

Department of Permitting & Inspections

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TO: Development Review Board
FROM: Scott Gustin
DATE: November 15, 2022
RE: ZAP-22-4; 89 Chestnut Terrace

The matter subject to this appeal has been resolved, and the appeal has been withdrawn.



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

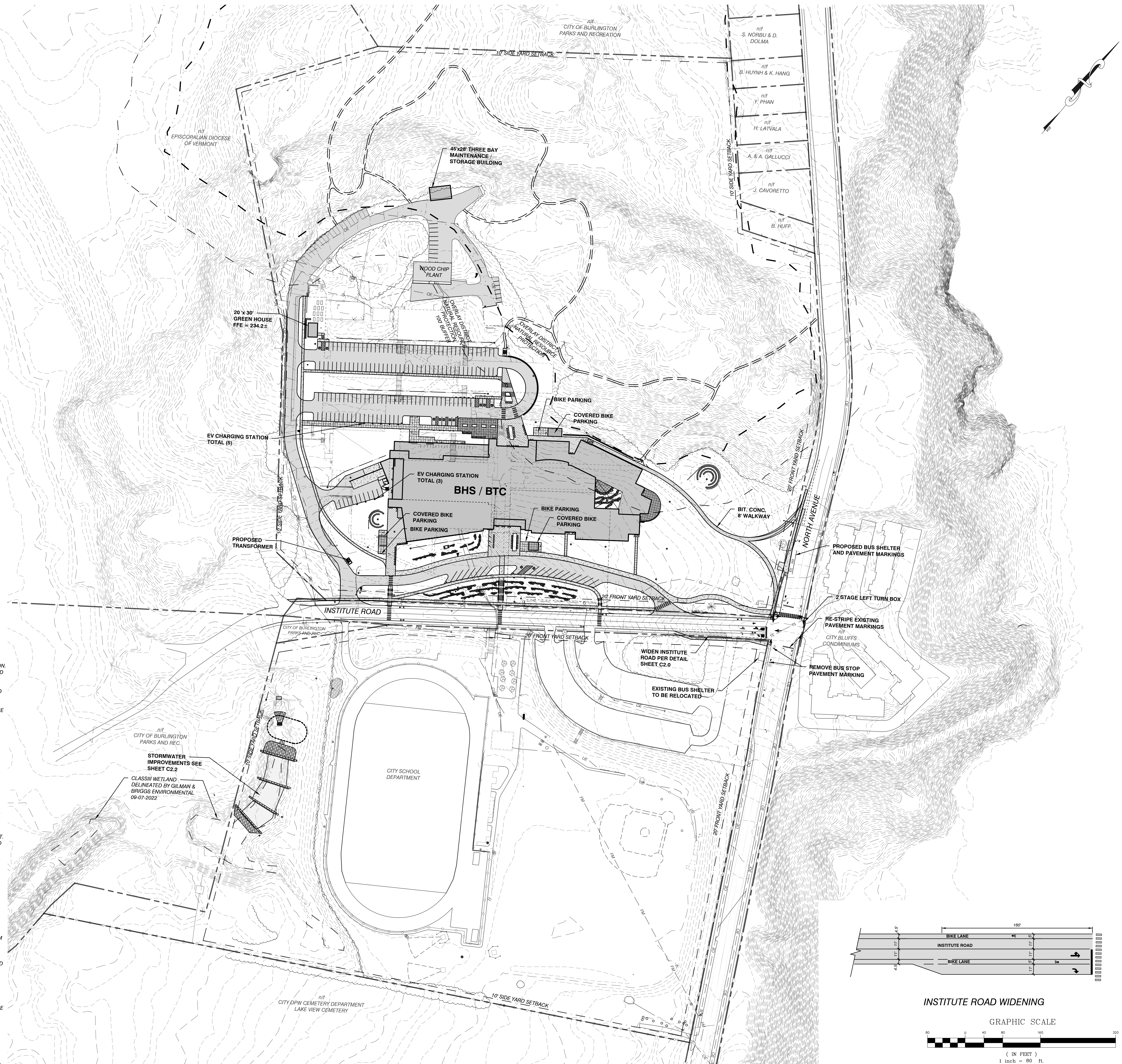
will continue to refine and optimize energy and materials performance throughout the design and construction process.

---	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 FORMEAIN
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
100	PROJECT BENCHMARK
---	PROPOSED CONTOUR
---	PROPOSED CURB
---	PROPOSED GRAVEL
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⊠	PROPOSED CATCH BASIN
⊙	PROPOSED YARD DRAIN
⊗	PROPOSED HYDRANT
⊙	PROPOSED SHUT OFF
⊕	PROPOSED SIGN

