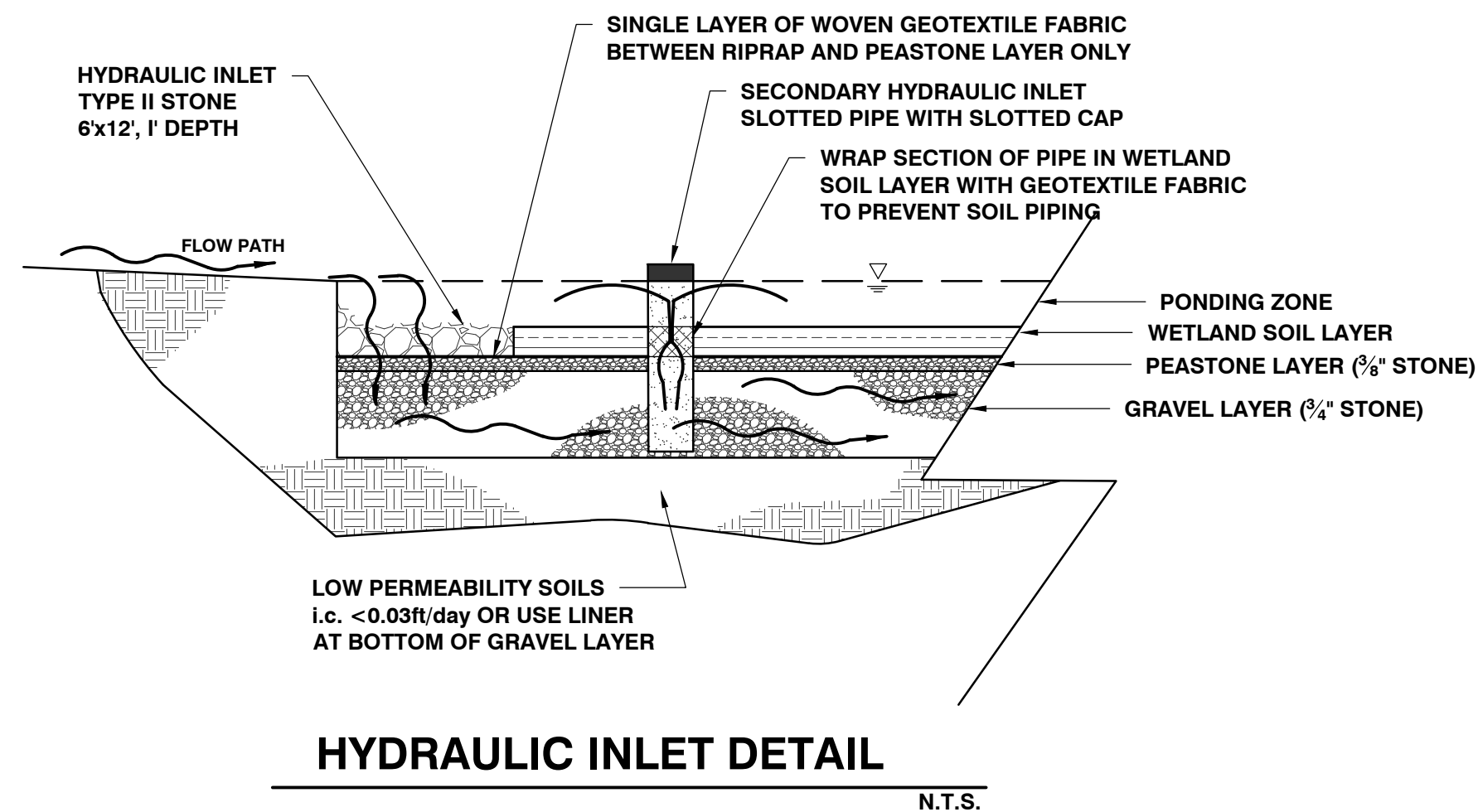
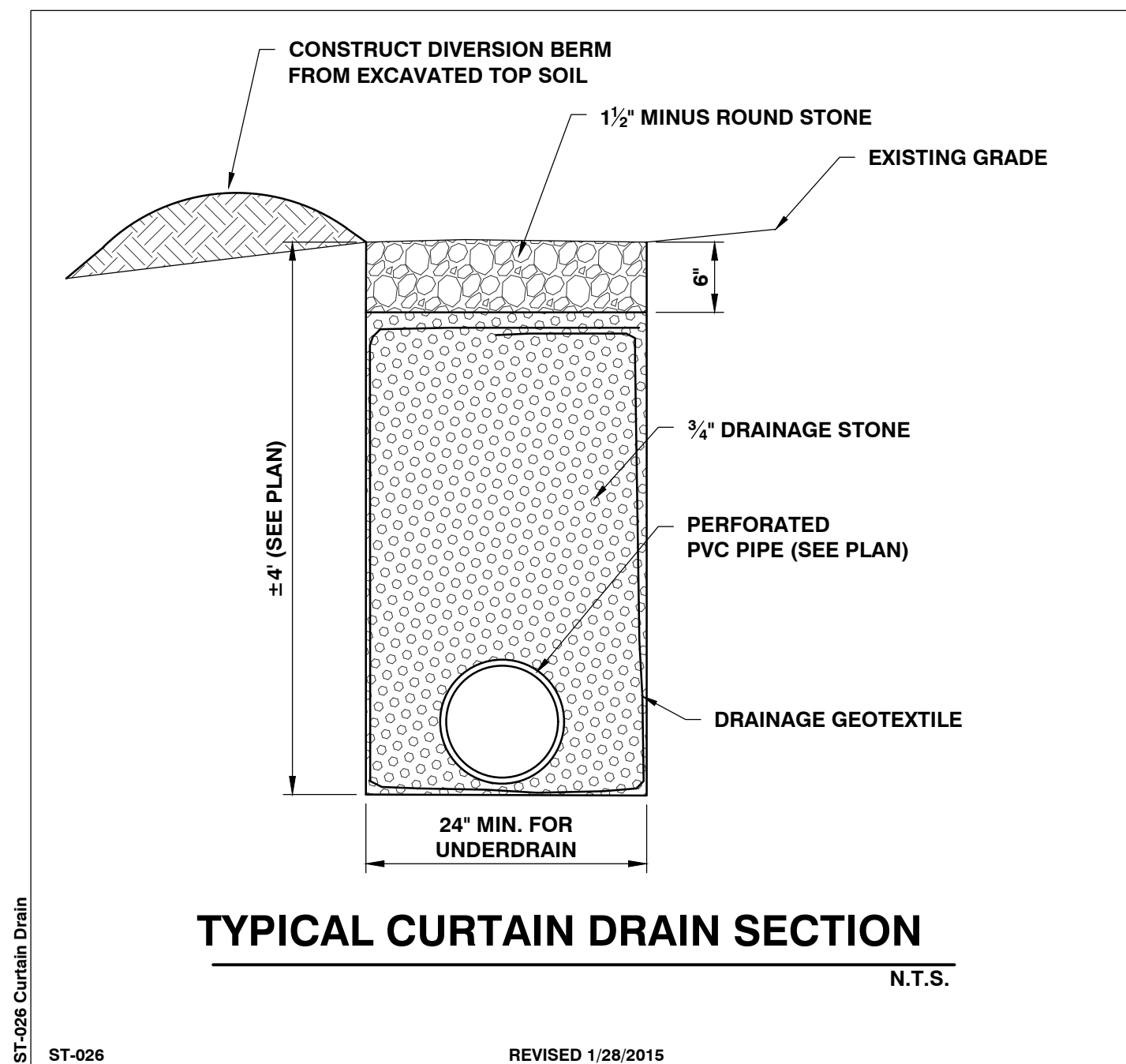
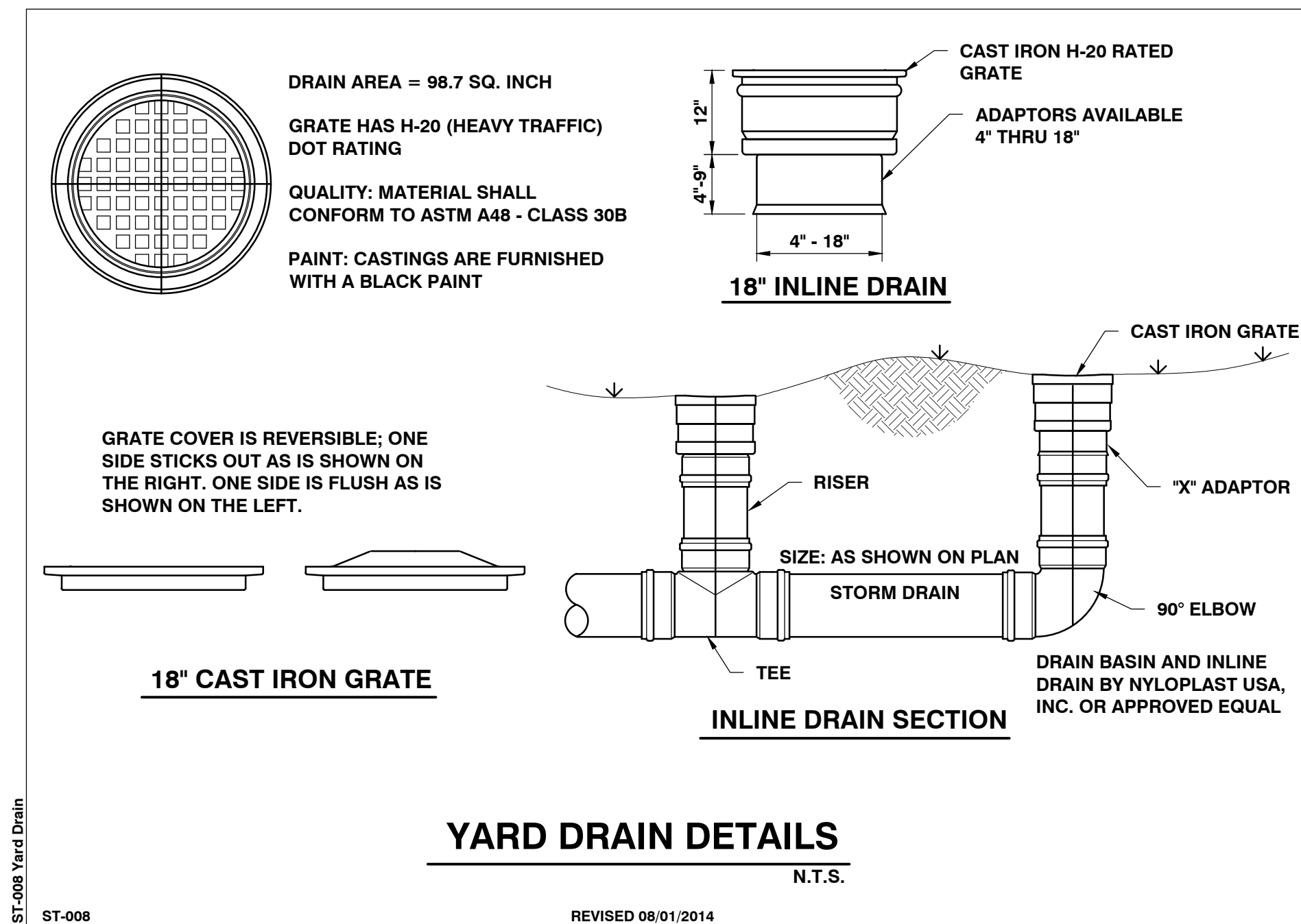
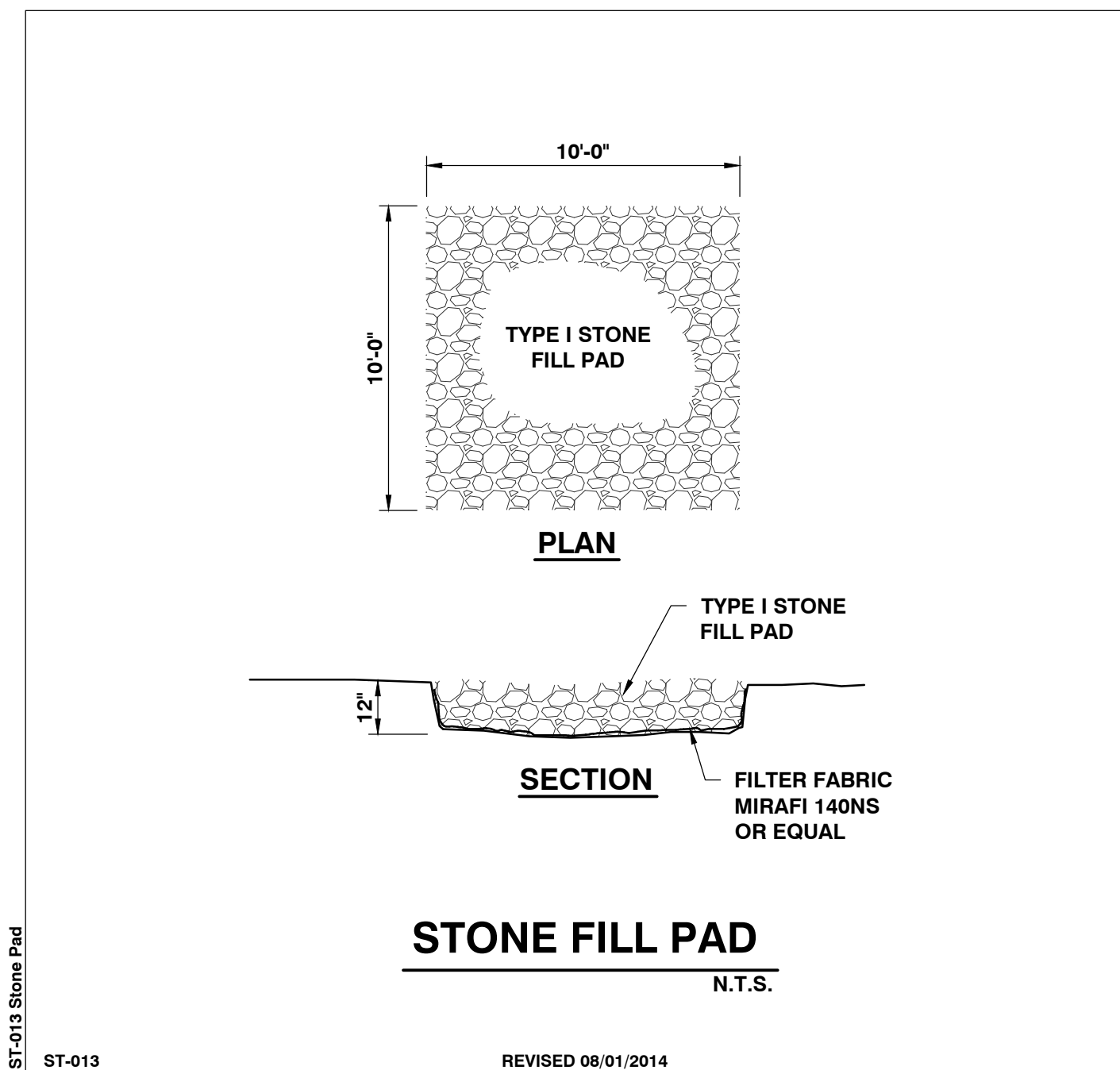
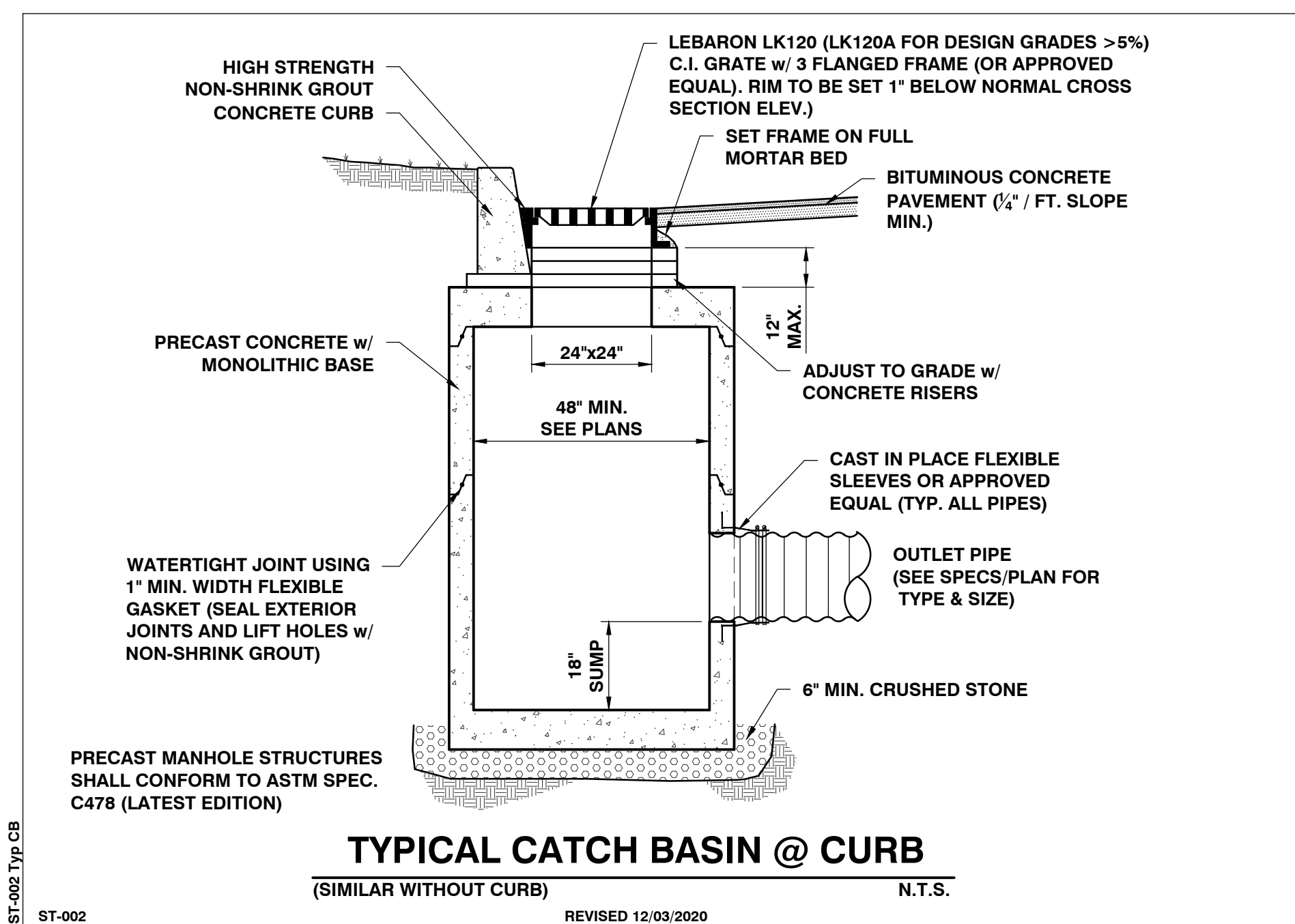
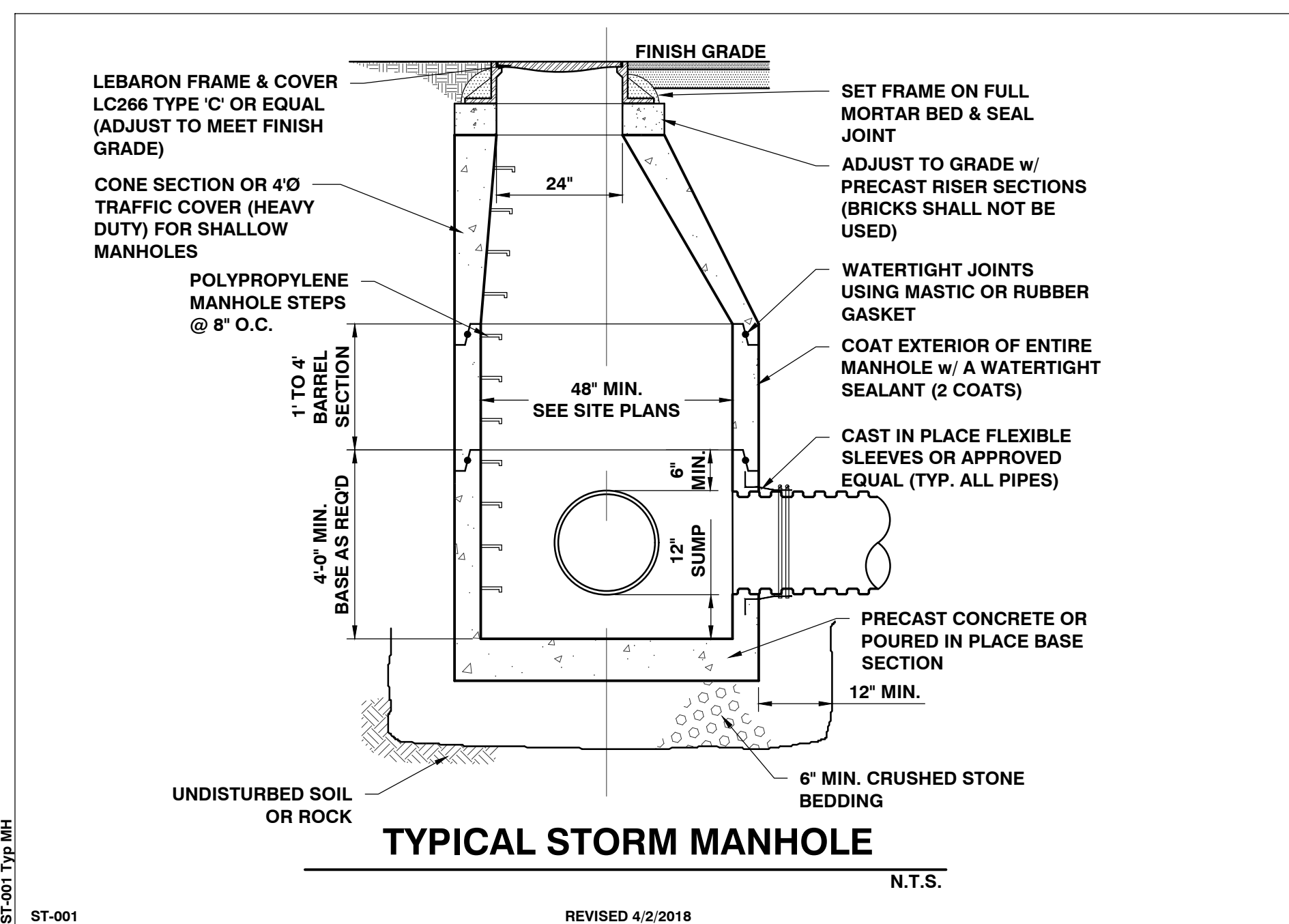
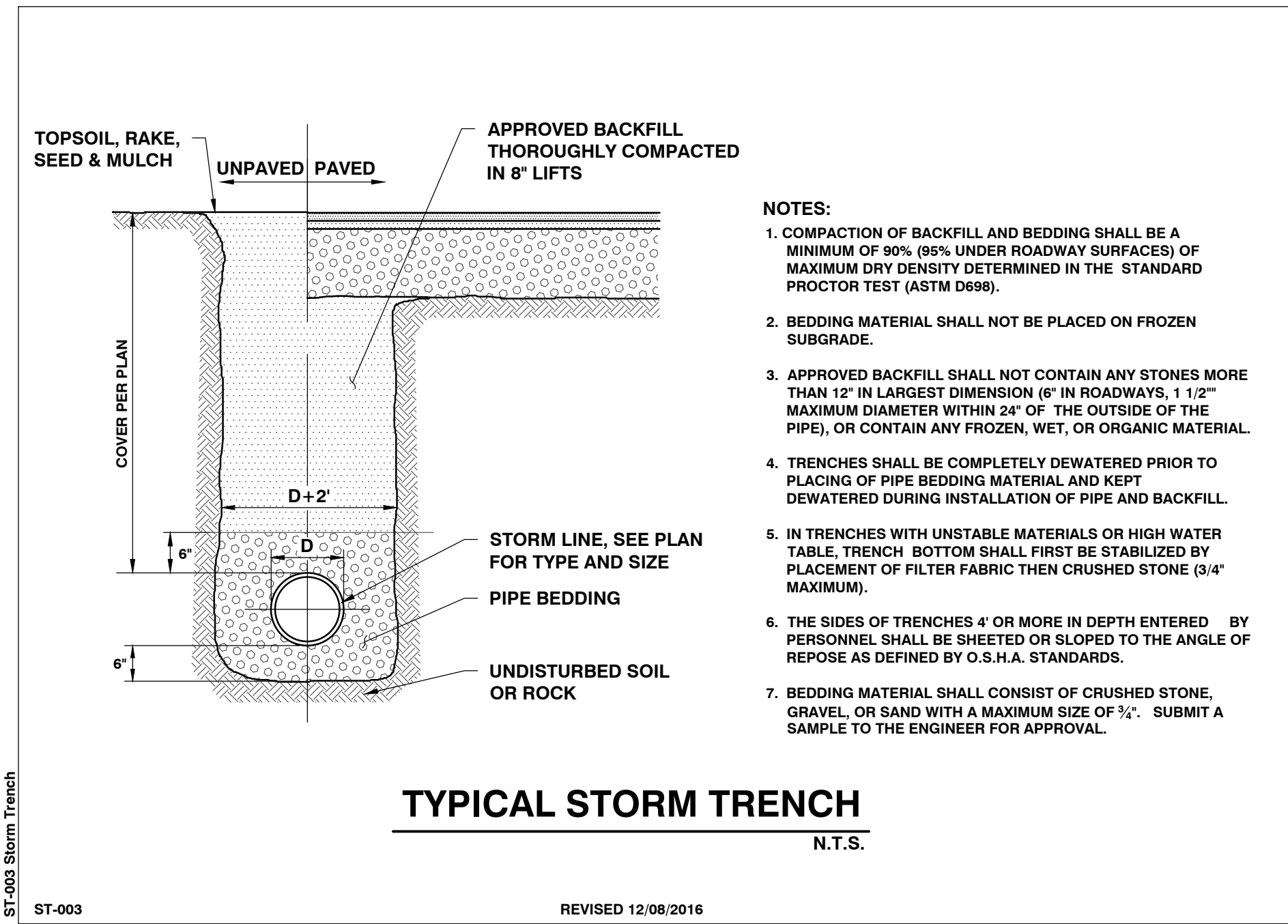
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SHEET CONTENTS: SITE DETAILS

SHEET NO: C5.0

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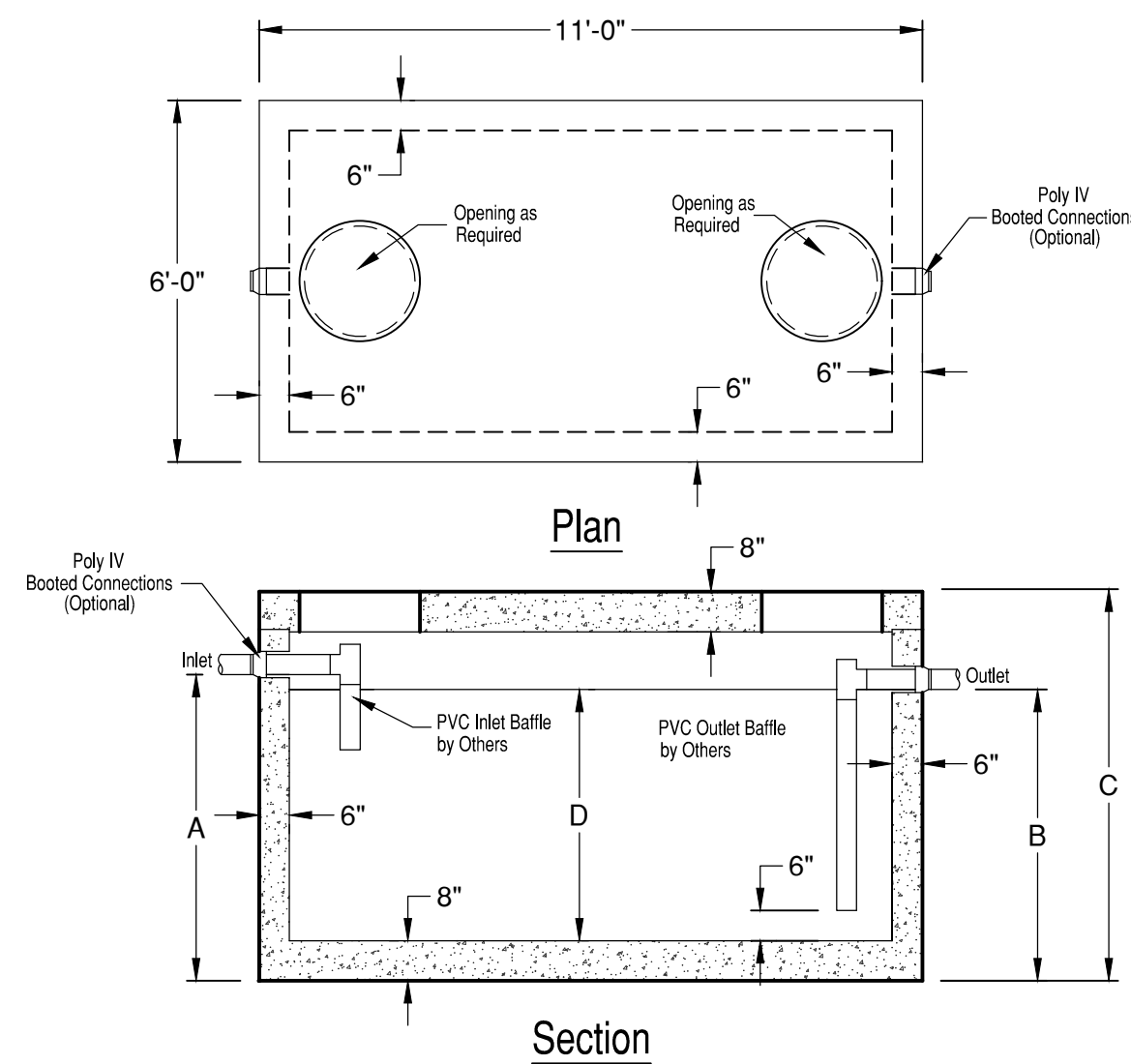
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STORMWATER DETAILS

SHEET NO:

C5.1

Heavy Duty Grease Trap 1,000 - 3,500 Gallon



Model	Tank Capacity	Inlet (A)	Outlet (B)	Height (C)	Liquid (D)	Weight
HD5-10-1000	1000 gallon	47"	44"	64"	33"	22,570 lb
HD5-10-1250	1250 gallon	52"	49"	70"	41"	23,750 lb
HD5-10-1500	1500 gallon	60"	57"	76"	49"	24,930 lb
HD5-10-2000	2000 gallon	75"	72"	94"	64"	28,430 lb
HD5-10-2500	2500 gallon	91"	88"	112"	80"	32,040 lb
HD5-10-3000	3000 gallon	107"	104"	124"	96"	34,410 lb
HD5-10-3500	3500 gallon	123"	120"	140"	112"	37,560 lb

- SPECIFICATIONS:**
- Concrete Minimum Strength 5000psi @ 28 days
 - Steel Reinforcement Grade 60
 - Joints Sealed with Butyl Sealant
 - Inlet and Outlet Baffles by Others
 - H2O Loading Available
 - (*) Denotes Top Seam
 - Weights Subject to Variation



CAMP Precast Concrete Products www.CAMPPRECAST.com

Revision Date : 2/14/2006 Section : 9

Table 11-1
Horizontal Isolation Distances, in Feet for Potential Sources of Contamination

Potential Source of Contamination	Potable Sources in Bedrock or Confined Surficial Aquifer	Potable Water Sources in Unconfined Surficial Aquifer	Water Service Lines and Water Service Pipes (Pressure)	Water Service Lines and Water Service Pipes (Suction)	Water Storage Tanks (Atmospheric Below Ground Surface)
Agricultural cropland	100	200	25	100	50
Building or structures, porches, foundations of building or structures	5	5	N/A	N/A	N/A
Cemeteries	100	150	25	100	50
Composting sites (commercial or agricultural) ¹	200	300	25	300	50
Concentrated livestock holding areas barnyard ²	200	500	25	100	50
Driveways (fewer than 3 residences)	5	10	N/A	N/A	10
Driveways (3 or more residences), roadways, parking lots	25	25	N/A	N/A	25
Fertilizers or pesticide storage structures (buried tank of any size; above ground tank >1,500 gallons; dry or liquid; and piping serving a non-residential facility)	100	200	50	200	50
Fuel oil, gasoline & other petroleum tanks and piping (not including liquefied petroleum gas tank)	25	100	25	100	50
Herbicide or pesticide application on utility right of way where herbicides or pesticides either have been applied in the last 12 months or may be applied within the next 12 month ³	100	200	25	200	100
Leachfields (proposed, existing, or permitted)	Requires isolation zone (see Table 11-2)		25	100	100
Manure storage systems, above ground ⁴	50	100	25	50	50
Manure storage systems, in-ground concrete or geosynthetic lined ⁵	100	200	25	200	100
Manure storage systems, earthen lined ²	200	500	25	200	200
Property lines	10	10	N/A	N/A	10
Salvage yards ⁴	300 ⁴	300 ⁴	25	300	100
Sanitary sewer collection lines and sanitary sewer service lines	50	75	Distances and requirements established in Section 1-1204 apply in lieu of this Section		
Sludge storages	50	75	25	75	50
Solid waste transfer facilities ⁵	100	200	25	200	100
Stormwater conveyance/treatment/control practice (unlined and subsurface systems)	10	10	10	10	10
Stormwater conveyance/treatment/control practice (unlined and subsurface systems)	100	150	10	150	25
Storm sewers	10	50	Distances and requirements established in Section 1-1204 apply in lieu of this Section		
Surface water, normal high water elevation ⁴	10	25	N/A	N/A	25
Wastewater disposal spray area and lagoons	200	300	50	300	100
Wastewater tanks (proposed, existing, or permitted) ⁷	Requires isolation zone (See Table 11-2)		25	50	50

¹ Isolation distances for composting sites (commercial or agricultural) shall be measured from the perimeter of the composting area or area used for storage of composted material.

² Isolation distances for concentrated livestock holding areas and manure storage systems shall be measured from the perimeter of the holding area or outside perimeter of the manure storage system.

³ Isolation distances for herbicide or pesticide application on utility right of way where herbicides or pesticides either have been applied in the last 12 months or may be applied within the next 12 month shall be measured from points of application of the herbicide or pesticide.

⁴ Isolation distances for salvage yards shall be measured from the perimeter of the area used for the storage of salvaged materials to the component.

⁵ Isolation distances for solid waste transfer facilities shall be measured from points within the transfer facility used for storing solid waste.

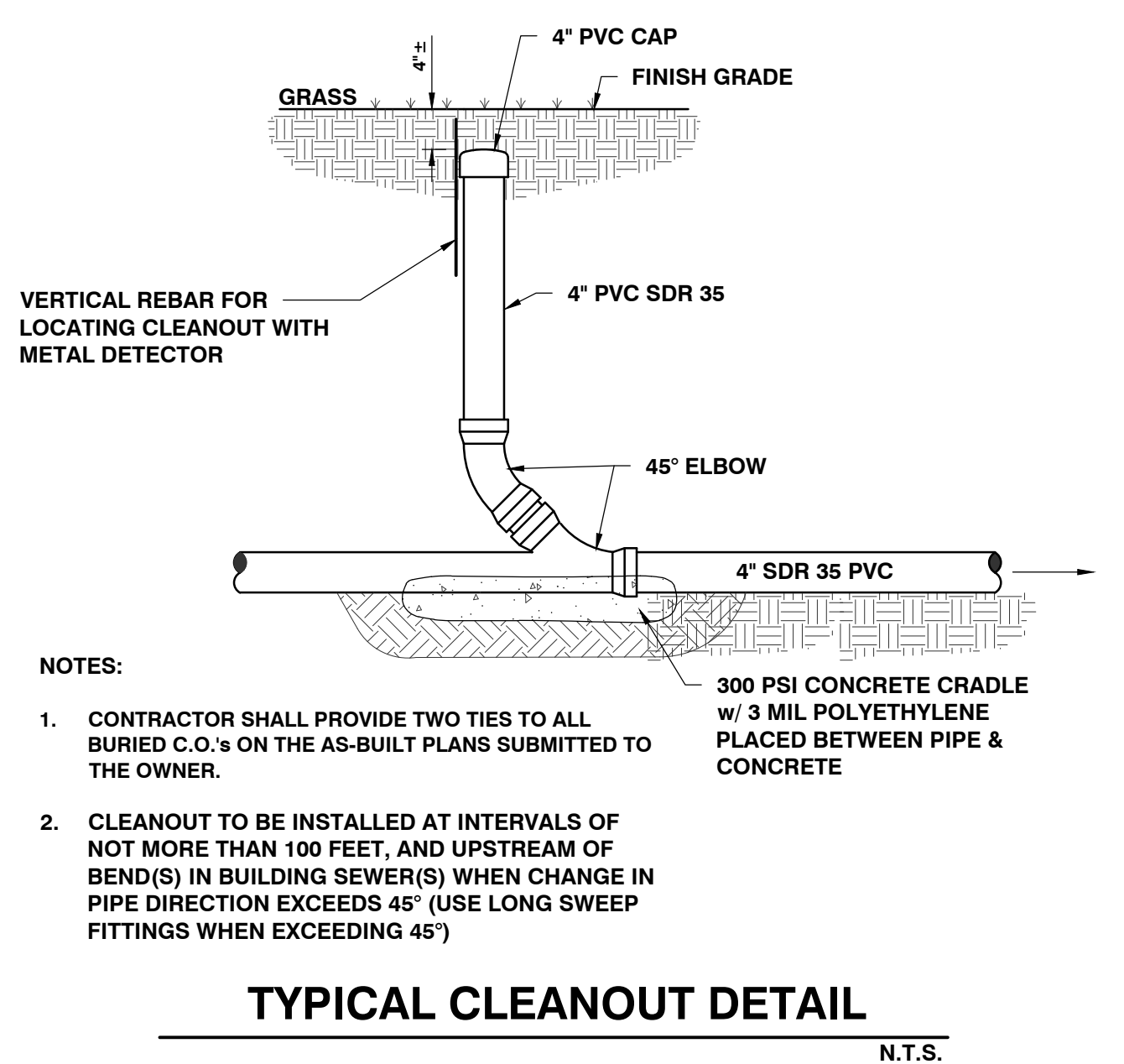
⁶ The horizontal location to surface water shall allow for possible future widening of the surface water due to bank expansion.

⁷ Wastewater Tanks include septic tanks, pump stations, dosing siphons, holding tanks, wastewater storage tanks, wastewater treatment tanks, and filters, constructed wetlands, and grease tanks.

⁸ If the applicant's designer demonstrates that the groundwater flow from the salvage yard is not in the direction of the potable water source, the isolation distance shall be 100 feet rather than 300 feet.

VERMONT WATER SUPPLY RULE - CHAPTER 21

TABLE 11-1 - HORIZONTAL ISOLATION DISTANCES



SWR-009 CD (Rev. 05/2015)

REVISED 10/07/2015

SWR-001 Trench

REVISED 12/08/2016

SWR-002 Service Con

REVISED 08/01/2014

SWR-003 Trench

REVISED 12/08/2016

SWR-004 Hydr

REVISED 3/9/2015

SWR-005 Trench

REVISED 12/08/2016

SWR-006 Trench

REVISED 12/08/2016

SWR-007 Trench

REVISED 12/08/2016

SWR-008 Trench

REVISED 12/08/2016

SWR-009 Trench

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SWR-010 Trench

REVISED 12/08/2016

SWR-011 Trench

REVISED 12/08/2016

SWR-012 Trench

REVISED 12/08/2016

SWR-013 Trench

REVISED 12/08/2016

SWR-014 Trench

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SWR-095 Trench

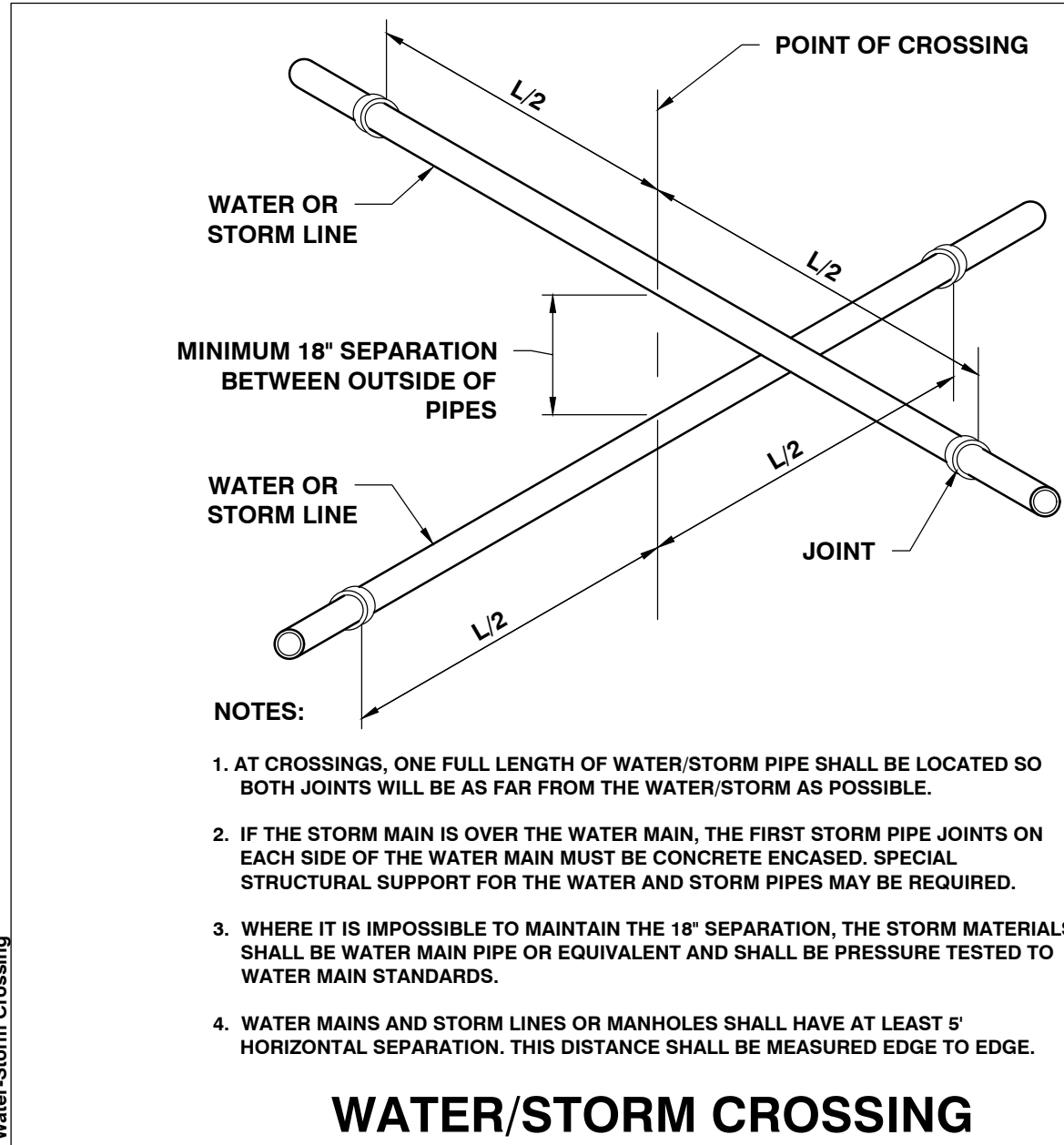
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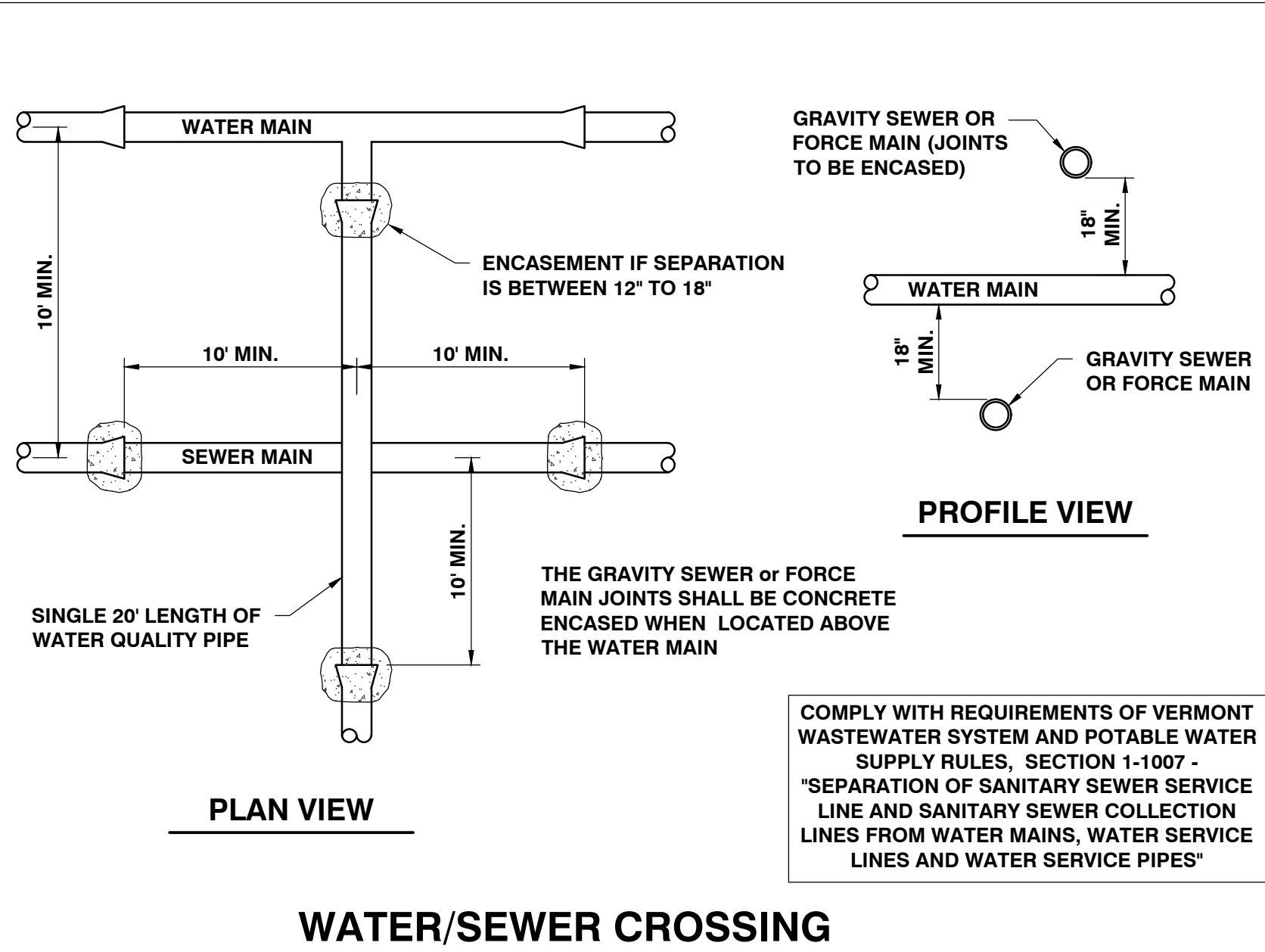
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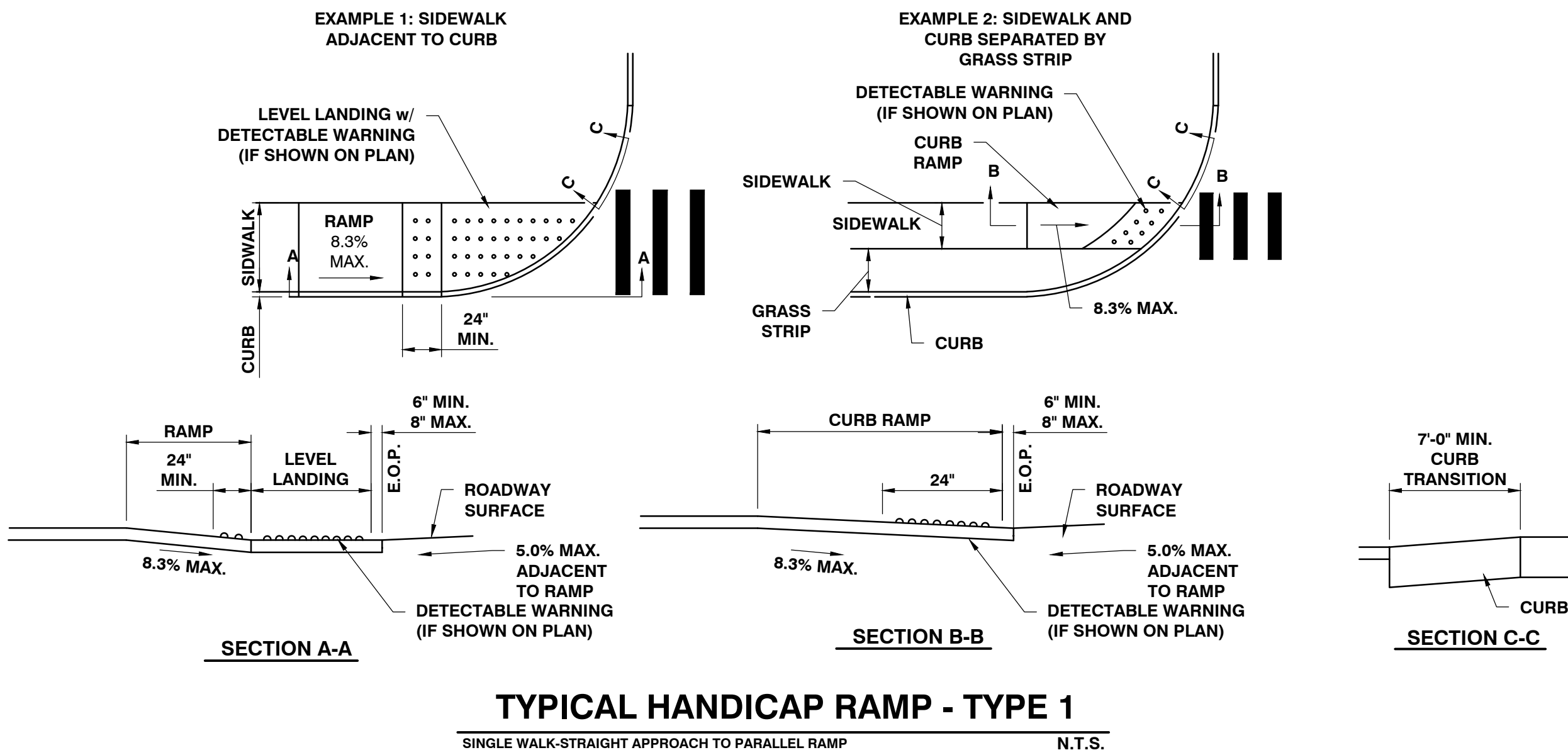
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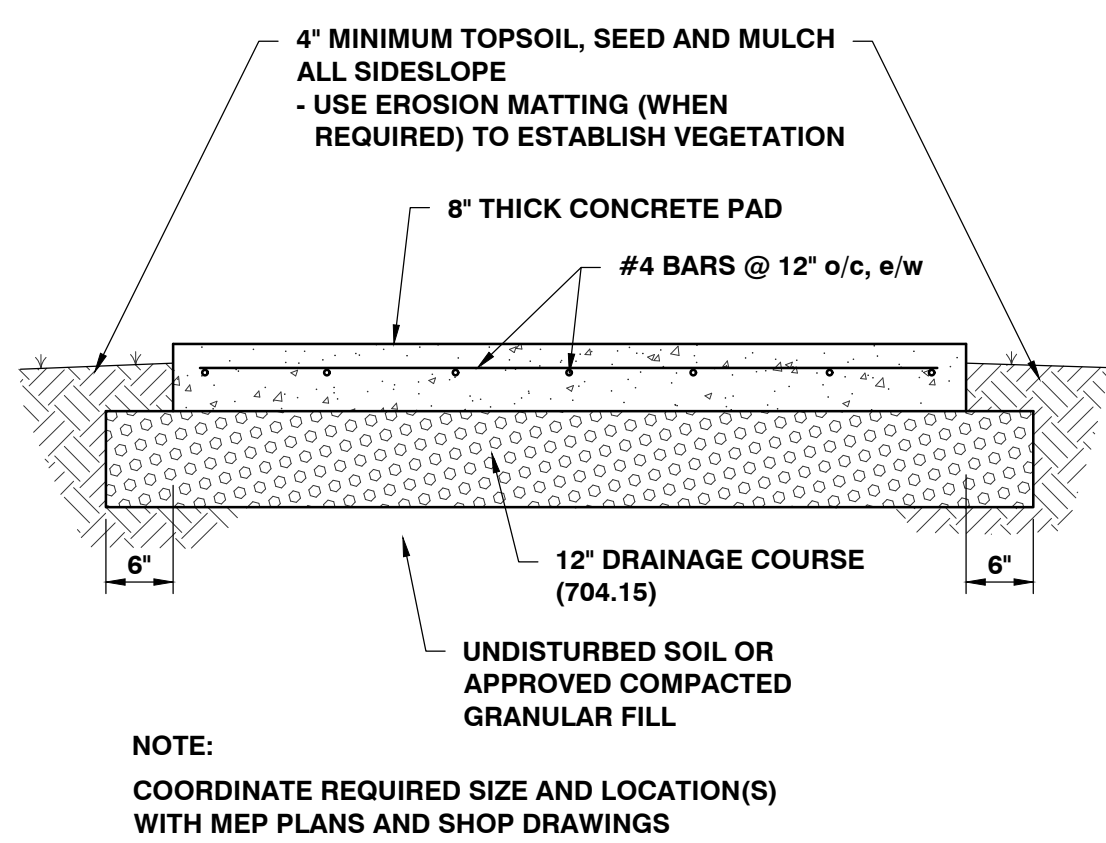
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REVISED 11/16/2021
N.T.S.