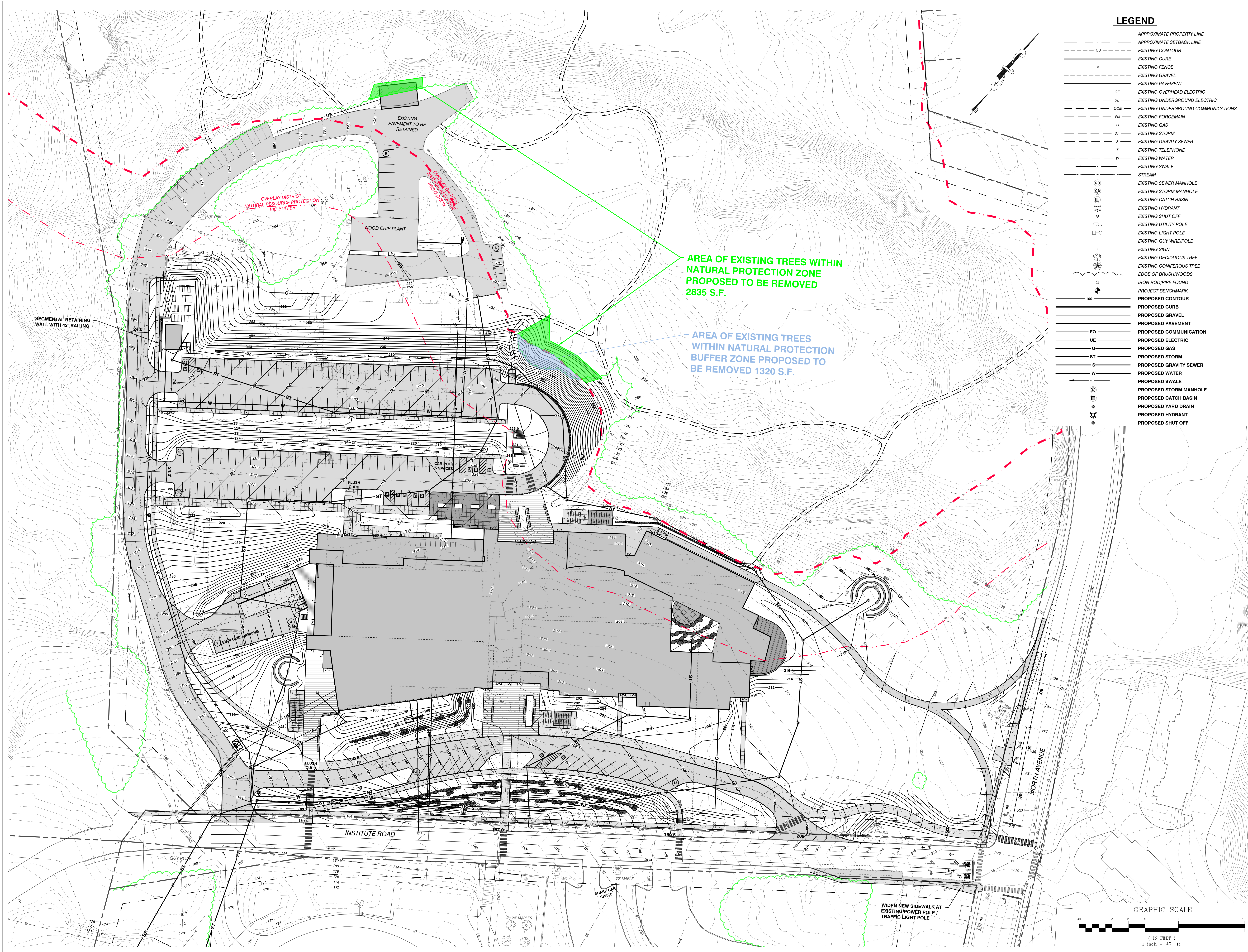
ZONING DISTRICT: INSTITUTIONAL DISTRICT

CATEGORY	REQUIRED	EXISTING	PROPOSED
PARCEL		48.7± AC. 2,121,372± S.F.	48.7± AC. 2,121,372± S.F.
SETBACK			
FRONT YARD NORTH AVE. INSTITUTE RD.	20'	570'± 131'±	318' 124'
SIDE YARD WEST NORTH	10'	11'± 455'±	60'± 293±
LOT COVERAGE	60% MAX.	27%	27%

- 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 RISE UP THE UTILITY LOCATIONS. 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.
2. ALL EXISTING UTILITIES NOT INCORPORATED INTO THE FINAL DESIGN SHALL BE REMOVED OR ABANDONED AS INDICATED ON THE PLANS OR DIRECTED BY THE ENGINEER.
3. 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.
4. THE CONTRACTOR SHALL REPAIR/RESTORE ALL DISTURBED AREAS (ON OR OFF THE SITE) AS A DIRECT OR INDIRECT RESULT OF THE CONSTRUCTION.
5. ALL GRASSED AREAS SHALL BE MAINTAINED UNTIL FULL VEGETATION IS ESTABLISHED.
6. MAINTAIN ALL TREES OUTSIDE OF CONSTRUCTION LIMITS.
7. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL WORK NECESSARY FOR COMPLETE AND OPERABLE FACILITIES AND UTILITIES.
8. 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.
9. IN ADDITION TO THE REQUIREMENTS SET IN THESE PLANS AND SPECIFICATIONS, THE CONTRACTOR SHALL COMPLETE THE WORK IN ACCORDANCE WITH A PERMIT CONDITIONS AND ANY LOCAL PUBLIC WORKS STANDARDS.
10. 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.
11. ANY DOWATERING NECESSARY FOR THE COMPLETION OF THE SITEWORK SHALL BE CONSIDERED AS PART OF THE CONTRACT AND SHALL BE THE CONTRACTOR'S RESPONSIBILITY.
12. THE CONTRACTOR SHALL COORDINATE ALL WORK WITHIN TOWN ROAD R.O.W. WITH TOWN AUTHORITIES.
13. THE CONTRACTOR SHALL INSTALL THE ELECTRICAL, CABLE AND TELEPHONE SERVICES IN ACCORDANCE WITH THE UTILITY COMPANIES REQUIREMENTS.
14. EXISTING PAVEMENT AND TRUNK STUMPS TO BE REMOVED SHALL BE DISPOSED OF AT AN APPROVED OFF-SITE LOCATION. ALL PAVEMENT CUTS SHALL BE MADE WITH A PAVEMENT SAW.
15. 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.
16. 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.
17. IF THE BUILDING IS TO BE SPRINKLERED, BACKFLOW PREVENTION SHALL BE PROVIDED IN ACCORDANCE WITH A PFA 4.1. THE CONTRACTOR SHALL LOCATE THE WATER LINE TO TWO FEET ABOVE THE FINISHED FLOOR. SEE MECHANICAL PLANS FOR RISER DETAIL.
18. THE CONTRACTOR IS RESPONSIBLE FOR OBTAINING TESTING AND INSPECTION SERVICES INDICATED IN THE CONTRACT DOCUMENTS, TYPICAL FOR CONCRETE AND SOIL TESTING.
19. 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.
20. 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.