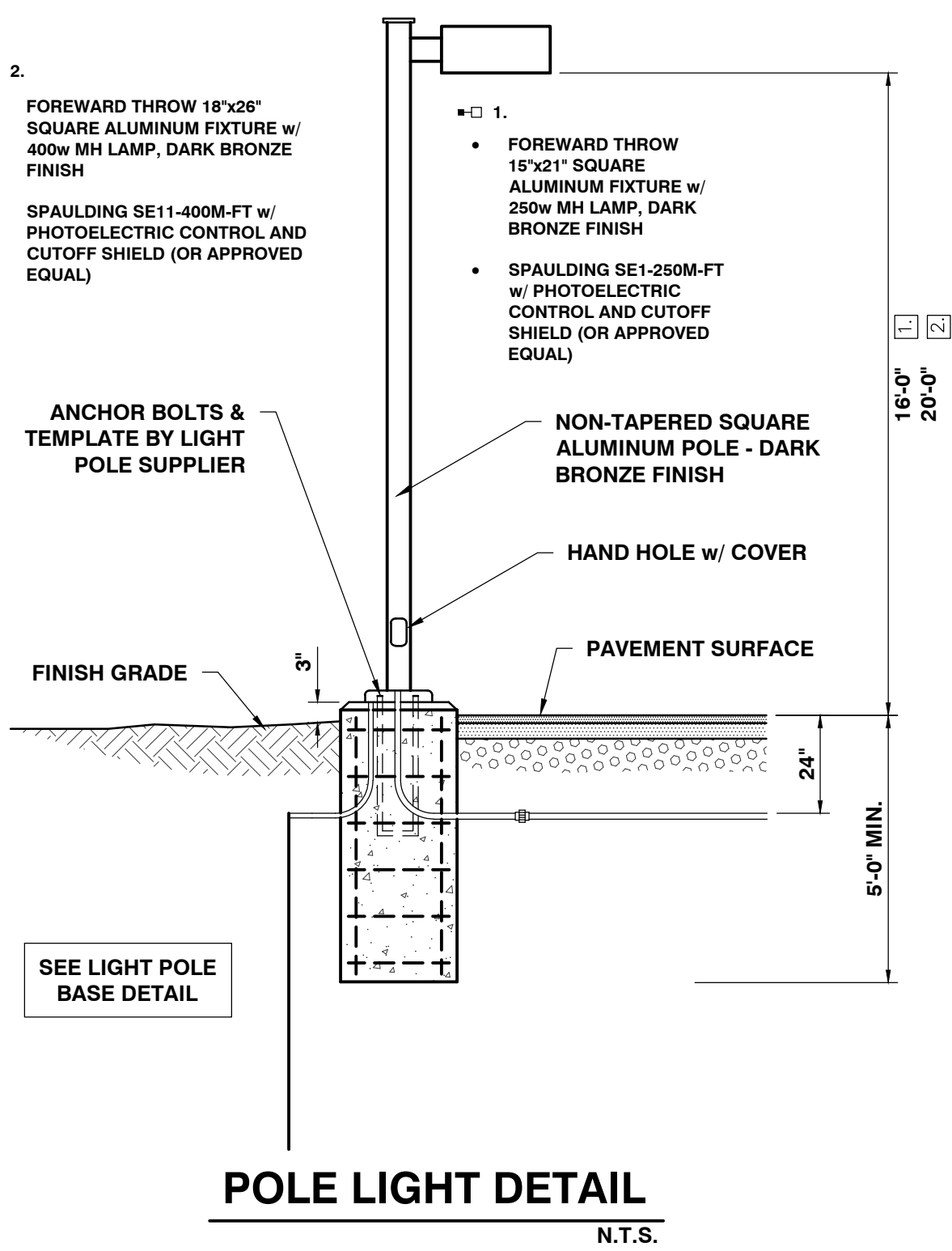
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REVISED 5/4/2021
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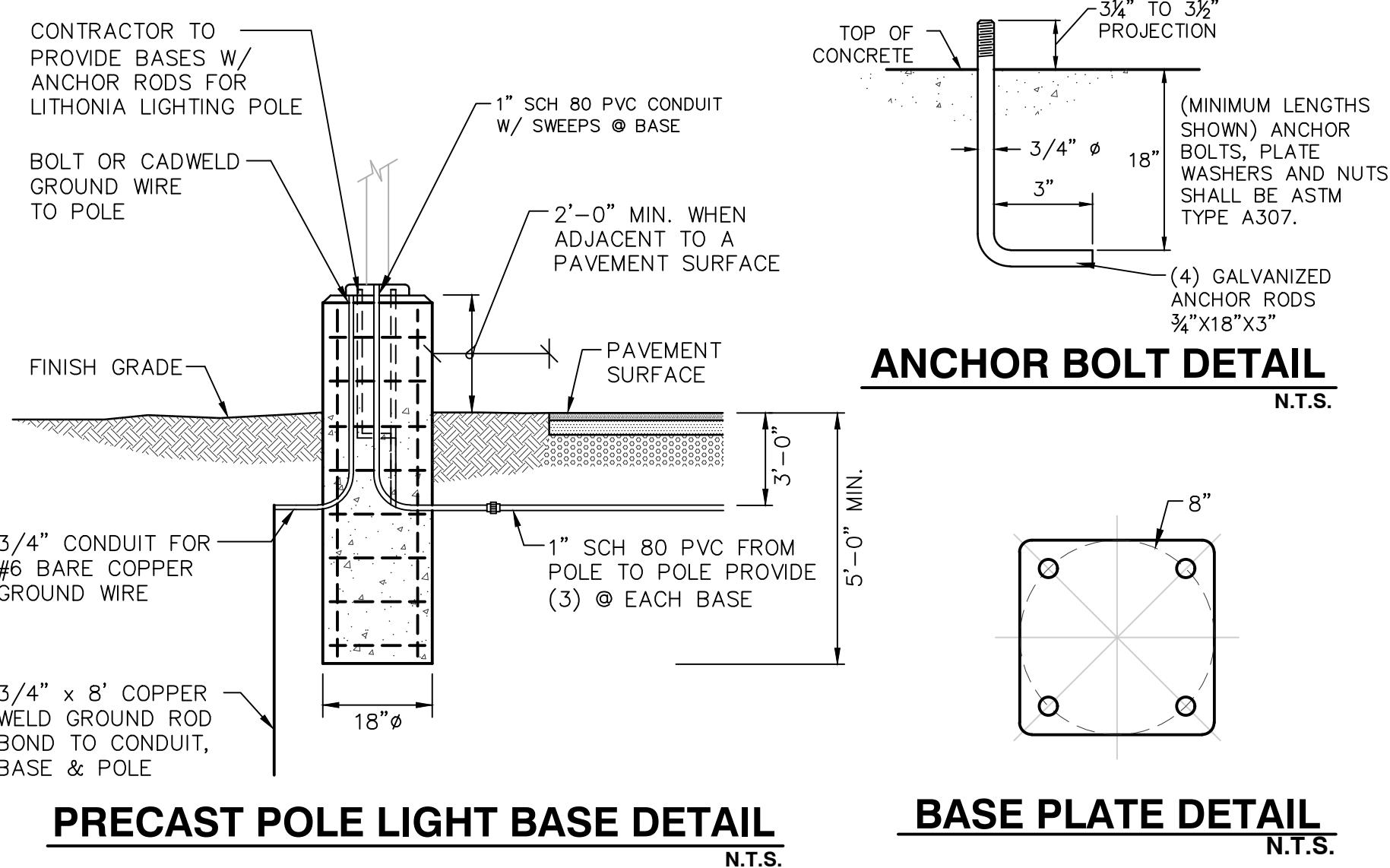
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REVISED 08/01/2014
N.T.S.



M-017 MEP SITE PAD DETAIL
REVISED 01/22/2018
N.T.S.



L-002 POLE LIGHT
REVISED 12/19/2014
N.T.S.



L-003a PRECAST POLE LIGHT BASE DETAIL
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HIGH SCHOOL
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CENTER

BURLINGTON, VT

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MISC.
DETAILS

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C5.3

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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 Storms: 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 CLEARING

PART 1 – GENERAL

1.01 SUMMARY

- A. Section includes:
1. Remove surface debris.
2. Clear site of plant life and grass.
3. Remove trees and shrubs.
4. Remove root system of trees and shrubs.

PART 2 – PRODUCTS

Not used.

PART 3 – EXECUTION

3.01 PROTECTION

- A. Protect utilities that remain from damage.
- B. Protect trees, plant growth, and features designated to remain as final landscaping.
- C. Protect bench marks and existing structures from damage or displacement.
- D. Use means necessary to prevent dust becoming a nuisance to the public, to neighbors, and to other work being performed on or near the site.
- E. Maintain access to the site at all times.

3.02 CLEARING

- A. Clear areas required for access to site and execution of Work.
- B. Remove trees and shrubs within marked areas. Remove stumps, roots and tap roots and other projections 1" or greater in diameter to 2'-0" below the excavated surfaces in cut areas and 2'-0" below the exposed subgrade in fill areas.

3.03 REMOVAL

- A. Remove debris, rock, and extracted plant life from site unless otherwise noted on plans.

3.04 UTILITIES

- A. Coordinate with utility companies and agencies as required.

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 – 40
No. 10	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"	100
No. 4	95 – 100
No. 4	25 – 50
No. 10	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 or 704.02B)

- 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
3"	100
3/4"	90 – 100
3/8"	20 – 55
No. 4	0 – 10
No. 8	0 – 5

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
3/4"	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
3/4"	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 some 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 incorporated 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%

UTILITY TRENCHING AND BACKFILLING

PART 1 – GENERAL

1.01 SUMMARY

- A. Section includes:
1. Trench, backfill, and compact as specified herein and as needed for installation of underground utilities.

1.02 QUALITY ASSURANCE

- A. Use adequate numbers of skilled workmen who are thoroughly trained and experienced in the necessary crafts and who are completely familiar with the specified requirements and the methods needed for proper performance of the work of this section.

- B. Use equipment adequate in size, capacity, and numbers to accomplish the work in a timely manner.

- C. Comply with all requirements of governmental agencies having jurisdiction.

PART 2 – PRODUCTS

2.01 SOIL MATERIALS

- A. Fill and backfill materials:

1. Provide backfill materials free from organic matter and deleterious substances, containing no rocks or lumps over 6" in greatest dimension.
2. Fill material is subject to the approval of the Engineer, and is that material removed from excavations or imported from off-site borrow areas, predominantly granular, non-expansive soil free from roots and other deleterious matter.
3. Do not permit rocks having a dimension greater than 2" within 2' of the outside of pipe.
4. Cohesionless material used for backfill: Provide sand free from organic material and other foreign matter, and as approved by the Engineer.

PART 3 – EXECUTION

3.01 PROCEDURES

- A. Existing Utilities:

1. Unless shown to be removed, protect active utility lines shown on the drawings or otherwise made known to the Contractor prior to trenching. If damaged, repair or replace at no additional cost to the Owner.

2. When existing underground utilities, which are not scheduled for removal or abandonment, are encountered in the excavation, they shall be adequately supported and protected from damage. Any damage to utilities shall be repaired promptly at no additional cost to the Owner.

3. If the service is interrupted as a result of work under this section, immediately restore service by repairing the damaged utility at no additional cost to the Owner.

4. If existing utilities are found to interfere with the permanent facilities being constructed under this section, immediately notify the Engineer and secure his instructions.

5. Do not proceed with permanent relocation of utilities until written instructions are received from the Engineer.

- B. Protection of persons and property:

1. Barricade open holes and depressions occurring as part of the work, and post warning lights on property adjacent to or with public access.

2. Operate warning lights during hours from dusk to dawn each day and as otherwise required.

3. Protect structures, utilities, sidewalks, pavements, and other facilities from damage caused by settlement, lateral movement, washout, and other hazards created by operations under this section.

- C. Dewatering: The Contractor, at all times, shall conduct his operations so as to prevent the accumulation of water, ice, and snow in excavations or in the vicinity of excavated areas, and to prevent water from interfering with the progress of quality of the work. Under no conditions shall water be allowed to rise in open trenches after pipe has been placed.

- D. Accumulated water, ice, and snow shall be promptly removed and disposed of by pumping or other approved means. Disposal shall be carried out in a manner which will not create a hazard to public health, nor cause injury to public or private property, or work completed or in progress, or public streets, nor cause any interference in the use of streets and road by the public. Pipes under construction shall not be used for drainage of excavations.

- E. Maintain access to adjacent areas at all time.

3.02 TRENCHING

- A. Core shall be exercised by the Contractor to avoid disrupting the operation of existing facilities without prior written approval of the Engineer.

- B. Provide sheeting and shoring necessary for protection of the work and for the safety of personnel.

1. Sheeting and bracing required for trenches shall be removed to the elevation of the pipe, but no sheeting will

be allowed to be pulled, removed, or disturbed below the pipe.

- C. A trench shall be excavated to the required depth and to a width sufficient to allow for joining of the pipe and compaction of the bedding and backfill material under and around the pipe. Where feasible, trench walls shall be vertical.

- D. The completed trench bottom shall be firm for its full length and width.

- E. If indicated on the plans or directed by the Engineer, poor foundation material encountered below the normal grade of the pipe bed shall be removed and replaced with granular backfill.

- F. Where pipes are to be placed in embankment fill, the excavation shall be made after the embankment has been completed to a height of 3 feet plus the diameter of the pipe above the designed grade of the pipe.

- G. Excavating for appurtenances:

1. Excavate for manholes and similar structures to a distance sufficient to leave at least 12" clear between outer surfaces and the embankment or shoring that may be used to hold and protect the banks.

2. Over-depth excavation beyond such appurtenances that has not been directed will be considered unauthorized. Fill with sand, gravel, or lean concrete as directed by the Engineer, and at no additional cost to the Owner.

- H. Excavation shall not interfere with normal 45° bearing splay of foundations.

- I. All trenching shall be in accordance with the latest OSHA requirements.

- J. Where utility runs traverse public property or are subject to governmental or utility company jurisdiction, provide depth, bedding, cover, and other requirements as set forth by legally constituted authority having jurisdiction, but in no case less than the depth shown in the Contract Documents.

- K. Where trenching occurs in existing lawns, remove turf in sections and keep damp. Replace turf upon completion of the backfilling.

3.03 BEDDING

- A. Pipe Bedding Area: Prior to laying pipe, bedding material shall be placed to the limits of the excavation and to a depth beneath the pipe as specified. This material shall be either sand, gravel, or crushed stone and shall not contain large lumps and stones over one inch in diameter. As the pipe is laid, bedding material shall be extended to 6" above the pipe and leveled along the width of the trench.

3.04 BACKFILLING

- A. Backfilling shall not be done in freezing weather, with frozen materials, or when materials already placed are frozen.

- B. Unless otherwise specified or indicated on the plans, material used for backfilling trenches above the bedding area shall be suitable material which was removed during excavation or obtained from borrow and when compacted shall make a dense stable fill. The material shall not contain vegetation, porous matter, masses of roots, individual roots more than 18 inches long or 1/2 inch thick, or stones greater than 50 pounds or larger than six inches in the widest dimension.

- C. If additional material is required, it shall be furnished from approved sources.

- D. Backfill material shall be evenly spread and compacted in lifts not more than 8 inches thick or as approved by the Engineer. Previously placed or new materials shall be moistened by sprinkling, if required, to ensure proper bond and compaction.

- E. Reopen trenches which have been improperly backfilled, to a depth as required for proper compaction. Refill and compact as specified, or otherwise correct to the approval of the Engineer.

- F. Should any of the work be so enclosed or covered up before it has been approved, uncover all such work and, after approvals have been made, refill and compact as specified, all at no additional cost to the Owner.

- G. Take special care in backfilling and bedding operations to not damage pipe and pipe coatings.

- H. No compacting shall be done when the material is too wet to be compacted properly. At such times the work shall be suspended until the previously placed and new materials have dried out sufficiently to permit proper compaction, or such other precautions are taken as may be necessary to obtain proper compaction.

- I. Backfill material shall be compacted to the following percentages of maximum dry density and the in-place moisture content shall not be more than 2% above the optimum moisture content, as determined by Modified Proctor ASTM D1557.

1. Around all structures, under roadway paving, shoulder and embankments – 95%.
2. All other areas – 90%.

BITUMINOUS CONCRETE PAVING

PART 1 – GENERAL

1.01 SUMMARY

- A. Section includes:

1. Base Courses
2. Leveling Courses
3. Finish Course

- B. General: This work shall consist of one or more courses of bituminous mixture, constructed on a prepared foundation in accordance with these Specifications and the type of surface being placed, and in conformity with the lines, grades, thicknesses and typical cross sections shown on the plans or established by the Engineer.

1.02 QUALITY ASSURANCE

- A. Use adequate numbers of skilled workers who are thoroughly trained and experienced in the necessary crafts and who are completely familiar with the specified requirements and the methods needed for proper performance of the work of this Section.

- B. All materials and installation shall be in accordance with The Asphalt Institute Manual (MS-4) and the VAOT Standard Specifications, (Latest Edition).

- C. Mixing Plant: Conform to State of Vermont Standards.

- D. Obtain materials from same source throughout.

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conditions of adjoining construction and site improvements, including finish surfaces, that might be misconstrued 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:

- 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.

- Seismographic monitoring during blasting operations.

- 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:

- 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.

- 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:

- 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.
- Verify site conditions and note all subsurface irregularities, which may affect any work requiring blasting.
- Identify required lines, levels, contours and datum.
- Determine a seismic survey prior to rock excavation to determine maximum charges that can be used without damaging adjacent properties, other work or existing utilities.

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 rock that fails to cross section the ledge 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.

- Perform blasting without damaging adjacent structures, properly, or site improvements.
- 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.

- 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:

- Culvert pipe and appurtenances.
- Stone fill.
- Drainage Structures

1.02 REFERENCES

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

1.03 SUBMITTALS

A. Manufacturer's technical data for:

- Pipe and appurtenances.
- Structures.

PART 2 – PRODUCTS

2.01 GENERAL REQUIREMENTS

A. Furnish ells, tees, reducing tees, wyes, couplings, increasers, crosses, transitions and end caps of the same type and class of material as the conduit, or of material having equal or superior physical and chemical properties as acceptable to the Engineer.

B. All culverts and storm drains shall meet the requirements of Section 601 of the Standard Specifications.

2.02 DRAINAGE PIPE & PERFORATED PIPE

A. Culvert / Drainage Pipe

- Corrugated Polypropylene pipe and fittings (smooth interior) meeting the requirements of ASTM F2881, Section 5 and AASHTO M330, Section 6.1.
- For drainage piping installed by directional boring techniques, use PE 3408 high density polyethylene pipe meeting ASTM D3350 Standard (SDR 11 or better)

2.03 CONCRETE STRUCTURES

A. ASTM C478, sized as indicated.

2.04 METAL ACCESSORIES

A. Manhole frames and covers:

- Grey cast iron, ASTM A48, as shown on plans.

2.05 STONE FILL

A. Stone for stone fill shall be approved, hard, blasted angular rock other than serpentine rock containing the fibrous variety chrysotile (asbestos). The least dimension of the stone shall be greater than 1/3 of the longest dimension. The stone fill shall be reasonably well graded from the smallest to the maximum size stone specified so as to form a compact mass when in place.

- Type I – The longest dimension of the stone shall vary from 1 inch to 12 inches, and at least 50 percent of the volume of the stone in place shall have a dimension of 4 inches.

- Type II – The longest dimension of the stone shall vary from 2 inches to 36 inches, and at least 50 percent of the volume of the stone in place shall have a least dimension of 12 inches.

- Type III – The longest dimension of the stone shall vary from 3 inches to 48 inches and at least 50 percent of the volume of the stone in place shall have a least dimension of 16 inches.

- Type IV – The longest dimension of the stone shall vary from 3 inches to 60 inches, and at least 50 percent of the volume of the stone in place shall have a least dimension of 20 inches.

PART 3 – EXECUTION

3.01 INSPECTION

A. Examine the areas and conditions under which storm sewer system work is to be installed and notify the Contractor in writing of conditions detrimental to the proper and timely completion of the work. Do not proceed with the work until unsatisfactory conditions have been corrected.

3.02 GENERAL

A. When existing underground utilities, which are not scheduled for removal or abandonment, are encountered in the excavation, they shall be adequately supported and protected from damage. Any damage to utilities shall be repaired promptly at no additional cost to the Owner.

3.03 PREPARATION

A. Hand trim excavation (where necessary) to required elevations. Correct over-excavations with fill material.

B. The slopes shall be graded to match the grade as shown on the plans. Where required, end sections shall be placed and backfilled to prevent undermining.

C. Remove large stones or other hard matter which could damage drainage structures or impede consistent backfilling or compaction.

3.04 INSTALLATION OF PIPE

A. All pipe and fittings shall be carefully examined for defects and no pipe or fittings shall be laid which are known to be defective. If any defective piece is discovered after laying, it shall be removed and replaced at the Contractor's expense. All pipes and fittings shall be cleaned before they are laid and shall be kept clean until accepted in the completed work.

B. The pipe shall be laid to conform to the lines and grades indicated on the drawings or given by the Engineer. Each pipe shall be laid as to form a close joint with the next adjoining pipe and to bring the inverts continuously to the required grade.

C. Unless otherwise permitted by the Engineer, the Contractor shall provide for the temporary diversion of water to permit the installation of the pipe in a reasonably dry trench.

D. Where the pipe is to be laid below the existing ground line, a trench shall be excavated to the required depth and to a width sufficient to allow for joining of the pipe and compaction of the bedding and backfill material under and around the pipe.

E. The completed trench bottom shall be firm for its full length and width.

F. If indicated on the plans or directed by the Engineer, unsuitable foundation material encountered below the normal grade of the pipe bed shall be removed and replaced with Granular Backfill, or other specified or approved material.

G. The Contractor shall take all necessary precautions to prevent flotation of the pipe in the trench.

H. When pipe laying is not in progress, the open ends of the pipe shall be closed with temporary watertight plugs. If water is in the trench when work is resumed, the plug shall not be removed until all danger of water entering the pipe is eliminated.

3.05 MANHOLES

A. Precast concrete structures:

- Place precast concrete structures and covers as shown on the Drawings.
- Where manholes occur in pavement, set tops of frames and covers flush with finish surface.
- Provide rubber joint gasket complying with ASTM C443.

CURBS AND WALKS

PART 1 – GENERAL

1.01 SUMMARY

A. Section includes:

- Concrete Curbs
- Concrete Sidewalks

PART 2 – PRODUCTS

2.01 CONCRETE

A. The concrete shall have a minimum compressive strength of 4,000 psi at 28 days and shall conform to the requirements of Cast-in-Place Concrete.

2.02 ADMIXTURES

A. Air-entraining admixture shall meet or exceed ASTM C260. Air content shall range from minimum of 5% to 7%.

2.03 EXPANSION JOINT MATERIAL

A. Expansion joint material shall be premolded bituminous filler conforming to ASTM D894.

PART 3 – EXECUTION

3.01 CONCRETE CURBS

A. Excavation shall be made to the required depth and the base material upon which the curb is to be set shall be compacted to a firm, even surface. All soft and unsuitable material shall be removed and replaced with suitable material which shall be thoroughly compacted.

B. Installation: The curb shall be set so that the front top line is in close conformity to the line and grade required. All space under the curbing shall be filled and thoroughly tamped with material meeting the requirements of the material for the bed course.

C. Concrete Mixing and Placing: Compaction of concrete placed in the forms shall be by spading or other approved methods. Forms shall be left in place for 24 hours or until the concrete has set sufficiently so that they can be removed without injury to the curbing. Upon removal of the forms, the curb shall be immediately rubbed down to a smooth and uniform surface but no plastering will be permitted. For this work, competent and skillful finishers shall be employed.

D. Sections: Curbing shall be constructed in sections having a uniform length of ten feet, unless otherwise ordered. Sections shall be separated by open joints 1/8 inch wide except at expansion joints.

E. Expansion Joints: Expansion joints shall be formed at the intervals shown on the plans using a pre-formed expansion joint filler having a thickness of 1/4 inch cut to conform to the cross-section of the curb. They shall be constructed at 20 foot intervals or as directed by the Engineer. When the curb is constructed adjacent to or on concrete pavement, expansion joints shall be located opposite or at expansion joints in the pavement.

F. Backfilling: After the concrete has set sufficiently, the spaces in front and back of the curb shall be filled to the required elevation with layers of not more than six inches of the same material as the bedding and thoroughly tamped.

G. The Contractor shall protect the curb and keep it in alignment until the completion of the contract. Each curb which is damaged at any time previous to final acceptance of the work shall be removed and replaced with satisfactory curb at the Contractor's expense.

H. Concrete Curing/Sealing/Curing and Sealing may be accomplished with a dissipating curing compound in conjunction with a sealer, moisture curing with a sealer or one step curing and sealing compound.

– Protect newly placed concrete against low and high temperature effects and against rapid loss of moisture. Cure all concrete for at least seven (7) days at a temperature of at least 50 degrees Fahrenheit by approved curing methods.

– Moisture curing with silane based sealer is recommended during hot weather applications.

– liquid membrane-forming curing and sealing (or sealing) compounds shall meet ASTM C309 or C1315. Sealers shall be based on silane or siloxane technology for best salt and water repellency for concrete pavements. Two coats shall be applied at right angles for even coverage, allowing first coat to dry before applying second coat. Install in conformance with manufacturers recommendations.

3.02 GRANITE CURBING

A. Sloped granite curbing shall be hard, durable, reasonably uniform in appearance and free from weakening seams. Surfaces shall be as follows:

– Top: 6" wide, sown true plane.

– Front Face: Smooth quarry split, right angle top (No drill holes showing in top 10").

– Back Face Exposed: Plane parallel with front face, straight split to 1 1/2" below surface.

– End Face Exposed: Square planes on top and face.

– Joints Exposed: Maximum 1" and pointed with mortar. Exposed faces shall be finished with a jointer. Remove all excess mortar from exposed faces.

– Length: Minimum length 3'.

Provide curved curbing to conform to radii indicated on the Contract Plans.

3.03 CONCRETE SIDEWALKS

A. Excavation and Foundation: Excavation shall be made to the required depth and to a width that will permit placing of bed course material and the installation and bracing of the forms. Bed course material shall be placed to the depth and section shown on the plans. When the layer required exceeds six inches, two layers of approximately equal depth shall be placed and each layer thoroughly compacted so that it is hard and unyielding. The wetting of bed course material may be required to obtain the compaction.

B. Finishing: The surface shall be finished with a wooden float. No plastering will be permitted. The edges shall be rounded with an edger having a radius of 1/4 inch. The surface of the sidewalk, after the floating and screeding process is completed, shall be finished with a broom of a type approved by the Engineer, drawn over the surface parallel to the transverse joints. Special texturing on sidewalk ramps shall be installed in accordance with construction plan details.

C. Joints: Construction Joints: Set Construction joints at side and end terminations of paving and at locations where paving operations are stopped for more than one-half hour unless paving terminates at isolation joints. Isolation Joints: Form isolation joints of preformed joint-filler strips abutting concrete curbs, catch basins, manholes, inlets, structures, other fixed obstructions and where indicated. Construction Joints: Form weakened-plane Construction Joints, sectioning concrete into areas as indicated. Typical joint spacing is 5 feet but may be indicated differently on plans for wider sidewalks or plaza areas. Construct construction joints for a depth equal to at least one-fourth of the concrete thickness, construction joints may be either grooved or sawed.

D. Curing: During the curing period all traffic, both pedestrian and vehicular, shall be excluded. Vehicular traffic shall be excluded for such additional time as the Engineer may direct.

E. Backfilling: Before the concrete has been opened to traffic, the space on each side of the sidewalk shall be backfilled to the required elevation with suitable material, firmly compacted and neatly graded.

F. Concrete Curing/Sealing/Curing and Sealing may be accomplished with a dissipating curing compound in conjunction with a sealer, moisture curing with a sealer or one step curing and sealing compound.

– Protect newly placed concrete against low and high temperature effects and against rapid loss of moisture. Cure all concrete for at least seven (7) days at a temperature of at least 50 degrees Fahrenheit by approved curing methods.

– Moisture curing with silane based sealer is recommended during hot weather applications.

– liquid membrane-forming curing and sealing (or sealing) compounds shall meet ASTM C309 or C1315. Sealers shall be based on silane or siloxane technology for best salt and water repellency for concrete pavements. Two coats shall be applied at right angles for even coverage, allowing first coat to dry before applying second coat. Install in conformance with manufacturers recommendations. Liquid membrane-forming curing and sealing compounds shall meet ASTM C309 or C1315. Sealers shall be based on

silane or siloxane technology for best salt and water repellency for concrete pavements, or equivalent approved by the Engineer. Two coats shall be applied at right angles for even coverage. Install in accordance with manufacturers recommendations.

G. Joint Sealing: All joints shall be sealed with polyurethane based, elastomeric sealant such as Sikaflex-2c SL, or equivalent approved by the Engineer.

SANITARY SEWER SYSTEMS

PART 1 – GENERAL

1.01 SUMMARY

A. Section includes:

- Gravity Sewer Pipe
- Manhole Structures and Appurtenances
- Pressure Sewer Pipe

B. Related Sections:

- Utility Trenching and Backfilling

1.02 SUBMITTALS

A. Product Data: Submit published data from manufacturers of products and accessories specified, indicating compliance with requirements.

1.03 QUALITY ASSURANCE

A. All sanitary sewer materials and construction of same shall be as shown on the Contract Plans and shall meet the requirements of the State of Vermont Agency of Natural Resources (Department of Environmental Conservation) and the Public Works Standards and Specifications of the local municipality.

PART 2 – PRODUCTS

2.01 GENERAL

A. Furnish ells, tees, reducing tees, wyes, couplings, increasers, crosses, transitions and end caps of the same type and class of material as the conduit, or of material having equal or superior physical and chemical properties as acceptable to the Engineer to provide a complete and operable system.

2.02 PVC GRAVITY SANITARY SEWER PIPE

A. PVC sewer pipe shall conform in all respects to the latest revision of ASTM Specifications D-3034 or F679. Type PSM Polyvinyl Chloride (PVC) Sewer Pipe and Fittings, SDR 35 pipe. All pipe and fittings shall be clearly marked as follows:

– Manufacturer's Name and Trademark

– Nominal Pipe Size (as shown on plans)

– Material Designation 12454–C PVC

– Legend "Type PSM SDR 35 PVC Sewer Pipe" or "PS 46 PVC Sewer Pipe"

– Designation ASTM D-3034 or F679

B. Joints shall be push-on type using elastomeric gaskets and shall conform to ASTM D-3212. The gaskets shall be factory installed. The pipe shall be furnished in nominal 13 foot lengths. Sufficient numbers of short lengths and full machine fittings shall be provided for use at manholes and connections. All connections will require the use of manufactured fittings. Field fabricated, saddle-type connections will not be considered acceptable.

C. Any pipe or fitting having a crack or other defect or which has received a severe blow shall be marked rejected and removed at once from the work site. All field cuts are to be made with saw and 90 degree miter box. Bevel the cut and to the same as the factory bevel and remove all interior burrs. Measure and place a honing mark on the pipe before assembling. The pipe installed under this specification shall be installed so that the initial deflection, measured as described below, shall be less than five percent (5%).

D. The manhole water stop gasket and stainless steel clamp assembly must be approved by the Town Wastewater Treatment Department prior to the installation of any pipe.

E. The Contractor will submit certification that the materials of construction have been sampled, tested, inspected, and meet all the requirements including wall thickness in accordance with ASTM D-3034 or ASTM F679 for all pipe and fittings to be included in project work. PVC pipe shall not be installed when the temperature drops below 32 degrees Fahrenheit or goes above 100 degrees Fahrenheit. During cold weather, the flexibility and impact resistance of PVC pipe is reduced. Extra care is required when handling PVC pipe during cold weather. PVC pipe shall not be stored outside and exposed to prolonged periods of sunlight, as pipe discoloration and reduction in pipe impact resistance occurs. Canvas and other opaque material shall be used to cover PVC pipe when stored outside.

2.03 PVC PRESSURE SEWER PIPE

A. PVC pipe shall conform in all respects to the latest revisions of ASTM Specifications D-2241. All pipe and fittings shall be SDR 26 (or as specified on plans) clearly marked as follows:

– Manufacturer's Name and Trademark

– Nominal Pipe Size (as shown on plans)

– Material Designation 12454–A PVC ASTM D-1784

B. Joints shall be push-on type using elastomeric gaskets factory installed conforming to ASTM Specification D-3212.

2.04 POLYETHYLENE (PE3408) SANITARY SEWER FORCE MAINS

A. This specification covers requirements for PE3408 high density polyethylene sanitary sewer force mains. All work shall be performed in accordance with these specifications and manufacturer requirements.

B. **Referenced Standards.** All standard specifications, i.e., Federal, ANSI, ASTM, etc., made a portion of these Specifications by reference, shall be the latest edition and revision thereof.

C. **Warranty and Acceptance.** The Contractor shall warrant all work to be free from defects in workmanship and materials for a period of one year from the date of completion of all construction. If work meets these specifications, a letter of acceptance, subject to the one year warranty period, shall be given at the time of completion. A final acceptance letter shall be given upon final inspection at the end of the one year warranty period, provided the work still complies with these specifications. In the event deficiencies are discovered during the warranty period, they shall be corrected by the Contractor without additional charge to the owner before final acceptance. During the warranty period, the Project Engineer shall determine if warranty repairs or replacement work shall be performed by the Contractor. The decision of the Project Engineer shall be binding upon the Contractor.

D. **Polyethylene Pipe and Fittings**

- Qualification of Manufacturers.** The Manufacturer shall have manufacturing and quality control facilities capable of producing and assuring the quality of the pipe and fittings required by these Specifications. The Manufacturer's production facilities shall be open for inspection by the Owner or his Authorized Representative. Qualified manufacturers shall be approved by the Project Engineer.
- Materials.** Materials used for the manufacture of polyethylene pipe and fittings shall be PE3408 high

density polyethylene (SDR 11 or better) meeting cell classification 345444C or 345444E per ASTM D 3350; and shall be listed in the name of the pipe and fitting manufacturer in the Plastic Pipe or Fittings Manual, 4th Edition, Recommended Hydrostatic Strengths and Design Stresses for Thermoplastic Pipe and Fitting Compounds, with a standard grade HDB rating of 1,600 psi at 73°F. The manufacturer shall certify that the materials used to manufacture pipe and fittings meets these requirements.

3. **Polyethylene Pipe.** Polyethylene pipe shall be manufactured in accordance with ASTM D 7174, SDR Polyethylene (PE) Plastic Pipe (SDR-11 rating or better). Based on Outside Diameter, and shall be so marked. Each production lot of pipe shall be tested for (from material or pipe) melt index, density, % carbon, (from pipe) dimensions and ring tensile strength.

4. **Polyethylene Fittings & Custom Fabrications.** Polyethylene fittings and custom fabrications shall be molded or fabricated by the pipe manufacturer. Butt fusion outlets shall be made to the same outside diameter, wall thickness, and tolerances as the mating pipe. All fittings and custom fabrications and connections shall be fully rated for the same internal pressure as the mating pipe. Pressure de-rated fabricated fittings are prohibited.

5. **Molded Fittings.** Molded fittings shall be manufactured in accordance with ASTM D 3261, Butt Heat Fusion Polyethylene (PE) Plastic Fittings for Polyethylene (PE) Plastic Pipe and Tubing, and shall be so marked. Each production lot of molded fittings shall be subjected to the tests required under ASTM D 3261.

6. **Fabricated Fittings.** Fabricated fittings shall be made by heat fusion joining specially machined material cut from pipe, polyethylene sheet stock, or molded fittings. Fabricated fittings shall be rated for internal pressure service at least equal to the full service pressure rating of the mating pipe.

7. **Polyethylene Flange Adapters.** Flange adapters shall be made with sufficient through bore length to be clamped in a butt fusion joining machine without the use of a stub-and-holder.

8. **Back-up Rings & Flange Bolts.** Flange adapters shall be fitted with back-up rings pressure rated equal to or greater than the mating pipe. The back-up ring bore shall be chamfered or radused to provide clearance to the flange adapter radius. Flange bolts and nuts shall be Grade 6 or higher (stainless steel).

9. **Compliance Tests.** Manufacturer's inspection and testing of the materials. In case of conflict with manufacturer's certifications, the Engineer, the Contractor, or Owner may request retesting by the manufacturer or have retests performed by an outside testing service. All retesting shall be at the requestor's expense, and shall be performed in accordance with the Specifications.

E. Joining

- Heat Fusion Joining.** Joints between plain end pipes and fittings shall be made by butt fusion, electrofusion couplings and joints between the main and saddle branch fittings shall be made using saddle fusion procedures that are recommended by the pipe and fitting manufacturer. The Contractor shall ensure that persons making heat fusion joints have received training in the manufacturer's recommended procedure. The Contractor shall maintain records of trained personnel and shall certify that training was received not more than 12 months before commencing construction. External and internal beads shall not be removed.

2. **Butt Fusion of Unlike Wall Thicknesses.** Fusions of different wall thickness are acceptable, as long as the difference is limited to a one SDR difference, i.e. SDR 11 to SDR 9. Transitions between unlike wall thicknesses greater than one SDR shall be made with a transition nipple (a short length of the heavier wall pipe with one end machined to the lighter wall) or by mechanical means.

3. **Joining by Other Means.** Polyethylene pipe and fittings may be joined together to other materials by means of (a) flanged connections (flange adapters and backup rings), (b) mechanical couplings designed for joining polyethylene pipe or for joining polyethylene pipe to another material, or (c) electrofusion. When joining by other means, the installation instructions of the joining device manufacturer shall be followed. All connections shall maintain the total pressure rating of the force main.

4. **Mechanical Joint Installation.** Mechanical joints shall be installed in accordance with the manufacturer's recommended procedure. When an OD compression mechanical coupling is used, a stiffener shall be installed in the bore of the polyethylene pipe.

5. **Branch Connections.** Branch connections to the main pipe shall be made by using PVC pipe during cold weather. PVC pipe shall be saddle fused to the main pipe.

2.05 HORIZONTAL DIRECTIONAL DRILLING W/ POLYETHYLENE PIPE

A. Directional boring with PE3408 pipe shall be completed in accordance with the manufacturer's requirements and shall not in any way affect the joint connections or the overall strength characteristics of the pipe.

B. References:

"Mini-Horizontal Directional Drilling Manual" published by North American Society for Trenchless Technology (NASTT).

"Guidelines for a Successful Directional Crossing Bid Package" published by Directional Crossing Contractors Association (DCCA).

"Polyethylene Pipe for Horizontal Directional Drilling" of the Plastic Pipe Institute's Handbook of Polyethylene Piping.

C. **Quality Control.** All directional boring shall be completed in such a way as not to jeopardize the existing infrastructure/facilities, such as the roadway, utility poles, subsurface utilities, structures/foundations, or significant landscaping. Prior to directional drilling, all potential conflicts shall be field verified.

D. General

- I. All sewer pipes shall be marked with magnetic marking tape. The marking tape shall be installed two (2) feet below finished grade, directly over the pipe and shall be labeled "sewer". Concrete thrust blocks or anchors shall be placed at bends, tees, fittings, and other locations on the force main as shown on the contract drawings or as directed by the Town representative. Concrete for thrust blocks and anchors shall be Class B concrete. Steel rods and clamps as required shall be galvanized and rust proofed or painted.
- 3.04 GRAVITY SEWER PIPE TESTING
- A. The Contractor shall provide all necessary equipment and instrumentation required for proper completion of the flushing and testing. Quality of water, test procedures, and method of disposal of water shall be approved by the Engineer. Prior to testing, flush with water to remove construction debris and pass through a full gauge squeegee.
- B. All tests shall be made in the presence of the Engineer. Preliminary tests made by the Contractor without being observed by the Engineer will not be accepted. The Engineer will be notified at least eight hours before any work is to be inspected or tested. The Town shall be notified at least at least two (2) days before testing.
- C. The maximum sewer length to be tested at one time shall be that length between any two manholes.
- D. Air Testing: Low pressure air testing shall be conducted in accordance with the following procedures:

1. Each end of the test section and laterals shall be plugged, capped and braced. Necessary safety precautions shall be taken to prevent blowouts and possible injury.
2. An air hose shall be connected to a tapped plug used for an air inlet. The hose will be connected to the air control equipment, which shall include valves and pressure gauges. These shall allow air to enter the sewer test line, monitor air pressure in the sewer, shut off air, and provide pressure reduction and relief. The monitoring pressure gauge shall have a range of 0–10 psi with divisions of 0.10 psi and accuracy of 0.05 psid.
3. The air compressor and air supply shall be connected to the test line and the test section filled slowly, until a constant pressure of 4.0 psig is maintained.
4. A pressure above 3.0 psig shall be maintained for at least five minutes to allow the temperature to stabilize. A check for leaks shall be made and if any are found, the pressure shall be released and the fitting replaced or repaired.
5. After the stabilization period, the pressure shall be adjusted to 3.5 psig and the air supply disconnected.
6. Measure and record the time interval for the test line pressure to drop from 3.5 psig to 2.5 psig.
7. If the groundwater table is above the pipe, increase above test pressure by one psi for each foot the groundwater is above the invert of the pipe.
8. The requirements of this specification shall be considered satisfied if the time required for the pressure to decrease from 3.5 to 2.5 psi greater than the average back pressure of any groundwater that may submerge the pipe is not less than that computed according to the following table:
- | Minimum Test Time for Various Pipe Sizes | |
|--|---------------------|
| Diameter (Inches) | Time (Sec./100 Ft.) |
| 4 | 18 |
| 6 | 45 |
| 8 | 75 |
| 9 | 90 |
| 12 | 110 |

- 3.05 MANHOLES
- A. The excavation shall be to the depth indicated on the plans or ordered by the Engineer, and carefully shaped and graded.
- B. Manhole sections shall be precast concrete and shall conform to the dimensions indicated on the plans or ordered by the Engineer.
- C. Channels, inverts and floor areas for sewer manholes shall be constructed of concrete. Inverts shall have the exact shape of the sewer to which they are connected and any change in size or direction shall be gradual and even. All construction of sewer manholes must be carried out to insure watertight work.
- D. The required precast concrete risers shall be placed on top of the concrete to the elevation indicated on the plans or as ordered by the Engineer.
- E. The cast iron frame shall be set as indicated on the plans in a full mortar bed. The cover shall be properly placed in the frame.

- 3.06 MANHOLE TESTING
- A. Manholes shall be tested separately by one of the following two procedures:
1. Exfiltration Leakage Test: All pipes and other openings into the manhole shall be suitably plugged and the plugs braced to prevent blowout. The manhole shall then be filled with water to the top of the cone section. A period of time may be permitted, if the Contractor so wishes, to allow for absorption. At the end of this period, the manhole shall be refilled to the top of the cone, if necessary, and the measuring time of at least four hours begun. At the end of the test period, the manhole shall be refilled to the top of the cone, measuring the volume of water added. This amount shall be converted to gallons per vertical foot depth for 24 hours. The leakage for each manhole shall not exceed one gallon/vertical foot/day. If leakage exceeds the allowable rate, repairs shall be made as approved by the Engineer and the manhole retested. If the Contractor elects to backfill prior to testing, the testing shall be at his own risk, and it shall be incumbent upon the Contractor to determine the reason for any failure of the test. No adjustment in the leakage allowance will be made for unknown causes such as leaking plugs, absorption, etc. It will be assumed that all loss of water during the test is a result of leaks through the joints or through the concrete. Furthermore, the Contractor shall take any steps necessary to assure the Engineer that the water table is below the bottom of the manhole throughout the test.
2. Vacuum Test: This method of testing manholes for leakage involves the use of a device for sealing the top of the manhole cone section and pumping the air out of the manhole, creating a vacuum and holding this vacuum for a prescribed period of time. The procedure for this test is as follows:

- a. All lifting holes and exterior joints shall be filled and pointed with an approved non-shrinking mortar. The completed manhole shall not be backfilled prior to testing. Manholes which have been backfilled shall be excavated to expose the entire exterior prior to vacuum testing or the manhole shall be tested for leakage by means of the exfiltration leakage test.
- b. All pipes and other openings into the manhole shall be suitably plugged in a manner to prevent displacement.
- c. A plate with an inflatable rubber ring the size of the top of the manhole shall be installed by inflating the ring with air to the point where the type material separates of air between the rubber ring and the manhole wall.
- d. Air shall then be pumped out of the manhole through an opening in the plate until a vacuum is created inside of the manhole equal to 10 inches of mercury on an approved vacuum gauge. The removal of air

shall then be stopped and the test begun.

e. The manhole shall pass this test if the vacuum holds at 10" Hg or drops no lower than 9" Hg within the following times:

Depth of 4" Manhole	Minutes	Seconds
0' – 10'	2	0
10' – 15'	2	30
15' – 20'	3	0
20' – 25'	3	30

- f. If the vacuum drop exceeds 1" Hg during the specified time periods, the manhole shall be resealed and Steps 2 through 5 above repeated until the vacuum holds for the specified time.
- g. After the manhole passes the vacuum test, it shall be backfilled carefully so that no leaks are created. If the manhole is disturbed in any way during backfill, it shall again be vacuum tested according to Steps 1 through 5 above. If the manhole fails the vacuum test, the Contractor shall test the manhole using the manhole exfiltration test.
- h. The Contractor shall provide the Engineer with a written log of each manhole leakage test result.
- i. Manholes shall be tested and accepted prior to building manhole inverts.

- 3.07 PRESSURE PIPE TESTING
- A. General: All force mains shall pass the hydrostatic pressure test and leakage test described herein. Prior to testing, all anchors and braces shall be installed. All concrete thrust blocks and restraints shall be in place and cured at least seven days. All buried pipe shall be backfilled. Suitable test plugs shall be installed on air release valves shall be installed at the high points.
- B. Hydrostatic Test: The following procedure shall be used:
1. All air release valves shall be opened and the pipe shall be filled with water at a rate not to exceed the venting capacity of the air release valves.
2. The water pressure shall be raised to 150 percent of the designed operating pressure or 60 psi minimum at the highest point.
3. Failure to hold the designated pressure within 5 psi of the specified test pressure for the two hour period constitutes a failure of the section tested.
- C. Leakage Test: The following procedure shall be used:
1. Leakage shall be defined as the quantity of water that must be supplied into the pipe being tested to maintain pressure within 5 psi of the specified test pressure.
2. No pipe installation shall be accepted if the leakage is greater than that determined by the following formula:

$$L = \frac{ND(P)^{0.5}}{7,400} \quad \text{Whichever is less}$$
$$L = \frac{SD(P)^{0.5}}{133,100}$$

S = Length of Pipe Testing
L = Allowable Leakage in Gal/Hr
D = Nominal Diameter of Pipe (")
P = Average Test Pressure (psi)
N = Number of Joints in the Pipeline Tested

All testing shall be conducted in accordance with AWWA C600–87 or latest revision.

- 3.08 PUMP STATION AND STORAGE TANK TESTING
- A. Pump Station and Storage Tank Testing: All manholes and storage tanks shall be tested for leakage in accordance with the following procedure:
- B. Water Test: After the structure has been assembled in place, all lifting holes and exterior joints shall be filled and pointed with non shrinking mortar. All pipes and other openings into the structure shall be suitably plugged and the plugs placed to prevent blowout.
1. Each structure shall be checked for exfiltration by filling with water to the top of the cone section. A stabilization period of one hour shall be provided to allow for absorption. At the end of this period, the structure shall be refilled to the top of the cone, if necessary, and the measuring time of at least six hours begun. At the end of the test period, the structure shall be refilled to the top of the cone measuring the volume of water added.
2. This amount shall be converted to a 24-hour rate and the leakage determined on the basis of depth and size of structure. The leakage for each structure shall not exceed one gallon per vertical foot per 15 linear feet of wall (as measured in plan view) for a 24 hour period for exfiltration and there shall be no visible infiltration.
- C. Air Test: Alternatively, the manhole may be tested for leakage using the following procedure:
1. All lifting hole and exterior joints shall be filled and pointed with an approved non-shrinking mortar. The completed manhole shall not be backfilled prior to testing. Structures that have been backfilled shall be excavated to expose the entire exterior prior to vacuum testing or the manhole shall be tested for leakage by means of a hydrostatic test.
2. All pipes and other openings in the manhole shall be suitably plugged in a manner to prevent displacement.
3. A plate with an inflatable rubber ring the size of the top of the manhole shall be installed by inflating the ring with air to a pressure adequate to prevent leakage of air between the rubber ring and the manhole wall.
4. Air shall then be pumped out of the manhole through an opening in the plate until a vacuum is created inside of the manhole equal to 10 inches of mercury on an approved vacuum gauge. The removal of the air shall then be stopped and the test time begun.
5. The vacuum must not drop below 9 inches of mercury within a 2 minute test period. If more than 1 inch of drop in vacuum occurs within the 2 minute test period the manhole has failed the test and shall be repaired or reconstructed and retested.
- D. Following satisfactory test results, the manhole may be backfilled.

- 3.09 SERVICE CONNECTION
- A. No sanitary sewer shall be placed in service until such time as the Town has given final approval to the sewer installation, including satisfactory completion of all required tests. Service connections shall not be made until all receiving sewer mains have been completed and approved as-built received along with GPS coordinates and approved by the Town Wastewater Department.
1. Laterals
- Where required on the plans, sewer service connections for one house shall be constructed of four inch (4") pipe, unless otherwise noted on the plans. If the type material specified under this section, The pipe shall be laid and its joints made as required for sewer construction in this specification. Open ends of pipes shall be properly sealed to prevent damage and intrusion of foreign matter where hookup to the building sewer is not coincident with sewer main construction. Additionally, the Contractor will provide a stable, temporary

marker approved by the Town Wastewater Department from the sewer service invert up to six inches (6") above the finish grade and sealed securely into the ground for esse in marking the end of sewer service connection for hooking up the building sewer. Two (2) tie points to permanent objects shall be documented. The tie points shall be submitted to the homeowner and to the Wastewater Department.

In the case of reconnection of existing services, such reconnection will be made only after the new sewer main has been completed, tested, and accepted. The excavation, bedding material, installation, and backfill for service connections shall be the same as for sewer mains.

2. Cleanouts for Sewers

Cleanouts for gravity sewers and force mains shall be provided at locations indicated on the plans or as directed by the Town Wastewater Department. Cleanout frames and covers against each other shall be machined to give continuous contact throughout their circumference. All iron castings shall be thoroughly cleaned and then coated with hot coal tar before being delivered. Individual laterals shall have cleanouts every one hundred feet (100'). Cleanouts shall also be installed in laterals with changes of alignment of 45 degrees or greater.

3. Chimneys

Chimneys shall be built of four inch (4") pipe and/or as indicated on the contract drawings. Each chimney shall be plugged or capped at end until ready to connect to existing services. Chimneys are required where the vertical drop between the finished grade surface and the main sewer line exceeds fifteen feet (15') at the eye from a service connection.

3.10 Force Main

- A. After force mains have been laid and the trench backfilled, the pipe shall be subjected to a hydrostatic pressure test in accordance with PVC Pressure Pipe Standards for Sewer Force Mains as published by the PVC Pipe Association (latest issue) and AWWA C900. The hydrostatic pressure shall be 150 percent (150%) of normal operational pressure. After the pressure test has been satisfactorily completed, a leakage test shall be conducted in accordance with Vermont Wastewater System & Potable Water Supply Rules (latest issue). The minimum test pressure shall be 50 pounds per square inch at the high point in the system.

3.11 Wet well

- A. The pre-cast concrete wet well shall be externally coated with an asphaltic sealant and tested for water tightness using an approved vacuum or water testing procedure.

PART 4 – PUMP STATION

4.01 SPARE PARTS

- A. A complete replacement pump shaft seal assembly shall be furnished with each lift station. The spare seal shall be securely fastened to the control panel and shall include complete installation instructions.
- B. Two (2) spare volute gaskets shall be provided.
- C. A spare filter cone for the seal filter shall be provided in the same container as the pump shaft seal.
- D. Provide 100% spare lamps and fuses for control panel.
- E. Provide all lubricants required for initial operation.
- F. Provide one (1) spare input and output card, processor, and power supply for the Programmable logic controller (PLC) system.
- G. Provide one (1) spare level transducer.

4.02 O & M MANUALS

- A. Installation of all mechanical equipment shall be done in accordance with written instructions provided by the manufacturer. Installation instructions shall be delivered with the station.
- B. The manufacturer shall provide 5 copies of a complete and detailed operating and maintenance manual. This manual shall provide all design criteria, general operating procedures, maintenance and servicing procedures for all major components, and as-built drawings of the contributory gravity sewer system, the pumping station and force main. All instructions and parts lists shall be prepared for the specific equipment furnished and shall not refer to similar equipment. O & M manuals shall be submitted to the Town prior to final acceptance of the station.

WATER SUPPLY SYSTEM

PART 1 – GENERAL

1.01 SUMMARY

A. Section includes:

1. Pipe Materials
2. Hydrants
3. Valves
4. Fittings
5. All other appurtenances necessary to complete the water main system as shown on the Contract Plans.

B. Related Sections:

1. Utility Trenching and Backfilling

1.02 SUBMITTALS

- A. Product Data: Submit published data from manufacturers of products and accessories specified, indicating compliance with requirements to the Engineer and local municipality.

1.03 QUALITY ASSURANCE

- A. All materials and the installation procedure shall be in accordance with the Department of Environmental Conservation, Vermont Drinking Water and Groundwater Protection Division and the applicable construction ordinances of the local municipality.

PART 2 – PRODUCTS

2.01 GENERAL

- A. Furnish els, tees, reducing tees, wyes, couplings, increasers, crosses, transitions and end caps of the same type and class of material as the conduit, or of material having equal or superior physical and chemical properties as acceptable to the Engineer as necessary to complete the water system.
- B. All wetted components shall be NSF 61 certified and comply with VT Act 198 (VT Lead Law)

2.02 WATER MAIN MATERIAL

C-900 PVC WATER MAIN

- A. Pipe shall be C-900 (DR-14 200 psi) PVC (sizes as shown on the plans) conforming to current AWWA C-900, latest revision and tested and approved by UL and FM approved. Larger size mains will be required if necessary to allow withdrawal of the

required fire flow while maintaining the minimum pressure specified in the Vermont Drinking Water and Groundwater Protection Division Rule, Chapter 21, 8.1.11. Any proposed departure from minimum requirements shall be justified by hydraulic analysis and future water use assessment, and will be considered only in special circumstances (Vermont Drinking Water and Groundwater Protection Division Rule, Chapter 21, 8.1.4). Push-on joint accessories shall conform to applicable requirements of ANSI/AWWA C111/A21.11.

- B. When a pipe material is specifically noted on the contract drawings, the contractor/developer shall not have the option of utilizing any other pipe material. Galvanized pipe or fittings shall not be used in any water system owned or maintained by the Town. The Town Water Department requires the use of polyethylene pipe for sleeve encasements and/or alternate pipe materials in known or suspected corrosive soil conditions. Any changes to the approved design will require approval by the Vermont Water Supply Division.

DUCTILE IRON WATER PIPE

- A. Pipe shall be Tylon Ductile Iron Class 52 (sizes as shown on the plans) conforming to current ANSI/AWWA C151/A21.51 latest revision. Push-on joint pipe shall be minimum thickness Class 52. Push-on joint accessories shall conform to applicable requirements of ANSI/AWWA C111/A21.11.
- B. Pipe shall be cement mortar lined on the inside in accordance with ANSI Specification A21.4 except that the cement lining thickness shall not be less than 1/8 inch. A plus tolerance of 1/8 inch will be permitted.
- C. Pipe shall be given an exterior petroleum asphaltic coating in accordance with ANSI/AWWA Specification C151/ASNI A21.51.
- D. Pipe shall be poly wrapped with a minimum thickness of 4 mil poly in accordance with AWWA Specification C105 / ANSI A21.5, unless approved otherwise.

2.03 FITTINGS

- A. Ductile iron fittings shall conform to ANSI/AWWA C110/A21.10, 350 PSI working pressure. Ductile iron fittings larger than twelve inches (12") shall have a standard body length equal to Class 250 Cast Iron fittings. Cast Iron Class 250 fittings will be allowed in lieu of ductile iron fittings larger than twelve inches (12"). Ductile iron fittings shall be rated for 250 p.s.i.. However, twelve inch (12") and smaller may be rated for 350 p.s.i. with the use of special gaskets. All ductile iron compact fittings shall conforming to AWWA/ANSI C153/A21.53 standards.

- B. Anchor tees shall be standard mechanical joint tees except that the branch is plain Class 250 cast iron or Class 350 ductile iron, cement lined, conforming to ANSI/AWWA C110/A21.10, C111/A21.11, and C104/A21.4. Anchor tees shall be Class F-1217, U.S. Pipe U5–92 or equal.

- C. Mechanical joint restraints shall be incorporated into the design of the follower gland and shall include a restraining mechanism which, when actuated, imports multiple wedging action against the pipe increasing its resistance as the pressure increases. Flexibility of the joint shall be maintained after burial. Glands shall be manufactured of ductile iron and have a minimum working pressure of 350 psi. Twist off nuts (i.e. mega-lug) or equal shall be used to ensure proper actuating of the restraining devices. Contractors may also use approved grip ring (or equal) retainer glands.
- D. Bolts shall conform to ANSI Specification A21.10.

- E. Pipeline couplings shall conform to AWWA Standards C110 and ANSI A21.10. Mechanical joint connecting pieces of proper diameter shall be installed in accordance with the manufacturer recommendations and at locations directed by the plans or the Town Water Department.

- F. All fittings shall be restrained; double poly wrapped and have concrete thrust blocks poured in place as defined herein.

2.04 TAPPING SLEEVES AND VALVES

- A. The Town Water Department shall be notified whenever a proposed tap is to be made on any transmission main within the municipal system.

- B. Only approved tapping companies shall be allowed to perform wet taps on any Town Water Department water mains.

- C. All materials used when tapping for a branch connection or interconnection from any Town Water Department water transmission or distribution pipelines shall be specified below

2.05 TAPPING SLEEVES

For use on existing asbestos cement, gray cast iron, ductile iron or PVC C-900 pipe:

- A. Tapping sleeves shall be of the split sleeve design, constructed with two solid half-sleeves bolted together. The sleeves shall be constructed of ductile iron and shall have a working pressure of at least 250 psi, and shall have mechanical joint ends with end and side gasket seals.

- B. All iron body tapping sleeves shall be provided with a 3/4" NPT test plug, or other provisions must be made for air testing the valve and sleeve at maximum working pressure, prior to tapping.

- C. All bolts and nuts for mechanical joints of tapping sleeves shall be of high-strength cast iron or high-strength, low-alloy steel conforming to ANSI/AWWA C111/A21.11.

- D. All bolts and nuts for flanged joints of tapping sleeves shall be of high-strength, low carbon steel conforming to ANSI/AWWA C110/A21.10.

- E. All bolts and nuts shall be sound, clean, and coated with a rust-resistant lubricant; their surfaces shall be free of objectionable protrusions that would interfere with their fit in the made-up mechanical or flanged joint.

2.06 TAPPING VALVES

- A. Tapping valves shall conform to ANSI/AWWA C509 Standard for Resilient-Seated Gate Valves for Water and Sewage Systems, except as modified herein. Valves shall open counterclockwise and shall have a minimum working pressure of 200 psi. Inlet flanges shall be Class 125 conforming to ANSI Specification B16.1 or ANSI/AWWA C110/A21.10, and outlet connection shall be Standardized Mechanical Joint unless specified otherwise on the drawings for the type of pipe required for the branch or lateral pipeline.

- B. Tapping valves over sixteen inches (16") diameter shall be installed with their stems horizontal, shall be equipped with rollers, tracks and scrapers, and shall be provided with bypass valves unless otherwise specified.

- C. Buried tapping valves shall be provided with a two inch (2") square wrench nut and shall be installed with a cast iron valve box as required to allow positive access to the valve operating nut at all times. In installations where the depth from grade to top of valve operating nut is greater than 50", a valve stem riser shall be provided and installed such that the depth from valve stem riser nut to grade is from four feet to five feet (4'–5'), (minimum length of valve stem riser is two feet (2')). Valve stem riser shall be of high strength steel and of welded construction.

- D. All contractors (or others) who apply for water line tapping permits shall submit complete specifications of the tapping material they intend to use at the time the tapping permit application is submitted on 8 1/2" x 11" sheet drawing sheets

- E. All bolts and nuts used with all pipe sleeves shall, upon final tightening and testing, be braced and secured heavily with a bitumastic cold-applied material to thoroughly cover all

exposed surfaces of the bolts and nuts.

2.07 GATE VALVES–RESILIENT SEAT

- A. Valves shall be manufactured to meet all requirements of AWWA Specification C509, latest edition. Valves twelve inches (12") and smaller shall be bubble tight, zero leakage at 200 psi working pressure. Valves shall have non-rising stems, open counter clockwise, and provide a two inch (2") square operating nut with arrow cast in the metal indicating direction of opening. Each valve shall have maker's name, pressure rating and year in which manufactured cast on the body. Prior to shipment from the factory, each valve shall be tested by hydrostatic pressure equal to twice the specified working pressure. Gate valves shall be Mueller, Kennedy, AFC, or approved equal.

- B. Buried valves shall be installed with a gate valve box.

- C. Gate valves shall normally be placed a maximum of five hundred feet (500') apart. Tee intersections shall have a minimum of three (3) gate valves. Cross sections (four way intersections) shall have a minimum of four (4) valves.

- D. The Town Water Department may require all bolts, studs and nuts be made from a corrosion resistant–material stainless steel.

2.08 VALVE BOXES

- A. Valve boxes shall be of the three-piece Cast iron slide-type with a minimum inside shaft diameter of five and one quarter inches (5 1/4") and a six foot (6') trench depth. Valve boxes shall not transfer loads into the valve.

- B. Valve boxes shall have a cast iron cover, marked "WATER". The boxes shall be dirt tight with the top of the cover flush with the top of the box rim, countersunk brass pentagon plug for paved or concrete areas, and standard two holes for grass areas. Curb box couplings and extensions will be the same material as the curb box. Both cover and upper section of the box shall be able to be located with an aqua type metal locator.

- C. All service connections shall be installed to the curb stop for all building lots before the street is paved.

- D. Valve boxes located in roadways shall have one non-adjusting paving riser of a height ranging from one and a half inches (1.5") to six inches (6") as needed to be brought to final pavement grade.

2.09 BACKFLOW PREVENTION DEVICES

- A. No water service connection shall be approved or maintained by the Town Water Department unless the water supply is protected as required by State laws, regulations and ordinances. The type of protective device shall depend on the degree of hazard that exists. In general, backflow devices designed to protect potable water supplies in accordance with national plumbing codes for non-health hazard cross connections and continuous pressure applications shall be used, i.e. Watts Series 007 or approved equal. Watts Series 709 Double Check Valve Assembly or approved equal shall be installed on all sprinkler systems. A shop drawing detail assembly showing backflow devices and meter placements shall be required by the Town Water Department.

2.10 PIPE BEDDING

- A. Water lines shall be laid and maintained on lines and grades established by the plans for the project. Pipeline trenches shall be excavated to the width and depths shown on the plans typicls. Pipeline trenches in which pipe is to be laid directly on the trench bottom shall not be excavated entirely by machinery, but shall be finally excavated by hand tools such that the trench shall have a bottom shaped to support the pipe throughout its entire length by firm and undisturbed material. Pipeline trenches, for which bedding is required, may be excavated to the required depths using machinery. No pipe shall be laid directly on ledge, hard shale or a very compact glacial till. When an unstable trench bottom is encountered and the Town Water Department determines that it cannot support the pipe adequately, an additional depth shall be excavated and refilled to the pipe invert with approved material at the contractor's expense. Pipeline trenches shall be dry during the laying of pipe. Wood supports under pipe shall be removed prior to backfilling. Pipeline installation procedures can be found in AWWA Standard C600.

- B. Bedding material shall consist of crushed or natural stone conforming to ASTM D2321.

Sieve	Percent Passing
1" Screen	100%
3/4" Screen	100%
1/2" Screen	90 – 100%
3/8" Screen	40 – 70%
No. 4 Sieve	0 – 15%

- C. Bedding and blanket material shall be Class II material (ASTM D2321) consisting of clean, granular material (sand), particle size limits described as follows:

Sieve	Percent Passing
No. 4	100%
No. 10	30%
No. 200	12%

2.11 PIPELINE INSULATION

- A. Approved waterlines with less than six feet (6'–0") of cover over the crown, that cross a storm sewer, or where indicated on the plans, shall be insulated against freezing by the installation of two inch (2") thick highest available density extruded polystyrene insulating sheets or equivalent. Sheets shall be the lessor of 3' or 2 x diameter of the pipe. The sheets shall be placed six inches (6") above the crown after placement of four to six inches (4" – 6") of clean medium or coarse sand below the pipe bottom and four to six inches (4" – 6") above the crown. Joints shall be overlapped so there is no gap that will allow frost to penetrate. Care shall be exercised during backfill and compaction over the polystyrene sheets to prevent damage to the sheets. The polystyrene sheets shall meet the comprehensive strength requirements of ASTM D1621–73. In no cases shall the sheets have less than four feet (4') of cover over the top of the pipe. When water line passes within 5 feet of a catch basin install 2" min. rigid insulation, polystyrene sheets, between water line and cb.

2.12 POLYETHYLENE PIPE ENCASEMENT

- A. Polyethylene pipe encasement may be required in areas of water mains and shall conform to current ANSI/AWWA C105/A21.5 Specifications. Minimum material requirements for the polyethylene film shall be high density, cross laminated virgin polyethylene 4 mil film. The Town Water Department reserves the right to specify Polyethylene pipe, C-900, in areas of corrosive soils.

- B. The polyethylene encasement shall prevent contact between the pipe or fittings and the surrounding backfill and bedding material and shall be installed as outlined in Section 4.1 of the above ANSI/AWWA standard.

2.13 CONCRETE FOR THRUST BLOCKS

- A. Concrete shall be Portland Cement concrete of 3,000 psi minimum 28 day compressive strength. ASTM C-94 specification for transit mixed concrete shall control the concrete quality. A maximum water cement ratio of 6 gallons per sack and a maximum slump of four inches (4") will be allowed.

2.14 FIRE HYDRANTS AND HYDRANT BRANCHES

- A. Fire hydrants shall be Mueller Super Centurion 250, Figure A-423, Kennedy K-81 D, or Watertec Pacer Hydrant and

shall conform to AWWA C502 with the following specifications:

1. Main Valve Opening: 5 1/4 inches

2. Nozzle Arrangement: Two 2 1/2 inch Hose Nozzles with National Standard Thread (NST)

3. One 4 1/2 inch Pumper Nozzle with National Standard Thread (NST)

4. Inlet Connection: 6 inch Mechanical Joint, "Mega-Lug" or equivalent retaining gland and concrete thrust block

5. Operating Nut: Standard 1 1/2 inch Pentagon

6. Direction of Opening: Counterclockwise

7. Depth of Bury: Six-foot cover. The hydrant shall have at least 15 inches and no more than 21 inches between the bottom of the steamer cap and the ground.

8. Drain: The hydrant shall be non-draining or have the drains permanently plugged.

9. Color: Red enamel

10. Other: Hydrants shall be compression type closing with the pressure. Hose and pumper nozzles shall be 1/4 turn type secured by stainless steel or corrosion resistant pins or screws. Pressure seals behind the nozzle flanges shall be "O" rings. A breakable coupling retained in place by stainless steel or corrosion resistant pins shall make the union between the upper and lower stems. The two-piece traffic flange shall be held in place by nuts and bolts. The upper barrel shall be able to rotate 360 degrees without removing any bolts. Hydrant flags shall be required and supplied for each hydrant. Wherever a traffic hazard appears to exist, curbing and/or bollards shall protect the hydrant.

- B. For single-family house subdivisions, there will be at least one hydrant at each intersection and a maximum of five hundred feet (500') between hydrants with a minimum water flow of 500 gallons per minute (gpm) at the flow hydrant with a 20-psi residual pressure of the residual hydrant. Hydrants should be located immediately adjacent to street property lines. A 20' x 20' easement will be required around all hydrants. No structures or plantings are to be placed within a 20'-20' area of any hydrant.

- C. Where dead-end mains occur, they shall be provided with a fire hydrant if flow and pressure meet minimum requirements. If flows and pressure are not sufficient, then an approved flushing hydrant or blow off shall be installed for flushing purposes. Flushing devices should be sized to provide flows which will give a velocity of at least 2.5 feet per second in the water main being flushed. The open end of a blow off must be capped and terminate at least eighteen inches (18") above grade.

- D. When set in lawn space between the curb and sidewalk, no portion of the hydrant or nozzle cap will be less than one foot off the gutter face of the curb or edge of the sidewalk. Hydrants shall be a minimum of four feet (4') and a maximum of six feet (6') from the edge of the sidewalk to the closest point on the hydrant when placed behind the sidewalk. In the absence of a curb or sidewalk, no hydrant shall be placed more than six feet (6') from the edge of pavement. Hydrants shall be located so as to provide complete accessibility and minimize the possibility of damage from vehicles or injury to pedestrians.

2.15 HYDRANT ASSEMBLIES

The base of the box shall be arch type so as to prevent the box from resting on the curb stop. The adjustable upper section shall be one inch (1") diameter for use with 3/4" and 1" curb stops. For larger curb stops, the upper section shall be 1 1/4" in diameter. Stationary rods affixed to the key of the curb stop with a brass pin shall be thirty inches (30") in length for 3/4" and 1" curb stops and twenty-four inches (24") for large curb stops. Curb box rods may be cast iron or stainless steel, as determined by the Town Water Department. The word "WATER" shall be inscribed on the cover of the box.

PART 3 – EXECUTION

3.01 INSTALLATION

- A. Contractors shall notify the Town Water Department and Dig Safe at least seven days prior to any work on the water system.
- B. Skilled workers experienced in such work shall install all items. Tools shall be adequate for the work and in good condition so as to produce good, clean cut threads of the correct size, pitch, and taper.
- C. Installation of all water lines shall be in accordance with the latest version of AWWA C600 or AWWA C605 , as applicable, current edition.
- D. Connection to an existing water main shall be done under the supervision of and with the approval of the Town Water Department. It is the applicant's, developer's, or owner of record's responsibility to secure ALL necessary connection permits and pay ALL applicable fees to make the connection, and to coordinate all parties involved in the process. The engineer and the Town Water Department shall be notified at least two working days in advance of the intended connection time. No existing valves, hydrants, curb stops, etc. shall be operated without prior approval of the Town Water Department. The Town Water Department shall operate all valves initially to ensure the integrity of the valve. The Town Water Department may then allow the contractor to operate those valves. Any damage occurring after the use of any valve operated by the contractor shall be the contractor's responsibility.
- E. Care shall be taken to prevent damage to valves and other appurtenances during handling and installation. All materials shall be carefully inspected for defects in workmanship and materials; all debris and foreign matter cleaned out of valve openings, etc.; all operating mechanisms operated to check their proper functioning, and all other nuts and bolts checked for tightness. Valves and other equipment, which do not operate easily, or are otherwise defective, shall be replaced. All valves shall be carefully incorporated into the water main and supported in their respective positions free from all distortion and strain. Valves and valve boxes shall be set plumb. Valve boxes, besides being plumb, shall be centered directly over the valves.
- F. All pipes showing cracks shall be rejected. If cracks occur in the pipe, the contractor may, at his own expense and after approval of the Town Water Department, cut off cracked portions at a point at least twice the pipe diameter from the visible limits of the crack and use the sound portion of the pipe.
- G. All water mains shall have no less than six feet (6') of cover unless waived by the Town Water Department. The pipe shall be laid to conform to the lines and grades indicated on the plans. The Town Water Department may restrict work before November 15 and after April 1 during adverse weather conditions. The Town Water Department may not allow excavating for water mains during the winter months except by special permission for emergencies. Each pipe shall be laid so as to form a close joint with the next adjoining pipe and to bring the inverts continuously to the required grade. In no cases shall the waterline have less than four feet (4') of cover over the top of the pipe.
- H. Temporary support, adequate protection, and maintenance of all underground structures, drains, sewers and other obstructions encountered in the progress of the work shall be provided at all times. If utility service is interrupted as a result of work for the project, the contractor shall immediately restore service by repairing the damaged utility at the contractor's expense.
- I. At all times, when pipe laying is not actually in progress, the open ends of the pipe shall be closed by temporary watertight plugs or by other approved means. If water is in the trench when work is resumed, the plug shall not be removed until all danger of water entering the pipe has passed. During construction, the contractor shall conduct operations so as to prevent the accumulation of water, ice, and snow in the vicinity of excavations or in the vicinity of excavated areas, and to prevent water from interfering with the progress and quality of the work.
- J. Under no conditions shall water be allowed to rise in open trenches after pipe has been laid.
- K. Accumulated water, ice, and snow shall be promptly removed and disposed of by pumping or other approved means. Disposal shall be carried out in a manner that will not create a hazard to public health, nor cause injury to public or private property, work completed or in progress, or public streets. Disposal shall not cause any interference in the use of streets and roads by the public. Pipes under construction shall not be used for drainage of excavations.
- L. Any deflection of joints in pipe up to twelve-inch (12") diameter shall be within the limits specified by the manufacturer, but not to exceed five degrees or nineteen inches (19") per eighteen feet (18') of pipe length.
- M. Concrete thrust blocks shall be installed on all hydrants, plugs, tees, and bends deflecting 11 1/4 degrees or more. Concrete thrust blocks shall be used in conjunction with "Mega-Lug" restraining glands or equivalent. Care shall be taken to ensure that concrete will not come into contact with flanges, joints, or bolts. The required area of thrust blocks shall be indicated on plan typifications and approved by the Town Water Department. Concrete shall be placed against undisturbed soil. Wooden side forms or equal shall be provided for thrust blocks. No backfilling shall be allowed until concrete masonry has set sufficiently. Where directed by the Town Water Department or engineer, concrete encasement of the waterline may be made for stream crossings and similar purposes. Where required on the plans or as directed by the Town Water Department or engineer, a concrete cradle shall be used to bolster and strengthen the pipe. The Town Water Department or its designee shall inspect all thrust blocks prior to backfilling.
- N. All trenching safety standards shall be in conformance with all applicable State and Federal guidelines. The contractor shall be solely responsible for any safety citations by State or Federal inspectors.
- O. There shall be no physical connection between the distribution system and any pipes, pumps, hydrants, or tanks that are supplied with water that is, or may be, contaminated.
- P. As necessary, temporary PVC markers shall be supplied at all gate valves, curb boxes, and at the end of water lines to a minimum of twelve inches (12") above finish grade until accepted by the Town Water Department.
- Q. All surplus material and debris shall be removed as the project progresses, leaving all areas clean and presentable.
- R. Unless otherwise required, all paving and sidewalks that may be damaged during construction shall be replaced with the same kind of material that previously existed.
- S. The contractor shall be responsible for proper protection of persons and property on the project. The contractor shall barricade open holes and depressions occurring as part of the work, and post warning lights on adjacent property to or with public access.
- T. Warning lights shall be operated during hours from dusk to

dawn and as otherwise requested.

- U. The contractor shall protect structures, utilities, sidewalks, pavements, and other facilities from damage caused by settlement, lateral movement, washout, and other hazards created by construction operations.

- V. No water lines shall be installed after November 15 or before April 1 without prior approval of the Town Water Department.

3.02 WATER/SEWER SEPARATION

- A. Water mains crossing sewers shall be laid to provide minimum vertical distance of eighteen inches (18") between the outside of the water main and the outside of the sewer line. This shall be the case where the water main is either above or below the sewer. At crossings, one full length of pipe shall be located so both joints will be as far from the sewer as possible; this critical separation shall be maintained for that portion of the water main located within ten feet (10') horizontally of any sewer it crosses. Water mains must be laid at least five feet (5') horizontally from any existing or proposed storm sewer and ten feet (10') from any existing or proposed sanitary sewer.
- B. When it is impossible to obtain horizontal and vertical separation shown on details in accordance with Vermont Drinking Water and Groundwater Protection Division Rule, Chapter 21, Appendix A, Section 8.6, coordinate with Engineer or Town Water Department. No water main shall pass through or come in contact with any part of a sewer manhole.
- C. Distribution lines shall not be placed closer than fifty feet (50') horizontal distance from any septic tank or leach field unless approved by the Vermont Drinking Water and Groundwater Protection Division Rule Provisions under Chapter 21.8.6.4 of the Town Water Department.
- D. Force main crossing shall be arranged so that at least one full length of sewer pipe is centered above or below the water line, with the sewer joints as far as possible from the water joints and entered in concrete. The new force main line shall be constructed to water main standards for a minimum of twenty feet (20') on either side of the crossing. The section constructed to water main standards shall be pressure tested to maintain 50 psi for fifteen (15) minutes without leakage prior to backfilling. In those areas that proper cover cannot be provided, proper insulation shall be installed.
- E. Sewer and waterline separation shall conform to all Vermont Drinking Water and Groundwater Protection Division Rule requirements, and installed in accordance with the latest edition of the "Ten States Standards – Recommended Standards for Water."

3.03 TESTING AND DISINFECTION

- A. All water mains shall be constructed, tested and disinfected in accordance with AWWA Standards C–600, C–605, C651 and the Vermont Drinking Water and Groundwater Protection Division Rule. All tests shall be conducted by and at the expense of the Contractor.
- The Contractor shall furnish all gauges, testing plugs, caps and all other necessary equipment and labor to perform leakage and pressure tests in sections of an approved length. Each valued section, including hydrant laterals, or a maximum length of 1,000 feet of pipe shall be tested. The Contractor shall provide at his own expense any additional taps to the water line necessary to perform the pressure and leakage test between valves. All disinfection/testing shall be completed by an independent third party unless otherwise approved by the Engineer or local municipality.
 - All water required for testing shall be potable. All testing shall be conducted in the presence of the Engineer.
 - The Contractor shall make the necessary provisions to tap the pipe at the high point to release all air and to release a plug same after completing the test. Hydrants or blowoffs located at high points may be used for air release in lieu of taps if approved by the Engineer.
 - For the pressure test, the Contractor shall develop and maintain for two hours, 150% of the working pressure, or 200 psi, whichever is greater. Failure to hold within 5 psi of the designated pressure for the full test time period constitutes a failure of the section tested.
 - No pipe installation shall be accepted if the leakage is greater than that determined by the following. Maximum allowable leakage will be:

$$L = \frac{SD \sqrt{P}}{148,000} \quad \text{or} \quad L = \frac{ND \sqrt{P}}{7,400}$$

whichever is less

Where:

L = allowable leakage, in gallons per hour
S = length of pipe tested, in feet
D = nominal diameter of the pipe, in inches
P = average test pressure during the leakage test, in pounds per square inch (gauge)
N = Number of joints in the pipeline tested

- All testing shall be conducted in accordance with AWWA C600 (latest edition)
- Should any section of pipe fail either the pressure or leakage test, the Contractor shall do everything necessary to locate and repair or replace the defective pipe, fittings, or joints at no cost to the Owner.
 - Disinfection: Disinfection of the pipeline shall be directed by the Engineer and at the Contractor's expense. AWWA Standard C–651 shall be used as a basis for the disinfection process.
 - The Engineer or Town Water Department will require as minimum:

- Complete flushing of the pipeline to wash out all dirt, debris, etc. which may have accumulated in the pipeline during construction. A reducing agent shall be used at the point of flushing to eliminate the free chlorine residual per the direction of the Town Water Department.
- Following flushing to clean clear water, the Contractor will add chlorine through continuous feed to the entire pipeline volume of water such that the water will have not less than 25 mg/L free chlorine, and let the mixture set for at least 24 hours.
- After the 24–hour duration, the water in the pipeline shall be tested for residual free chlorine and must contain a minimum of 10 mg/L chlorine. If less than 10 mg/L are found, then the disinfection procedure shall be repeated until at least 10 mg/L chlorine residual is indicated by test.
- Upon successful completion of step 3 above, the pipeline shall be flushed again until the chlorine concentration in the pipeline is no higher than that prevailing in the supply system. A reducing agent shall be used to eliminate the free chlorine residual in the flushing process per the direction of the Town Water Department.
- After final flushing and before the new water main is connected to the distribution system, two consecutive sets of acceptable samples, taken at least 24 hours apart, shall be collected from the new main, and submitted to the Vermont Health Department for analysis. At least one set of samples shall be collected from every 1,000 feet of the new water main, plus one set from the end of the line and at least one set from each branch. All samples shall show the absence of coliform organisms and, if required, the presence of a chlorine residual (AWWA C651–99). If the initial disinfection fails to produce samples which pass the V.S.H.D.

requirements for potable drinking water, then the new main shall be refushed and shall be resampled until satisfactory test results are obtained.

- D. Upon satisfactory results by the Vermont State Health Department, the pipeline may be placed in service. All costs for water, material, equipment and labor to perform the required testing, disinfection, and flushing of the pipeline shall be paid by the Contractor.

3.04 SUBMITTAL OF TEST RESULTS

- A. A. The Applicant or Project Engineer shall be responsible for submittal of test results to the Town Water Department. The Applicant or Project Engineer shall also provide a letter to the Town Water Department certifying that the water system has passed all tests, is constructed in accordance with the approved plans, except as may have been modified by approved Change Order, and is in condition to be placed in service. **Submittal of all test results shall be required prior to the water main being placed into service.**

3.05 FINAL INSPECTION

- A. For one year from the date the new system is placed into service, the applicant's developer/contractor will be responsible for any necessary repairs or corrections as part of the project warranty. At the end of a one-year period, an inspection will be performed by the Town Water Department prior to the system assuming ownership of any of the lines and appurtenances. The contractor shall correct any punch list items accumulated during the inspection after receipt of this list. Incomplete work on the system shall not be included in the initial inspection, but shall be inspected as the project continues. The contractor shall repair, replace, or retest promptly as directed by the Town Water Department and without further charges, all work equipment, materials or parts, which may fail during the one year warranty period.
- B. A final walk-through inspection shall be conducted by the Town Water Department prior to the water system being accepted for ownership by the system owner. This inspection shall include but not be limited to:
- Valves, hydrants, and curb stops operating properly.
 - Valve boxes and covers set plumb and at proper elevations.
 - Proper hydrant nozzle height above grade.
 - Proper hydrant opening direction, nozzle thread, and barrel color.
 - Proper distance from the face of the curb of hydrant nozzles.
 - Hydrant flags meeting Town Water Department specifications installed on each fire hydrant at the time of installation.
 - Static and residual hydrant pressures and flow rates.
 - Curb boxes inside ROW, set to grade, containing operating rod, and plumb.
 - Tie information and record drawings complete and submitted.
 - Material testing results, lab reports, manufacturers' certificates, and leakage test results complete and on file.
 - General appearance and restoration.
 - Submittal of O&M manuals in hard copy and Adobe Acrobat Bulet (.pdf) format.
 - Submittal of As-Builts in hard copy format and AutoCAD-DWG Version 2000 format or newer within 14 days of completion.

3.06 GENERAL INFORMATION

- A. All persons taking water must keep the fixtures and service pipe within their own premises in good repair and fully protected from frost, and must prevent unnecessary leakage of water. The Town Water Department shall not be liable for leakage of hydrants, pipes or fixtures upon the premises of any consumer, nor for obstructions therein by freezing or otherwise, nor for damages resulting from any of the foregoing causes. All leaks that are on the building side of the curb stop will be the owner's responsibility and repaired at the owner's expense.
- B. Water rates shall be collected for all water used until the water is shut off at the curb stop by the Town Water Department. No abatement of water rates will be allowed by reason of duase, diminished use, or vacancy of premises without proper notice to the Town Water Department.
- C. The Town Water Department or system owner shall not be liable for any injury, loss or damage of whatever nature occasioned by the failure to maintain a constant or uniform pressure in the water mains, or for damages occasioned by or growing out of a stoppage of said water by frost or other cause, or for damages occasioned by or growing out of an insufficient supply of water, or for accident or damage of any kind caused by the same or of the use or failure of said water.
- D. No person shall open any hydrant or draw water there from except the Town Water Department personnel or persons under their direction, or the officers or designees of the municipal fire department and members of the fire companies under their direction for fire purposes, or those individuals who have been granted approval on a hydrant use application by the Town Water Department, in which case, all such usage shall be metered. Fines for unauthorized use of any hydrant or connection may be incurred, according to the Rules and Regulations of the Town Water Department.
- E. One curb stop and one water meter shall be installed for each individual dwelling unit, condominium unit, apartment unit, commercial or office occupancy. Exceptions may be permitted in cases where a condominium association signs a binding agreement to be responsible for all collection of water bills. In cases where condominiums are converted into separate apartments, separate curb stops and water meters shall be installed for each unit. Town Water Department employees shall install all water meters. Under no circumstances are plumbers or persons other than those authorized by the Town Water Department permitted to turn water on or off at the curb stop. The water will not in any instance be turned on to any premise for use until the Town Water Department has suitably attached a meter.
- F. The owner of the premises shall be responsible for all water payments. A change of tenants or premises will not relieve the owners from payment of a back bill.

LANDSCAPE GRADING

PART 1 – GENERAL

1.01 SUMMARY

- A. Section includes:

1. Construction of storm water detention pond.

PART 2 – PRODUCTS

2.01 MATERIALS

- A. Compacted Fill/Granular Borrow: The material for the fill shall be obtained from the designated areas and shall conform to the requirements of the Site Earthwork Section. The material shall be free from stumps, wood, brush, rocks, sod, rubbish, and other matter that may decay. It should be free of stones over 4 inches in diameter when compacted by hand or mechanical tampers, or over 6 inches in diameter where compacted by rollers or other equipment. Frozen material shall not be placed in the fill, nor shall the fill material be placed on a frozen foundation.

- B. Stone Fill: Stone fill shall conform to the requirements of Type I Stone Fill as specified in the Drainage Section.

- C. Riser and Drain Pipe: Riser and drain pipe shall conform to the requirements of the Drainage section.

PART 3 – EXECUTION

3.01 SITE PREPARATION

- A. The area to be covered by the pond and embankments shall be cleared of all trees, brush, stumps, roots and other objectionable material. The area to be covered by the earth embankment and the surface of the borrow area shall be stripped of all grass, roots, organic materials, or other objectionable materials to a depth that will insure the removal of any materials which will prevent bond between the foundation and the fill. Material cleared shall be disposed of in accordance with the Site Clearing Section. Where the embankment will be 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.

3.02 COMPACTED FILL/GRANULAR BORROW

- A. Preparation of Foundation: Upon completion of the clearing operation and just prior to placing the fill material on any portion of the foundation, the topsoil shall be scarified, plowed, or disked to a depth of 3 inches. All objectionable material exposed by this operation shall be disposed of outside the limits of the fill.
- B. Placing and Spreading Material: The placing and spreading of material shall be started at the lowest part of the section under construction and the fill constructed in layers of 6 inches. The layers shall slope slightly towards the reservoir to prevent puddles and provide for faster runoff in case of rain. Where possible, the layers shall extend over the entire area of the fill. The distribution and gradation of the materials throughout the fill shall be such that there be no lenses, pockets, streaks, or layers of material differing substantially in texture or gradation from the surrounding material. The most porous borrow material shall be placed on the downstream portions of the embankment.
- C. Compaction: All fill shall be compacted to 95% maximum density per ASTM D–698, Standard Proctor.
- D. Limits: The embankment shall be constructed where located and as detailed in the Contract Plans. Side slope shall be 1 vertical to 3 horizontal.
- E. Revisions to the proposed design of the detention pond may be necessary if, in the opinion of the Engineer, unsuitable material is found at the pond location.

3.03 SLOPE PROTECTION

- A. Placement: Stone Fill Type I shall be placed at locations indicated on the plans to a minimum thickness of 1'–0" in one course in a manner that will result in a reasonably well graded surface. The Contractor shall be required to avoid displacing of the underlying material. The stones shall be placed and distributed so that there will be no accumulations of either the larger or the smaller stones. Re-arrangement of the stone fill by hand labor or mechanical equipment may be required to obtain the specified results.

3.04 LANDSCAPING

- A. At completion of grading, slopes, ditches, and all disturbed areas shall be smooth and free of pockets with sufficient slope to ensure drainage. All disturbed areas shall receive a minimum of four inches (4") of topsoil and shall be seeded, fertilized, limed, and mulched in accordance with the following:
- Seed mixture in all areas shall be urban mix conforming to the table below. For seeding between September 1 and October 1, winter rye shall be used at an application rate of 100 pounds per acre.
 - Fertilizer shall be standard commercial grade conforming to the State Fertilizer Law and to the Standards of the Association of Official Agricultural Chemists. Dry fertilizer, if used, shall be applied at the rate of 500 pounds per acre. Liquid fertilizer, if used, shall be applied in a 1–2–1 ratio with the minimum rate to include 100 pounds of nitrogen, 200 pounds of phosphate, and 100 pounds of potash per acre.
 - Limestone shall conform to all State and Federal regulations and to the Standards of the Association of Official Agricultural Chemists. The limestone shall be applied at a rate of one ton per acre as directed.
 - Within twenty-four (24) hours of application of fertilizer, lime, and seed, the surface shall be mulched with a hay mulch. Mulch shall be spread uniformly over the area at a rate of two (2) tons per acre.
 - All turf establishment shall be performed in accordance with the Vermont Standard Specifications for Construction, Section E51.