man French Freeman



SCHEMATIC
DESIGN

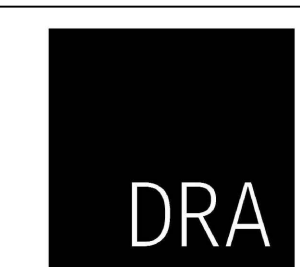
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BURLINGTON
HIGH SCHOOL
&
BURLINGTON
TECHNICAL
CENTER

BURLINGTON, VT

FF PROJECT NO: 21255

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

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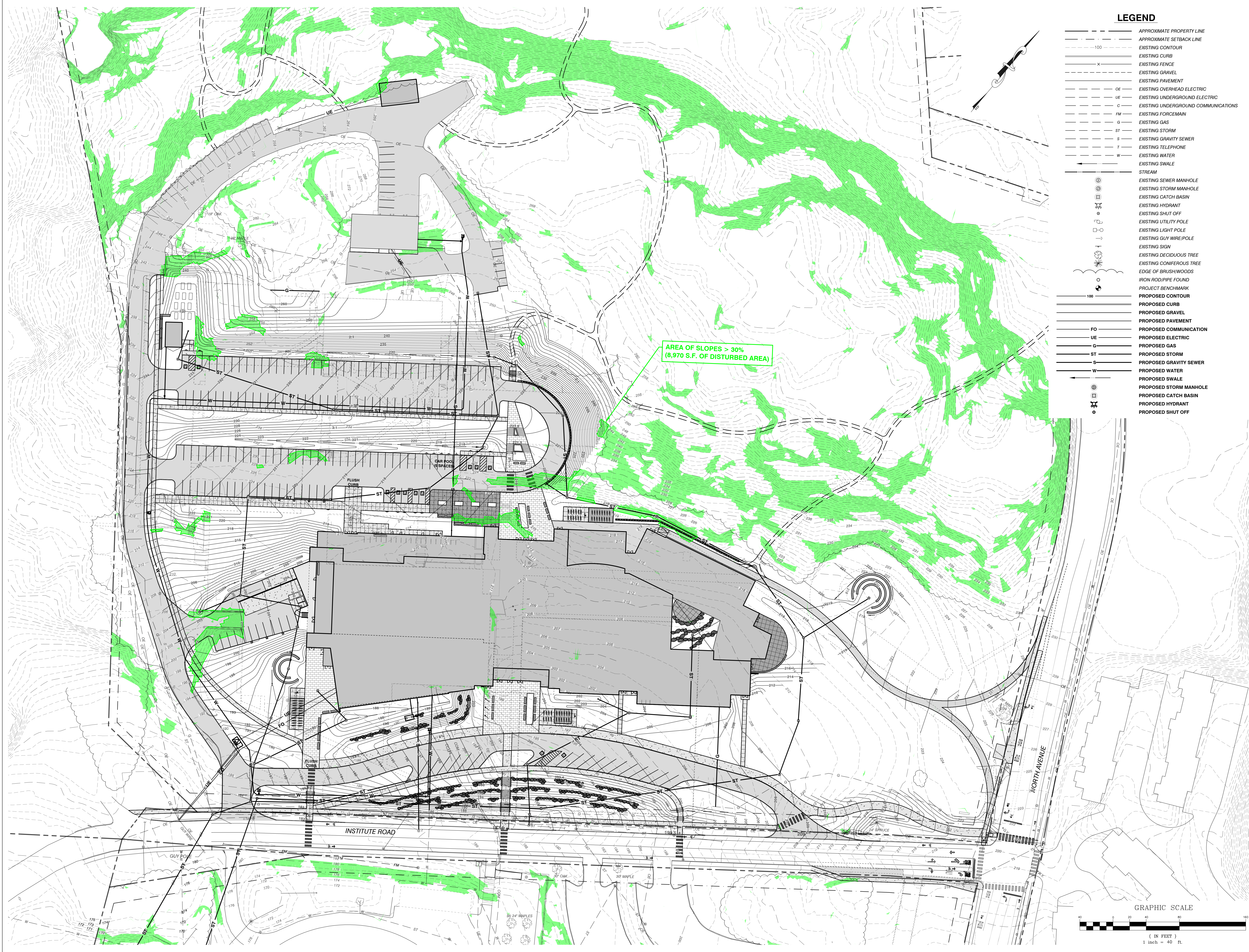
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ZONING PERMIT DRAFT 08/23/22
ZONING PERMIT 09/30/22

SHEET CONTAINS:
OVERLAY
DISTRICT
NATURAL RESOURCE
PROTECTION

WS2

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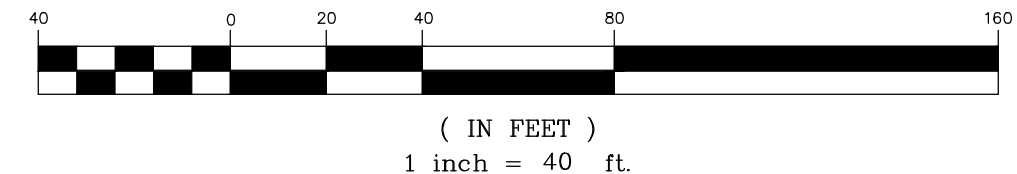
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LEGEND

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OE	EXISTING OVERHEAD ELECTRIC
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---	PROPOSED STORM MANHOLE
---	PROPOSED CATCH BASIN
---	PROPOSED HYDRANT
---	PROPOSED SHUT OFF

GRAPHIC SCALE



SCHEMATIC DESIGN

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BURLINGTON
HIGH SCHOOL
&
BURLINGTON
TECHNICAL
CENTER

BURLINGTON, VT

FF PROJECT NO: 21255

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

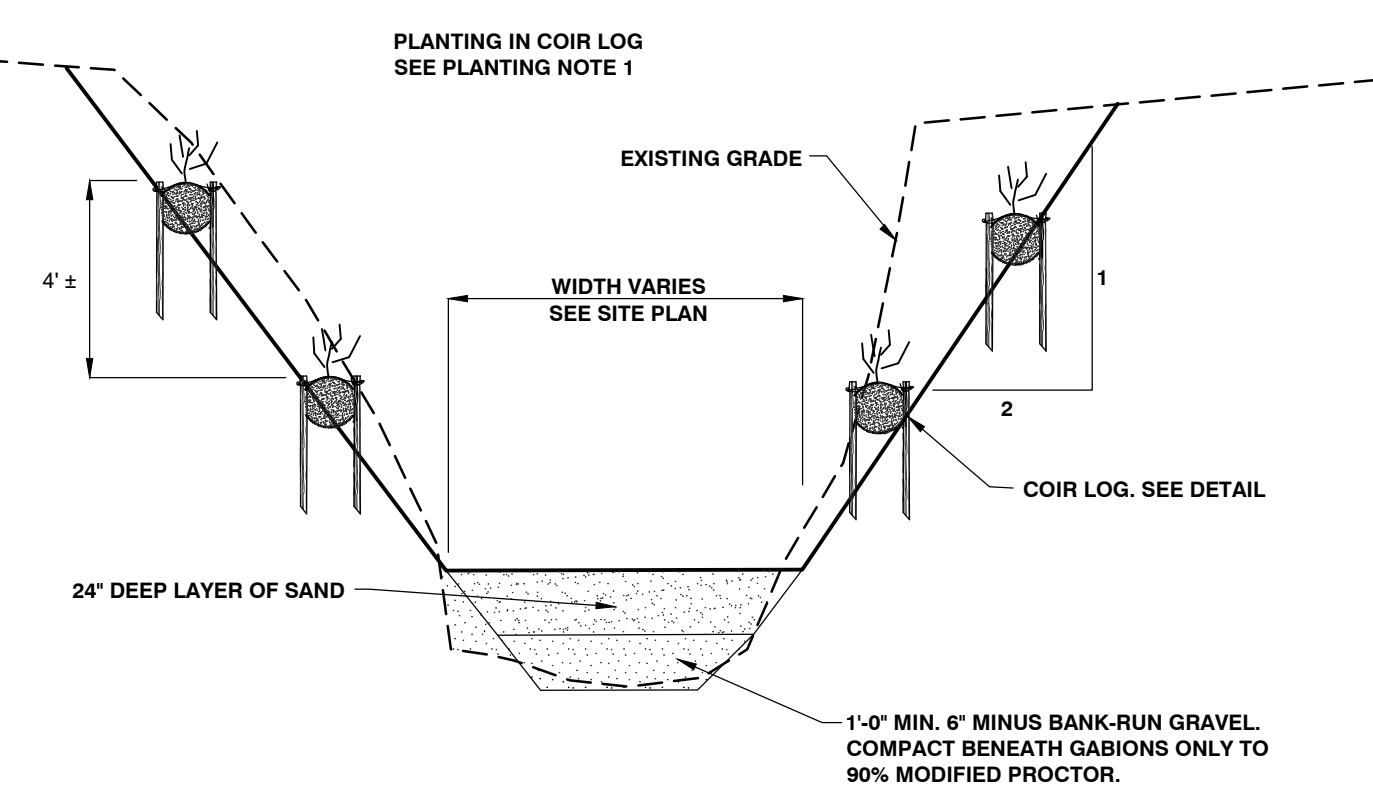
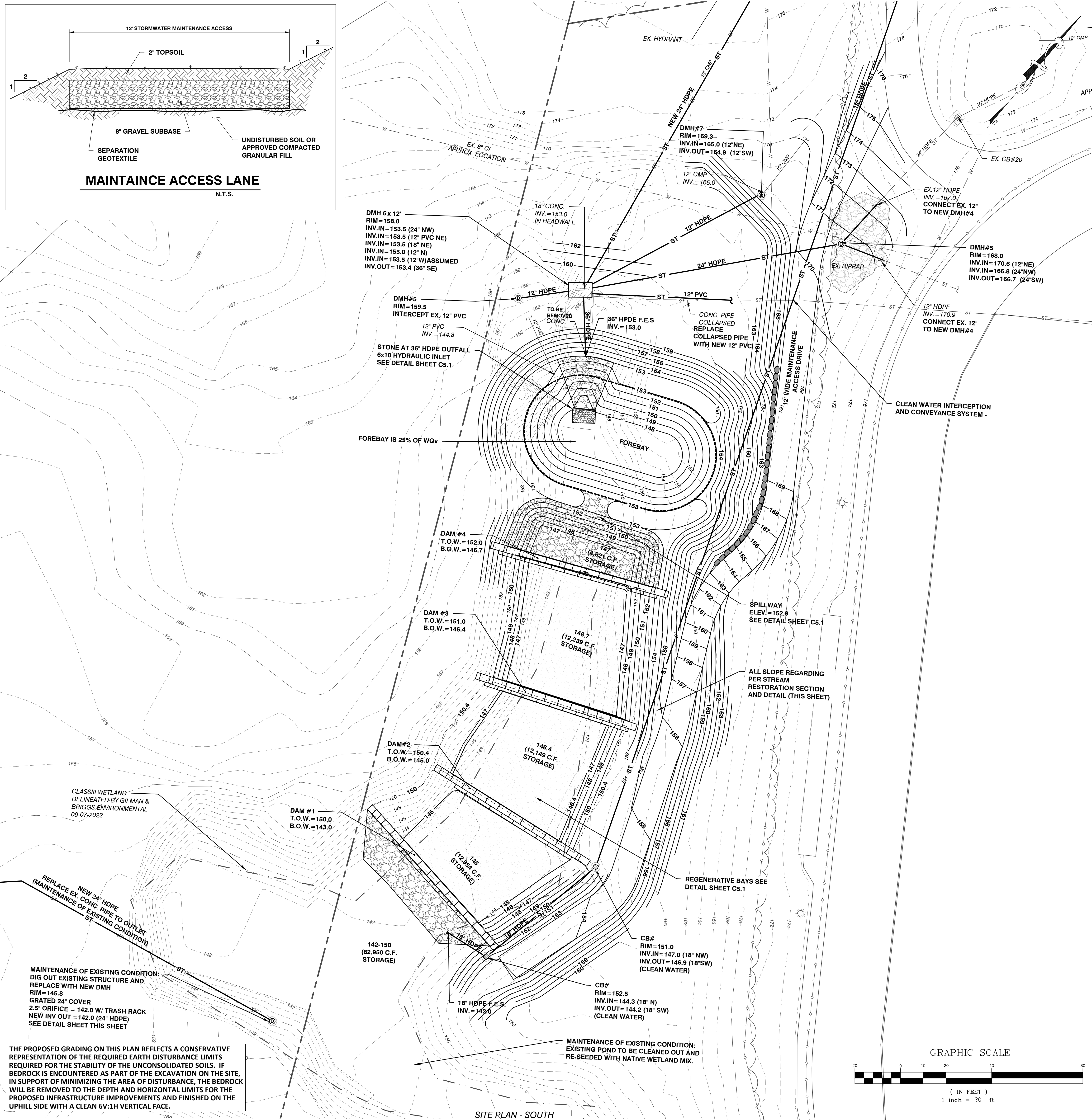
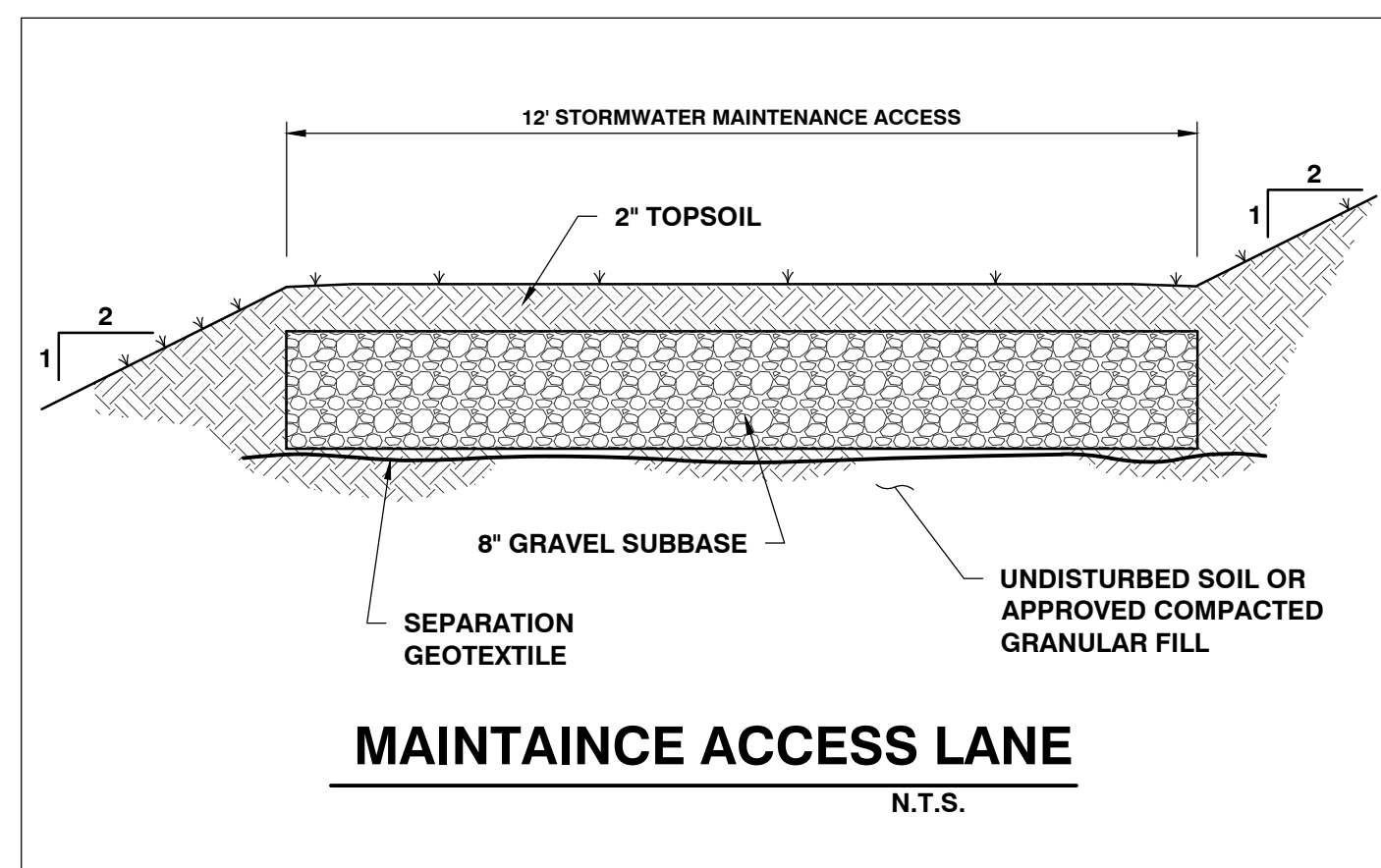
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ISSUE LOG:
ZONING PERMIT DRAFT 08/23/22