URBAN MIX GRASS SEED

Percentage By Weight	Pounds Live Seed Per Acre	Type of Seed
37.50%	45.0	Creeping Red Fescue
37.25%	37.5	Kentucky Blue Grass, Winter Hardy, Perennial Rye
31.25%	37.5	(variety Pennfaine, Manhattan, or similar varieties)
100%	120 pounds live seed per acre	

LANDSCAPE GRADING

PART 1 – GENERAL

1.01 SUMMARY

- A. Section includes:

- Finish grading; bring rough grade in areas to design elevations as shown on the drawings.
- Topsoil: Work shall consist of furnishing, placing and shaping topsoil, or placing, spreading, and shaping topsoil form stockpiles or stripped areas.

PART 2 – PRODUCTS

2.01 TOPSOIL

- A. Topsoil shall be loose, friable, reasonably free of admixtures of subsoil, free from refuse, stumps, roots, brush, weeds, rocks, and stones 1 1/4 inch in overall dimensions. The topsoil shall also be free from any material that will prevent the formation of a suitable seedbed or prevent seed germination and plant growth. It shall contain not less than three (3) nor more than twenty (20) percent organic matter. Any material which has become mixed with undue amounts of subsoil during any operation at the source or during placing or spreading will be rejected and shall be replaced by the Contractor with acceptable material.

PART 3 – EXECUTION

3.01 SUBGRADE PREPARATION

- A. Clean subgrade of all stumps, stones, roots, trash or other materials which might hinder proper tillage or spreading.
- B. All surfaces on which topsoil is to be placed shall be graded to a reasonably true surface and scarified by raking, discing or other approved means to a minimum depth of two inches before placing topsoil.

3.02 PLACING TOPSOIL

- A. Minimum final depth of topsoil shall be 4 inches.
- B. Place topsoil when seeding operations can closely follow spreading operations. Use topsoil in relatively dry state.
- C. Topsoil shall be spread and shaped to the lines and grades shown on the plans, or as directed by the Engineer. The depth stated in the contract to which the topsoil is to be placed is that required after final rolling of the material has taken place. All stones, roots and debris over 1¼ inch in diameter along with any sodding weeds and other undesirable material shall be removed.
- D. After shaping and grading, all trucks and other equipment shall be excluded from the topsoiled area to prevent excessive compaction. The Contractor shall perform such work as required to provide a friable surface for seed germination and plant growth prior to seeding.
- E. It shall be the Contractor's responsibility to restore to the line, grade and surface all eroded areas with approved material and to keep topsoiled areas in acceptable condition until the completion of the work.

SEEDING

PART 1 – GENERAL

1.1 Section Includes:

- A. Seeding.

- Furnish all labor, materials and equipment to complete all seeding work as shown on the drawings and specified herein.
- Except where otherwise shown or specified, the Contractor shall seed all areas where new contours are shown on the drawings and all areas where existing ground cover has been disturbed by the Contractor's operations.

1.2 SUBMITTALS

- A. Product Data: For each type of product indicated.

1.3 PROJECT CONDITIONS

- A. Planting Restrictions: Seeding and initial fertilizing shall be done between May 1st and September 15th unless otherwise authorized. Seeding shall not be done during windy weather or when the ground is frozen, excessively wet, or otherwise unutilable. If seeding is done during July or August, additional mulch material may be required. Coordinate planting periods with initial maintenance periods to provide required maintenance from date of Substantial Completion.

PART 2 – PRODUCTS

2.1 SEED

- A. Conservation Seed Mix:

Kind of Seed	Minimum Purity	Minimum Germination	Lbs/Acre
Creeping Red Fescue	98%	85%	22.5
Tall Fescue	98%	90%	22.5
Red Top	95%	90%	3
Birdsfoot Trefoil	98%	85%	9
Annual Ryegrass	95%	85%	3
		TOTAL =	60

2.2 INORGANIC SOIL AMENDMENTS

- A. Lime: ASTM C 602, agricultural limestone containing a minimum of 85 percent calcium carbonate equivalent and as follows:
1. Class: T, with a minimum of 99 percent passing through No. 8 sieve and a minimum of 75 percent passing through No. 60 sieve.

2.3 FERTILIZER

- A. Commercial Fertilizer: Commercial-grade complete fertilizer of neutral character, consisting of fast- and slow-release nitrogen, 50 percent derived from natural organic sources of urea formaldehyde, phosphorus, and potassium.
- B. Slow-Release Fertilizer: Granular or pelleted fertilizer consisting of 50 percent water-insoluble nitrogen, phosphorus, and potassium.
- 2.4 MULCHES
- A. Mulch: Provide air-dry, clean, mildew- and seed-free, hay or threshed straw of wheat, rye, oats, or barley.
- B. Compost Mulch: Well-composted, stable, and weed-free organic matter, pH range of 6.5–8; moisture content 35 to 55 percent by weight; 100 percent passing through 1-inch sieve; soluble salt content of 2 to 5 deciseimens/m; not exceeding 0.5 percent inert contaminants and free of substances toxic to plantings; and as follows:
- Organic Matter Content: 50 to 60 percent of dry weight.

PART 3 – EXECUTION

3.1 PREPARATION

- A. Protect structures, utilities, sidewalks, pavements, and other facilities, trees, shrubs, and plantings from damage caused by planting operations.
- Protect adjacent and adjoining areas from hydros seeding and hydromulching overspray.
 - Protect grade stakes set by others until directed to remove them.
- B. Provide erosion-control measures to prevent erosion or displacement of soils and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways.
- C. Newly Graded Subgrades: Loosen subgrade to a minimum depth of 4 inches. Remove all vegetation, stumps, roots, rocks in any dimension and sticks, roots, rubbish, and other extraneous matter.
- Apply fertilizer directly to subgrade before loosening.
 - Delay mixing fertilizer with planting soil if planting will not proceed within a few days.
 - Mix lime with dry soil before mixing fertilizer.
 - Finish Grading: Grade planting areas to a smooth, uniform surface plane with loose, uniformly fine texture. Grade to within plus or minus 1 inch of finish elevation. Rake, remove ridges, and fill depressions to meet finish grades. Limit finish grading to areas that can be planted in the immediate future.
 - Moisten prepared areas before planting if soil is dry. Water thoroughly and allow surface to dry before planting. Do not create muddy soil.
 - Before planting, restore areas if eroded or otherwise disturbed after finish grading.

3.2 APPLICATION RATES

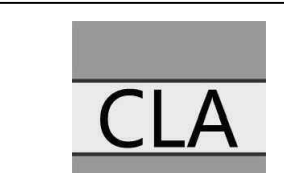
- A. When a soil test is not available, the following minimum amounts should be applied:
- Agricultural limestone: 2 tons/acre.
 - Nitrogen (N): 50 lbs./acre.
 - Phosphate: 100 lbs./acre.
 - Potash: 100 lbs./acre.

SCHEMATIC DESIGN

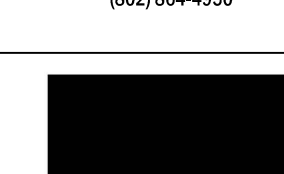
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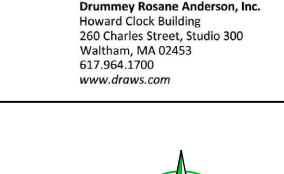
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BURLINGTON
HIGH SCHOOL
&
BURLINGTON
TECHNICAL
CENTER

BURLINGTON, VT

11/1 PROJECT NO:

21255

ORIGINATOR DATE: 07/22/2022

DRAWN BY: MAB

CHECKED BY: NTS

DATE: 09/29/22

09/29/22

09/29/22

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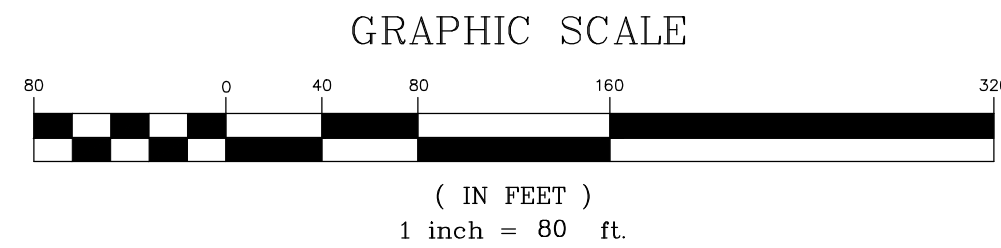
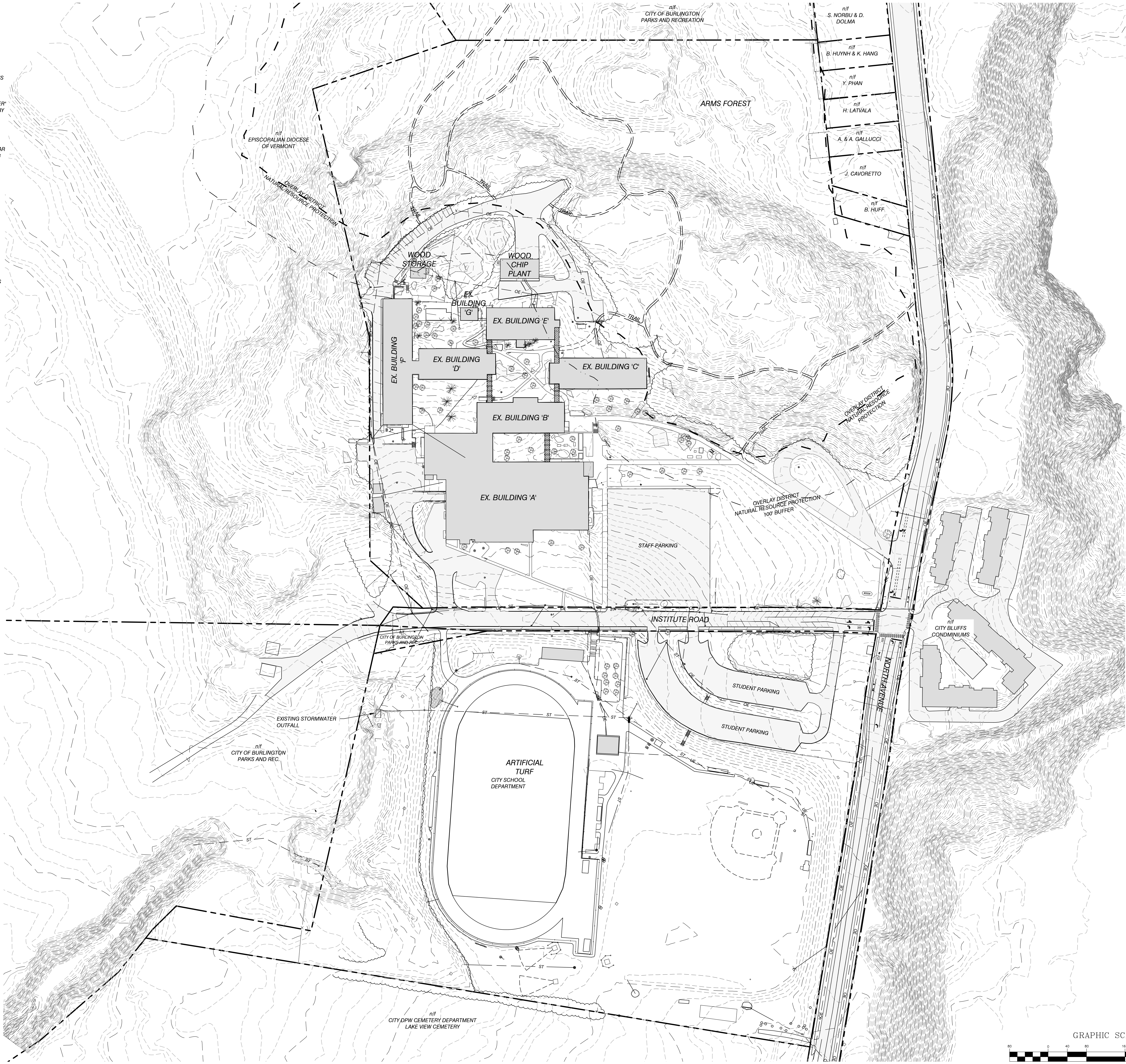
- UTILITIES SHOWN DO NOT PURPORT TO CONSTITUTE OR REPRESENT ALL UTILITIES LOCATED UPON OR ADJACENT TO THE SURVEYED PREMISES. EXISTING UTILITY LOCATIONS ARE APPROXIMATE ONLY. THE CONTRACTOR SHALL FIELD VERIFY ALL UTILITY CONFLICTS. ALL DISCREPANCIES SHALL BE REPORTED TO THE ENGINEER. THE CONTRACTOR SHALL CONTACT DIG SAFE (888-344-7233) PRIOR TO ANY CONSTRUCTION.
- PROPERTY LINE INFORMATION IS BASED ON A PLAN ENTITLED "EXISTING CONDITIONS SURVEY OF BURLINGTON HIGH SCHOOL AND BURLINGTON TECHNICAL CENTER" PREPARED BY AES NORTHEAST DATED 2014. THIS PLAN IS NOT A BOUNDARY SURVEY AND IS NOT INTENDED TO BE USED AS ONE.
- SITE INFORMATION IS BASED ON A PLAN ENTITLED "EXISTING CONDITIONS SURVEY OF BURLINGTON HIGH SCHOOL AND BURLINGTON TECHNICAL CENTER" PREPARED BY AES NORTHEAST DATED 2014 AND FIELD SURVEY PERFORMED BY CIVIL ENGINEERING ASSOCIATES, INC. DECEMBER 2021. CIVIL ENGINEERING ASSOCIATES, INC. SURVEY ORIENTATION IS "GRID NORTH". VERMONT COORDINATE SYSTEM OF 1983 (HORIZONTAL) AND NAVD83 (VERTICAL) ESTABLISHED FROM GPS OBSERVATIONS ON SITE.
- CONTOUR INFORMATION OUTSIDE OF AREA OF INTEREST IS BASED UPON LIDAR DATA FROM 2014. HORIZONTAL AND VERTICAL DATUM BASED ON VCS NAD 83 AND NAVD 88.

LEGEND

---	APPROXIMATE PROPERTY LINE
- - -	APPROXIMATE SETBACK LINE
- - - 100	EXISTING CONTOUR
=====	EXISTING CURB
- x -	EXISTING FENCE
- - - - -	EXISTING GRAVEL
=====	EXISTING PAVEMENT
--- OE ---	EXISTING OVERHEAD ELECTRIC
--- UE ---	EXISTING UNDERGROUND ELECTRIC
--- COM ---	EXISTING UNDERGROUND COMMUNICATIONS
--- FM ---	EXISTING FORCEMAIN
--- G ---	EXISTING GAS
--- ST ---	EXISTING STORM
--- S ---	EXISTING GRAVITY SEWER
--- T ---	EXISTING TELEPHONE
--- W ---	EXISTING WATER
---	EXISTING SWALE
---	STREAM
⊙	EXISTING SEWER MANHOLE
⊙	EXISTING STORM MANHOLE
⊙	EXISTING CATCH BASIN
⊙	EXISTING HYDRANT
⊙	EXISTING SHUT OFF
⊙	EXISTING UTILITY POLE
⊙	EXISTING LIGHT POLE
⊙	EXISTING GUY WIRE/POLE
⊙	EXISTING SIGN
⊙	EXISTING DECIDUOUS TREE
⊙	EXISTING CONIFEROUS TREE
⊙	EDGE OF BRUSH/WOODS
⊙	IRON ROD/PIPE FOUND
⊙	PROJECT BENCHMARK
⊙	EXPOSED LEDGE

DRAWING INDEX

C1.0	OVERALL EXISTING CONDITION SITE PLAN
C1.1	EXISTING CONDITIONS - NORTH
C1.2	EXISTING CONDITIONS - SOUTH
C1.3	EXISTING CONDITIONS DEMOLITION PLAN
C2.0	OVERALL PROPOSED SITE PLAN
C2.1	PROPOSED GRADING AND DRAINAGE - NORTH
C2.2	PROPOSED GRADING AND DRAINAGE - SOUTH
C2.3	PARTIAL GRADING AND DRAINAGE - NORTH
C2.4	PARTIAL GRADING AND DRAINAGE - NORTH
C2.5	PARTIAL GRADING AND DRAINAGE - NORTH
C3.0	PROPOSED UTILITY PLAN - NORTH
C3.1	PARTIAL UTILITY PLAN - NORTH
C3.2	PARTIAL UTILITY PLAN - NORTH
C4.0	EPSC SITE PLAN - NORTH
C4.1	EPSC SITE PLAN - SOUTH
C4.2	EPSC NARRATIVE
C4.3	EPSC NARRATIVE
C4.4	EPSC DETAILS
C4.5	EPSC DETAILS AND SPECIFICATIONS
C5.0	SITE DETAILS
C5.1	STORMWATER DETAILS
C5.2	UTILITY DETAILS
C5.3	UTILITY AND MISC. DETAILS
C6.0	SPECIFICATIONS
C6.1	SPECIFICATIONS
C6.2	SPECIFICATIONS
C6.3	SPECIFICATIONS



SCHEMATIC DESIGN

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BURLINGTON
HIGH SCHOOL
&
BURLINGTON
TECHNICAL
CENTER

BURLINGTON, VT

fff PROJECT NO:

21255

ORIGINATION DATE: SCALE:

07/22/2022 1" = 80'

DRAWN BY: CHECKED BY:

MAB DSM

ISSUE LOG:

ZONING PERMIT DRAFT 09/23/22

ZONING PERMIT 09/30/22

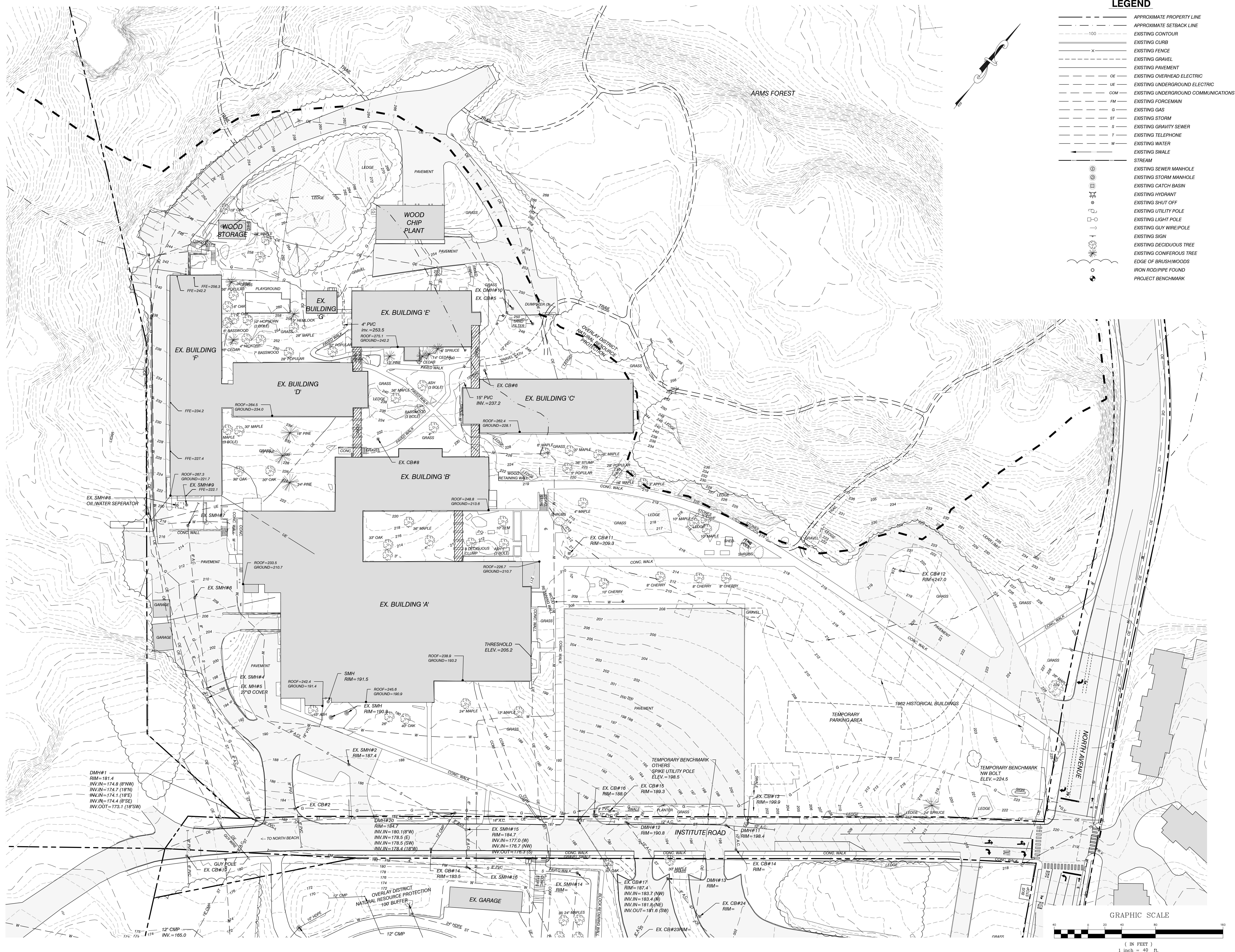
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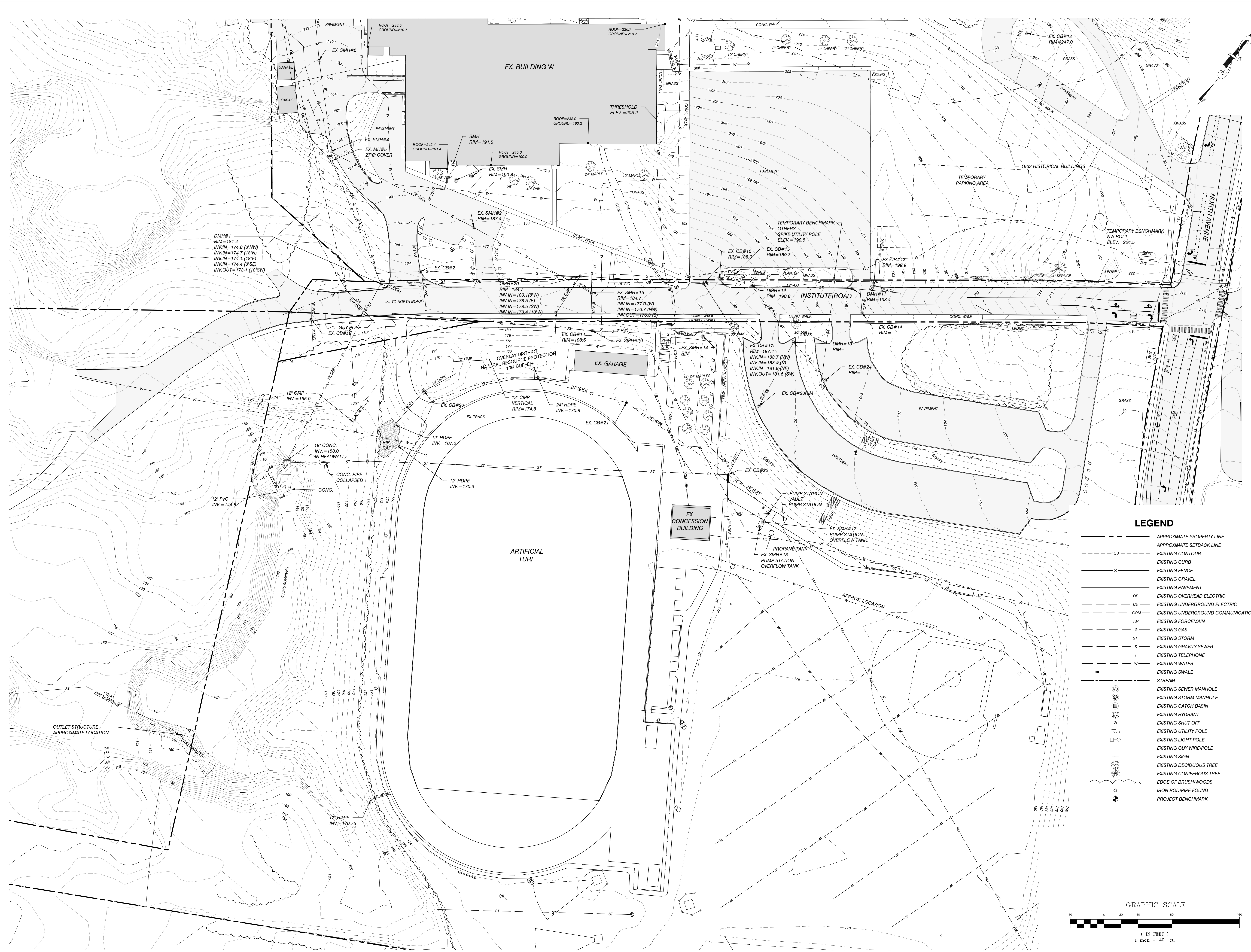
OVERALL
EXISTING
CONDITIONS
SITE PLAN

SHEET NO:

C1.0

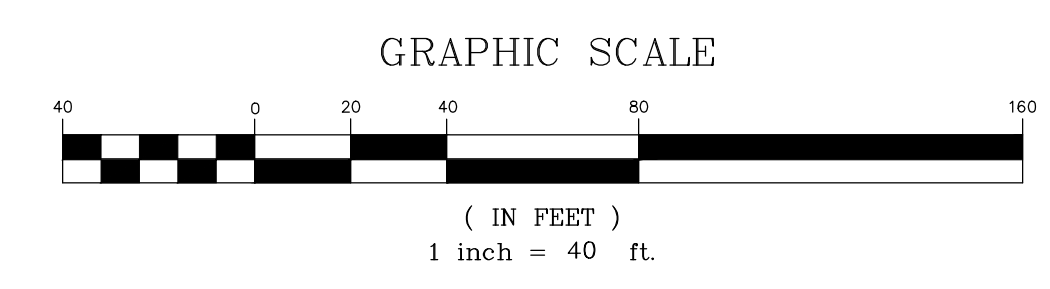
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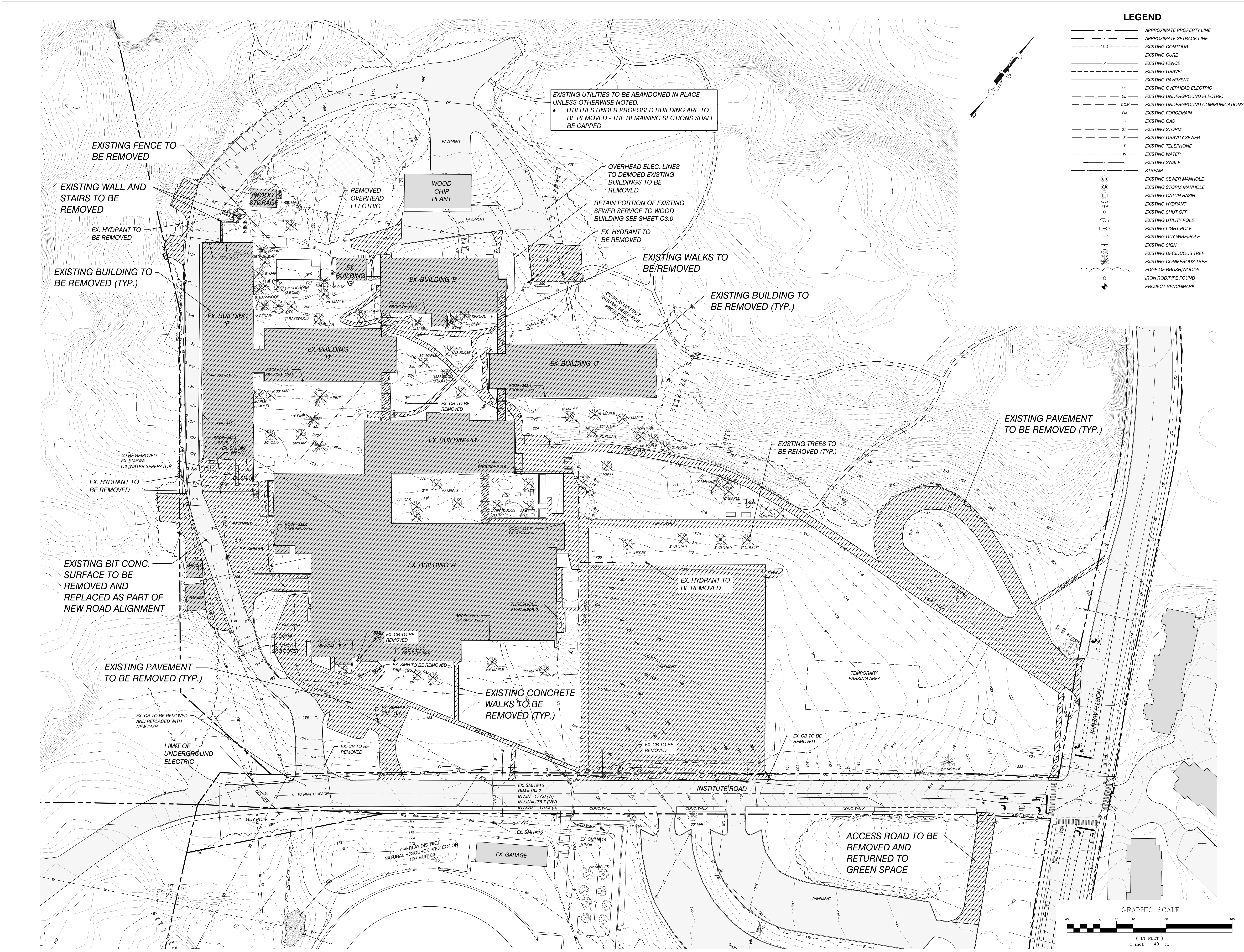




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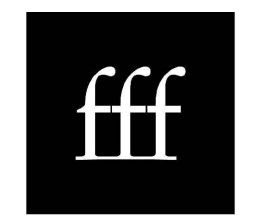


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- EXISTING LIGHT POLE
- EXISTING GUY WIRE/POLE
- EXISTING SIGN
- EXISTING DECIDUOUS TREE
- EXISTING CONIFEROUS TREE
- EDGE OF BRUSHWOODS
- IRON ROD/PIPE FOUND
- PROJECT BENCHMARK

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HIGH SCHOOL
&
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TECHNICAL
CENTER

BURLINGTON, VT

PROJECT NO. 21255

ORIGIN DATE: 07/22/2022 SCALE: 1" = 40'

DRAWN BY: MAB CHECKED BY: DSM

ISSUE LOG: ZONING PERMIT DRAFT 09/23/22 ZONING PERMIT 09/30/22

SHEET CONTENTS:
EXISTING
CONDITIONS
DEMOLITION
PLAN

C1.3

LEGEND

	APPROXIMATE PROPERTY LINE
	APPROXIMATE SETBACK LINE
	EXISTING CONTOUR
	EXISTING CURB
	EXISTING FENCE
	EXISTING GRAVEL
	EXISTING PAVEMENT
	EXISTING OVERHEAD ELECTRIC
	EXISTING UNDERGROUND ELECTRIC
	EXISTING UNDERGROUND COMMUNICATIONS
	EXISTING FORCEMAIN
	EXISTING GAS
	EXISTING STORM
	EXISTING GRAVITY SEWER
	EXISTING TELEPHONE
	EXISTING WATER
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	STREAM
	EXISTING SEWER MANHOLE
	EXISTING STORM MANHOLE
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	PROPOSED CATCH BASIN
	PROPOSED YARD DRAIN
	PROPOSED HYDRANT
	PROPOSED SHUT OFF
	PROPOSED SIGN

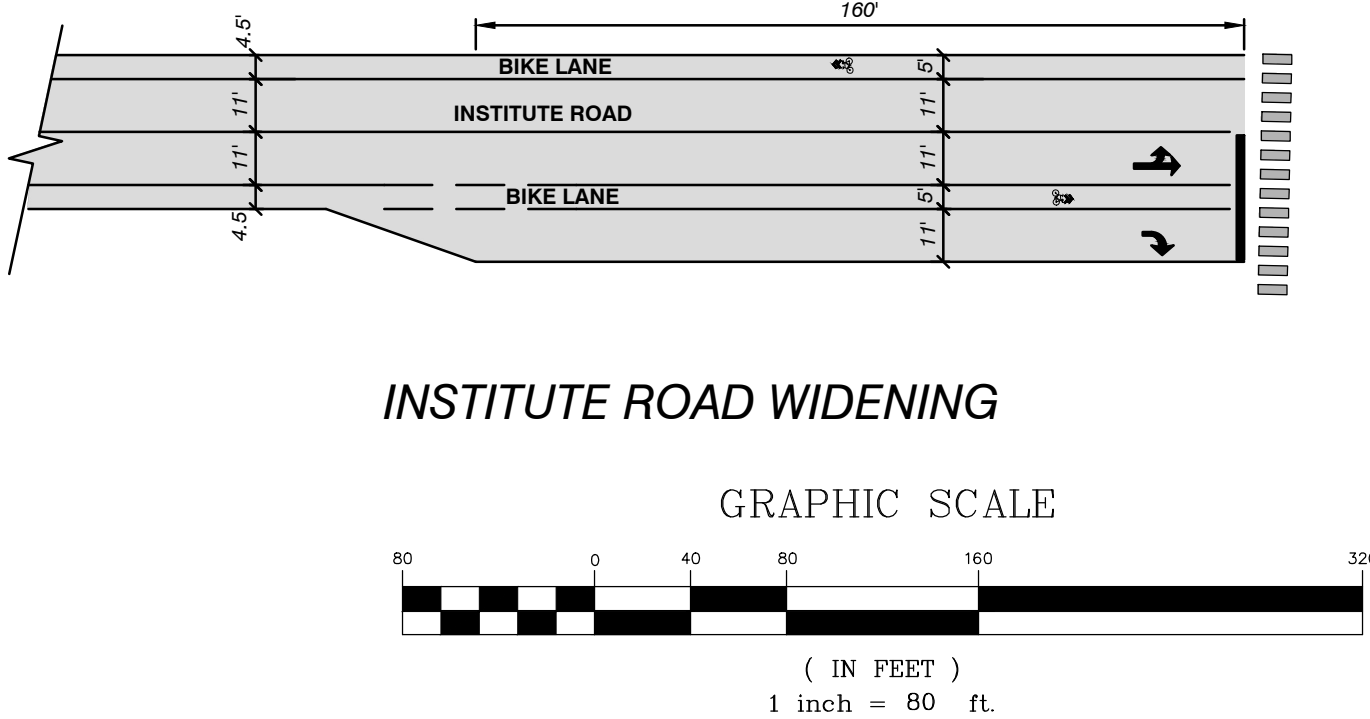
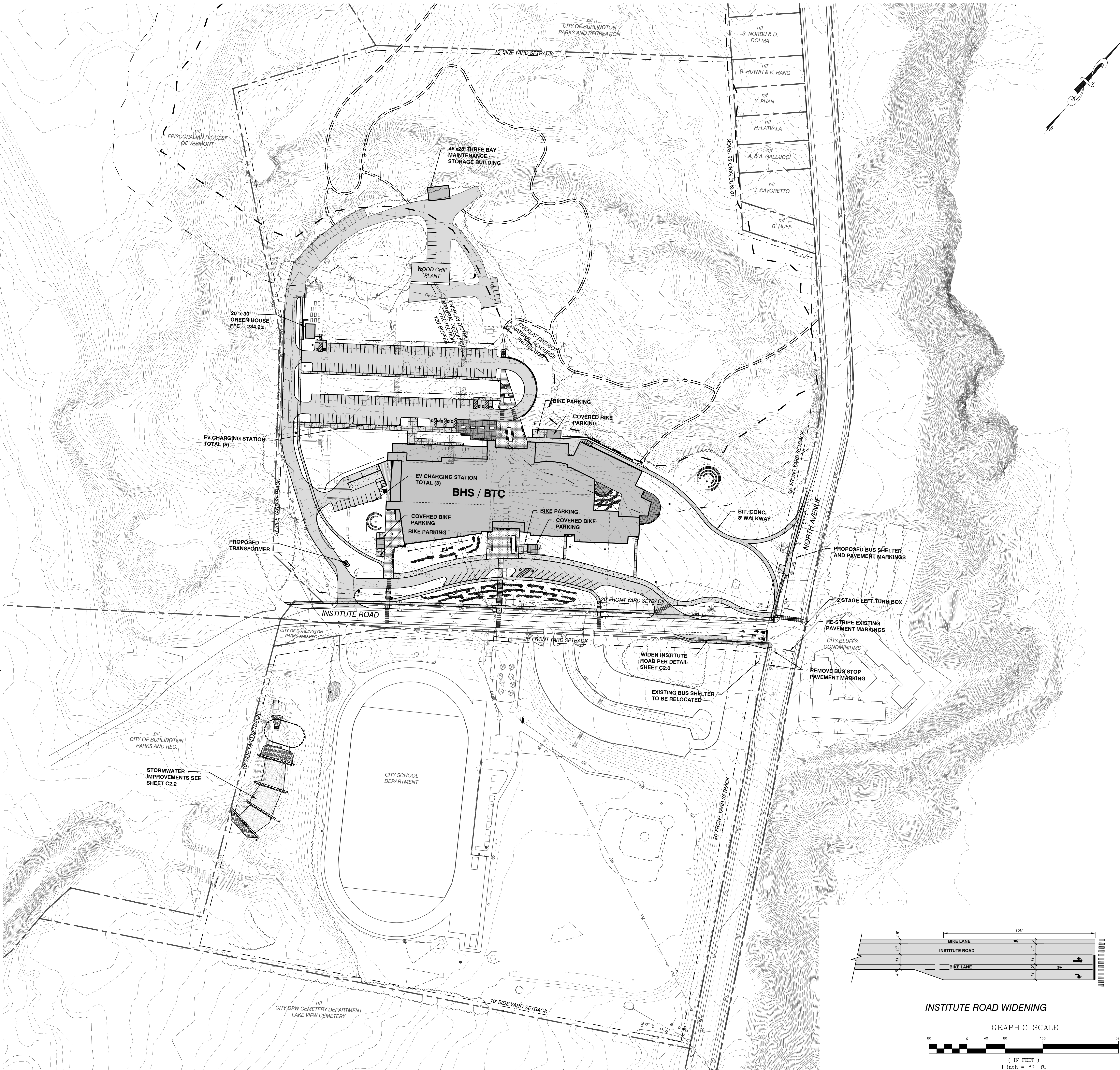
ZONING REQUIREMENTS:

ZONING DISTRICT: INSTITUTIONAL DISTRICT

CATEGORY	REQUIRED	EXISTING	PROPOSED
PARCEL		48.7± AC.	48.7± AC.
		2,121,372± S.F.	2,121,372± S.F.
SETBACK			
FRONT YARD	20'	304'	305'
NORTH AVE.		123'	196'
INSTITUTE RD.			
SIDE YARD	10'	235'	52±
WEST		800±	290±
NORTH			
LOT COVERAGE	60% MAX.	27%	27%

GENERAL NOTES

- 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. IN ADDITION, THE CONTRACTOR SHALL HIRE A PRIVATE UTILITY LOCATING FIRM TO LOCATE OWNER OWNED UNDERGROUND UTILITIES PRIOR TO START OF ANY EXCAVATION.
- ALL EXISTING UTILITIES NOT INCORPORATED INTO THE FINAL DESIGN SHALL BE REMOVED OR ABANDONED AS INDICATED ON THE PLANS OR DIRECTED BY THE ENGINEER.
- THE CONTRACTOR SHALL MAINTAIN AS-BUILT PLANS (WITH TIES) FOR ALL UNDERGROUND UTILITIES. THOSE PLANS SHALL BE SUBMITTED TO THE OWNER AT THE COMPLETION OF THE PROJECT.
- THE CONTRACTOR SHALL REPAIR/RESTORE ALL DISTURBED AREAS (ON OR OFF THE SITE) AS A DIRECT OR INDIRECT RESULT OF THE CONSTRUCTION.
- ALL GRASSED AREAS SHALL BE MAINTAINED UNTIL FULL VEGETATION IS ESTABLISHED.
- MAINTAIN ALL TREES OUTSIDE OF CONSTRUCTION LIMITS.
- THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL WORK NECESSARY FOR COMPLETE AND OPERABLE FACILITIES AND UTILITIES.
- THE CONTRACTOR SHALL SUBMIT SHOP DRAWINGS FOR ALL ITEMS AND MATERIALS INCORPORATED INTO THE SITE WORK. WORK SHALL NOT BEGIN ON ANY ITEM UNTIL SHOP DRAWING APPROVAL IS GRANTED.
- IN ADDITION TO THE REQUIREMENTS SET IN THESE PLANS AND SPECIFICATIONS, THE CONTRACTOR SHALL COMPLETE THE WORK IN ACCORDANCE WITH ALL PERMIT CONDITIONS AND ANY LOCAL PUBLIC WORKS STANDARDS.
- THE TOLERANCE FOR FINISH GRADES FOR ALL PAVEMENT, WALKWAYS AND LAWN AREAS SHALL BE 0.1 FEET. UNLESS NOTED OTHERWISE, ALL EXISTING MANHOLE COVERS, VALVES, CURB STOPS AND OTHER ITEMS TO REMAIN SHALL BE ADJUSTED TO THE NEW FINISH GRADE.
- ANY DEWATERING NECESSARY FOR THE COMPLETION OF THE SITEWORK SHALL BE CONSIDERED AS PART OF THE CONTRACT AND SHALL BE THE CONTRACTOR'S RESPONSIBILITY.
- THE CONTRACTOR SHALL COORDINATE ALL WORK WITHIN TOWN ROAD R.O.W. WITH TOWN AUTHORITIES.
- THE CONTRACTOR SHALL INSTALL THE ELECTRICAL, CABLE AND TELEPHONE SERVICES IN ACCORDANCE WITH THE UTILITY COMPANIES REQUIREMENTS.
- EXISTING PAVEMENT AND TREE STUMPS TO BE REMOVED SHALL BE DISPOSED OF AT AN APPROVED OFF-SITE LOCATION. ALL PAVEMENT CUTS SHALL BE MADE WITH A PAVEMENT SAW.
- IF THERE ARE ANY CONFLICTS OR INCONSISTENCIES WITH THE PLANS OR SPECIFICATIONS, THE CONTRACTOR SHALL CONTACT THE ENGINEER FOR VERIFICATION BEFORE WORK CONTINUES ON THE ITEM IN QUESTION.
- PROPERTY LINE INFORMATION IS BASED ON A PLAN ENTITLED "EXISTING CONDITIONS SURVEY OF BURLINGTON HIGH SCHOOL AND BURLINGTON TECHNICAL CENTER" PREPARED BY AES NORTHEAST DATED 2014. THIS PLAN IS NOT A BOUNDARY SURVEY AND IS NOT INTENDED TO BE USED AS ONE.
- IF THE BUILDING IS TO BE SPRINKLERED, BACKFLOW PREVENTION SHALL BE PROVIDED IN ACCORDANCE WITH AWWA M14. THE SITE CONTRACTOR SHALL CONSTRUCT THE WATER LINE TO TWO FEET ABOVE THE FINISHED FLOOR. SEE MECHANICAL PLANS FOR RISER DETAIL.
- THE CONTRACTOR IS RESPONSIBLE FOR OBTAINING TESTING AND INSPECTION SERVICES INDICATED IN THE CONTRACT DOCUMENTS, TYPICAL FOR CONCRETE AND SOIL TESTING.
- THE CONTRACTOR IS RESPONSIBLE FOR ALL LAYOUT AND FIELD ENGINEERING REQUIRED FOR COMPLETION OF THE PROJECT. CIVIL ENGINEERING ASSOCIATES WILL PROVIDE AN AUTOCAD FILE WHERE APPLICABLE.
- THE OWNER SHALL BE RESPONSIBLE FOR THE INSTALLATION OF ANY AND ALL SAFETY FENCES OR RAILS ABOVE EXISTING AND PROPOSED WALLS. THE OWNER SHALL VERIFY LOCAL, STATE AND INSURANCE REQUIREMENT GUIDELINES FOR THE INSTALLATION AND VERIFY ANY AND ALL PERMITTING REQUIREMENTS.