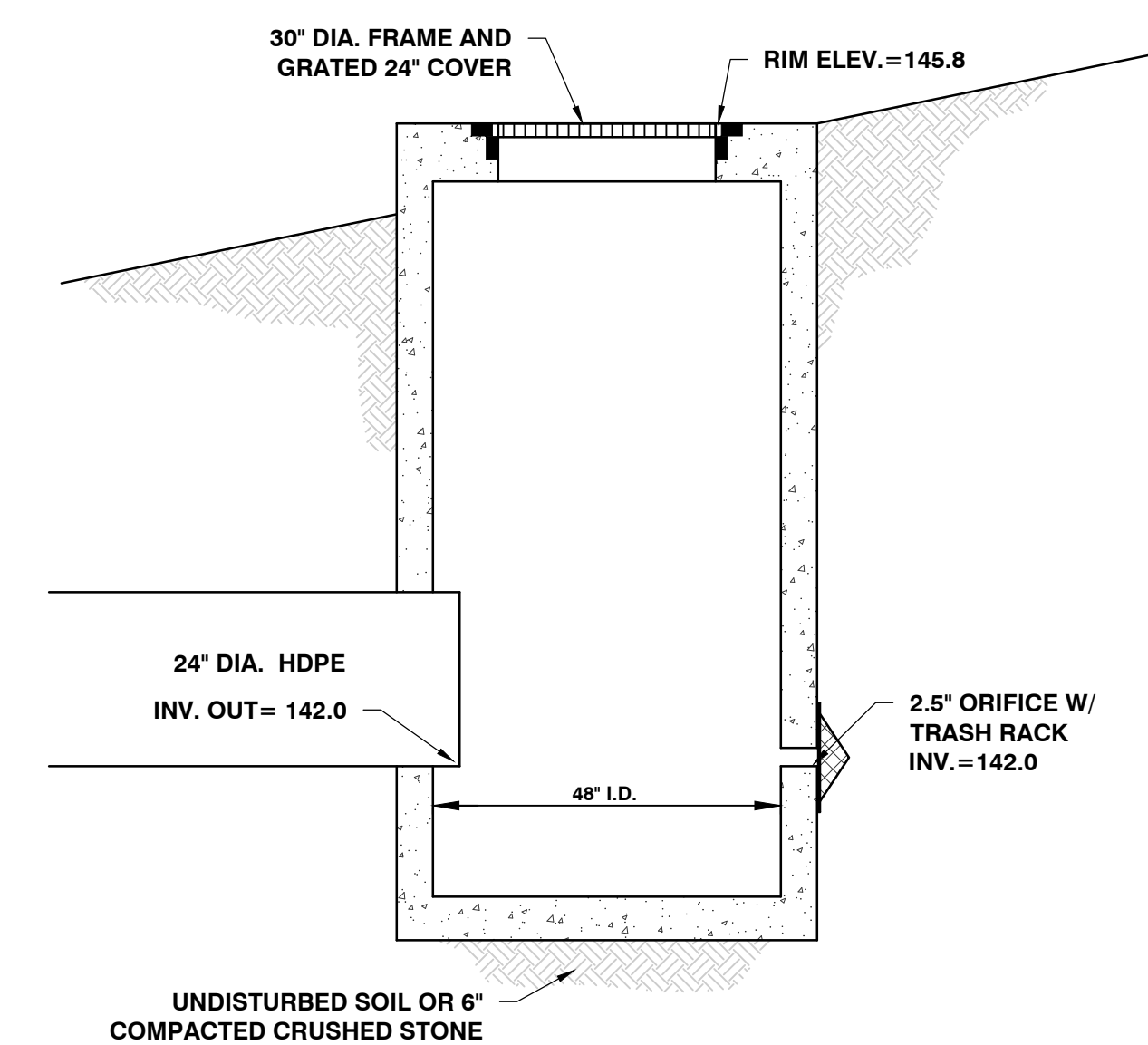
SHEET CONTAINS:
SLOPE
ANALYSIS
PROPOSED

SHEET NO: WS2

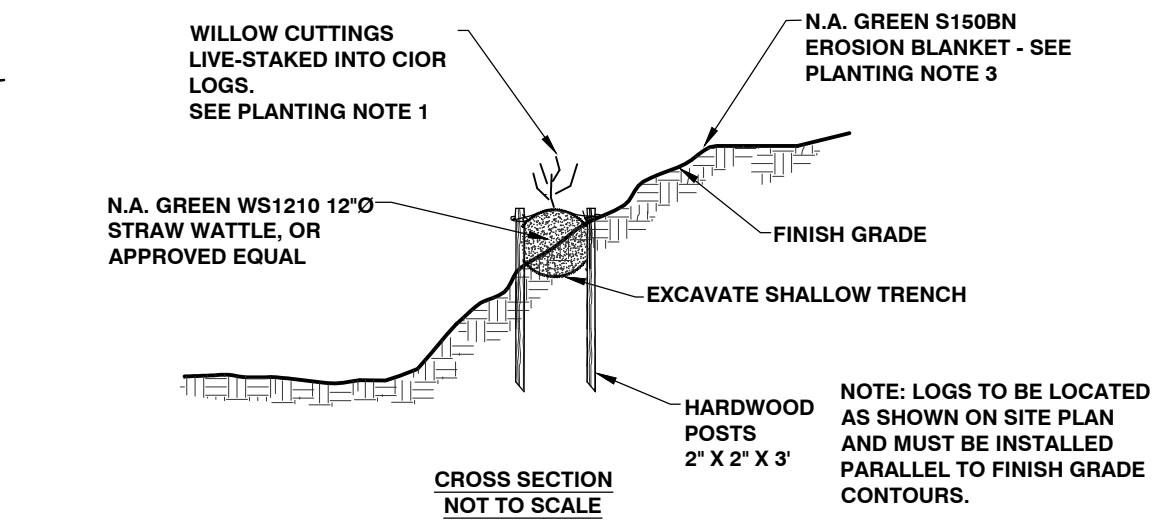
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TYPICAL SECTION - STREAM RESTORATION



POND OUTLET STRUCTURE

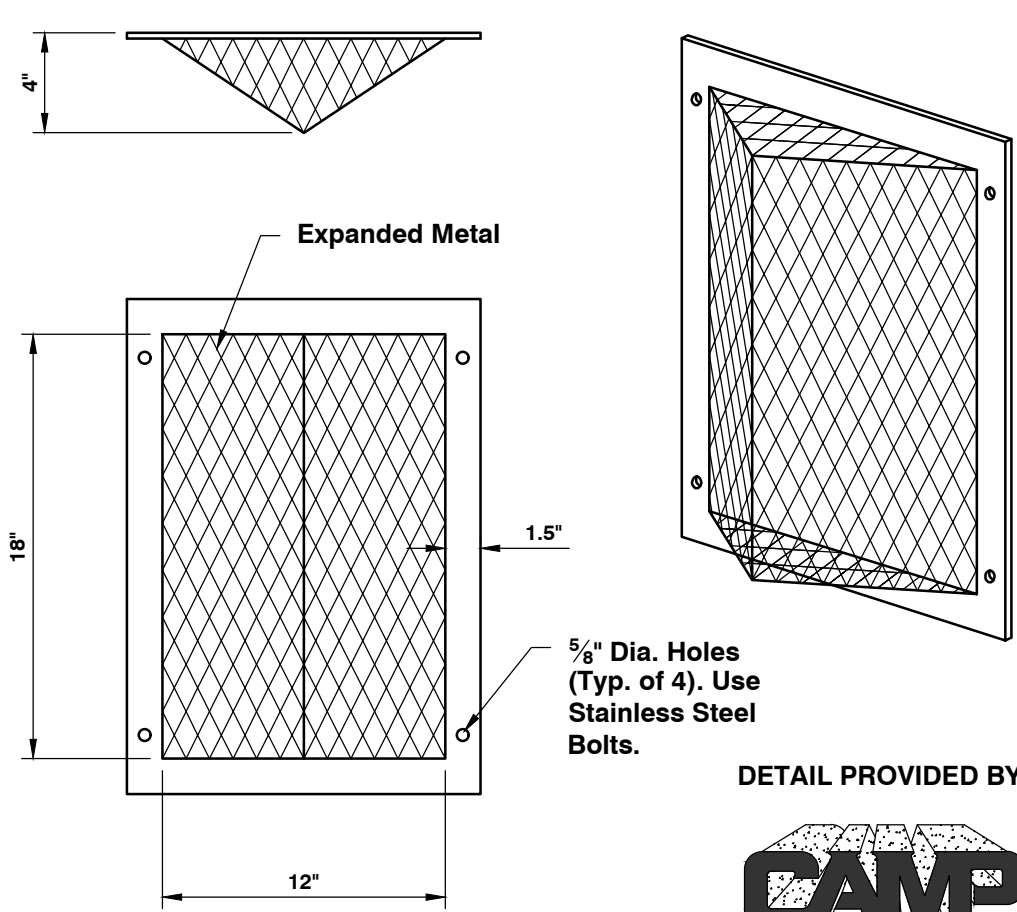


CONSTRUCTION SPECIFICATIONS

1. EXCAVATE A SHALLOW TRENCH AT THE TOE OF SLOPE TO SLIGHTLY BELOW BASEFLOW.
2. PLACE THE ROLL IN THE TRENCH AND ANCHOR WITH 2" X 2" POSTS PLACED ON BOTH SIDES OF THE ROLL AND SPACED LATERALLY ON 2' TO 4' CENTERS. TRIM THE TOP OF THE POSTS EVEN WITH THE EDGE OF THE ROLL, IF NECESSARY.
3. NOTCH THE POSTS AND TIE TOGETHER, ACROSS THE ROLL, WITH 9 GAUGE GALVANIZED WIRE OR 1/8" DIAMETER BRAIDED NYLON ROPE.
4. PLACE SOIL EXCAVATED FROM THE TRENCH BEHIND THE ROLL AND HAND TAMP. PLANT WILLOW CUTTINGS IN LOG AS SPECIFIED. SEE PLANTING NOTE 3.

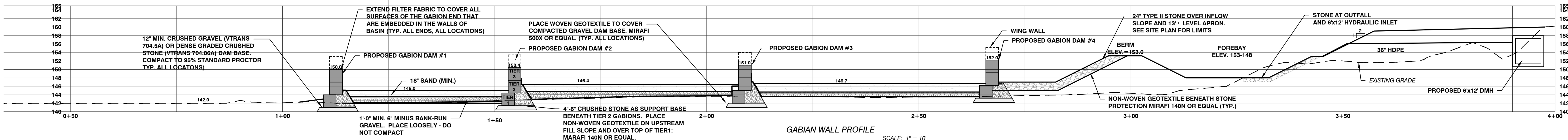
DETAIL - COIR LOG BANK STABILIZATION

Note: Trash Rack Coated with Cold Galvanized Spray



ORIFICE TRASH RACK (12'X18")

THE PROPOSED GRADING ON THIS PLAN REFLECTS A CONSERVATIVE REPRESENTATION OF THE REQUIRED EARTH DISTURBANCE LIMITS REQUIRED FOR THE STABILITY OF THE UNCONSOLIDATED SOILS. IF BEDROCK IS ENCOUNTERED AS PART OF THE EXCAVATION ON THE SITE, IN SUPPORT OF MINIMIZING THE AREA OF DISTURBANCE, THE BEDROCK WILL BE REMOVED TO THE DEPTH AND HORIZONTAL LIMITS FOR THE PROPOSED INFRASTRUCTURE IMPROVEMENTS AND FINISHED ON THE UPHILL SIDE WITH A CLEAN 6V:1H VERTICAL FACE.



SCHEMATIC DESIGN

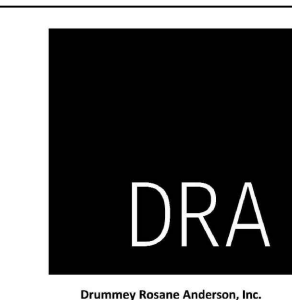
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BURLINGTON
HIGH SCHOOL
&
BURLINGTON
TECHNICAL
CENTER

BURLINGTON, VT

PROJECT NO. 21255

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

DRAWN BY: MAB CHECKED BY: DSM

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

PROPOSED
GRADING AND
DRAINAGE
SOUTH

C2.2

Burlington High School Traffic Impact Study

Burlington, VT

PREPARED FOR

Burlington School District

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SEPTEMBER 2022

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1

Introduction and Existing Conditions

Vanasse Hangen Brustlin, Inc. (VHB) has completed a Traffic Impact Study (TIS) for the proposed Burlington High School to be built at the original 52 Institute Road site. This chapter introduces the project and defines the scope of this TIS. The existing conditions on the street network are also presented.