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BURLINGTON HIGH SCHOOL & BURLINGTON TECHNICAL CENTER

BURLINGTON, VT

FF PROJECT NO: 21255

ORGANIZATION DATE: 07/22/2022 SCALE: 1" = 80'

DRAWN BY: MAB CHECKED BY: DSM

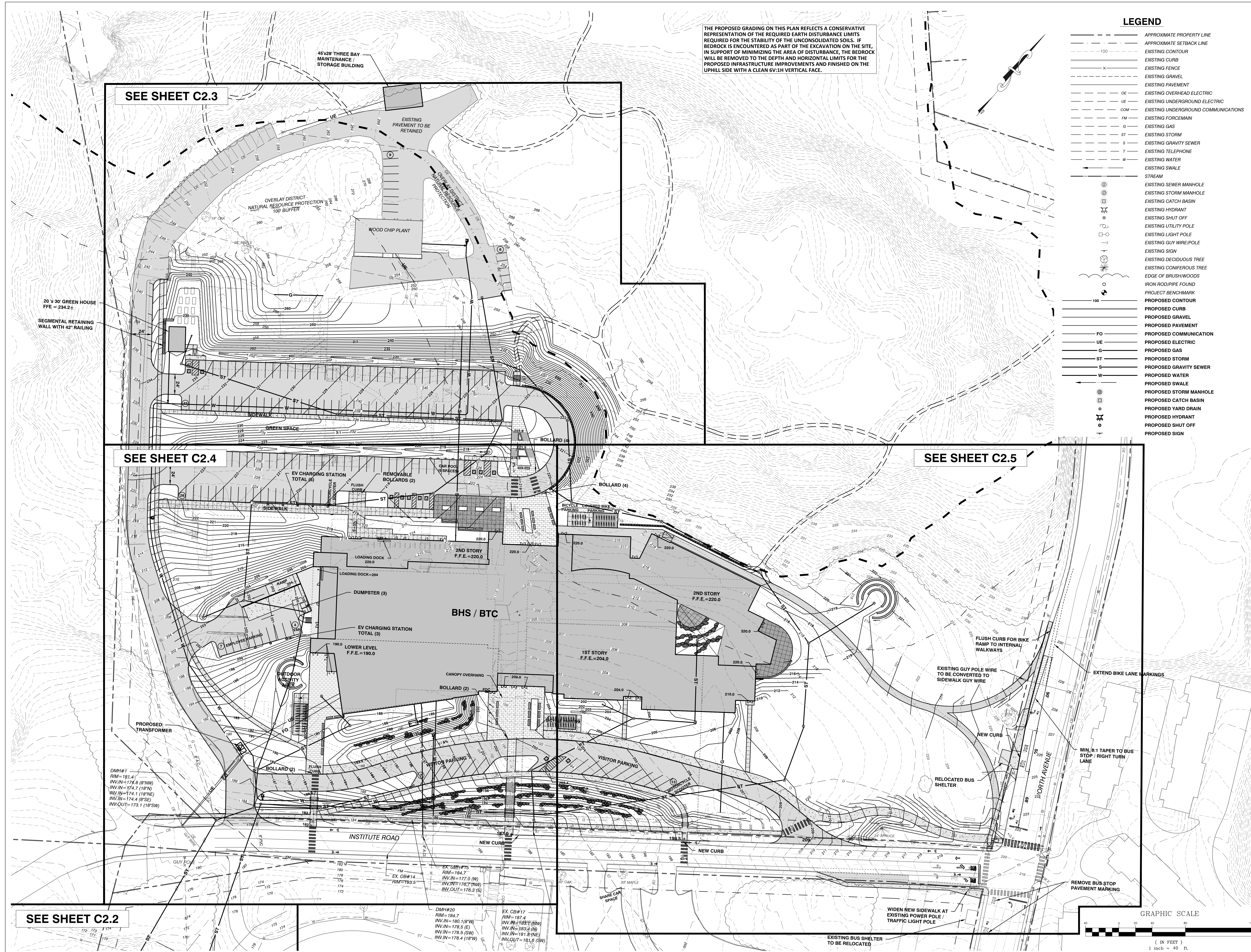
ISSUE LOG: ZONING PERMIT DRAFT 08/23/22 ZONING PERMIT 09/30/22

SHEET CONTENTS:

OVERALL PROPOSED SITE PLAN

SHEET NO: C2.0

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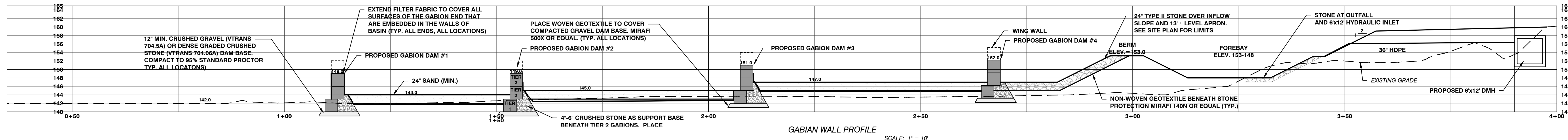
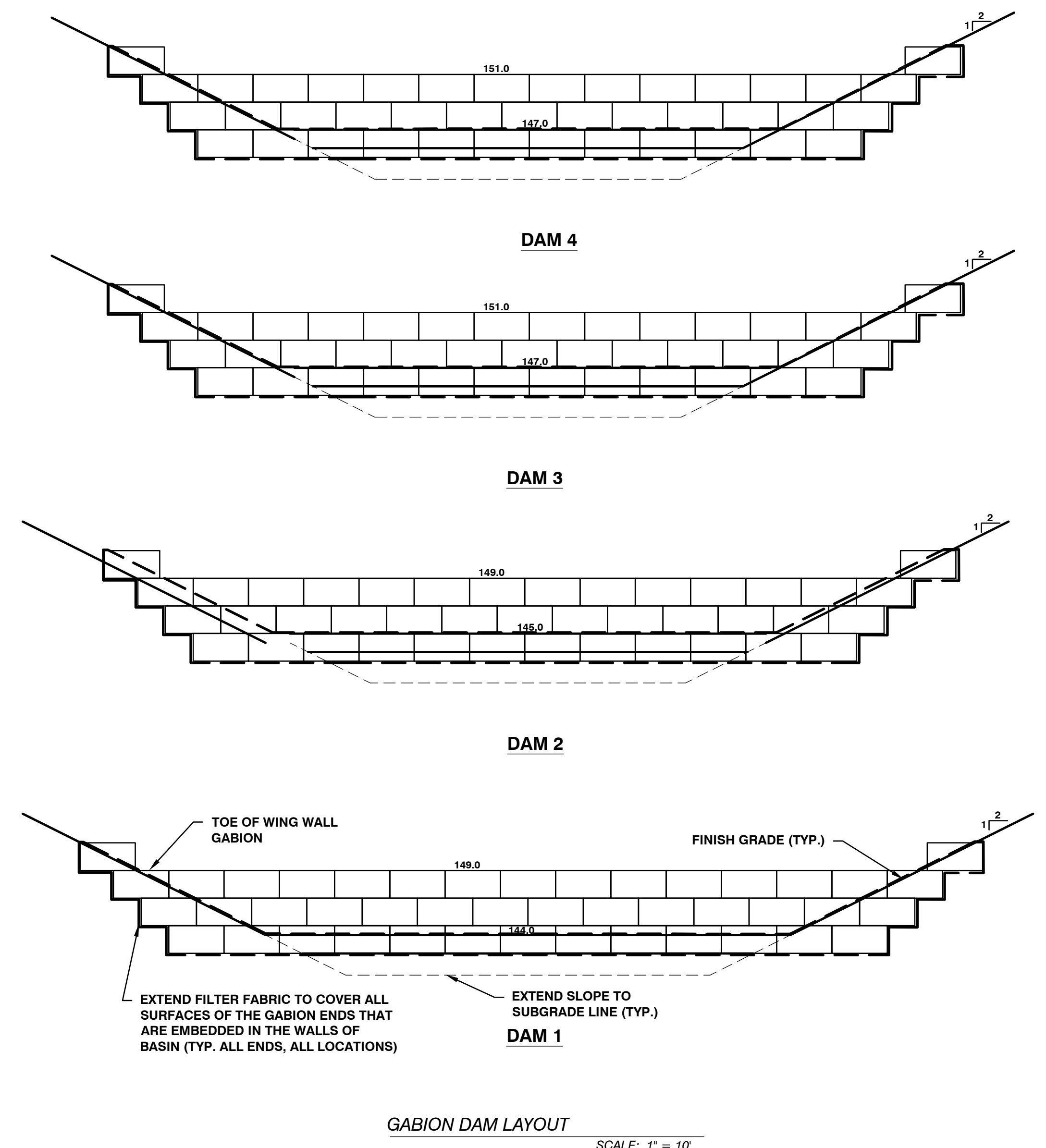
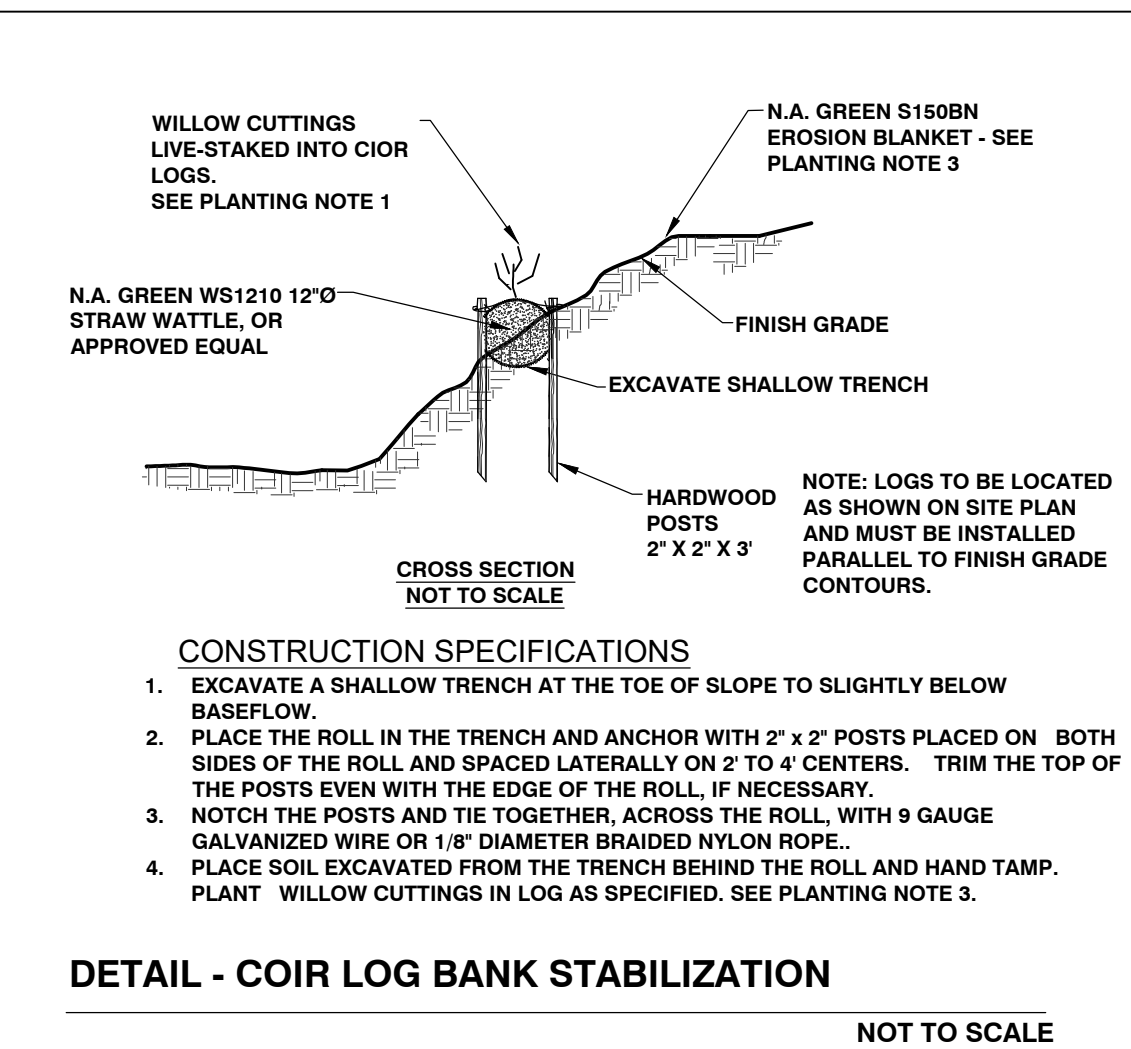
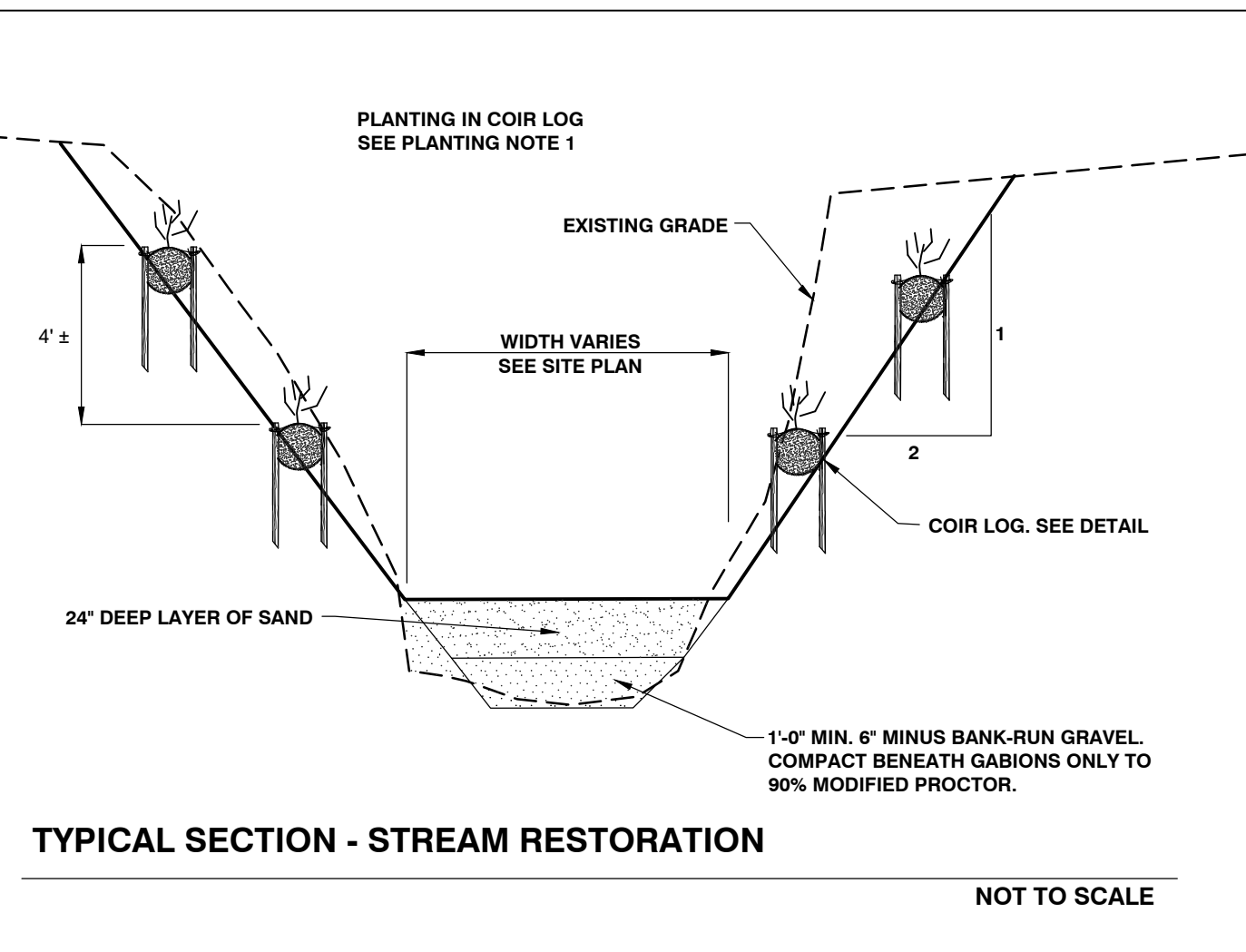
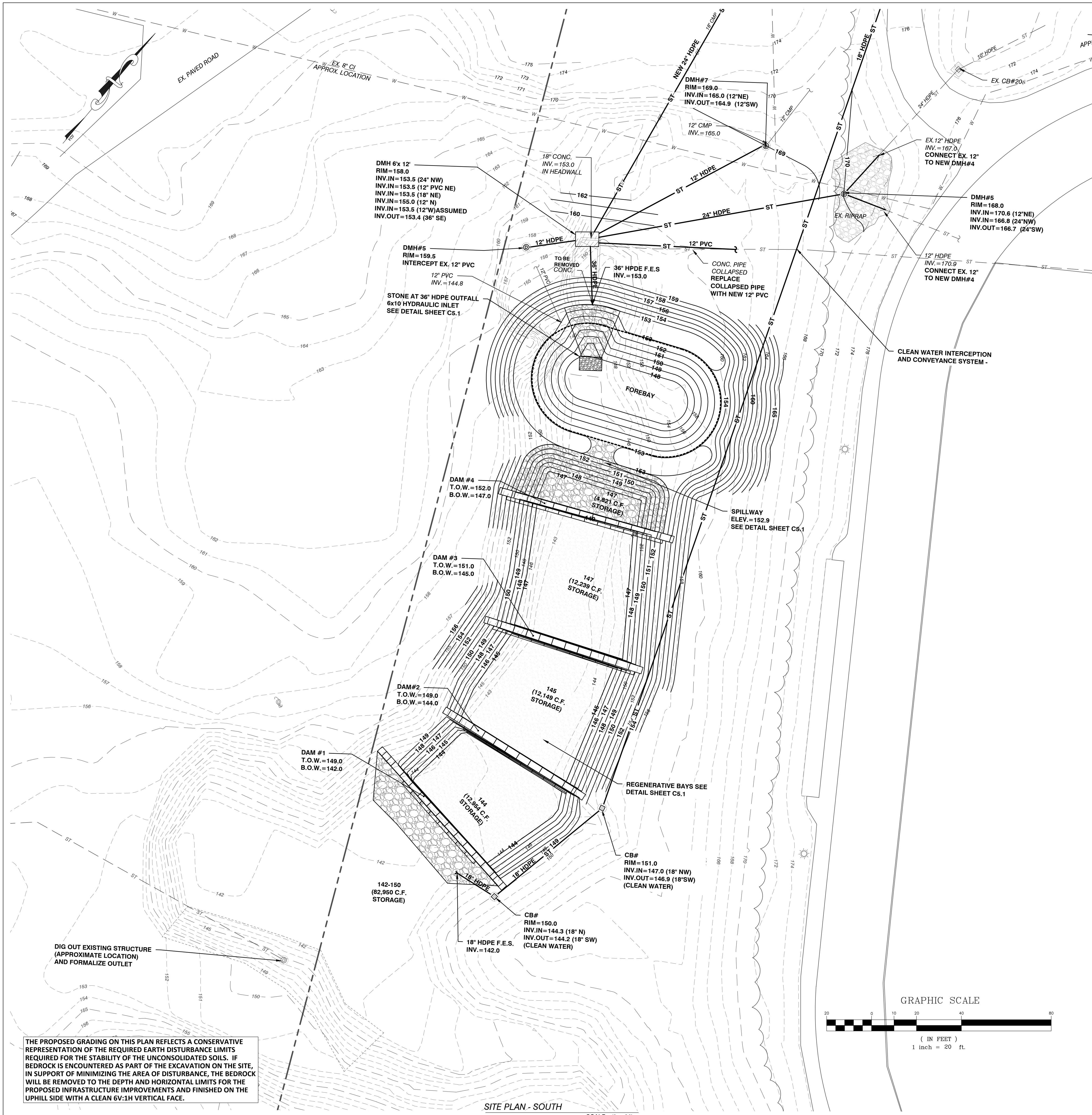
BURLINGTON, VT

FF PROJECT NO: 21255
ORIGINATION DATE: 07/22/2022
SCALE: 1" = 40'
DRAWN BY: MAB
CHECKED BY: DSM
ISSUE LOG:
ZONING PERMIT DRAFT 08/23/22
ZONING PERMIT 09/30/22

SHEET CONTENTS:
PROPOSED GRADING AND DRAINAGE NORTH

C2.1

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BURLINGTON HIGH SCHOOL & BURLINGTON TECHNICAL CENTER

BURLINGTON, VT

FF PROJECT NO: 21255

ORIGINATION DATE: 07/22/2022

SCALE: 1" = 20'

DRAWN BY: MAB

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ISSUE LOG:

ZONING PERMIT DRAFT

08/23/22

ZONING PERMIT

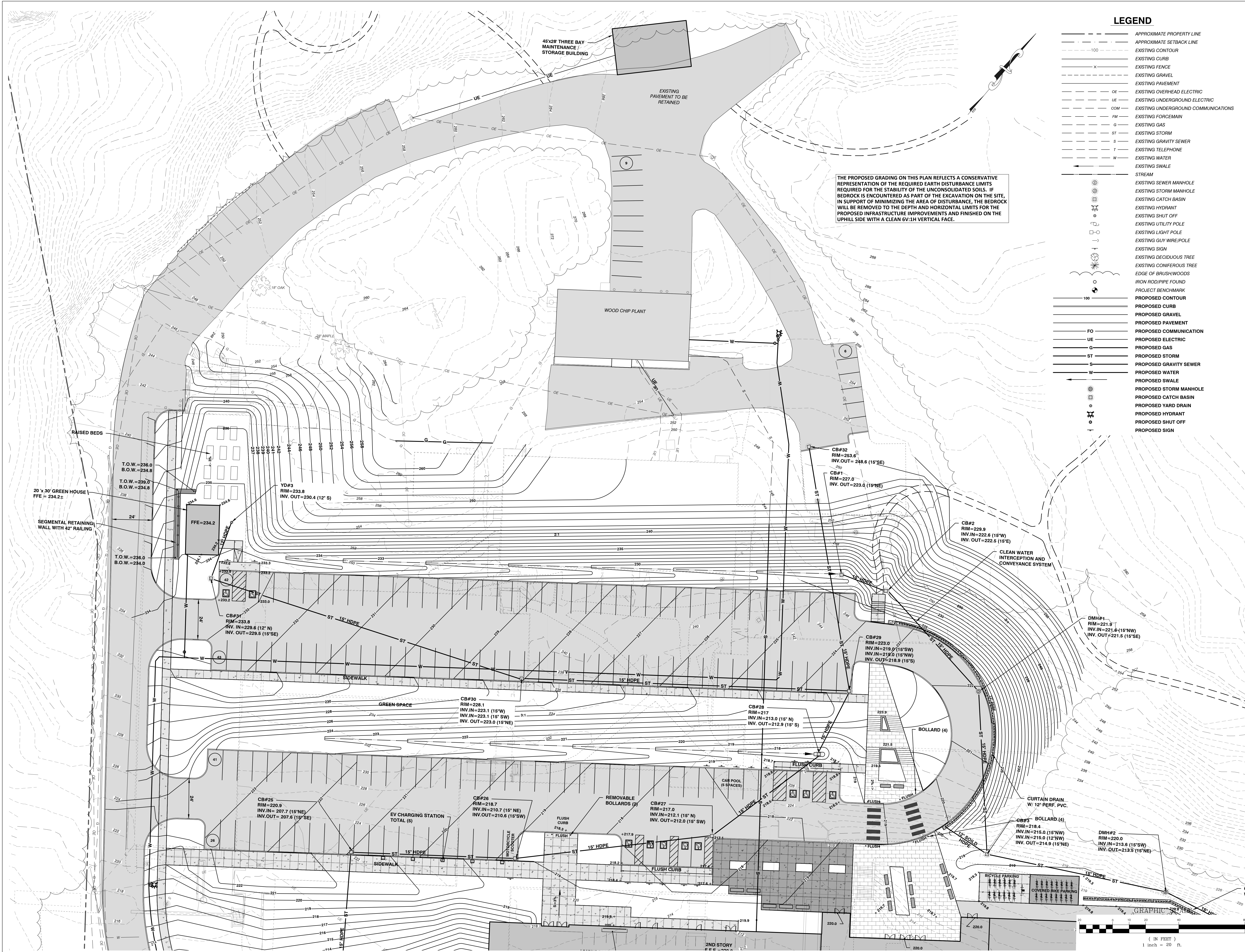
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PROPOSED GRADING AND DRAINAGE SOUTH

SHEET NO: C2.2

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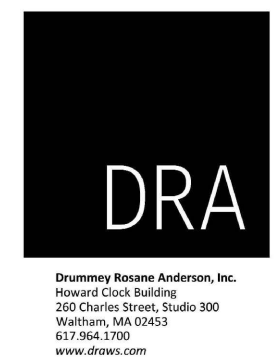


LEGEND

- APPROXIMATE PROPERTY LINE
- APPROXIMATE SETBACK LINE
- EXISTING CONTOUR
- EXISTING CURB
- EXISTING FENCE
- EXISTING GRAVEL
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- PROPOSED SHUT OFF
- PROPOSED SIGN

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BURLINGTON HIGH SCHOOL & BURLINGTON TECHNICAL CENTER

BURLINGTON, VT

PROJECT NO. 21255

ORGANIZATION DATE: 07/22/2022 SCALE: 1" = 20'

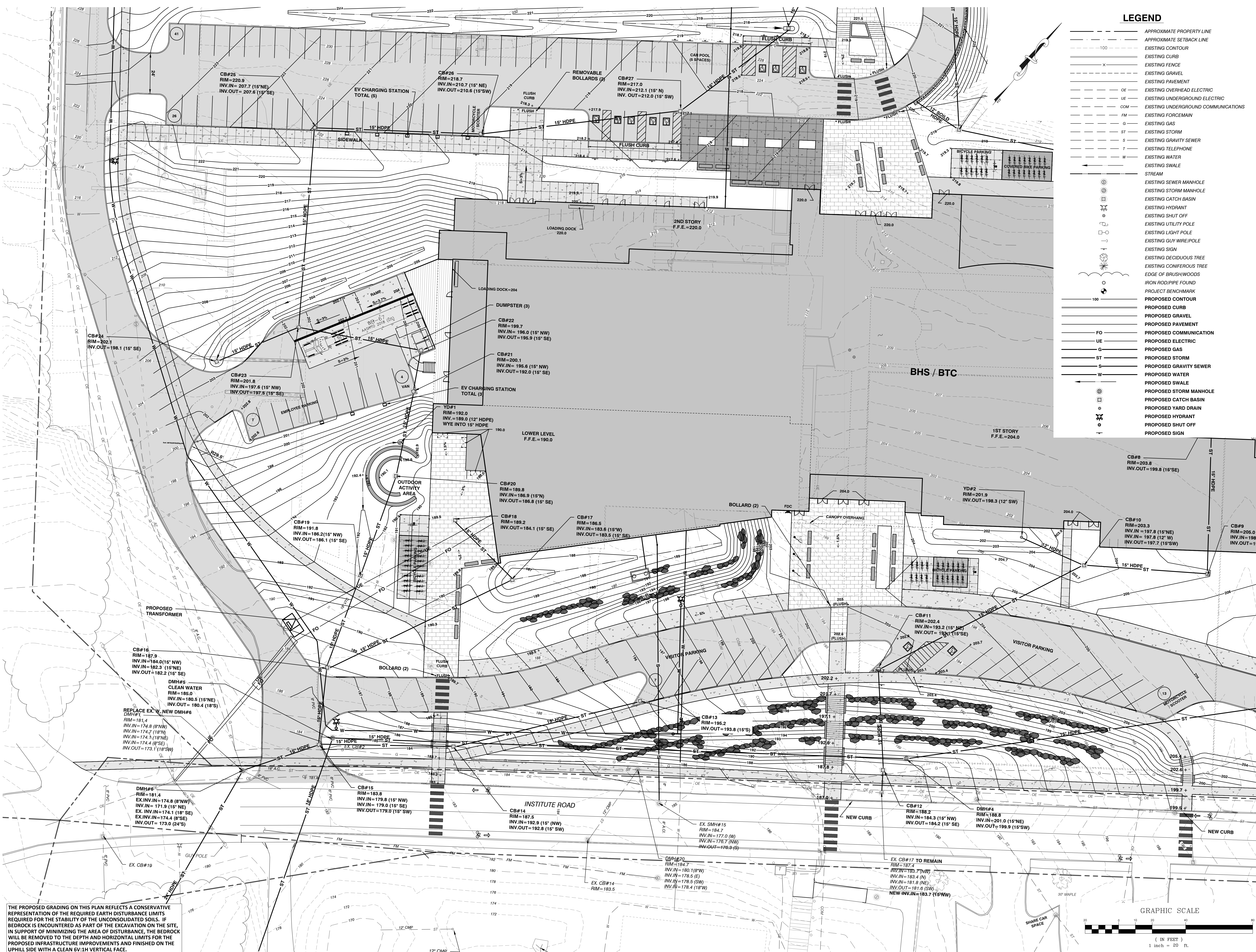
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PARTIAL GRADING AND DRAINAGE - NORTH

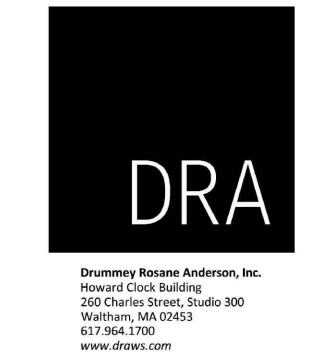
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BURLINGTON, VT

PROJECT NO. 21255

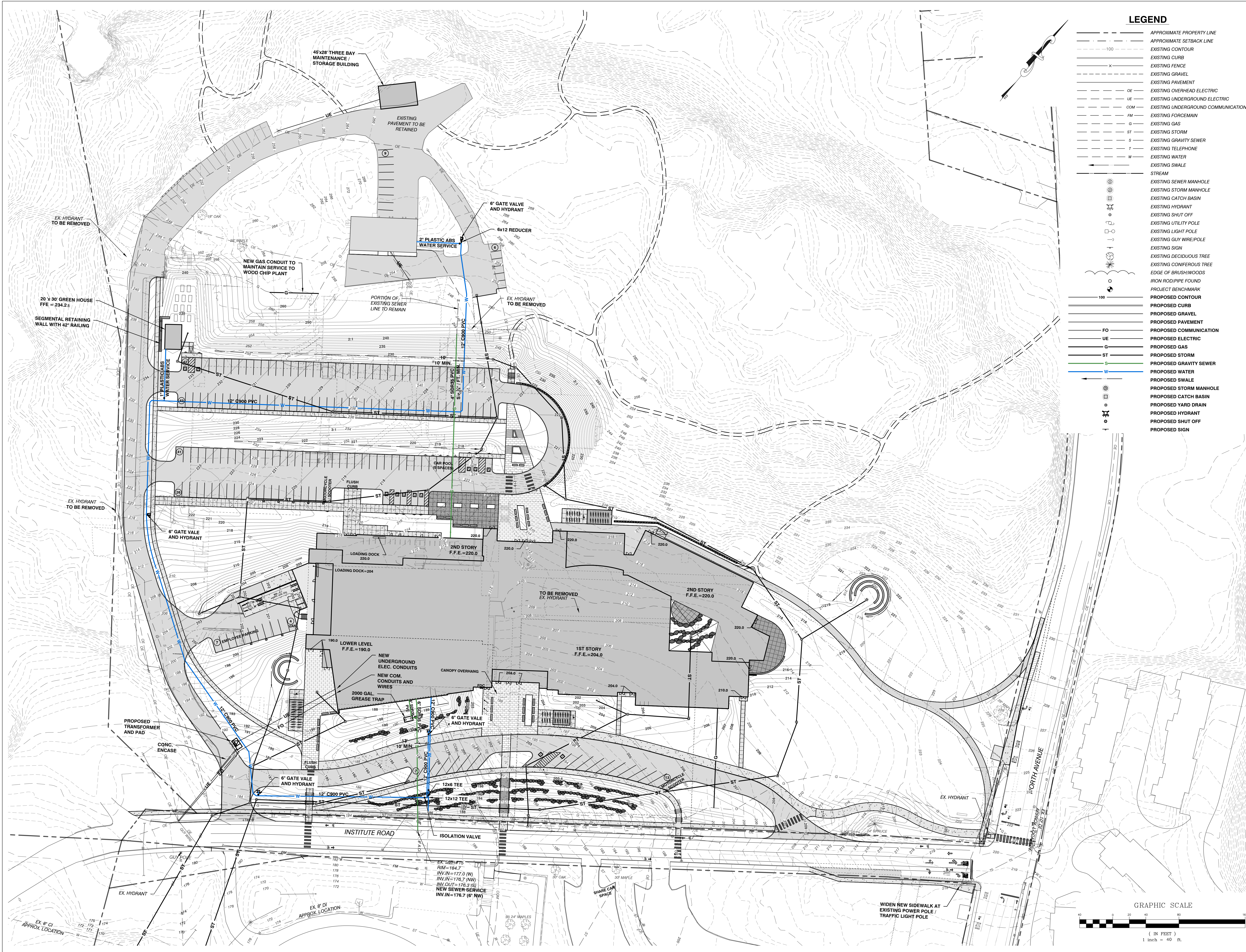
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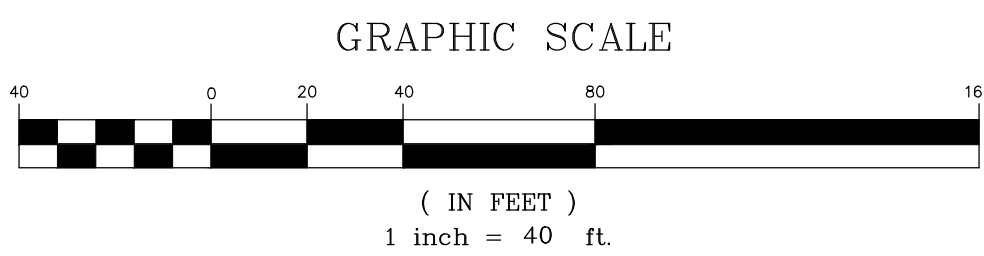
PARTIAL
GRADING AND
DRAINAGE
NORTH

C2.4



LEGEND

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BURLINGTON, VT

FF PROJECT NO: 21255

ORIGINATION DATE: 07/22/2022 SCALE: 1" = 40'

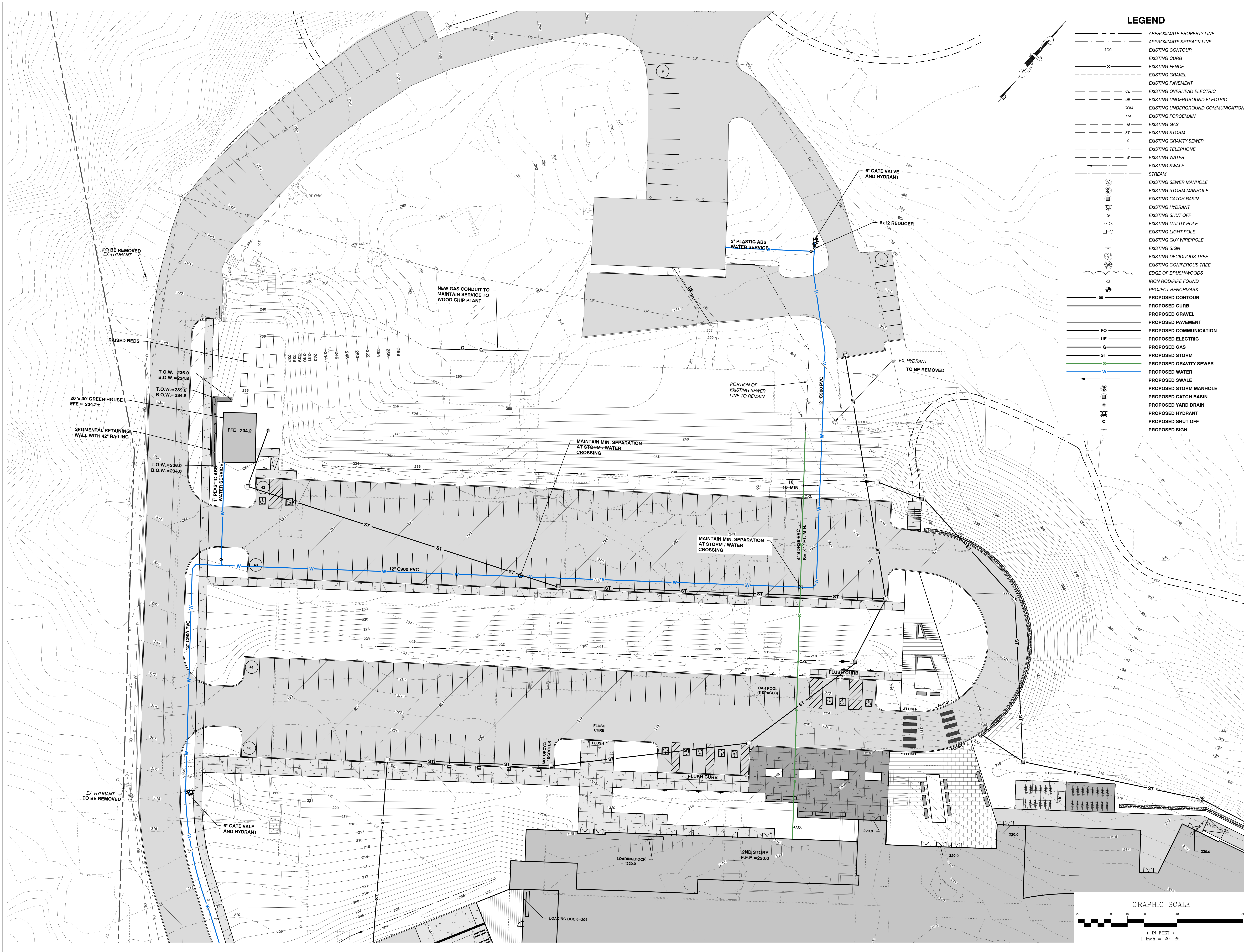
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ISSUE LOG:
ZONING PERMIT DRAFT 08/23/22
ZONING PERMIT 09/30/22

SHEET CONTAINS:
PROPOSED
UTILITY PLAN
NORTH

SHEET NO: C3.0

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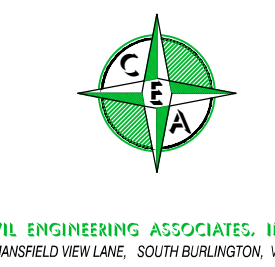
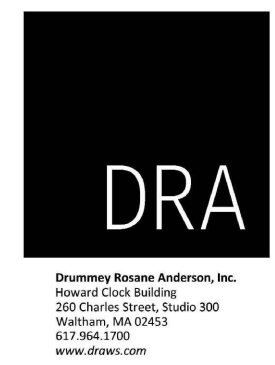


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BURLINGTON, VT

PROJECT NO: 21255

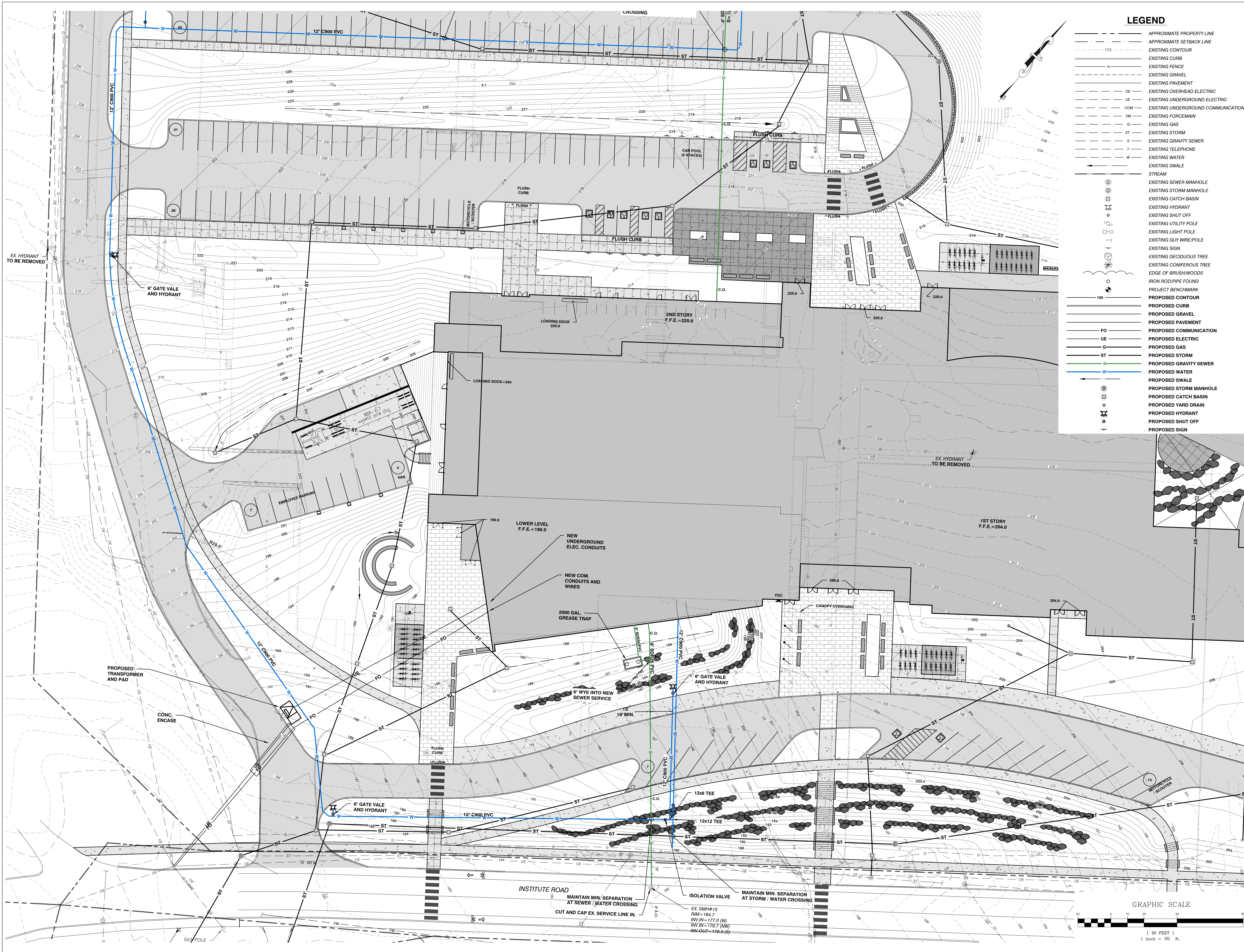
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DRAWN BY: MAB CHECKED BY: DSM

ISSUE LOG: ZONING PERMIT DRAFT 08/23/22 ZONING PERMIT 09/30/22

SHEET CONTENTS:
PARTIAL
UTILITY PLAN
NORTH

C3.1



LEGEND

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BURLINGTON, VT

FF PROJECT NO: 21255

ORIGINATION DATE: 07/22/2022 SCALE: 1" = 40'

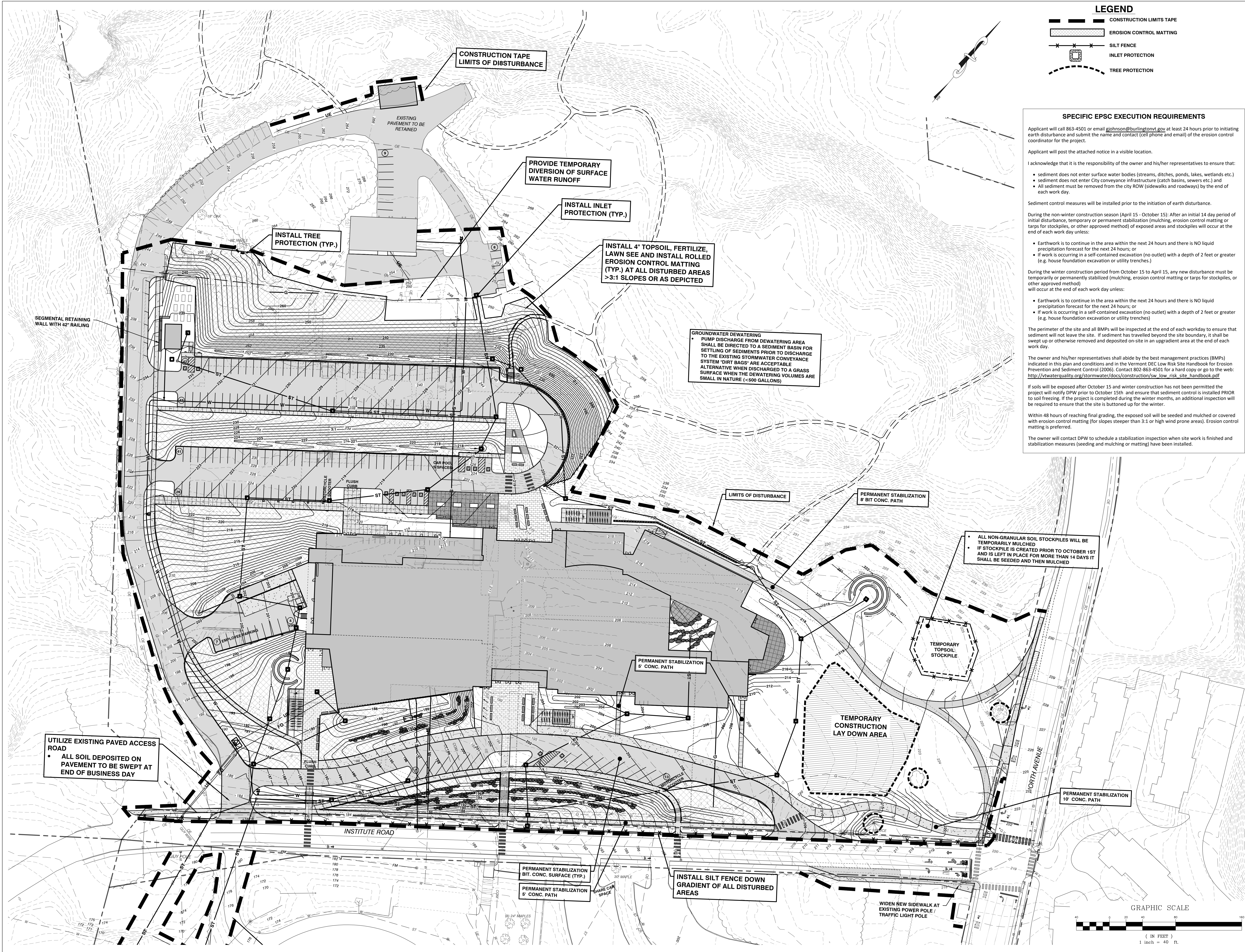
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ISSUE LOG:
ZONING PERMIT DRAFT 08/23/22
ZONING PERMIT 09/30/22

SHEET CONTAINS:
PARTIAL
UTILITY PLAN
NORTH

SHEET NO: C3.2

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LEGEND

- CONSTRUCTION LIMITS TAPE
- EROSION CONTROL MATTING
- SILT FENCE
- INLET PROTECTION
- TREE PROTECTION

SPECIFIC EPSC EXECUTION REQUIREMENTS

Applicant will call 863-4501 or email gjohnson@burlingtonvt.gov at least 24 hours prior to initiating earth disturbance and submit the name and contact (cell phone and email) of the erosion control coordinator for the project.

Applicant will post the attached notice in a visible location.

I acknowledge that it is the responsibility of the owner and his/her representatives to ensure that:

- sediment does not enter surface water bodies (streams, ditches, ponds, lakes, wetlands etc.)
- sediment does not enter City conveyance infrastructure (catch basins, sewers etc.) and
- All sediment must be removed from the city ROW (sidewalks and roadways) by the end of each work day.

Sediment control measures will be installed prior to the initiation of earth disturbance.

During the non-winter construction season (April 15 - October 15): After an initial 14 day period of initial disturbance, temporary or permanent stabilization (mulching, erosion control matting or tarps for stockpiles, or other approved method) of exposed areas and stockpiles will occur at the end of each work day unless:

- Earthwork is to continue in the area within the next 24 hours and there is NO liquid precipitation forecast for the next 24 hours; or
- If work is occurring in a self-contained excavation (no outlet) with a depth of 2 feet or greater (e.g. house foundation excavation or utility trenches.)

During the winter construction period from October 15 to April 15, any new disturbance must be temporarily or permanently stabilized (mulching, erosion control matting or tarps for stockpiles, or other approved method) will occur at the end of each work day unless:

- Earthwork is to continue in the area within the next 24 hours and there is NO liquid precipitation forecast for the next 24 hours; or
- If work is occurring in a self-contained excavation (no outlet) with a depth of 2 feet or greater (e.g. house foundation excavation or utility trenches)

The perimeter of the site and all BMPs will be inspected at the end of each workday to ensure that sediment will not leave the site. If sediment has travelled beyond the site boundary, it shall be swept up or otherwise removed and deposited on-site in an upgradient area at the end of each work day.

The owner and his/her representatives shall abide by the best management practices (BMPs) indicated in this plan and conditions and in the Vermont DEC Low Risk Site Handbook for Erosion Prevention and Sediment Control (2006). Contact 802-863-4501 for a hard copy or go to the web: http://vtwaterquality.org/stormwater/docs/construction/sw_low_risk_site_handbook.pdf

If soils will be exposed after October 15 and winter construction has not been permitted the project will notify DPW prior to October 15th and ensure that sediment control is installed PRIOR to soil freezing. If the project is completed during the winter months, an additional inspection will be required to ensure that the site is buttoned up for the winter.

Within 48 hours of reaching final grading, the exposed soil will be seeded and mulched or covered with erosion control matting (for slopes steeper than 3:1 or high wind prone areas). Erosion control matting is preferred.

The owner will contact DPW to schedule a stabilization inspection when site work is finished and stabilization measures (seeding and mulching or matting) have been installed.

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BURLINGTON HIGH SCHOOL & BURLINGTON TECHNICAL CENTER

BURLINGTON, VT

HP PROJECT NO: **21255**

ORIGINATION DATE: **07/22/2022** SCALE: **1" = 40'**

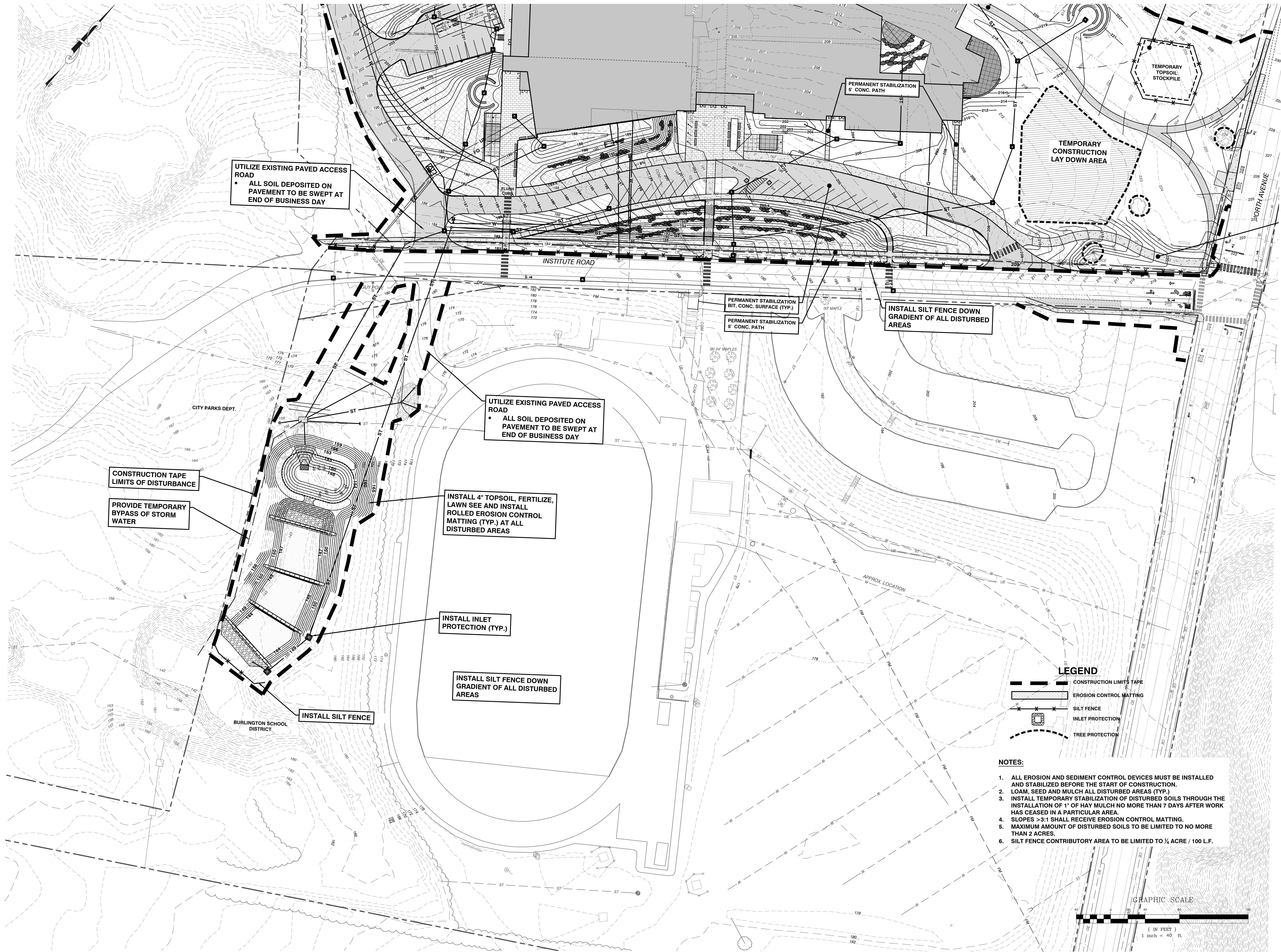
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ISSUE LOG:
ZONING PERMIT DRAFT 08/23/22
ZONING PERMIT 09/30/22

SHEET CONTAINS:
EPSC SITE PLAN NORTH

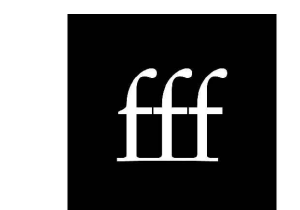
SHEET NO: **C4.0**

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&
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CENTER

BURLINGTON, VT

FF PROJECT NO: 21255

ORGANIZATION DATE: 07/22/2022 SCALE: 1" = 40'

DRAWN BY: MAB CHECKED BY: DSM

ISSUE LOG:

ZONING PERMIT DRAFT 08/23/22

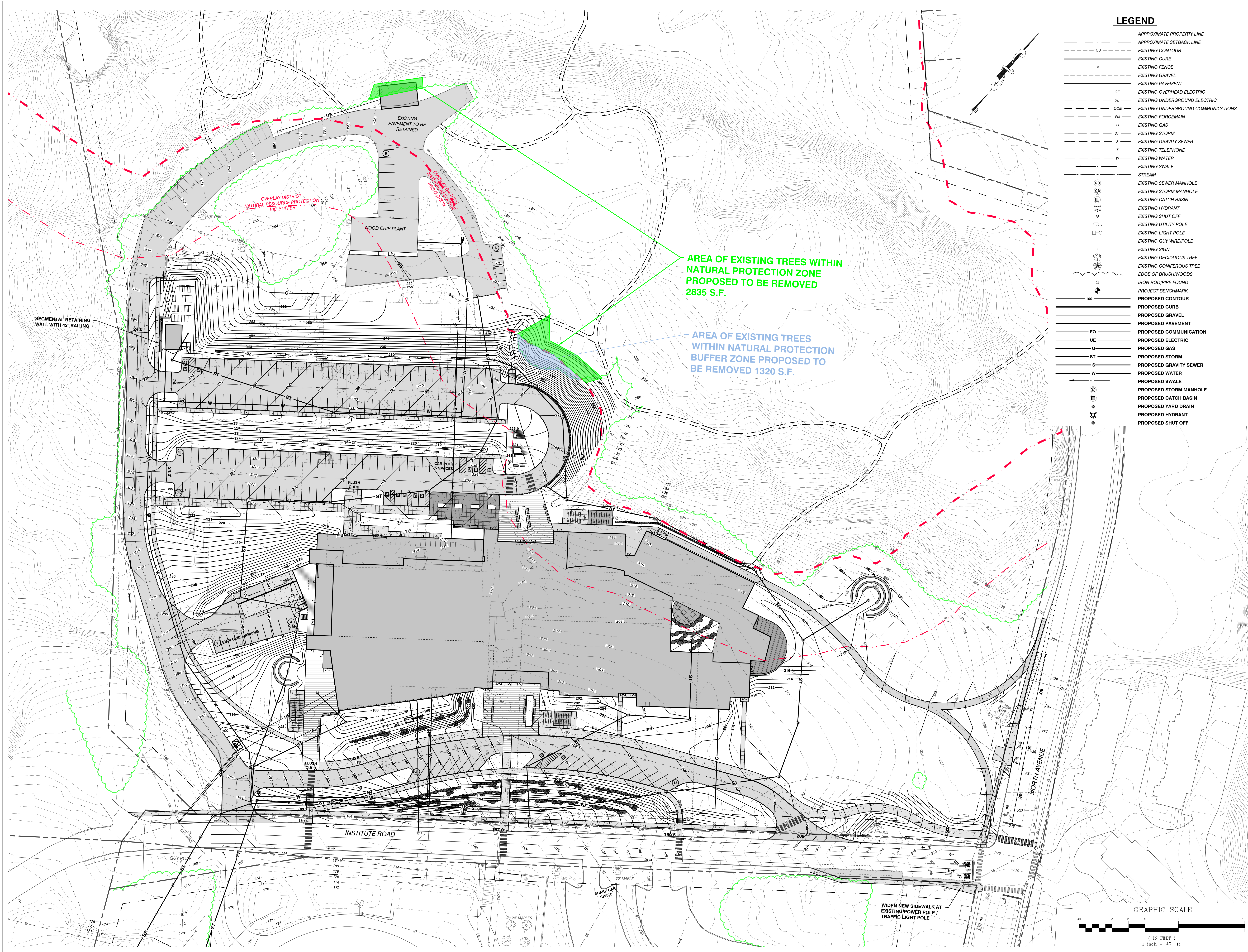
ZONING PERMIT 09/30/22

SHEET CONTAINS:
EPSC SITE
PLAN
SOUTH

SHEET NO:

C4.1

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LEGEND

---	APPROXIMATE PROPERTY LINE
---	APPROXIMATE SETBACK LINE
---	EXISTING CONTOUR
---	EXISTING CURB
---	EXISTING FENCE
---	EXISTING GRAVEL
---	EXISTING PAVEMENT
OE	EXISTING OVERHEAD ELECTRIC
UE	EXISTING UNDERGROUND ELECTRIC
COM	EXISTING UNDERGROUND COMMUNICATIONS
FM	EXISTING FORCEMAIN
G	EXISTING GAS
ST	EXISTING STORM
S	EXISTING GRAVITY SEWER
T	EXISTING TELEPHONE
W	EXISTING WATER
---	EXISTING SWALE
---	STREAM
⊙	EXISTING SEWER MANHOLE
⊙	EXISTING STORM MANHOLE
⊙	EXISTING CATCH BASIN
⊙	EXISTING HYDRANT
⊙	EXISTING SHUT OFF
⊙	EXISTING UTILITY POLE
⊙	EXISTING LIGHT POLE
⊙	EXISTING GUY WIRE/POLE
⊙	EXISTING SIGN
⊙	EXISTING DECIDUOUS TREE
⊙	EXISTING CONIFEROUS TREE
⊙	EDGE OF BRUSHWOODS
⊙	IRON ROD/PIPE FOUND
⊙	PROJECT BENCHMARK
---	PROPOSED CONTOUR
---	PROPOSED CURB
---	PROPOSED GRAVEL
---	PROPOSED PAVEMENT
FO	PROPOSED COMMUNICATION
UE	PROPOSED ELECTRIC
G	PROPOSED GAS
ST	PROPOSED STORM
S	PROPOSED GRAVITY SEWER
W	PROPOSED WATER
---	PROPOSED SWALE
⊙	PROPOSED STORM MANHOLE
⊙	PROPOSED CATCH BASIN
⊙	PROPOSED YARD DRAIN
⊙	PROPOSED HYDRANT
⊙	PROPOSED SHUT OFF

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BURLINGTON, VT

FF PROJECT NO: 21255

ORIGIN DATE: 07/22/2022 SCALE: 1" = 40'

DRAWN BY: MAB CHECKED BY: DSM

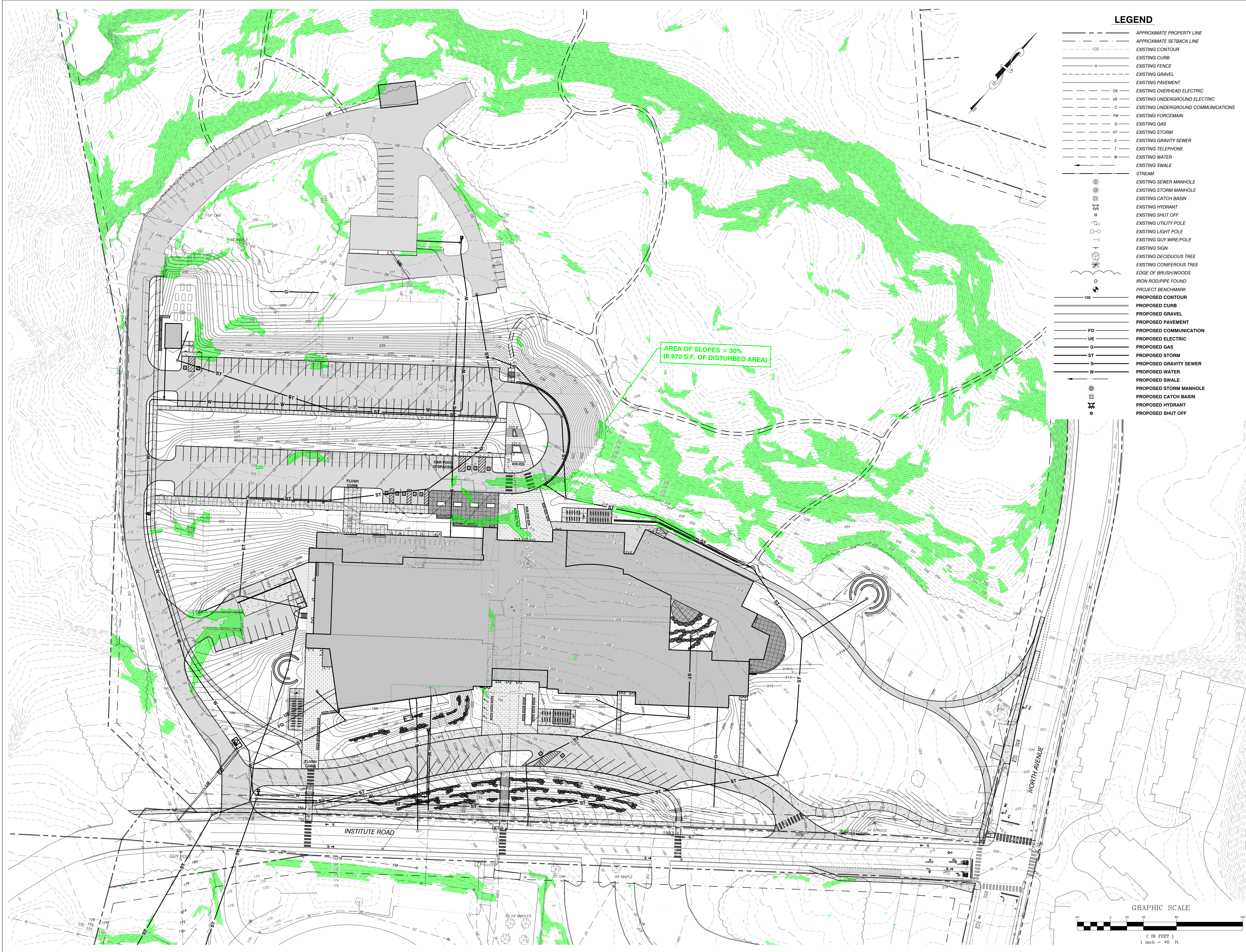
ISSUE LOG:
ZONING PERMIT DRAFT 08/23/22
ZONING PERMIT 09/30/22

SHEET CONTAINS:
OVERLAY DISTRICT NATURAL RESOURCE PROTECTION

WS2

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LEGEND

---	APPROXIMATE PROPERTY LINE
---	APPROXIMATE SETBACK LINE
---	EXISTING CONTOUR
---	EXISTING CURB
---	EXISTING FENCE
---	EXISTING GRAVEL
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⊙	PROPOSED SHUT OFF

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FF PROJECT NO: 21255

ORIGINATION DATE: 07/22/2022 SCALE: 1" = 40'

DRAWN BY: MAB CHECKED BY: DSM

ISSUE LOG: ZONING PERMIT DRAFT 08/23/22

SHEET CONTAINS:
SLOPE
ANALYSIS
PROPOSED

SHEET NO: WS2

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MEMORANDUM

To: Burlington Development Review Board
Mary O'Neil, Principal Planner
Scott Gustin, Principal Planner & Asst. Administrative Officer

From: Joe Weith, Senior Project Manager

Date: October 3, 2022

Re: BHS | BTC Reconstruction – Project Narrative

Burlington School District (“BSD”) is proposing to reconstruct the Burlington High School/Burlington Technical Center (“BHS/BTC”) property at 52 Institute Road. The reconstruction project will consist of remediation and demolition of all but one of the existing buildings and construction of a new BHS/BTC building. This narrative provides a description of the project and addresses several key design aspects and regulatory requirements as outlined in the Burlington Comprehensive Development Ordinance (“CDO”).

Project Description

The BHS/BTC reconstruction project will consist of two (2) primary overlapping phases. Phase 1 will involve remediation and demolition of buildings A through G of the existing campus. The northerly most building, the former wood chip plant, will remain and be repurposed. Phase 2 will involve construction of a new high school/technical center building and a green house.

The proposed BHS/BTC will total approximately 253,865 square feet which includes a new 250,000 square foot high school/tech center building, a 600 square foot greenhouse and the existing 3,265 square foot former wood chip plant. The new BHS/BTC building will be oriented to Institute Road and all access to the property will be from Institute Road. Two

main entrances will serve the building – a south entrance and a north entrance. The south entrance will face Institute Road and serve as the primary entrance for visitors, bus drop off/pick up and users of the existing parking area on the south side of Institute Road. The north entrance will serve users of the new north parking lot, additional bus drop off/pick up and student drop off/pick up. Both entrances will provide direct access to the 2-story student commons, gymnasium and auditorium.

Program highlights include:

- **Two-level Student Commons** for dining, gathering, collaboration.
- **Three Small Learning Communities for BHS** each with a variety of classroom sizes, science labs, extended learning areas, teacher planning, and student support spaces.
- **Significant Student Support resources** including Counseling & Special Needs.
- **Five Tech Center Program spaces** with dedicated BTC entrance.
- **Large Group Multi-Purpose Presentation space.**
- **750 seat Auditorium** with robust lighting, rigging, & sound systems.
- **12,000 sf Gym plus 5,500 sf Community Gym** with dedicated after-hours entrance.
- **Strong connection to the outdoors** including two (2) outdoor learning areas, a secure courtyard, and enhanced connections to the Arms Forest.

Existing vs Proposed

The proposed BHS/BTC campus will have less gross square footage and fewer classrooms than the existing BHS/BTC campus. The existing BHS/BTC contains approximately 255,600 gross square feet of building area and 89 classrooms/instructional spaces. The proposed BHS/BTC will contain approximately 253,900 gross square feet of building area and 77 classrooms/instructional spaces.

Using a recommended standard of maximum number of students per classroom/instructional space and appropriate utilization rates, we estimate the student capacity of the existing BHS/BTC to be 1,802 students. Using these same standards, we estimate student capacity of the proposed BHS/BTC to be 1,594 students. Therefore, the proposed reconstruction project will result in a lower student capacity compared to existing.

Demo/Remediation and Construction Timeline

BSD's target open date for the new BHS/BTC is August 2025. Below is the preliminary project timeline:

- Building demolition and remediation: January 2023 – September 2023
- Foundation and site construction: May 2023 – August 2025
- Building construction: August 2023 – August 2025
- Target building occupancy: August 2025

Due to the complexity and size of this reconstruction project, we request approval for a permit life of four (4) years.

Environmental

Extensive testing of building materials and soils for hazardous materials has been conducted on the property. Hazardous materials have been detected on site including asbestos, lead, PCBs, and polycyclic aromatic hydrocarbons (PAHs) in the soils that exceed EPA and VTDEC standards. Testing and analysis determined that the most cost-effective approach to remediating hazardous materials is to fully demolish the buildings and dispose of all material as PCB bulk product waste. Therefore, demolition and removal of the buildings is a necessary component of the overall remediation plan. BSD has been working closely with the Vermont Department of Environmental Conservation (“VTDEC”) and EPA and is currently preparing a corrective action plan (CAP) that will require approval of both VTDEC and EPA.

Remediation of hazardous materials will consist of the following:

- Accessible asbestos containing materials (ACM) will be removed prior to demolition of the buildings.
- The interiors of Buildings A – G will be abated prior to demolition activities.
- There will likely be select remediation of PCB building materials on the exterior of the building including joint and door caulking.
- The entire buildings will be demolished and disposed of as PCB bulk product waste.
- Soil remediation will include select soil excavation and disposal to satisfy VTDEC and EPA regulations.

The abatement, remediation, and demolition will require the following regulatory agency permits and approvals to facilitate completion of the project:

- Site Investigation Report for hazardous building materials (PCBs) to be approved by VTDEC Sites Management Section (SMS).
- Site Investigation Report for soil materials to be approved by VTDEC SMS.
- Compliance with Vermont Department of Health lead and ACM regulations.

- Corrective Action Plan (CAP) for hazardous building materials (PCBs) and soil remediation to be approved by VTDEC SMS. This includes public notice and final decision.
- Corrective Action Construction Completion Report to be prepared for completed hazardous building materials (PCBs) and soil remediation.
- Performance based disposal of PCBs in accordance with the EPA 40 CFR section 761.61(b). This includes proper EPA notification and closure requirements.

Dimensional Standards and Density

Building Setbacks: The building setbacks are approximately 304 feet from North Avenue (20 foot minimum required), 123 feet from Institute Road (20 foot minimum required), 52 feet (greenhouse) and 235 feet (school building) from the west property line (10 foot minimum required), and 290 feet (maintenance building) and 500+ feet (school building) from the north property line (10 foot minimum required).

Lot Coverage: The proposed lot coverage for both parcels combined (north and south sides of Institute Road) is 27% (Maximum lot coverage of 60% allowed).

Building Height: As shown on Sheet A200 of the Architectural Drawings set, the building height along the North Avenue elevation (i.e., east elevation) ranges from 40 feet to 54 feet (80 foot maximum allowed). The building height along the Institute Road elevation (i.e., south elevation) ranges from 44 feet to 70 feet (80 foot maximum allowed). The maximum building height along both elevations is well below the maximum allowed height of 80 feet.

Parking

Vehicle Parking: As shown in the Vehicle and Bicycle Parking Table, the CDO allows a maximum of 385 vehicle parking spaces for this secondary school use. A potential maximum of 1,275 vehicle parking spaces could be allowed if other uses are considered such as a performing arts center and indoor and outdoor recreation. The BHS/BTC project is proposing to provide a total of 362 vehicle parking spaces with 218 spaces located north of Institute Road and 144 spaces located in the existing parking lot south of Institute Road.

As recommended in Section 4.5.2(b)(6) of the CDO, a majority of the parking will be located behind or to the side of the new BHS/BTC building. Also, as was discussed during the sketch plan review meeting, visitor parking is proposed to be located near the south entrance for efficiency and security reasons.

Bicycle Parking: As indicated in the Vehicle and Bicycle Parking Table, the CDO requires a minimum of 480 bicycle parking spaces. We believe this to be excessive for a school of this size based on actual parking counts conducted at the Downtown BHS and other published guidelines for bicycle parking. The bicycle parking demand study conducted by VHB in Fall, 2022 determined a peak parking demand of 0.03 spaces per enrolled student. Applying this standard to the estimated student capacity of the new school indicates that 48 bicycle parking spaces would be sufficient for the proposed BHS/BTC. We also considered the LEED guidelines for bicycle parking since we are pursuing a LEED certification for the new building. Based on LEED guidelines, a total of 134 bicycle parking spaces would adequately serve the proposed project.

The BHS/BTC project is proposing to provide 136 bicycle parking spaces, with 80 of those to be long term (enclosed) spaces and 56 to be short term spaces. **Based on the above, we request approval to provide 136 bicycle parking spaces for the project.**

Traffic/Transportation

Traffic operations on the proposed campus, Institute Road and on adjacent North Avenue have been reviewed by our traffic/transportation consultant. During design, the consultant provided input on the circulation at the site as well as improvements to the operation of the signalized intersection to better accommodate all users (e.g., motorists, bus transit users, pedestrians, and cyclists).

As indicated in the Burlington High School Traffic Impact Study dated September 2022, the proposed BHS/BTC reconstruction project is not expected to generate unreasonable congestion or unsafe conditions on the site or on the City of Burlington's transportation system. The intersection of North Avenue and Institute Road has sufficient capacity to handle the high school/tech center trips without falling below Level of Service C for any movement. The following improvements will be implemented as part of the reconstruction project to improve traffic flow and access for pedestrians, cyclists, and transit users:

- Addition of a right turn lane (turn to southbound) on the Institute Road approach;
- Relocate the southbound transit stop on North Avenue to the north side of the intersection;
- Add pedestrian crosswalks, accessible ramps, pedestrian push buttons and pedestrian signal heads across the north leg and east leg of the intersection;
- Add a traffic signal head to control the Institute Road approach;
- Repaint existing bicycle lanes northbound along North Avenue at the signalized intersection and add a bicycle turn box;
- Buffer southbound bicycle lane to the south of the intersection for first 200 feet (using paved area from moved transit stop);
- Restripe all pavement markings within 200' of the intersection
- Remove on-street parking along Institute Road and add bike lanes on both sides of Institute Road.

- Add new sidewalks along the north side of Institute Road and on the BHS/BTC property.
- Provide safe and efficient bus drop off/pick up at both the south and north entrances to the building.

Stormwater

The proposed stormwater management system will use a Regenerative Conveyance System (RCS) to provide centralized stormwater treatment and detention for the new school facilities. This system consists of a series of stepped pools and stone grade change structures with underlying filter and infiltration materials to provide improved water quality treatment. The system will handle stormwater flows from Institute Road, the lands to the north and a small portion of the athletic field impervious surfaces. The RCS system will be located south of Institute Road and west of the sports stadium. It will also correct the current state of disrepair of the existing stormwater outfall which is severely undermined and has partially collapsed.

Details of the stormwater modeling, drainage maps, testing, operation and maintenance, and erosion control are provided in the Stormwater – EPSC Package and are shown on the Civil plans (sheets C2.1 – C2.5, C4.0 and C4.1).

To provide the most efficient treatment of the runoff from the school property, a system has been developed where the clean stormwater runoff from the Arms Forest area to the north will be intercepted and conveyed separately around the treatment facility.

The stormwater facilities have been designed to address the “3-Acre Rule” requirements recently adopted by the State for all of the redeveloped portion of the property.

Landscaping and Lighting

Proposed landscaping and lighting for the project is depicted in the Landscape-Lighting Permit Set. As shown on the landscape plans, a variety of deciduous and evergreen trees and shrubs will be planted. The loading dock and dumpster area on the west end of the building will be screened by evergreen trees. A plant schedule showing the types, quantities and sizes of landscaping is included on Sheet L-300.

The lighting plan will consist of downcasting cutoff fixtures. The light fixture and pole specifications and statistical area summary (e.g., foot candles) is included on Sheet L-400 Overall Landscape Lighting Plan.

Tree Removal/Natural Resources Protection Overlay District

Areas of tree removal are depicted on plan WS2 Overlay District Natural Resource Protection. Trees will be removed within an area of 2,835 square feet of the Natural Resources Protection zone and within 1,320 square feet of the Natural Resources Protection Buffer zone.

Potential impacts to the Natural Resources Protection Overlay District were assessed by Gilman & Briggs Environmental. As indicated in their assessment memorandum dated 9/30/22, Gilman & Briggs concluded that, overall, the project will not have significant effect on the forested community.

Steep Slopes

Areas where the project potentially impacts existing slopes of 30% or more are depicted on Sheet WS2 Slope Analysis Proposed.

The project has been designed in a manner where steep slopes greater than 40% are proposed to be employed as a means of minimizing earth disturbance. Slopes greater than 30% have been avoided except where subsurface groundwater conditions are favorable for the long-term stability of the unconsolidated soils. Specifically, some areas have been graded at 3:1 and will be temporarily stabilized with the use of erosion control matting until vegetation with a suitable root mass has been established. For excavation into bedrock, the side slopes shall be no steeper than 6 vertical to 1 horizontal to reduce cyclical dislodgement of rock from the exposed face. In some areas 2H:1V slopes may be employed with the use of angular stone substrate as a means of minimizing sloughing of saturated soil surfaces.

Energy Efficiency/Sustainability

The new BHS/BTC building will use a renewable primary heating system as required by Burlington Ordinance Chapter 8 Article 5. The building's heating, cooling, and domestic hot water will be provided by electric heat pumps connected via heat exchanger to an open-loop ground source (i.e., geothermal) heat pump loop. This system is designed to provide all anticipated heating and cooling needs for the project. This proposed system is based upon the confirmation of substantial water flows on site from a test well and design phase energy modeling of the building. The building enclosure performance will exceed VT CBES 2020 standards, with a particular focus on air tightness. Building and equipment performance values have been optimized through the energy modeling process.

The roof is arranged and structured to support solar photovoltaic arrays and infrastructure will be put in place to support BSD's plan to arrange for installation of solar PV by a third-party on the building's roof through a power purchase agreement. The BHS/BTC project is registered as a LEED project and the intent is to obtain LEED Certification. We

will continue to refine and optimize energy and materials performance throughout the design and construction process.

Gilman & Briggs Environmental

1 Conti Circle, Suite 5, Barre VT 05641

Ph: (802) 479-7480; FAX: (802) 476-7018

team@gebvt.com

MEMORANDUM

To: Joe Weith
From: Art Gilman
Date: 30 September 2022
Re: Natural Resources investigations at the Burlington High School, Burlington, VT

In connection with the proposed rehabilitation of the Burlington High School campus, I have inspected the environs of the existing facilities north of the already developed area to the approximate BHS property line, to determine presence or absence of rare plants, and significant natural communities. This memorandum serves as an update to my memo dated 11 December 2020, which referred to the previous development plan, now superseded by the current plan entitled Proposed Grading and Drainage North Sheet C2.1 dated 9/30/22 (see attached). A comparison of the two plans shows that the current plan has two alterations in regard to any intrusions into the forested area:

- 1) addition of a maintenance shed at the forest line above the upper parking lot, and
- 2) deletion of a proposed salt shed a little east of that area.

Here follows my original report from 2020, with the exception that the final paragraph (which specifically discussed the 2020 site plan) and with emphasis added by underlining:

“Two natural community types are mapped in the forest on the northern edge of the BHS property, these being “Dry Oak-Maple-Limestone Forest” and “Mesic Maple-Ash-Hickory-Oak Forest.” These several resources—rare plants and significant natural communities) are shown on the attached Figure 1, constructed using the Vermont Natural Resources Atlas online (note, species on parcels other than BHS are not discussed here).

“Two plant species are mapped on immediately adjacent properties: harsh sunflower and squarrose goldenrod. Harsh Sunflower (*Helianthus strumosus*) is listed in Vermont as Threatened, and has a rarity rank, assigned by the Vermont Natural Heritage Inventory of S2/S3, i.e., rare to uncommon. Squarrose goldenrod (*Solidago squarrosa*) has the same rarity rank (S2/S3) but is not listed as threatened or endangered. Additional rare species are mapped east of North Avenue, in habitats dissimilar to those on the BHS.

“With these considerations in mind, I visited the site on 31 August 2019. Weather was sunny, warm, and dry. This date would be optimal for observing Harsh Sunflower and Squarrose Goldenrod, both late summer bloomers. I started along the forest edge just west of North Avenue and searched the entire parcel north of the existing facilities, noting all the plant species (Table 1) and the composition of the communities.

“The site is characterized by a low limestone outcrops, and thin, stony soils. As such, the plant communities reflect dry, calcareous conditions and the native species that are present are mostly those found in similar situations throughout the Champlain Valley. I observed no rare or protected plants—in particular, neither Harsh Sunflower nor Squarrose Goldenrod were noted. A single plant of Large Yellow Lady’s-slipper (*Cypripedium parviflorum* var. *pubescens*), was located on the north-facing slope beyond the crest of the knoll. This an uncommon species (rank S3) in Vermont, where it occurs in several types of habitats, often swampy but also rich forests and limestone ledges. Because of its location, remote from the proposed redevelopment; there will be no impact to it.

“The natural community “Dry Oak-Maple-Limestone Forest” is present, especially on the south-facing side of the knoll but is in a relatively degraded condition. There are a number of large trees, 16”–36” in diameter at breast height, including basswood, sugar maple, red oak, white oak, and white pine, as well as many smaller trees. It appears that the site was relatively open with only these large trees growing for some time, while the land surrounding them was invaded by common buckthorn. The buckthorn is now aged and is dying out after dominating the understory. The ground level flora is only moderately diverse and is relatively sparse, likely a consequence of several factors: the dryness, the site history (natural forest to open, back to shade, and heavy shading from the buckthorn), and the small size of the area (which limits plant movement into the area). Certain plants, e.g., Herb Robert (*Geranium robertianum*), which is known to be lime-loving, are found on the outcrops themselves. The forest is also somewhat impacted by formal and informal trails, associated with the school and the neighborhood. Thus, the community composition today does not reflect truly natural conditions which, given its small size, markedly reduces its significance. It is, in effect, a remnant patch.

“The forest on the north side of the knoll, away from the proposed development, has a different composition, with many hemlock trees, and more rugged ledge outcrops. It has a limited understory and the ground layer is particularly sparsely occupied, in consequence of the shade cast by the hemlocks, which is too deep for most plants.”

As noted above, a maintenance shed is newly proposed for the redevelopment, but otherwise, the total intrusion into the woodline is less than in the 2020 plan. Furthermore, the area of that proposed shed, although mapped within the Natural Resources Protection Overlay, is not part of the community as discussed above but is a rough area at the top of the drive. It slopes down to the northwest and has no limestone outcrops or large trees.

Other new development, i.e., some of the parking, building, and concrete walkway along the NE side, lays within the 100’ buffer but is currently developed parking, building, mowed lawn and walkway, etc.—that is, in areas already developed and not functioning as buffer. The natural community lies upslope of these areas.

Overall, the project will not have significant effect on the forested community. There is some evidence of educational use, and I might suggest more such use, including such projects as removal of invasive plant species, better definition of the paths to reduce widening, etc.



Forest composition: a few large trees (white pine on left), and many small ones.



Interior: trails and end-stage buckthorn.



Herb Robert, a calciphile herb, restricted to limestone outcrops.



Trail leading North from the site; weedy vegetation along trail.



North-facing slope beyond crest; more rugged outcrops and very shaded conditions.

Gilman & Briggs Environmental

1 Conti Circle, Suite 5, Barre VT 05641

Ph: (802) 479-7480; FAX: (802) 476-7018

team@gebvt.com**MEMORANDUM**

To: Marty Spaulding
From: Art Gilman
Date: 11 December 2020
Re: Natural Resources investigations at the Burlington High School, Burlington, VT

In connection with the proposed rehabilitation of the Burlington High School campus, I have inspected the environs of the existing facilities north of the already developed area to the approximate BHS property line, to determine presence or absence of rare plants, and significant natural communities.

Two plant species are mapped on immediately adjacent properties: harsh sunflower and squarrose goldenrod. Harsh Sunflower (*Helianthus strumosus*) is listed in Vermont as Threatened, and has a rarity rank, assigned by the Vermont Natural Heritage Inventory of S2/S3, i.e., rare to uncommon. Squarrose goldenrod (*Solidago squarrosa*) has the same rarity rank (S2/S3) but is not listed as threatened or endangered. Additional rare species are mapped east of North Avenue, in habitats dissimilar to those on the BHS.

Two natural community types are mapped in the forest on the northern edge of the BHS property, these being “Dry Oak-Maple-Limestone Forest” and “Mesic Maple-Ash-Hickory-Oak Forest.” These several resources—rare plants and significant natural communities) are shown on the attached Figure 1, constructed using the Vermont Natural Resources Atlas online (note, species on parcels other than BHS are not discussed here).

With these considerations in mind, I visited the site on 31 August 2019. Weather was sunny, warm, and dry. This date would be optimal for observing Harsh Sunflower and Squarrose Goldenrod, both late summer bloomers. I started along the forest edge just west of North Avenue, and searched the entire parcel north of the existing facilities, noting all the plant species (Table 1) and the composition of the communities.

The site is characterized by a low limestone outcrops, and thin, stony soils. As such, the plant communities reflect dry, calcareous conditions and the native species that are present are mostly those found in similar situations throughout the Champlain Valley. I observed no rare or protected plants—in particular, neither Harsh Sunflower nor Squarrose Goldenrod were noted. A single plant of Large Yellow Lady’s-slipper (*Cypripedium parviflorum* var. *pubescens*), was located on the north-facing slope beyond the crest of the knoll. This an uncommon species (rank S3) in Vermont, where it occurs in several types of habitats, often swampy but also rich forests and limestone ledges. Because of its location, remote from the proposed redevelopment; there will be no impact to it.

The natural community “Dry Oak-Maple-Limestone Forest” is present, especially on the south-facing side of the knoll but is in a relatively degraded condition. There are a number of large trees, 16”–36” in diameter at breast height, including basswood, sugar maple, red oak, white oak, and white pine, as well as many smaller trees. It appears that the site was relatively open with only these large trees growing for some time, while the land surrounding them was invaded by common buckthorn. The buckthorn is now aged and is dying out after dominating the understory. The ground level flora is only moderately diverse and is relatively sparse, likely a consequence of several factors: the dryness, the site history (natural forest to open, back to shade, and heavy shading from the buckthorn), and the small size of the area (which limits plant movement into the area). Certain plants, e.g. Herb Robert (*Geranium robertianum*), which is known to be lime-loving, are found on the outcrops themselves. The forest is also somewhat impacted by formal and informal trails, associated with the school and the neighborhood. Thus, the community composition today does not reflect truly natural conditions which, given its small size, markedly reduces its significance. It is, in effect, a remnant patch.

The forest on the north side of the knoll, away from the proposed development, has a different composition, with many hemlock trees, and more rugged ledge outcrops. It has a limited understory and the ground layer is particularly sparsely occupied, in consequence of the shade cast by the hemlocks, which is too deep for most plants.

The proposed project, which has been modified from the plan of August 2019, will impact none of the Dry Oak-Maple-Limestone Forest except an extremely small area at the east end of the proposed Building B and the existing Building C, for installation of a water line. This area is shown on Site Plan Sheet C2.4, where the water line location is shown in blue near the right edge of the Plan. I recommend that the forest edge be avoided as much as possible, and that tree-cutting be minimized. The area of the existing Building C, which will be removed, will be regraded and returned to a vegetated condition. With these considerations, I believe the Project will not have an undue adverse impact on the natural community and its composition through the rest of the site.



Forest composition: a few large trees (white pine on left), and many small ones.



Interior: trails and end-stage buckthorn.



Herb Robert, a calciphile herb, restricted to limestone outcrops.



Trail leading North from the site; weedy vegetation along trail.



North-facing slope beyond crest; more rugged outcrops and very shaded conditions.

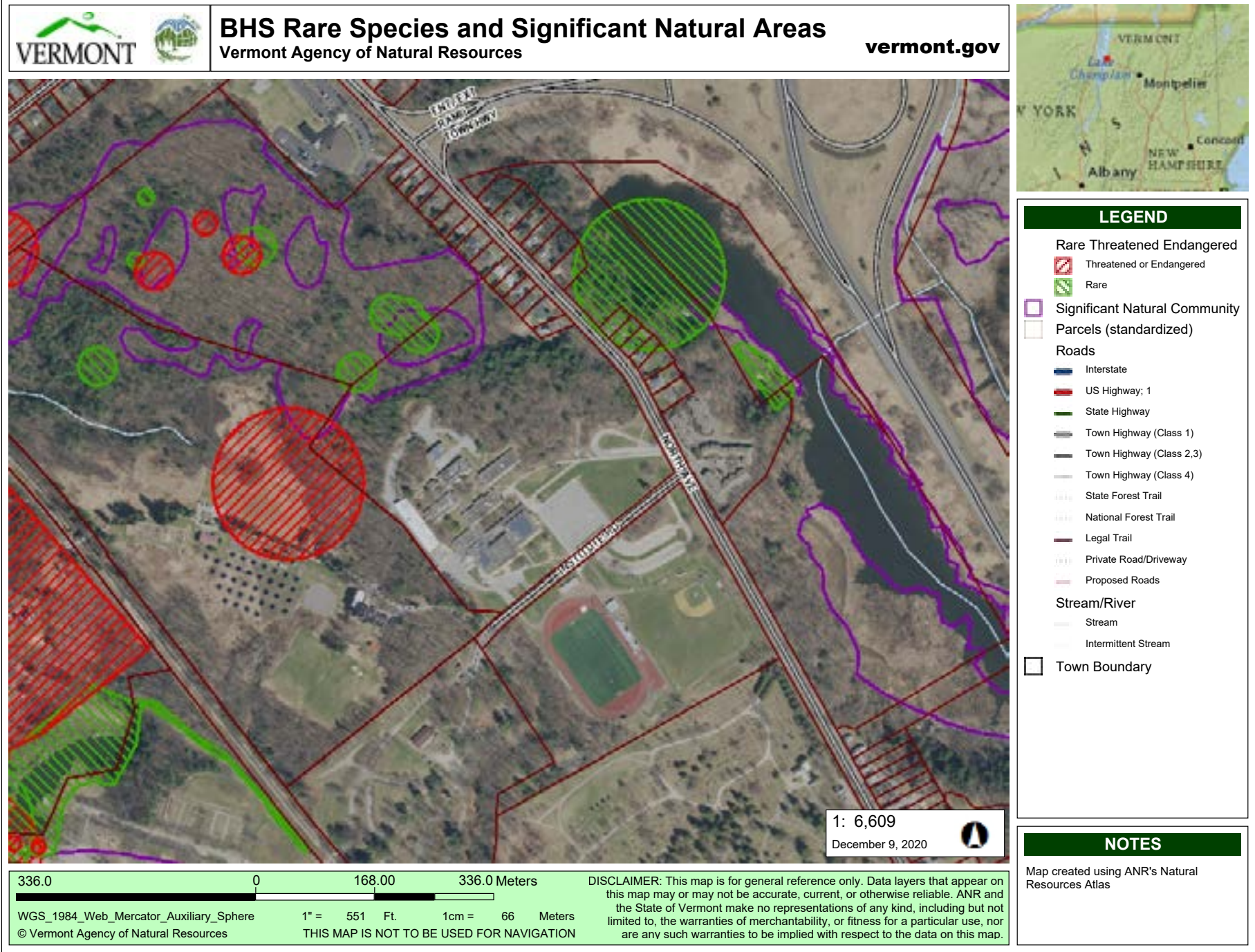
Table 1. Plants observed, north of the existing entrance, the lawns, and the buildings; to the approximate north property line; includes species around the parking lot north of the buildings. Date of observations, 31 Aug 2019.

Note: species listed in SMALL CAPS are non-native
 NNIS = Non-native Invasive Species

	Common Name	Notes
TREES, SHRUBS & WOODY VINES		
<i>Acer negundo</i>	Box-elder	Weed tree, edge of parking
<i>Acer saccharum</i>	Sugar maple	
<i>BERBERIS VULGARIS</i>	Common barberry	NNIS shrub
<i>Betula papyrifera</i>	Paper birch	
<i>Carpinus caroliniana</i>	Blue beech	
<i>Carya cordiformis</i>	Bitternut hickory	
<i>Celastrus americana</i>	Bittersweet	The NNIS Oriental bittersweet may occur
<i>Celtis occidentalis</i>	Hackberry	Grove of 11 trees to 12" dbh, knoll near North Avenue
<i>Fraxinus americana</i>	White ash	
<i>MALUS DOMESTICA</i>	Common apple	One tree
<i>MORUS ALBA</i>	White mulberry	One tree
<i>Ostrya virginiana</i>	Hop hornbeam	One tree, 13: dbh
<i>Parthenocissus quinquefolia</i>	Woodbine	
<i>Pinus resinosa</i>	Red pine	
<i>Pinus strobus</i>	White pine	Several large, to 18" dbh
<i>Populus deltoides</i>	Cottonwood	Weed trees, near parking
<i>Populus grandidentata</i>	Large-toothed aspen	Weed trees, near parking
<i>Prunus pensylvanica</i>	Pin cherry	
<i>Prunus virginica</i>	Choke cherry	
<i>Quercus alba</i>	White oak	Several large, 3 at 16" dbh, 1 at 36"
<i>Quercus rubra</i>	Red oak	
<i>RHAMNUS CATHARTICA</i>	Common buckthorn	NNIS shrub
<i>Rhus typhina</i>	Staghorn sumac	
<i>ROSA MULTIFLORA</i>	Multiflora rose	Somewhat invasive
<i>Rubus occidentalis</i>	Black raspberry	
<i>Sambucus nigra</i>	Elderberry	
<i>Tilia americana</i>	Basswood	
<i>Toxicodendron radicans</i>	Climbing poison ivy	
<i>Toxicodendron rydbergii</i>	Creeping poison ivy	
<i>Tsuga canadensis</i>	Hemlock	All hemlocks N side of hill
<i>Ulmus americana</i>	American elm	
<i>Viburnum trilobum</i>	Highbush cranberry	

<i>Vitis riparia</i>	Riverbank grape	
FERNS & ALLIES		
<i>Athyrium angustum</i>	Lady-fern	
<i>Dryopteris intermedia</i>	Intermediate woodfern	Shaded forest N of crest
<i>Dryopteris marginalis</i>	Marginal woodfern	Shaded forest N of crest
<i>Onoclea sensibilis</i>	Sensitive fern	Damp area, trail N of crest
<i>Matteuccia struthiopteris</i>	Ostrich fern	Damp area, trail N of crest
GRASSES/SEDGES		
<i>BROMUS INERMIS</i>	Hungarian brome	
<i>Carex eburnea</i>	Ivory sedge	Notably lime-loving, on outcrop
<i>Carex laxiflora</i>	Loose-flowered sedge	
<i>Carex rosea</i>	Rosy sedge	
<i>DACTYLIS GLOMERATA</i>	Orchard grass	
<i>DIGITARIA ISCHAMEUM</i>	Crabgrass	Weed of parking area
<i>Leersia virginica</i>	White grass	
<i>Muhlenbergia frondosa</i>	Muhly	
<i>Patis racemosa</i>	Black-seeded mountain rice	Notably a rich woods grass
<i>PHLEUM PRATENSE</i>	Timothy	
<i>SCHEDONORUS PRATENSIS</i>	Meadow fescue	
<i>SETARIA PUMILA</i>	Yellow foxtail	Weed of parking area
<i>Sporobolus vaginæflorus</i>	Dropseed	Weed of parking area
HERBS		
<i>Actaea pachypoda</i>	Doll's-eyes	
<i>ALLIARIA PETIOLATA</i>	Garlic mustard	NNIS herb
<i>Ambrosia artemisiifolia</i>	Ragweed	
<i>Amphicarpaea bracteata</i>	Hog-peanut	
<i>Anemone virginiana</i>	Thimbleweed	
<i>ARENARIA SERPYLLIFOLIA</i>	Sandwort	
<i>Artemisia vulgaris</i>	Mugwort	Weed of parking area
<i>Asclepias syriaca</i>	Milkweed	
<i>BERTEROA INCANA</i>	Hoary alyssum	Weed of parking area
<i>CENTAUREA JACEA</i>	Brown knapweed	Weed of parking area
<i>CENTARIUM PULCHELLUM</i>	Centaury	Weed of parking area
<i>Chenopodium album</i>	Lamb's-quarter	
<i>CICHORIUM INTYBUS</i>	Chicory	Weed of parking area
<i>Circaea canadense</i>	Enchanter's nightshade	
<i>CONVALLARIA MAJALIS</i>	Lily-of-the-valley	In forest, but a horticultural introduction
<i>Cypripedium parviflorum</i> var. <i>pubescens</i>	Yellow lady's-slipper	Uncommon species, ledge outcrop, north of crest; one plant
<i>DAUCUS CAROTA</i>	Queen Anne's lace	Weed of parking area
<i>Erigeron pulchellus</i>	Robin's plantain	
<i>Erigeron strigosus</i>	Daisy fleabane	
<i>Eurybia macrophylla</i>	Large-leaved wood aster	
<i>Galium circaezans</i>	Wild licorice	Limestone outcrop species
<i>GALIUM MOLLUGO</i>	Bedstraw	

<i>Geranium robertianum</i>	Herb Robert	Lime-loving species
<i>Hackelia virginiana</i>	Virginia stickseed	
<i>Hylodesmum glutinosum</i>	Woodland tick-trefoil	
<i>HYPERICUM PERFORATUM</i>	Common St. John's-wort	
<i>LINARIA VULGARIS</i>	Butter-and-eggs	
<i>Maianthemum canadense</i>	False lily-of-the-valley	
<i>Maianthemum racemosum</i>	False Solomon's seal	
<i>MELILOTUS ALBUS</i>	TALL WHITE CLOVER	
<i>Nabalus altissimus</i>	Tall white lettuce	
<i>Oenothera biennis</i>	Biennial evening primrose	
<i>Oxalis stricta</i>	Yellow wood-sorrel	
<i>Persicaria virginiana</i>	Jumpseed	
<i>Phryma racemosa</i>	Lopseed	
<i>Polygonatum pubescens</i>	Solomon's-seal	
<i>RANUNCULUS ACRIS</i>	TALL BUTTERCUP	
<i>RUMEX CRISPUS</i>	CURLY DOCK	
<i>SAPONARIA OFFICINALIS</i>	SOAPWORT	
<i>SILENE LATIFOLIA</i>	WHITE CAMPION	
<i>SILENE VULGARIS</i>	BLADDER CAMPION	
<i>Solidago altissima</i>	Tall goldenrod	
<i>Solidago caesia</i>	Blue-stem goldenrod	
<i>Solidago canadensis</i>	Canada goldenrod	
<i>Solidago flexicaulis</i>	Zig-zag goldenrod	
<i>Solidago gigantea</i>	Giant goldenrod	
<i>Solidago juncea</i>	Early goldenrod	
<i>Symphyotrichum cordifolium</i>	Heart-leaved aster	
<i>Symphyotrichum lanceolatum</i>	Lance-leaved aster	
<i>Thalictrum dioicum</i>	Early meadow-rue	
<i>TRIFOLIUM PRATENSE</i>	RED CLOVER	
<i>TRIFOLIUM REPENS</i>	WHITE CLOVER	
<i>Urtica dioica</i> var. <i>gracilis</i>	Common nettle	
<i>Verbascum thapsus</i>	Mullein	
<i>Verbena urticifolia</i>	White vervain	
<i>VERONICA OFFICINALIS</i>	SPEEDWELL	
<i>VICIA CRACCA</i>	COW VETCH	
<i>Viola pubescens</i>	Downy yellow violet	



Vehicle and Bicycle Parking

9/30/2022

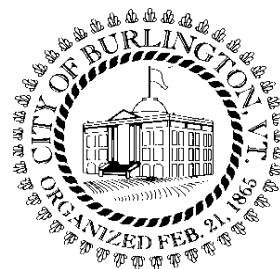
Vehicle Parking			
Maximum Parking Standard			
Use	Max Parking Standard	Proposed Metric	Max Parking Allowed
School Secondary	5 per Classroom	77 classrooms	385
Performing Arts Center	1 per 4 seats	750 seats	188
Recreational Facility - Outdoor Commercial	1 per 4 seats	1,000 seats	250
Recreational Facility - Indoor (Gym & Community Gym)	1 per 4 seats	1,750 seats	438
Total Max Parking Allowed			1,261
Proposed Parking			
Location	No. of Spaces		
South of Institute Road	144		
North of Institute Road	218		
Total Parking Spaces Proposed	362		

Bicycle Parking			
CDO Minimum Required Bicycle Parking			
Type	Parking Standard	Proposed Metric	No. of Required Spaces
Long Term	1 per 20K sf	253,865	13
	1 per 10 students	1,594 student capacity	159
Total Long Term Spaces			172
Short Term	4 per Classroom	77	308
Total Minimum Bicycle Parking			480
LEED Recommended Minimum Bicycle Parking			
Long Term	5% of student capacity	1,594 student capacity	80
	5% of faculty/staff	175 faculty/staff	9
Total Long Term Spaces			89
Short Term	2.5% of student capacity	1,594 student capacity	40
	2.5% of faculty/staff	175 faculty/staff	4
	2.5% of visitors	30 visitors estimated	1
Total Short Term Spaces			45
Total Minimum Bicycle Parking			134
Minimum Bicycle Parking Based on BHS Bicycle Parking Demand Study			
Total Bicycle Parking	0.03 spaces per student	1,594 student capacity	48
Proposed Bicycle Parking			
Type	No. of Spaces		
Long Term (Enclosed)	80		
Short Term	56		
Total Bicycle Parking Proposed	136		

Department of Permitting and Inspections

Zoning Division
645 Pine Street
Burlington, VT 05401
www.burlingtonvt.gov/pz
Phone: (802) 865-7188
Fax: (802) 865-7195

William Ward, Director
Scott Gustin, AICP, CFM, Principal Planner
Mary O'Neil, AICP, Principal Planner
Ryan Morrison, Associate Planner
Joseph Cava, Planning Technician
Celeste Crowley, Permit Administrator
Theodore Miles, Zoning Specialist



MEMORANDUM

To: The Design Advisory Board
From: Mary O'Neil, AICP, Principal Planner
RE: ZP-22-528; 447 Main Street
Date: October 11, 2022

File: ZP-22-528
Location: 447 Main Street
Zone: RL **Ward:** 6S
Parking District: Neighborhood
Date application accepted: September 16, 2022
Applicant/ Owner: Marcus Gonzales, Ramsey/Gourd Architects / Jeremy Dressley and Jane Seymour, owners.
Request: Demolition of existing carriage house to construct a new accessory structure with an additional 335 square feet of living space with new 166 square foot patio. Both house and carriage barn are listed on the National Register of Historic Places within the University Green Historic District, as amended.



Background:

- **Zoning Permit 06-769FC;** installation of additional 6' high stockade fencing to match existing fencing. Installation of 3 gates, including a driveway gate. May 2006.
- **Non-applicability of Zoning Permit Requirements;** enclose outside entryway/porch. October 2004.
- **Zoning Permit HO-2001-010;** home occupation for antique shop. Approved by ZBA September 2000.
- **Zoning Permit 99-393;** rear two story addition over existing greenhouse foundation for the single family home. Proposal includes removing the existing aluminum siding (undovering/replacing wood clapboards), removal of the rear chimney and extending the existing shed dormer out onto the addition. March 1999.
- **Zoning Permit 99-249;** installation of 6' stockade style fencing along the side property line parallel to the existing single family home. November 1998.
- **Zoning Permit 95-071;** installation of a 4' and 6' high sections of solid picket style fencing to surround the existing rear yard of the single family home. Structure listed on the Burlington City Historic Sites survey. August 1994.

The programs and services of the City of Burlington are accessible to people with disabilities. For accessibility information call 865-7188 (for TTY users 865-7142).

- **Zoning Permit n.n.;** Use part of the house as an office for the practice of child psychiatry. Approved by ZBA August 1989.
- **ZBA review,** request to erect sign and allow for sample swatches of woolens as an agent for the Vermont Natives Industries of Bridgewater. Renovation of garage in rear for storage and display of woolens. (No additional documents attached.) Request dated January, 1955.

Overview: 447 Main Street is a single family home with a rear, detached barn that has been utilized as a garage. The Assessor's office indicates the upper floor is utilized as living space. The owners request demolition and replacement of the structure, continuing the existing expanded living area in the upper floor.

Part 1: Land Division Design Standards

Not applicable.

Part 2: Site Plan Design Standards

Sec. 6.2.2 Review Standards

(a)Protection of Important Natural Features:

The replacement building is in the same location as the existing. No important natural features have been identified.

(b) Topographical Alterations:

No topographical alterations are included in the proposal.

(c)Protection of Important Public Views:

There are no protected public views from or through this parcel. Not applicable.

(d) Protection of Important Cultural Resources:

Burlington's architectural and cultural heritage shall be protected through sensitive and respectful redevelopment, rehabilitation, and infill. Archeological sites likely to yield information important to the city's or the region's pre-history or history shall be evaluated, documented, and avoided whenever feasible. Where the proposed development involves sites listed or eligible for listing on a state or national register of historic places, the applicant shall meet the applicable development and design standards pursuant to Sec. 5.4.8(b).

See Section 5.4.8, below.

(e) Supporting the Use of Renewable Energy Resources:

No part of this application would preclude the use of solar, water, wind, geothermal, or other renewable energy resource.

(f) Brownfield Sites:

This address is not included on the Vermont Department of Environmental Conservation's Brownfield list.

(g) Provide for nature's events:

Special attention shall be accorded to stormwater runoff so that neighboring properties and/or the public stormwater drainage system are not adversely affected. All development and site disturbance shall follow applicable city and state erosion and stormwater management guidelines in accordance with the requirements of Art 5, Sec 5.5.3.

Design features which address the effects of rain, snow, and ice at building entrances, and to provisions for snow and ice removal or storage from circulation areas shall also be incorporated.

The pedestrian entry door remains on the west elevation, albeit more centered than the existing entry. Some modest canopy is recommended to shelter those entering or exiting from roof runoff and sliding snow off the metal roof.



(h) Building Location and Orientation:

The proposed replacement building is located in the same location as the existing barn, and addresses the streetfront in a similar manner.

(i) Vehicular Access:

Vehicular access will continue in the same alignment as existing; directly from Main Street via the existing curb cut.

(j) Pedestrian Access: This detached barn has direct access from the driveway paved area, which connects northward to Main Street and a public sidewalk.

(k) Accessibility for the Handicapped:

ADA accessibility is under the jurisdiction of Burlington's Building Official.

(l) Parking and Circulation:

No change is proposed to the parking plan or count. The first floor will continue to offer a single parking space; there is existing space to parking the additional vehicle within the driveway.

(m) Landscaping and Fences:

No new landscaping is included within the plan. There are existing fences along the perimeter of the property. A patio is included in the plan that has not been part of any previous site plan approval; the applicant shall provide a finalized site plan, with measurements, to confirm lot coverage and site features.

(n) Public Plazas and Open Space:

Not applicable.

(o) Outdoor Lighting:

Where exterior lighting is proposed the applicant shall meet the lighting performance standards as per Sec 5.5.2.

No light fixtures are depicted on building elevations. Lighting is recommended at the building pedestrian and garage entries, at the very least, to assure safety. If included, the applicant shall submit fixture and illumination information for staff review. All lighting shall be full-cutoff downlit fixtures.

(p) Integrate infrastructure into the design:

Exterior storage areas, machinery and equipment installations, service and loading areas, utility meters and structures, mailboxes, and similar accessory structures shall utilize setbacks, plantings, enclosures and other mitigation or screening methods to minimize their auditory and visual impact on the public street and neighboring properties to the extent practicable.

Utility and service enclosures and screening shall be coordinated with the design of the principal building, and should be grouped in a service court away from public view. On-site utilities shall be placed underground whenever practicable. Trash and recycling bins and dumpsters shall be located, within preferably, or behind buildings, enclosed on all four (4) sides to prevent blowing trash, and screened from public view.

Any development involving the installation of machinery or equipment which emits heat, vapor, fumes, vibration, or noise shall minimize, insofar as practicable, any adverse impact on neighboring properties and the environment pursuant to the requirements of Article 5, Part 4 Performance Standards.

There are no meters, mechanical equipment, condensing units, or similar features illustrated on building elevations or the site plan. If they are proposed for inclusion, they shall be appropriately

included on plans for assessment. Mechanical equipment must observe required setbacks. All new electrical connections shall be undergrounded.

Similarly, there are no dumpsters, recycling bins or trash containers. It may be assumed refuse will be stored within the garage; the applicant shall confirm.

Part 3: Architectural Design Standards

Sec. 6.3.2 Review Standards

(a)Relate development to its environment:

1. *Massing, Height and Scale:*

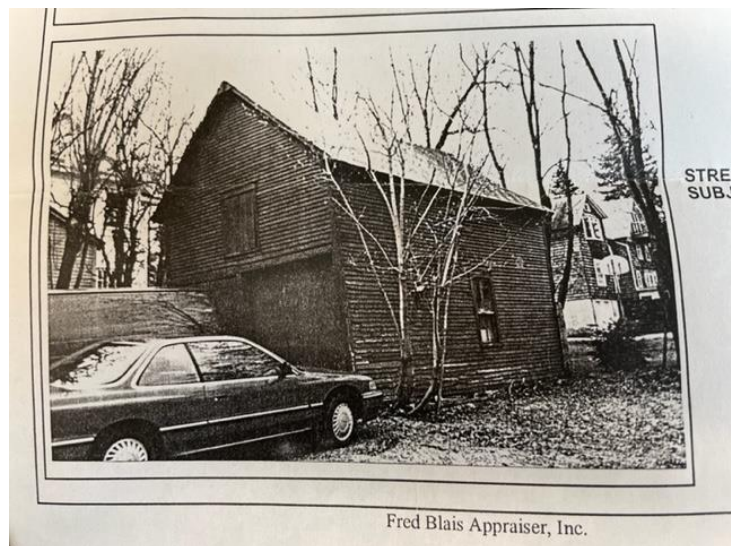
The replacement structure duplicates the height and volume of the existing structure, with the addition of a small shed-roofed addition to the west. In massing, height and scale, the proposed building relates to its environment.

2. *Roofs and Rooflines.*

The replacement building will continue the gable roof configuration, with the addition of a small dormer to the west. A skylight has been included on that same roofplane.

3. *Building Openings*

The sliding barn door enclosure will be replaced with a mahogany overhead door with the appearance of paired carriage house doors. Zoning files inform that the sliding glass door is a newer alteration, as a 1995 appraisal document shows a solid garage door. Pedestrian access is presented on the west elevation. Windows are similarly arranged, with the addition of a skylight and dormer sash on the westerly roof. The 8/12 windows on the 2nd floor north (primary) elevation are duplicated (although likely not original); the new windows on the west addition are proposed as 4/4 triple mulled sash. The 1998 appraisal photo shows a single 2/2 double hung, and no pedestrian door on the west.



(b) Protection of Important Architectural Resources:

Burlington's architectural and cultural heritage shall be protected through sensitive and respectful redevelopment, rehabilitation, and infill. Where the proposed development involves buildings listed or eligible for listing on a state or national register of historic places, the applicant shall meet the applicable development and design standards pursuant to Sec. 5.4.8. The introduction of new buildings to a historic district listed on a state or national register of historic places shall make every effort to be compatible with nearby historic buildings.

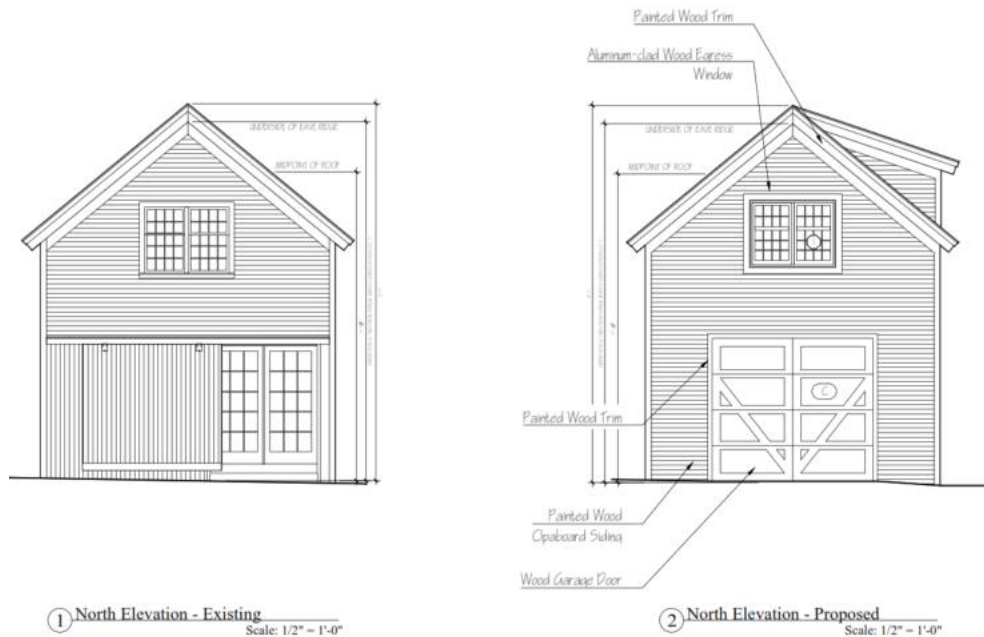
See Section 5.4.8.

(c) Protection of Important Public Views:

Not applicable.

(d) Provide an active and inviting street edge:

The replacement structure will present a similar appearance to the streetfront.



(e) Quality of materials:

All development shall maximize the use of highly durable building materials that extend the life cycle of the building, and reduce maintenance, waste, and environmental impacts. Such materials are particularly important in certain highly trafficked locations such as along major streets, sidewalks, loading areas, and driveways. Efforts to incorporate the use of recycled content materials and building materials and products that are extracted and/or manufactured within the region are highly encouraged.

Owners of historic structures are encouraged to consult with an architectural historian in order to determine the most appropriate repair, restoration or replacement of historic building materials as outlined by the requirements of Art 5, Sec. 5.4.8.

Painted wood clapboard siding, aluminum-clad wood windows, painted wood trim and a standing seam metal roof are proposed. All are considered durable for purposes of new construction.

(f) Reduce energy utilization:

The applicant will be required to submit a Residential Building Energy Standards form (RBES) for assurance of compliance with Vermont Residential Building Energy Standards.

(g) Make advertising features complementary to the site:

Not applicable.

(h) Integrate infrastructure into the building design:

See 6.2.2. (p), above.

(i) Make spaces secure and safe:

Development must conform to all applicable building and life safety codes as defined by Burlington's Building official.

Sec. 5.4.8 Historic Buildings and Sites

The City seeks to preserve, maintain, and enhance those aspects of the city having historical, architectural, archaeological, and cultural merit. Specifically, these regulations seek to achieve the following goals:

To preserve, maintain and enhance Burlington's historic character, scale, architectural integrity, and cultural resources;

To foster the preservation of Burlington's historic and cultural resources as part of an attractive, vibrant, and livable community in which to live, work and visit;

To promote a sense of community based on understanding the city's historic growth and development, and maintaining the city's sense of place by protecting its historic and cultural resources; and,

To promote the adaptive re-use of historic buildings and sites.

(a) Applicability:

These regulations shall apply to all buildings and sites in the city that are listed, or eligible for listing, on the State or National Register of Historic Places.

The carriage barn at 447 Main Street is a contributing resources within the University Green Historic District, as amended.

18a. Garage/ Carriage Barn, c.1915, Contributing building

Located in the rear yard of 447 Main Street is a wood-frame, 1.5-story, gable-front, former carriage house with raking eaves, which appears to have replaced an earlier outbuilding nearby. The clapboard building has two sliding wooden garage doors which extend across the first story of the north elevation facing the driveway and a paired, 8/12, double-hung sash window in the gable above. In 2005, the upper story of this building was converted into an accessory apartment.

(b) Standards and Guidelines:

The following development standards, following the Secretary of the Interior's Standards for the Treatment of Historic Properties, shall be used in the review of all applications involving historic buildings and sites subject to the provisions of this section and the requirements for Design Review in Art 3, Part 4. The Secretary of the Interior's Standards are basic principles created to help preserve the distinctive character of a historic building and its site. They are a series of concepts about maintaining, repairing and replacing historic features, as well as designing new additions or making alterations. These Standards are intended to be applied in a reasonable manner, taking into consideration economic and technical feasibility.

1. *A property will be used as it was historically or be given a new use that requires minimal change to its distinctive materials, features, spaces, and spatial relationships.*

The building will continue to serve as storage for vehicles, with the inclusion of some expanded living space on the upper floor. The applicant asserts this is not an accessory dwelling unit.

2. *The historic character of a property will be retained and preserved. The removal of distinctive materials or alteration of features, spaces, and spatial relationships that characterize a property will be avoided.*

The building is proposed to be located in the same location as the existing building. The replacement intentionally replicates the volume, location and appearance of the existing carriage barn.

3. *Each property will be recognized as a physical record of its time, place, and use. Changes that create a false sense of historical development, such as adding conjectural features or elements from other historic properties, will not be undertaken.*

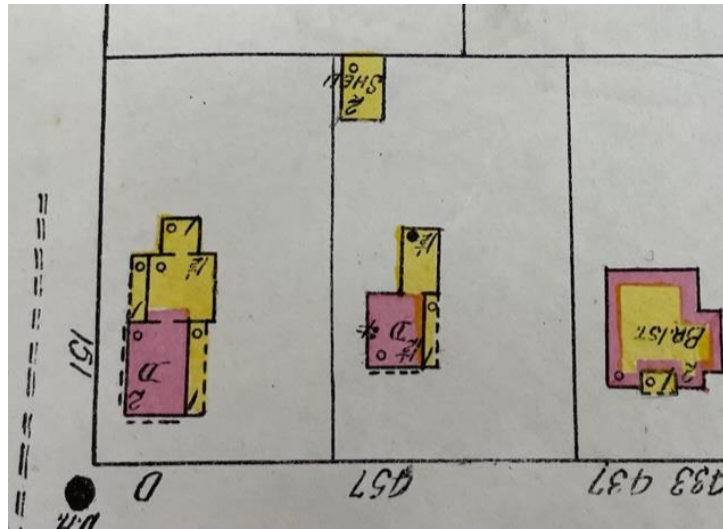
No conjectural features are proposed.

4. *Changes to a property that have acquired historic significance in their own right will be retained and preserved.*

None identified.

5. *Distinctive materials, features, finishes, and construction techniques or examples of craftsmanship that characterize a property will be preserved.*

The distinction of the carriage barn (identified as a *SHED* on the 1918 Sanborn Map of Burlington) is most likely its modest presence, as typically recognized on or near a property boundary and accessory to the existing residence. This application continues that site familiarity with service for vehicle storage and the addition of expanded habitable space.



1919 Sanborn Fire Insurance Map of Burlington (detail)

447 Main Street, center.

Subject building center top.

Note that street numbers have changed, as has the rear property boundary.

6. *Deteriorated historic features will be repaired rather than replaced. Where the severity of deterioration requires replacement of a distinctive feature, the new feature will match the old in design, color, texture, and, where possible, materials recognizing that new technologies may provide an appropriate alternative in order to adapt to ever changing conditions and provide for an efficient contemporary use. Replacement of missing features will be substantiated by documentary and physical evidence.*

The application is not intended to repair or replace historic materials and features, but build a replacement building of similar massing and location.

7. *Chemical or physical treatments, if appropriate, will be undertaken using the gentlest means possible. Treatments that cause damage to historic materials will not be used.*

Demolition is always the most extreme of physical treatments. Reconstruction is proposed.

8. *Archeological resources will be protected and preserved in place. If such resources must be disturbed, mitigation measures will be undertaken.*

There are no known archaeological resources on site. If redevelopment results in discovery, appropriate authorities will be notified for assessment, evaluation, and appropriate treatment.

9. *New additions, exterior alterations, or related new construction will not destroy historic materials, features, and spatial relationships that characterize the property. The new work shall be differentiated from the old and will be compatible with the historic materials, features, size, scale, and proportion, and massing to protect the integrity of the property and its environment.*

While the application proposes removal of a historic feature of the property, a replacement building of similar massing and site placement is included.

10. *New additions and adjacent or related new construction will be undertaken in such a manner that, if removed in the future, the essential form and integrity of the historic property and its environment would be unimpaired.*

The carriage barn is a secondary structure on this parcel. While removal and redevelopment will alter the essential integrity of a contributing structure on the lot, the principal structure will remain unchanged. The significant form and integrity of the overall environment will be altered, but not totally impaired.

Items for the Board's consideration:

- The applicant shall provide a finalized site plan, with measurements, to confirm lot coverage and site features.
- If demolition and redevelopment is supported, the applicant shall provide photographic documentation of existing conditions for the zoning record.
- All materials shall be so disposed in a safe and legal manner, utilizing best practices for lead and other hazard abatement.
- There are no identified zoning permits on file for the creation of an Accessory Dwelling Unit, or habitable space in the barn. It is unknown whether the 2001 permit for the Antique Shop use included conversion to habitable space. If the 2nd floor conditioned space in the barn is intended to be a separate living unit, the request shall be included in the zoning application. All conditions of ADUs will apply.
- There shall be no expansion of the existing non-conformity (building location, height or setback) in replacement of the building.



Street Address: **447 Main Street, Burlington VT 05401**
Tax Parcel ID: **050-3-014-000**
Zoning District: **Residential - Low Density**
Land Use: **R1 - Single Family**

	Existing	Proposed	Pursuant to Code (article 4.4.5-3)
Lot Area:	19,417 SF	19,417 SF	19,417 SF
Lot Frontage:	102'	102'	102'
Lot Width:	102'	102'	102'
Lot Depth:	204'	204'	204'
Lot Coverage (Structure and Driveway):	29.2%	31%	35%
Lot Coverage (Walkways and Patios):	5.1%	5.1%	

Total Lot Coverage: **34.3%** **34.3%** **35% (Max. Allowable Impervious + 10% Bonus For Patios)**

Impervious Surface Coverage:

Principal			
Structure:	3,189 sf	3,189 SF	
Accessry Bldg:	384 sf	384 sf	
Driveway:	~2,100 sf	~2,100 sf	
Walkways and Patios:	997 sf	997 sf	1,942 sf
Total:	6,670 sf	6,670 sf	8,738 sf (Max. 35% + 10%)

Set Backs (principal structure):

North:	44'	44'	25'
South:	62'	62'	25% of lot
East:	17'	17'	10% of Width or 5'
West:	51'	51'	10% of Width or 5'

Set Backs (accessory structure/garage):

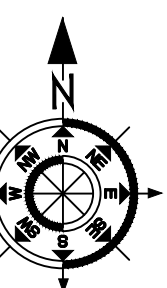
North:	143'-8'	143'-8'	25'
South:	~3'-0 1/2"	to match ex.	25% of lot
East:	~3'-3"	to match ex.	10% of W. or 5'
West:	66'	to match ex.	10% of W. or 5'

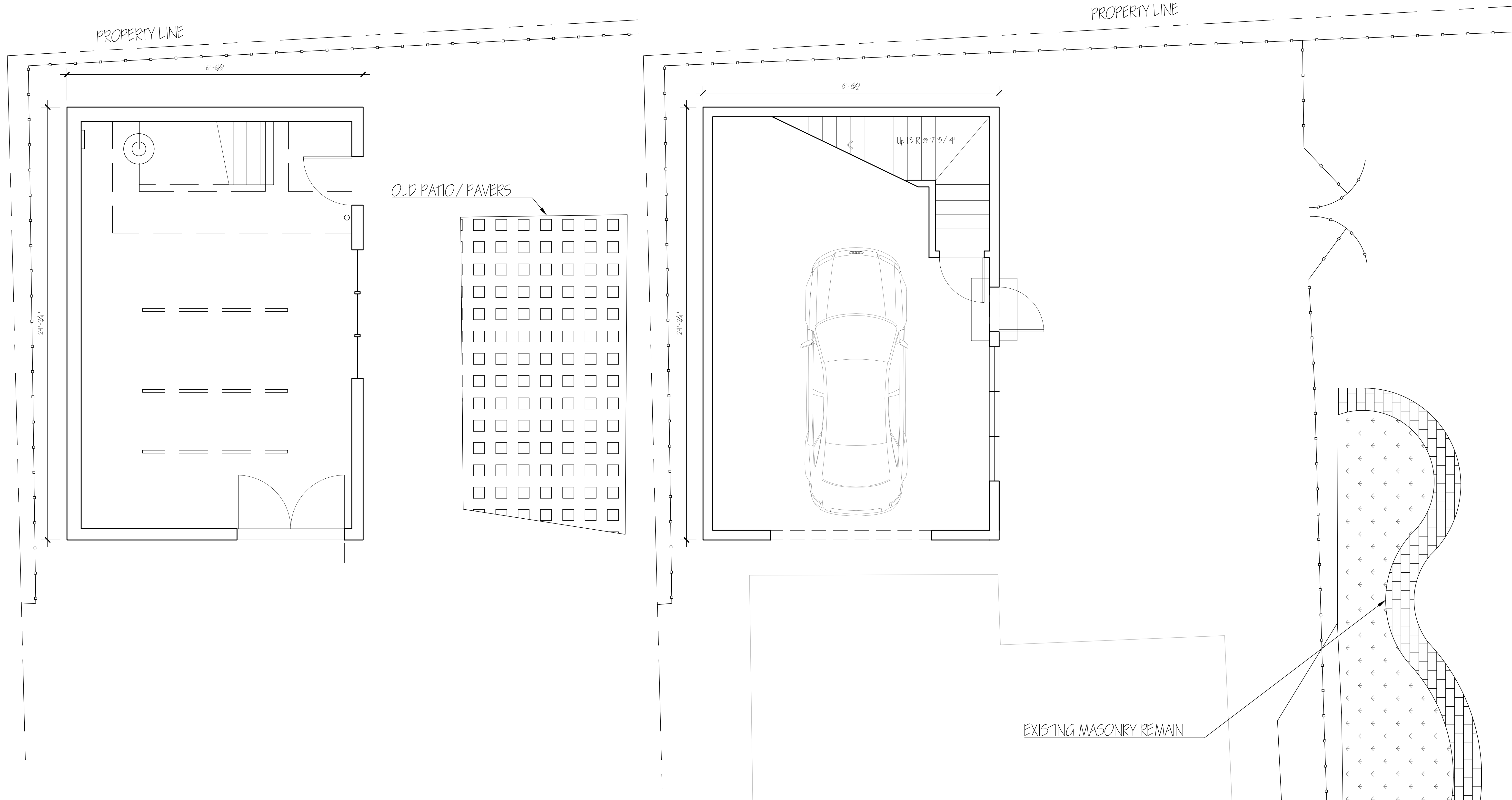
Accessory Structure:

Height (to mid point of roof per article 5.2.6 point "a"):	17'-3 1/2"	17'-3 1/2"	35'
Stories:	1 1/2	1 1/2	2 1/2

Gar. Width:	16'-6"	16'-6"	
Gar. Length:	24'-2"	24'-2"	
Distance from Principal Bldg:	34'	34'	

Within 200' of another municipality? **No**
Adjacent to County road? **No**
Adjacent to State road? **No**
Conforming Use? **Yes**





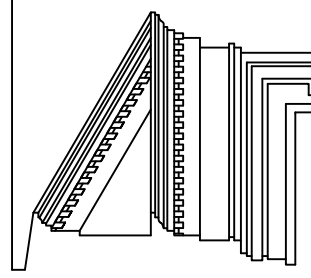
1 First Floor Plan - Existing
Scale: 3/8" = 1'-0"

2 First Floor Plan - Proposed
Scale: 3/8" = 1'-0"

Revisions:

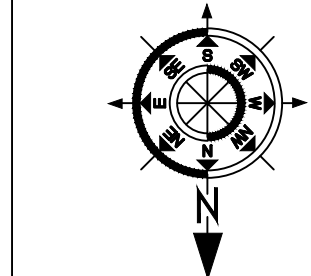
Drawn By:
Date: 11 October 2022

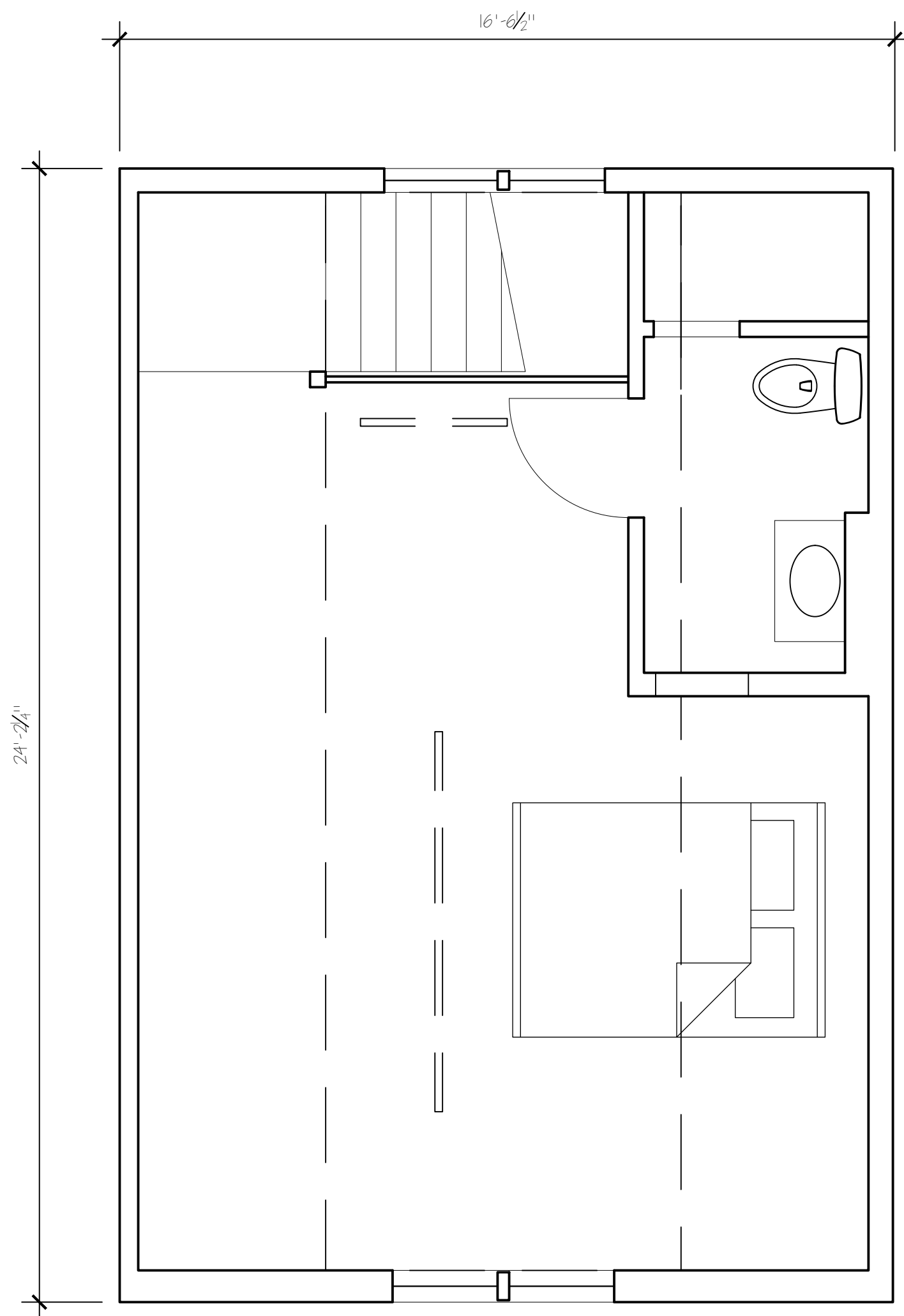
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Floor Plans

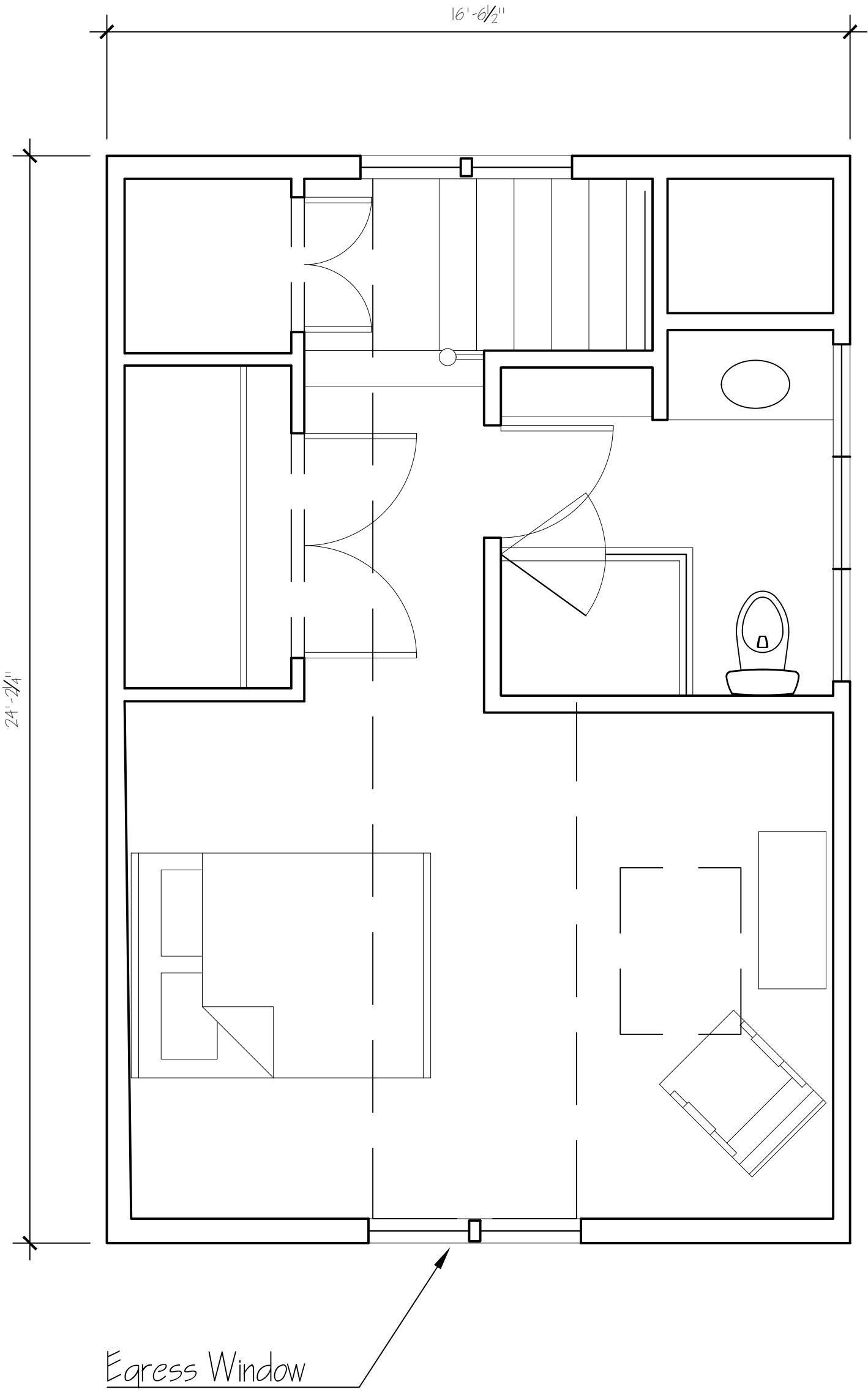
A-1.1





③ Second Floor Plan - Existing

Scale: 3/8" = 1'-0"



④ Second Floor Plan - Proposed

Scale: 3/8" = 1'-0"

Revisions:

Drawn By:
Date: 11 October 2022

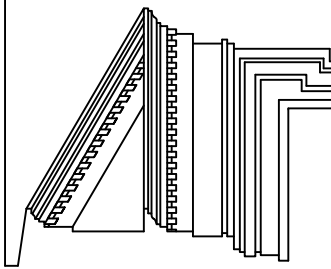
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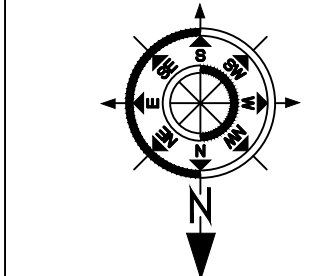
Burlington, VT

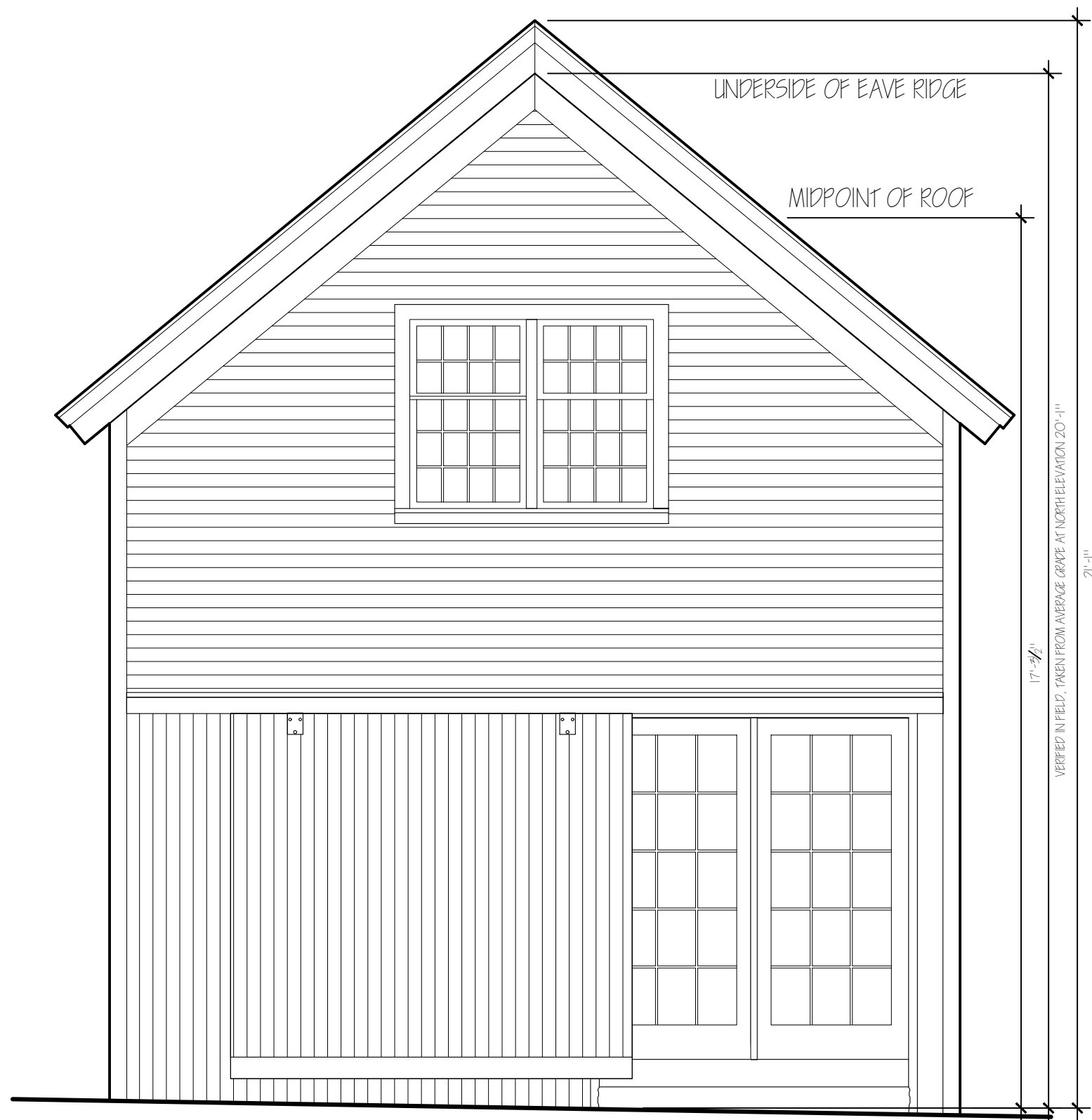
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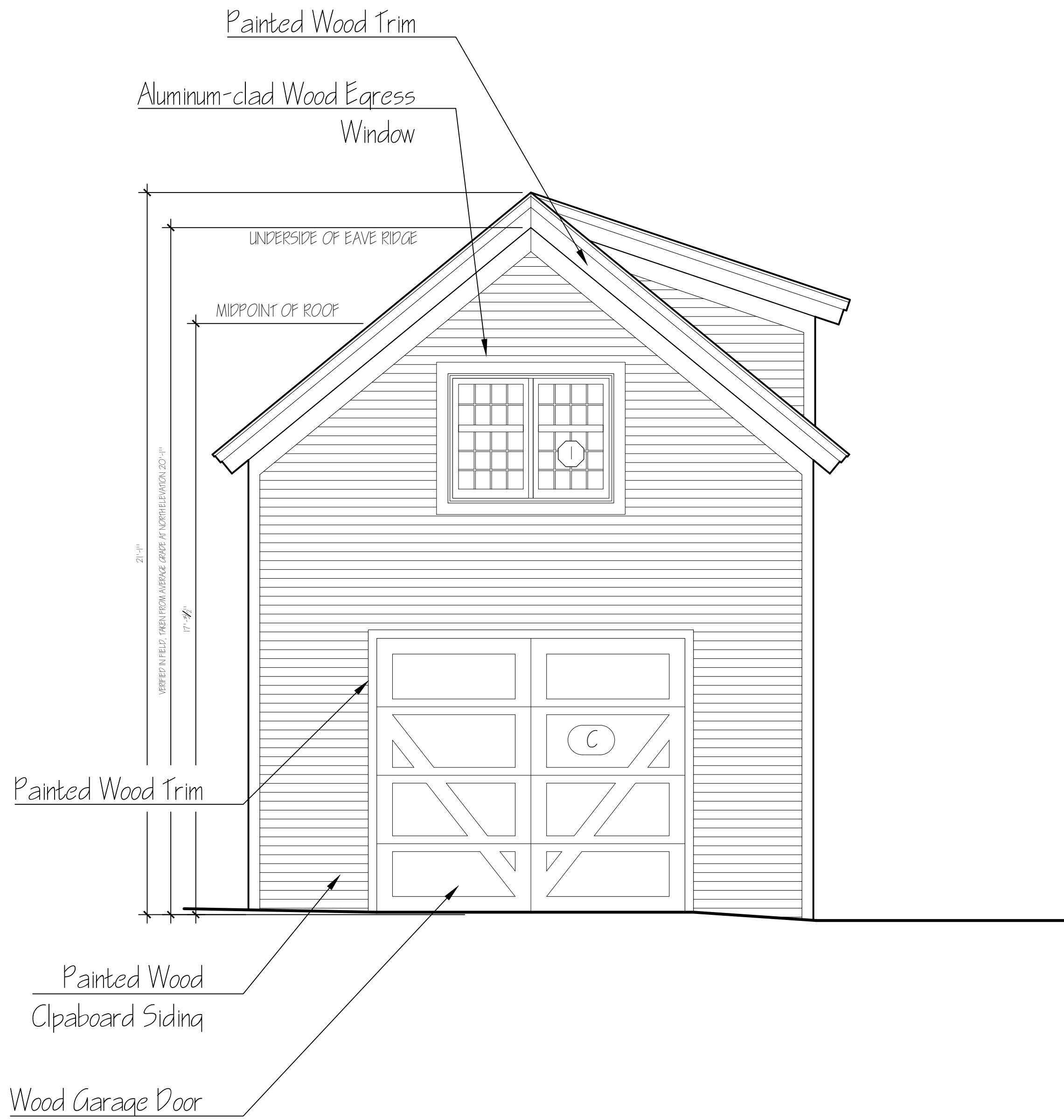
Floor Plans

A-1.2





① North Elevation - Existing
Scale: 1/2" = 1'-0"

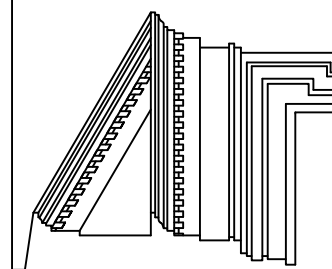


② North Elevation - Proposed
Scale: 1/2" = 1'-0"

Revisions:

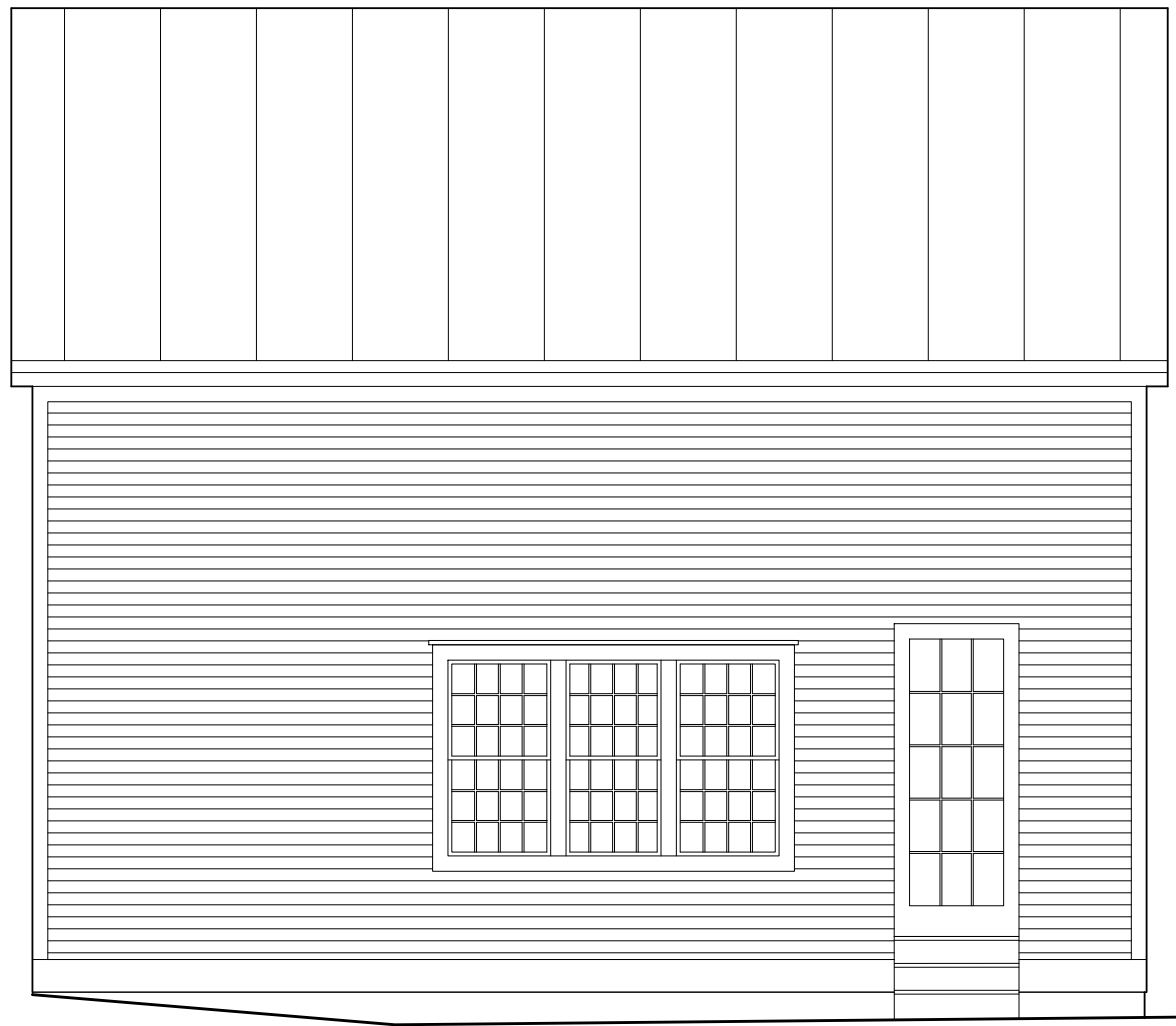
Drawn By:
Date: 11 October 2022

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Exterior Elevation

A-2.1



① West Elevation - Existing

Scale: 1/2" = 1'-0"



② West Elevation - Proposed

Scale: 1/2" = 1'-0"

Revisions:

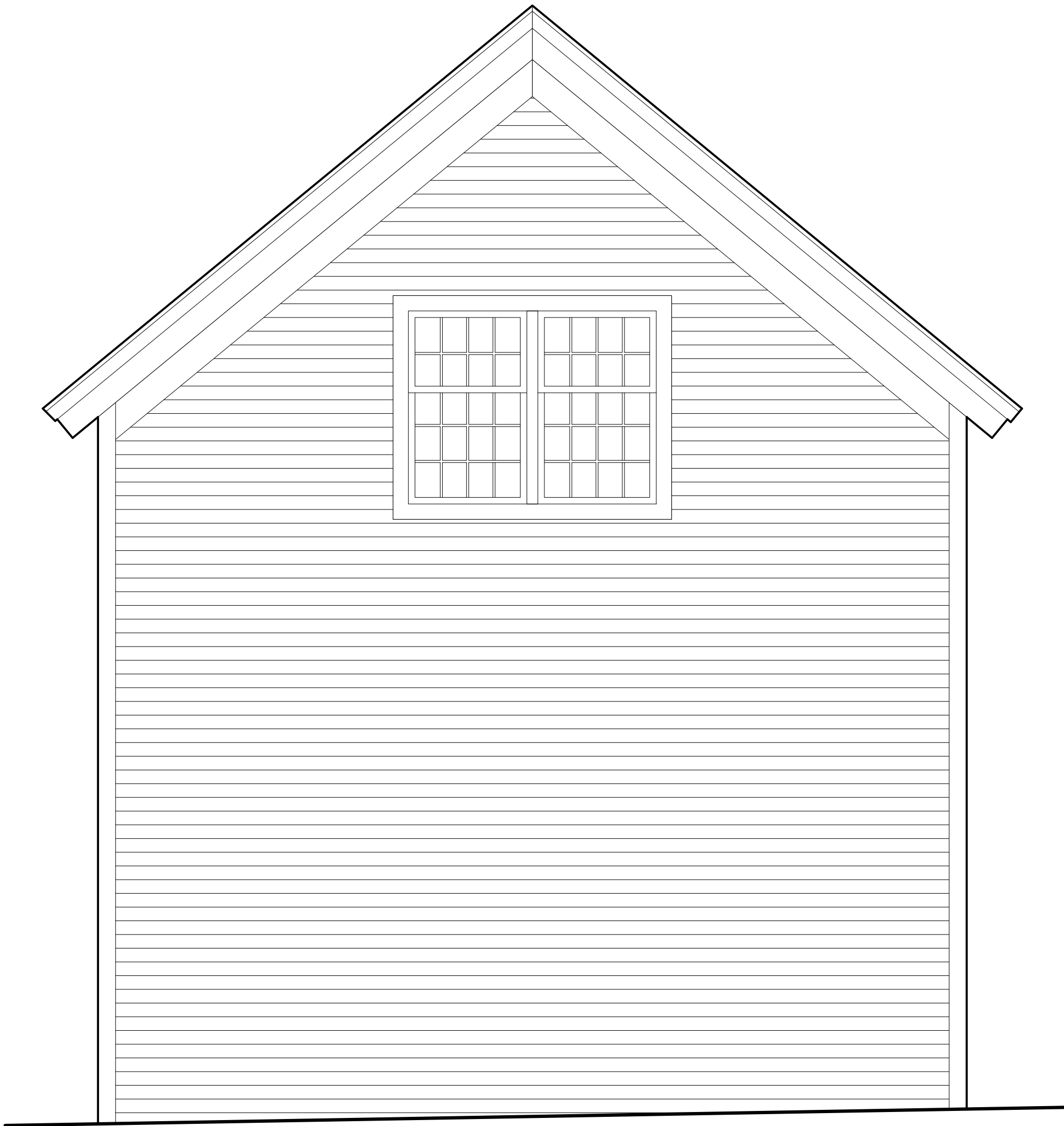
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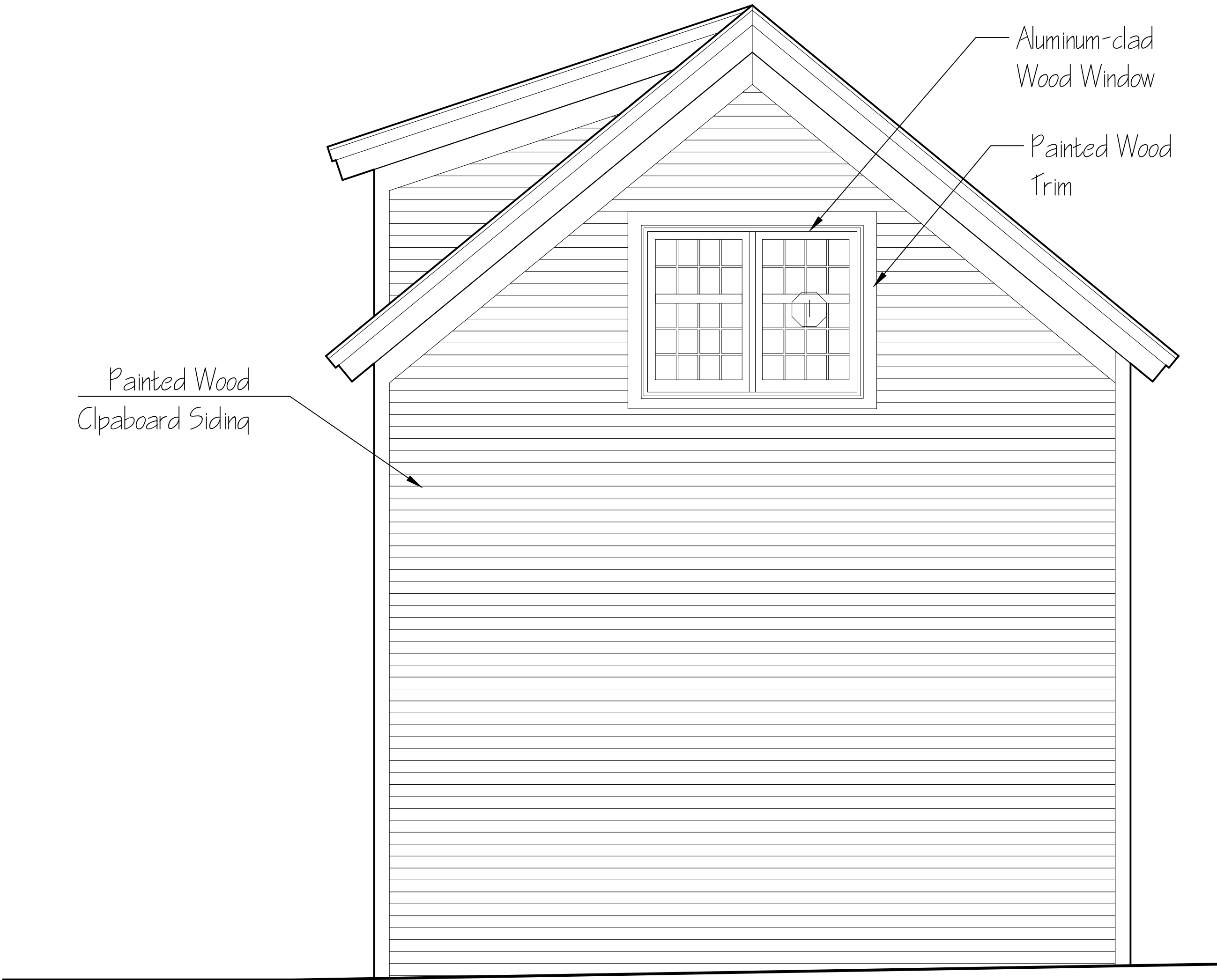
Exterior

A-2



① South Elevation - Existing

Scale: 1/2" = 1'-0"



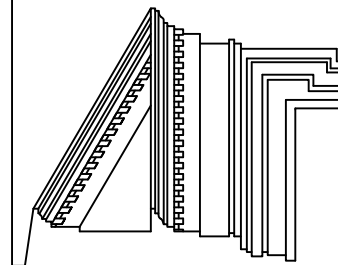
② South Elevation - Proposed

Scale: 1/2" = 1'-0"

Revisions:

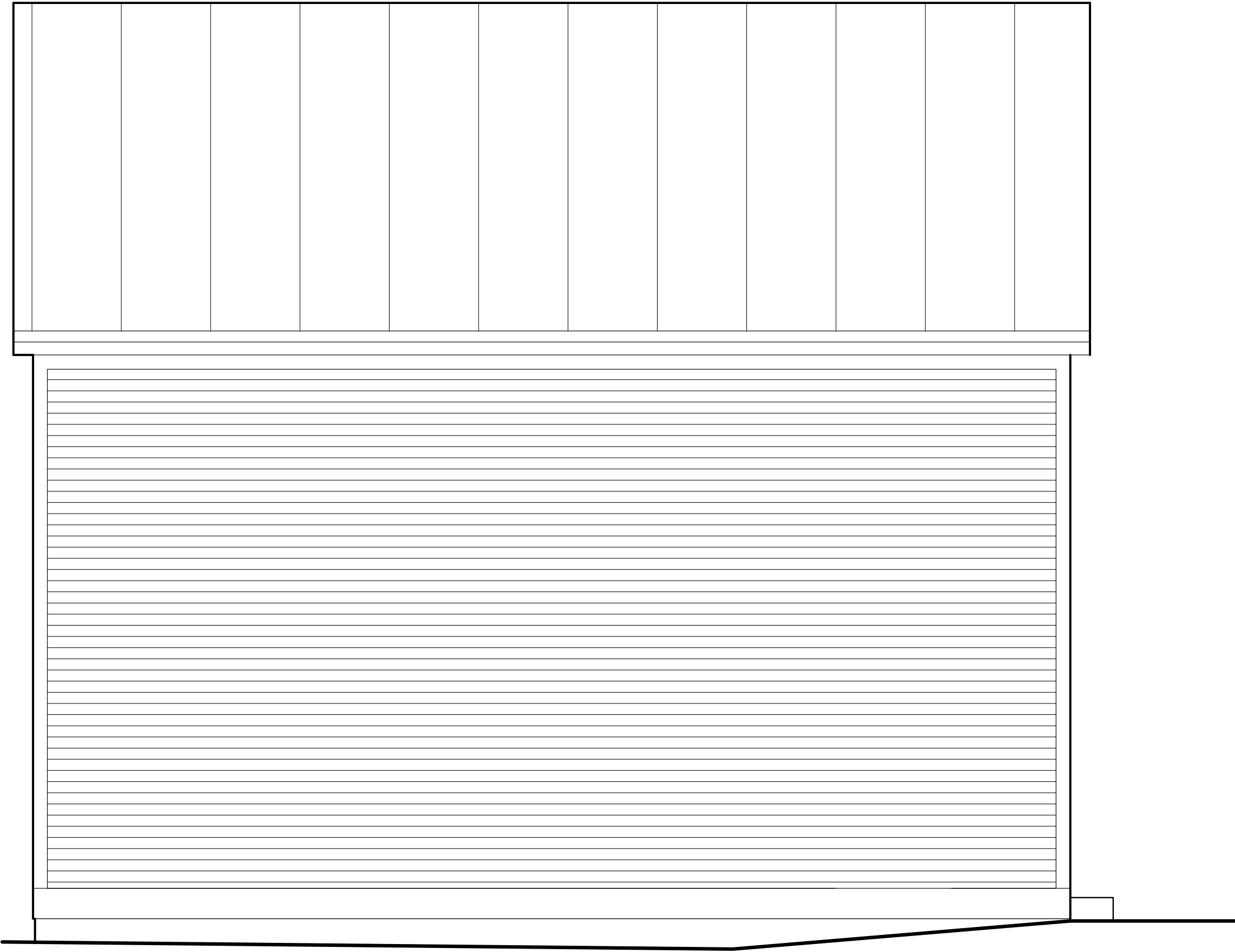
Drawn By:
Date: 11 October 2022

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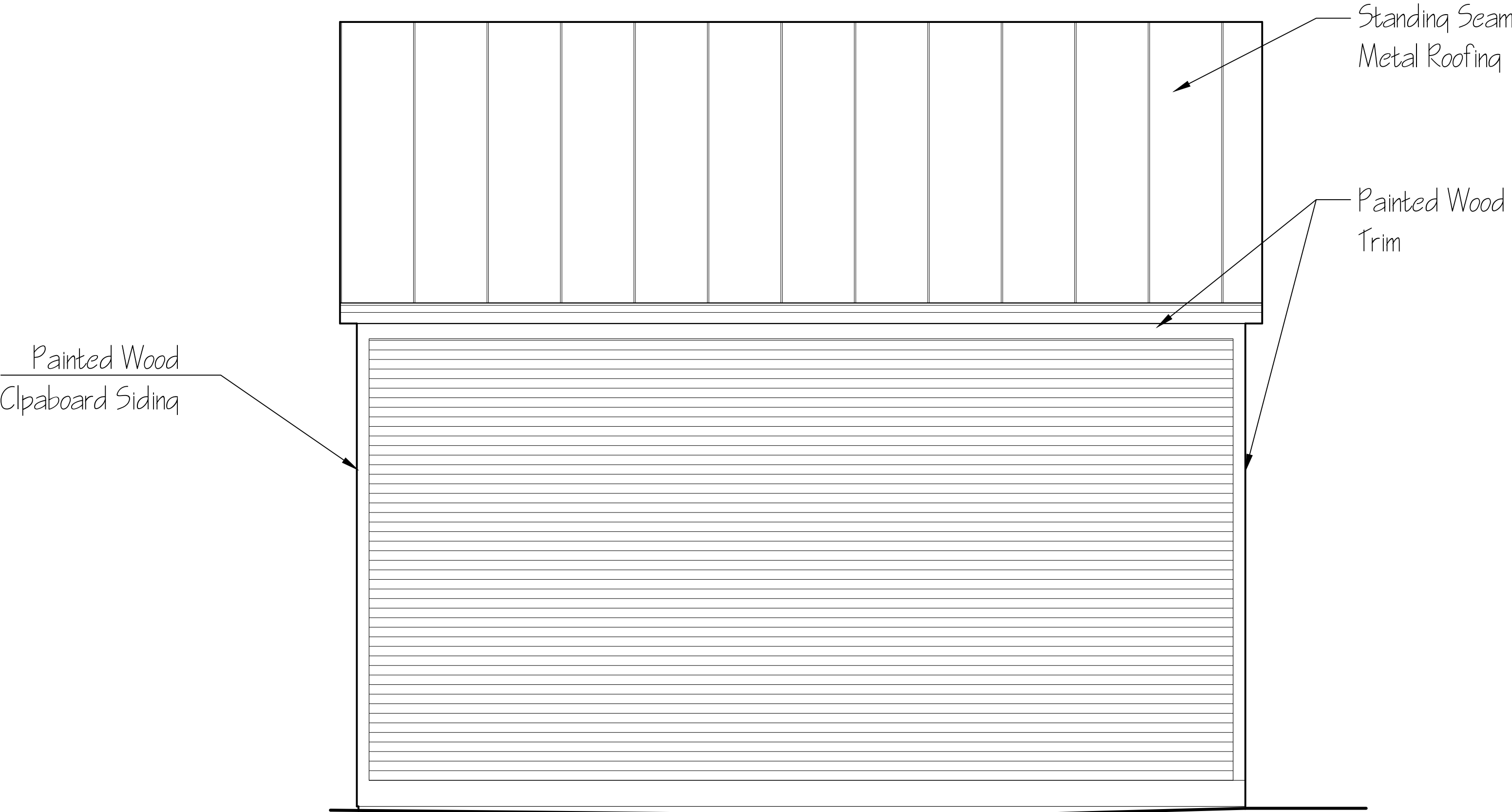
Exterior Elevation

A-2.3



① East Elevation - Existing

Scale: 1/2" = 1'-0"



② East Elevation - Proposed

Scale: 1/2" = 1'-0"

Revisions:

Drawn By:
Date: 11 October 2022

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Burlington, VT

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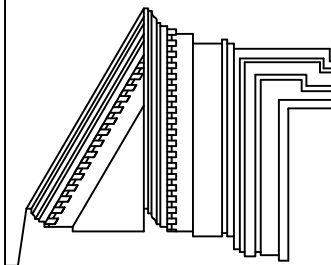
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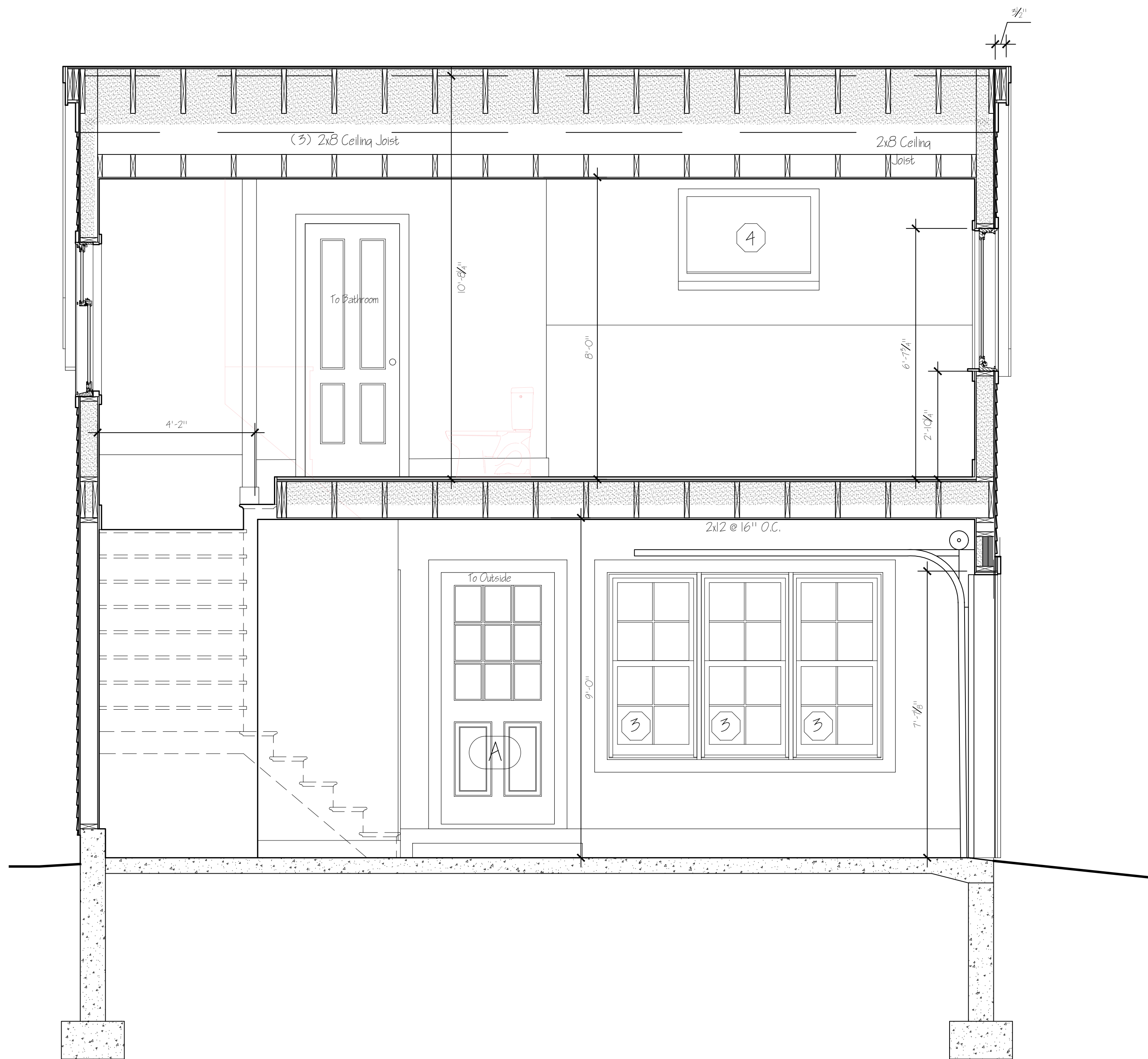
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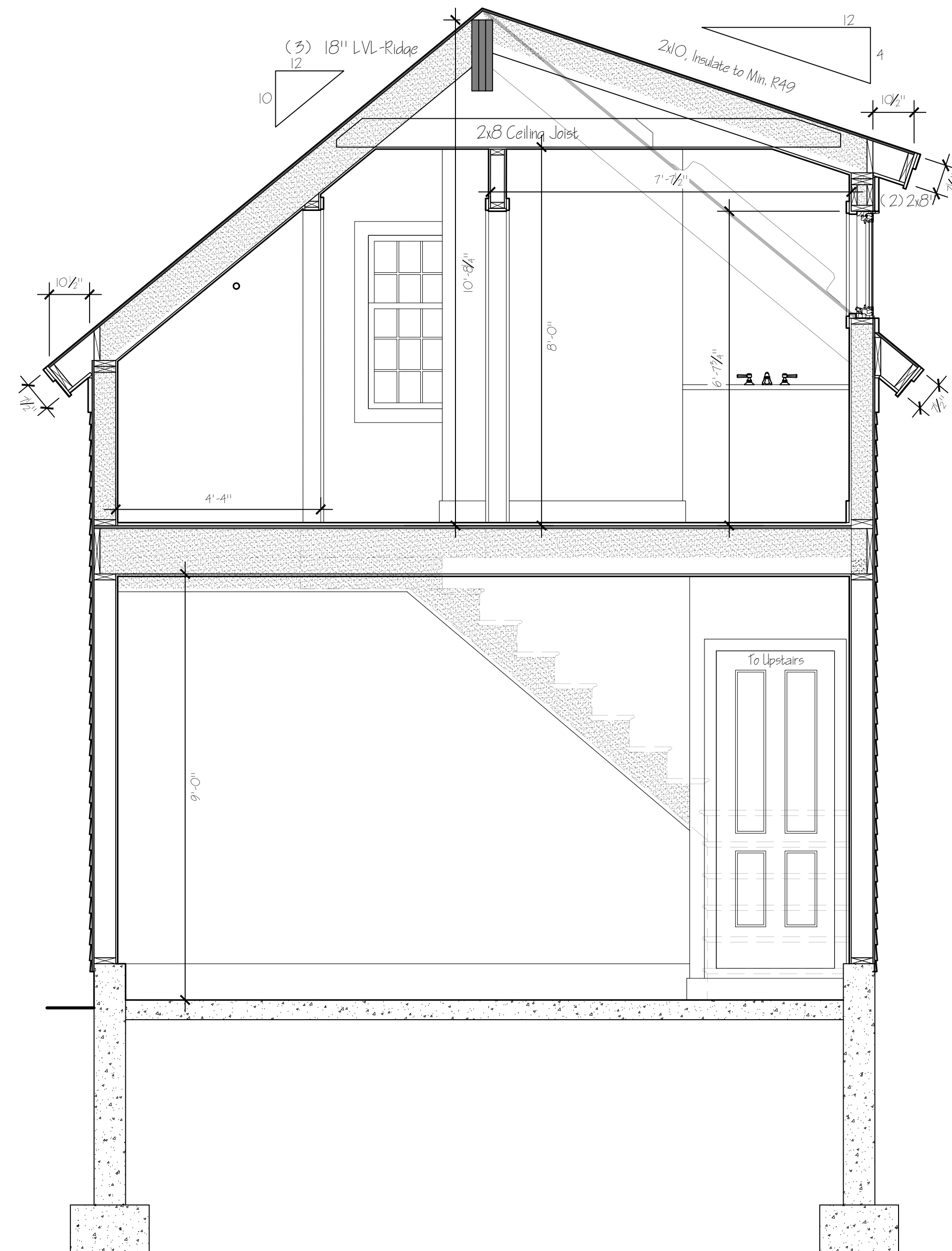
Exterior Elevation

A-2.4



1 Building Section

Scale: 1/2" = 1'-0"



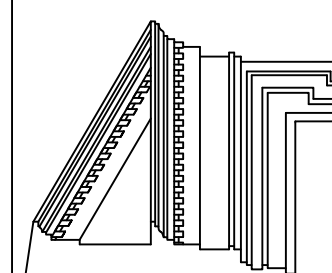
2 Building Section

Scale: 1/2" = 1'-0"

Revisions:

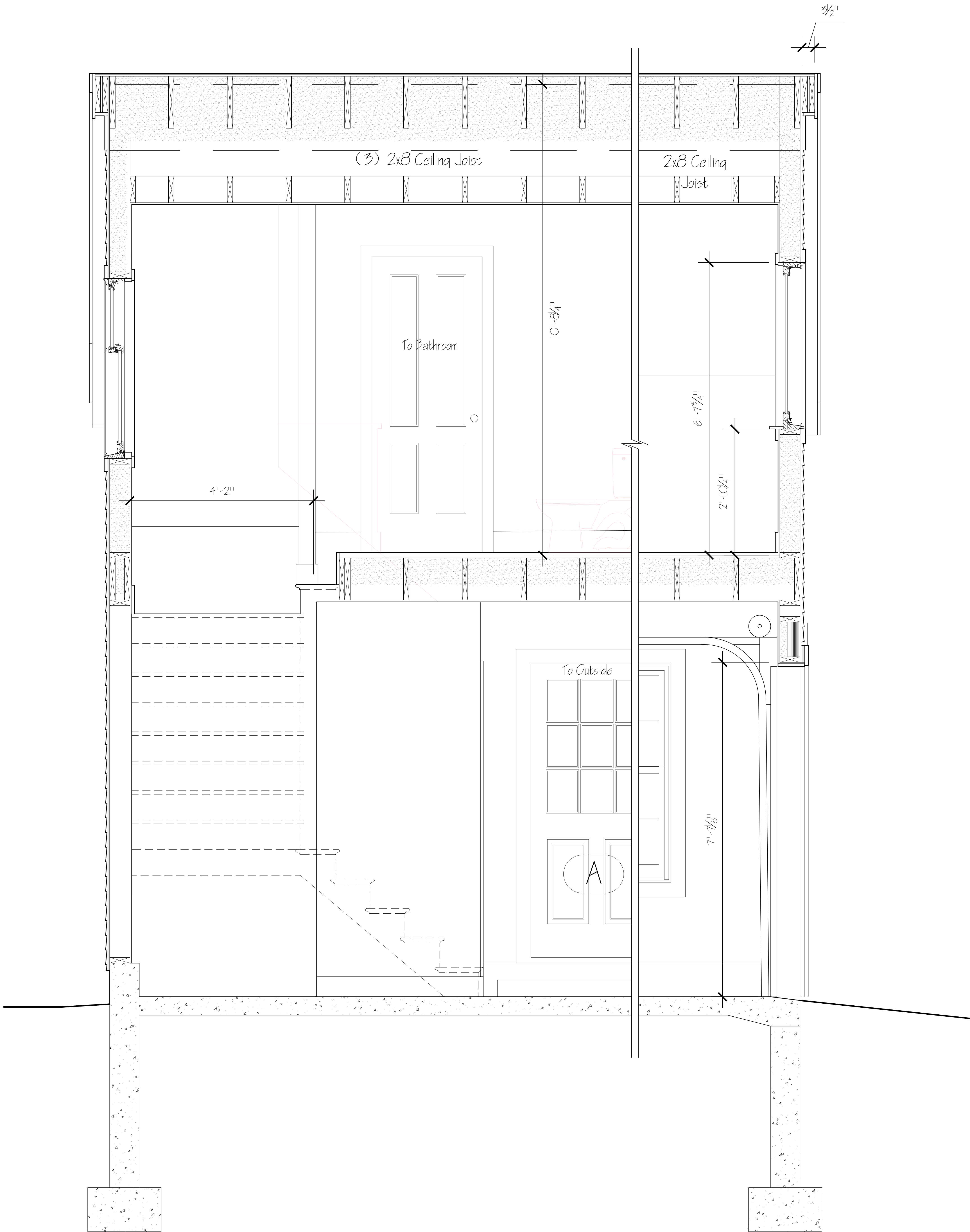
Drawn By:
Date: 11 October 2022

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Sections

A-3.1

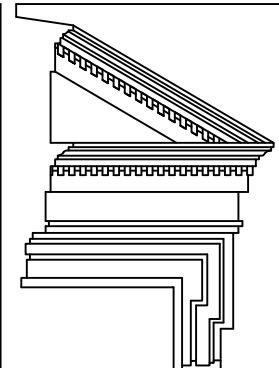


1 Building Section

Scale: 1" = 1'-0"

A-3.2

Sections



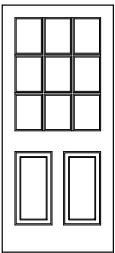
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Drawn By:
Date: 11 October 2022

Revisions:

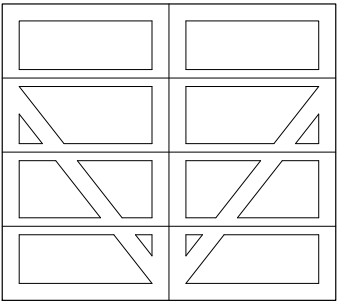
DOOR SCHEDULE

Notes: - 7/8" SDL w/ spacer bar, Dual Pane, Low-E2.



A

QTY: 1
3'0" x 6'8" DOOR
SIMPSON OR SIM.
INSWING
RO. 3'-2" X 6'-9 1/2"
NOTES:
simspon 944 TRADITIONAL SASH



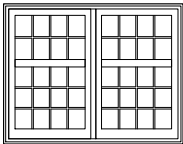
C

QTY: 1
8'0" x 9'0" OVERHEAD DOOR
WOOD - MAHOGANY
RO. 8'-0" X 9'-0"
NOTES:

WINDOW SCHEDULE

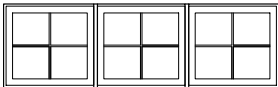
Notes: MARVIN ULTIMATE --

7/8" SDL w/ spacer bar, Dual Pane, Low-E2.



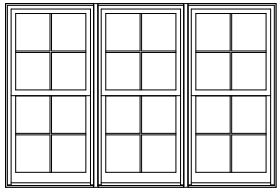
1

QTY: 4
MARVIN ULTIMATE
UPCAI
2-WIDE IN-SWING CASEMENT
RO. 4'-11" X 3'9 7/8"



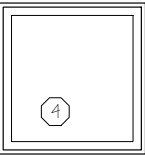
2

QTY: 3
MARVIN ULTIMATE
LAWN3028
3-WIDE AWNING
RO. 7'-6 1/8" X 2'-3 5/8"



3

QTY: 3
MARVIN ULTIMATE
LDHG2 2426
DOUBLE HUNG
RO. 7'-3 7/8" X 5'-0"



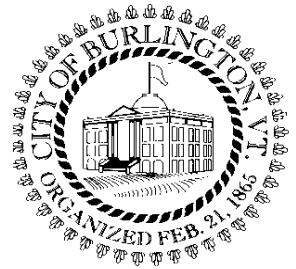
4

QTY: 1
VELUX MANUAL SKYLIGHT (VS) DECK
MOUNTED
506
MANUAL OPERATION
RO. 44 1/4" X 45 3/4"

Department of Permitting and Inspections

Zoning Division
645 Pine Street
Burlington, VT 05401
www.burlingtonvt.gov/pz
Phone: (802) 865-7188
Fax: (802) 865-7195

*William Ward, Director
Scott Gustin, AICP, CFM, Principal Planner
Mary O'Neil, AICP, Principal Planner
Ryan Morrison, Associate Planner
Joseph Cava, Planning Technician
Celeste Crowley, Permit Administrator
Theodore Miles, Zoning Specialist
Charlene Orton, DPI Administrator*



MEMORANDUM

To: The Design Advisory Board
From: Mary O'Neil, AICP, Principal Planner
RE: ZP22-466; 187 South Champlain Street
Date: October 25, 2022

File: ZP-22-466

Location: 187 South Champlain Street

Zone: FD5 **Ward:** 5S

Parking District: Mixed Use Multi Modal

Date application accepted: August 11, 2022 (incomplete)

Applicant/ Owner: Max Madalinski, Burlington Parks, Recreation and Waterfront Department / City of Burlington

Request: Renovations to City Pocket Park. Includes: replacement and relocation of playground, installation of park light and associated electrical, installation of tables/benches/bike racks, grading, and construction of a concrete walkway and seating area.

Background:

- **Zoning Permit 98-429;** Improvements to existing park including play equipment, lighting, benches, etc. April 1998.

Overview:

187 South Champlain Street is within Form District 5, and identified as a Civic site. Article 6 does not apply; rather **Sections 14.3.6 – G Pocket Park** and **14.7.1(f)** of Article 14 (Form Code.)

Article 5: Citywide General Regulations

Section 5.2.1 Existing Small Lots.

187 South Champlain Street is an existing lot. The 1919 Sanborn Map illustrates a single parcel (included 189-191 South Champlain Street) with three residential dwellings and a large concrete and iron-clad outbuilding. By the 1930s, the single dwelling at 187 South Champlain Street was a duplex, and the rear outbuilding was gone. The 1952 Sanborn Map shows the duplex at 187-189 removed, and a playground area is identified in the rear of the lot.

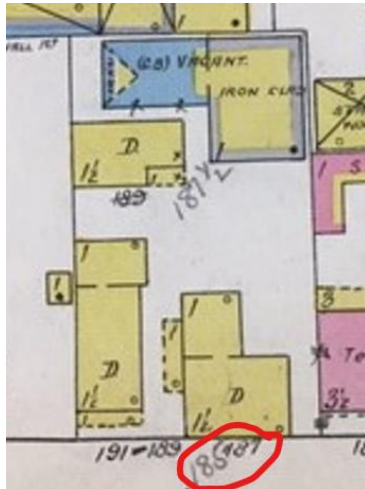
Section 5.2.2 Required Frontage or Access

187 South Champlain Street has direct access to the public way and city sidewalks.

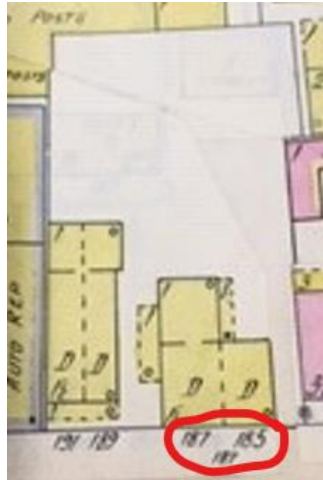
Section 5.2.3 Lot Coverage Requirements

See Section 14.3.6. (b), Civic Spaces.

The programs and services of the City of Burlington are accessible to people with disabilities. For accessibility information call 865-7188 (for TTY users 865-7142).



Sanborn map 1919



June 1930



July 1952

Section 5.2.4 Buildable Area Calculation

Not applicable.

Section 5.2.5 Setbacks

See Section 14.3.6.G.

Section 5.2.6 Building Height Limits

No buildings are proposed. Not applicable.

Section 5.2.7 Density and Intensity of Development Calculations

Not applicable.

Part 3: Non Conformities

Not applicable.

Sec. 5.4.8 Historic Buildings and Sites

Not applicable

Section 5.5.1 Nuisance Regulations

As City property, parcel upkeep and monitoring will be consistent with other public parks.

Section 5.5.2 Outdoor Lighting

Lighting may not exceed 0.1 footcandles measured 20' beyond the property line. The applicant has provided a revised photometric that assures compliance.

Section 5.5.3 Stormwater and Erosion Control

If the installation of the stone base/rubberized playground surface will disrupt more than 400 sf, an EPSC will be required with approval by the Stormwater Team prior to issuance of a zoning permit.

Section 5.5.4 Tree Removal

Not applicable.

Article 14: Plan BTV Downtown Code

Section 14.3.6 Civic Spaces

(a) Purpose & Applicability

The purpose of this subsection is to provide a diverse palette of parks and other publicly accessible Civic Spaces for use within the Form Districts as essential components of walkable urban environments and vibrant community centers. The standards established in this Subsection shall be applicable to the development all proposed Civic Spaces within a Form District either independent from or in combination with other forms of development, and shall be considered independent from the standards found within each Form District.

Civic Spaces established in this subsection are intended to be created independent from or in combination with other Civic Space Types and/or Building Types. The process regarding the review of newly proposed, or alteration to existing, Civic Spaces shall be as provided in Section 14.7.1 f).

(b) Civic Space Types:

- i. **Location:** *The Form District(s) in which the Civic Space type is allowed.*
- ii. **Size:** *The range of allowed sizes of the Civic Space type.*
- iii. **Frontage:** *The relationship along property lines of a Civic Space to Adjacent Buildings or Lots. The front of the Lots attached to or across a Thoroughfare from a Civic Space should face on to the Civic Space to the maximum extent possible.*
 - A. **Building.** *Lots that are attached to or across a thoroughfare from a Civic Space listed as having a “Building” frontage shall have the front of the Lot Facing on to the Civic Space for a minimum of three quarters of the Civic Space perimeter.*
 - B. **Independent.** *Lots that are attached to or across a Thoroughfare from Civic Space listed as having an “Independent” frontage may have the front, side street, or rear of the Lot facing on to the Civic Space.*
- iv. **Form.** *The placement and Disposition of objects within the Civic Space.*
 - A. **Natural.** *Civic Spaces with a “Natural” character are designed in a natural manner with no formal arrangement of elements.*
 - B. **Formal.** *Civic Spaces with a “Formal” character have a more rigid layout that follows geometric forms and has Trees and other elements arranged in formal patterns.*
 - C. **Informal.** *Civic Spaces with an “informal” character have a mix of both Formal and Natural characteristics.*
- v. **Coverage.** *The allowed proportion of Impervious Surface within the Civic Space type.*

- vi. **Typical Facilities:** A list of the typical facilities found within the Civic Space. This list is not intended to be a complete list of facilities allowed nor is it intended that every Civic Space would contain each of the facilities listed. Where allowed, Buildings, Structures, and commercial concessions within a Civic Space Type shall be Accessory to the overall Civic or recreational function of the Civic Space type. Any commercial concessions shall require a license approved by the Parks, Recreation and Waterfront Director or the City Council as applicable.

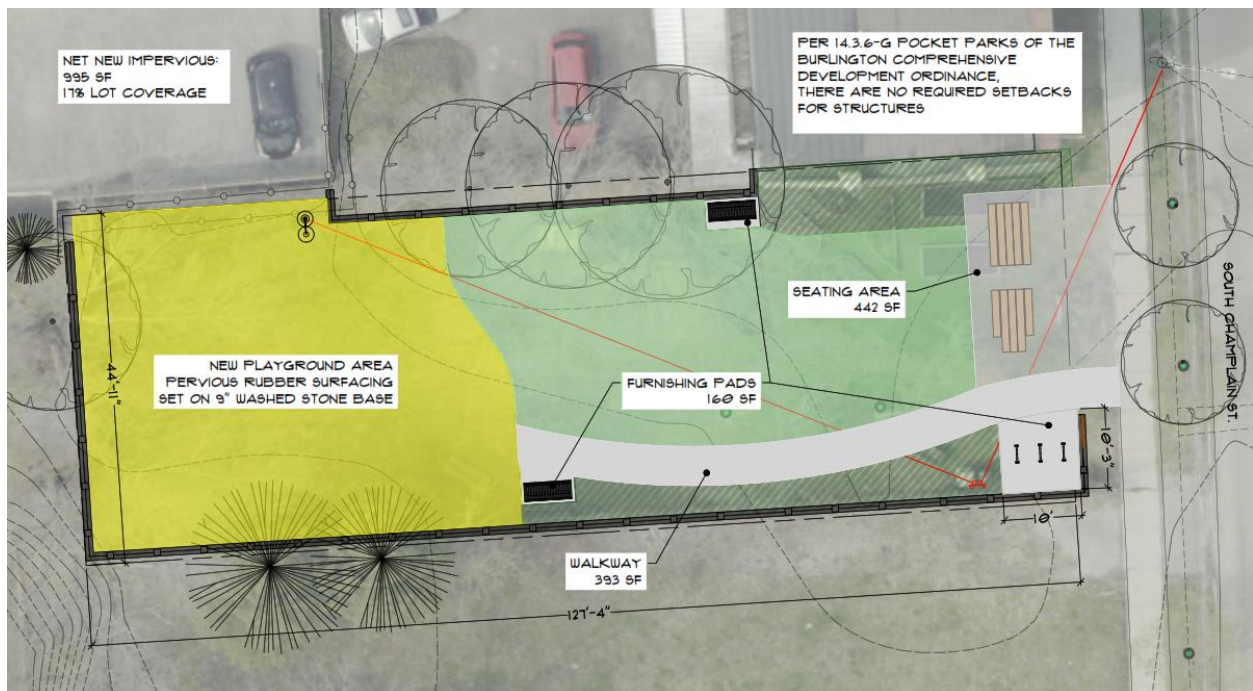
14.3.6-G Pocket Park

Intent: a small, predominantly green Open Space available for unstructured passive recreation.

Specifications:

Form District FD5, FD6 (FD5)
Size 500 sf minimum, 0.5 acre maximum (5,835 sf)
Frontage Independent (faces South Champlain Street)
Character Formal

There are existing trees within the green belt, and along the abutting property to the north. The improvements will include a gently arcing walkway from an aggregate-surfaced seating area to the playground at the rear of the lot.



Coverage 0% minimum – 50% maximum (17% reported. Rubberized surface over washed stone considered pervious by Stormwater Program.)
Structures 600 sf maximum in aggregate (no structures other than seating area: 442 sf)
Setback for Structures none

Section 14.7.1 Applying for a Zoning Permit: Submission Requirements and Review
f) Review and Approval of Civic Spaces and Civic Buildings.

The creation of new Civic Spaces or Civic Buildings, or the Substantial Modification¹ of an existing Civic Space or Civic Building, shall follow the process as defined below. Any other proposed alteration to an existing Civic Space or Civic Building shall be reviewed and approved by the Administrative officer who shall ensure ongoing compliance with the intent and standards of this Chapter as applicable.

Because of their important civic nature and public use, the design and form of a new or Substantial Modified Civic Space or Civic Building shall be determined after:

- *Pre-application review and consultation with the departments of City Planning, Permitting and Inspections, Community and Economic Development, and Parks, Recreation and Waterfront;*

Consultation with the Departments of Permitting and Inspections (8.17.2022) CEDO (9.22.2022), Parks, Recreation and Waterfront (applicant team); confirmation by email of consultation with the Office of City Planning (rec'd 10.14.2022.)

- *A pre-application Neighborhood Public Meeting pursuant to Section 3.2.1 (d) of the BCDO;*

The application includes confirmation of NPA attendance as follows:

NPA Wards 2-3	October 14, 2021 and May 12, 2022
NPA Ward 5	October 21, 2021 and April 19 or 21, 2022
NPA Ward 6	October 7, 2021 and May 5, 2022.

- *Review and recommendation of the Design Advisory Board; and*
- *Final review and approval by the Development Review Board.*

In its discretion to approve a new Civic Space or Civic Building, the Development Review Board, after a Public Hearing, shall consider and reach an affirmative finding on each of the following:

- Conformance with the adopted land use and development plans for the area as identified in the Municipal Development Plan;*
- Consistency with:*
 - The purpose of this ordinance;*
 - The intent of the Form District where the project is located;*
 - The purpose of Civic Spaces generally; and*
 - The intent of the Civic Space Type being proposed; and*
- That the proposed Civic Space or Civic Building as designed provides a positive public benefit and enhancement to the community and the context within which it is proposed.*

¹ Section 14.8: Glossary

Substantial Modification: Any demolition, deconstruction, relocation, rehabilitation, or redevelopment of an existing Building, Structure, Frontage, Development, Improvement, Site, Lot or other appurtenance thereto that, as determined by the Zoning Administrative Officer:

1. Exceeds fifty percent (50%) or more of the pre-development assessed value of the Structure or Building;
2. Involves an improvement or modification of fifty percent (50%) or more of the Lot Area exclusive of any Building or Structure; or;
3. Modifies thirty percent (30%) or more of the Building Façade located within the maximum required Front Setback.

Burlington Design Advisory Board

Department of Permitting and Inspections

645 Pine Street

Burlington, VT 05401

<http://www.burlingtonvt.gov/DPI/Boards/Design-Advisory-Board/>

Telephone: (802) 865-7188

Ron Wanamaker

Emily Morse

Jack Qualey

Gabriel Stadecker

Jay White

Kathleen Ryan, Alternate

Michael Alvanos, Alternate



DESIGN ADVISORY BOARD Tuesday October 25, 2022; 3:00 PM

Minutes

Present: Ron Wanamaker, Jay White, Jack Qualey, Gabe Stadecker (remote)

Absent: Emily Morse, Kathleen Ryan (alternate), and Michael Alvanos (alternate)

Staff present: Mary O'Neil

Guests: Max Madalinski (remote), Jesse Beck, Lyle Smith, Randy Burnett, Brian Leet, Ramsey Gould and Marcus Gonzales, Jane Seymour/Jeremy Dressler (remote) and Sharon Bushor (remote.)

Agenda

Session I – 3:00 PM – 3:30 PM

ZP-22-466; 187 South Champlain Street (CIVIC, Ward 5S) City DPW

Parks and Recreation Department / Max Madalinski

Renovations to City Pocket Park including replacement and relocation of playground with associated grading, installation of park lighting with associated electrical, installation of tables, benches, and bike racks, and construction of concrete walkway and seating area. (Project Manager, Mary O'Neil)

Motion by Jay White to approve application with the following recommendations:

Soften the edges of the playground as described by applicant; work with neighbor to the west.

2nd – Jack Qualey

Vote 4-0.

Motion carries.

Session II – 3:30 PM – 4:00 PM

ZP-22-546; 52 Institute Road (RCO-RG, Ward 4N) City School Department

/ Joe Weith

Demolish and remediate existing high school and construct new 250,000 square foot high school/technical center. (Project Manager, Mary O'Neil)

Motion by Jack Qualey to recommend approval and forward to the Development Review Board.

2nd – Jay White.

Vote 3-0-1 (Gabe Stadecker abstains)

Motion carries.

Session III – 4:00 PM – 4:30 PM

ZP-22-528; 447 Main Street (RL, Ward 6S) Jeremy Dressler & Jane Seymour / Marcus Gonzalez

Proposed demolition of existing carriage house to construct a new accessory structure. (Project Manager, Mary O'Neil)

RW recuses from this review.

Motion by Jay White to table application, and request the following in a revised submission:

- Carefully drawn details – corner boards drawn traditionally.
- capture historic proportions, correct details.

2nd – Jack Qualey

Vote 3-0

Motion carries.

Adjournment: 4:40 PM