1.1 Project Overview

The Burlington School District proposes to demolish the former High School and Technical Center at 52 Institute Road and construct a replacement on the same site. School has been held remotely or at the Downtown BHS building since 2020. When students return to the site, expected enrollment is 1,150 students with 150 staff, comparable to previous years.

The proposed high school will be accessed from two points on Institute Road, with all new parking on the north side of the street. The general site layout is shown below in Figure 1.

Figure 1 Proposed BHS Site Layout



This TIS includes the following elements:

- A description of the proposed development program,
- A review of existing conditions near the site, including geometry, pedestrian and bicycle circulation,
- Trip generation estimates for the new high school and their directional distribution,
- An evaluation of traffic operations at North Avenue and Institute Road, and
- Conclusions and recommendations regarding the project.

1.2 Existing Conditions

The High School campus is located at 52 Institute Road. Institute Road is a dead-end street that also serves North Beach and Rock Point. These neighbors generate minimal traffic, especially during school hours. Institute Road currently has two 11.5' travel lanes, a sidewalk on its south side, and a small amount of on-street parking.

1.2.1 Vehicular Infrastructure

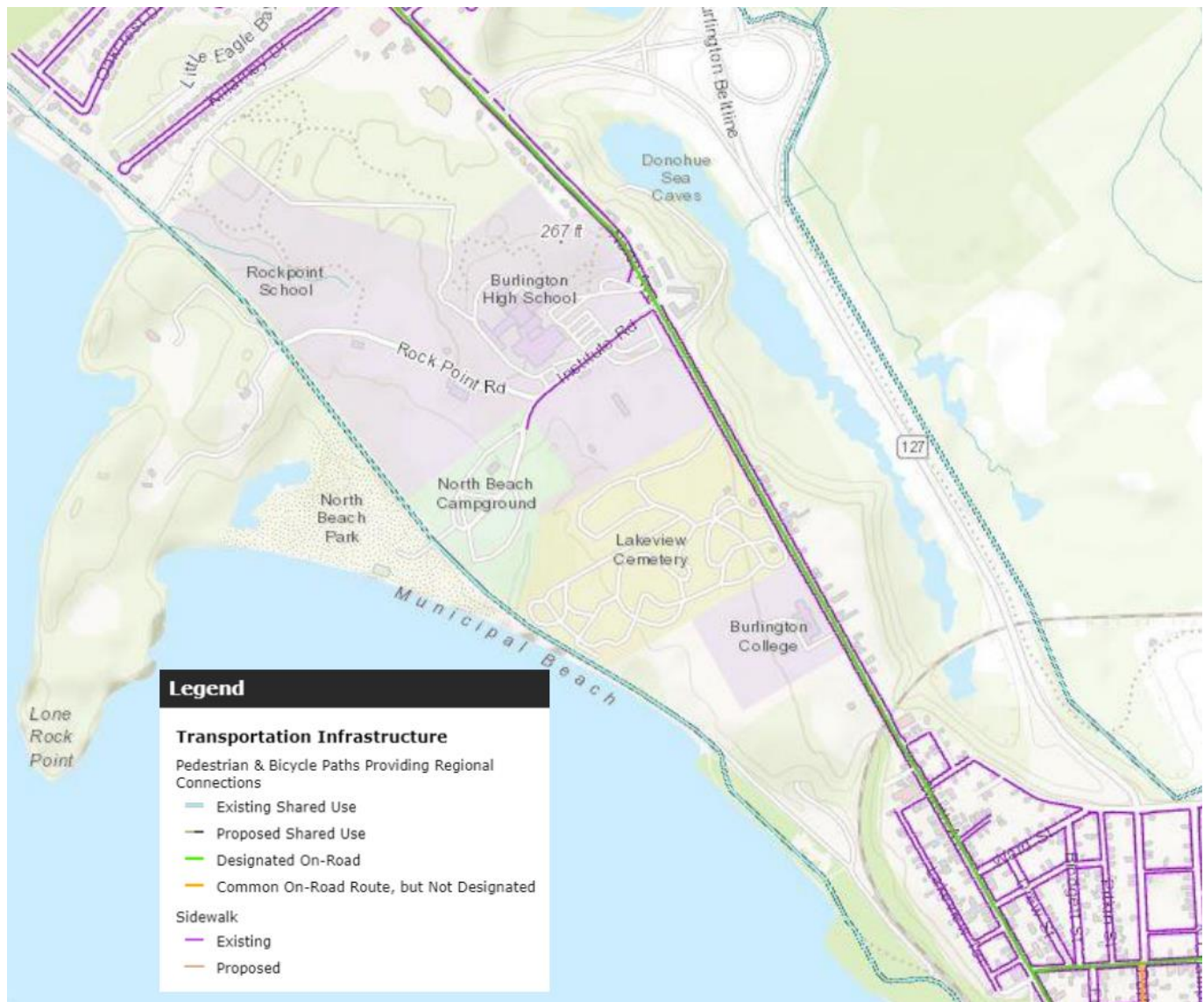
All traffic to and from the school travels through the intersection of North Avenue and Institute Road. This intersection is signalized. North Avenue has two 12-foot travel lanes and bike lanes in both directions, and a sidewalk on both sides. There is a northbound left-turn lane and a southbound right-turn lane. The eastbound approach has one left/thru and one right turn lane. Right turns on red are permitted on all approaches. The east leg of the intersection is the private driveway for the City Bluffs Condominiums.

1.2.2 Pedestrian and Bicycle Infrastructure

There are sidewalks surrounding the High School's campus as well north and south on either side of North Avenue. This provides students with strong connectivity to the surrounding neighbors and recreation opportunities such as the bike path and beaches.

The intersection has marked crosswalks across all but the north leg. However, only the south leg has pedestrian signal heads to communicate appropriate crossing times to the pedestrian. As a school crossing, all crossings should have pedestrian signals to meet MUTCD requirements.

North Avenue currently has on-street bike lanes in both directions. Bike racks will be located on the south side of the building facing Institute Road. The Burlington Bike Path is nearby but there is not a direct connection from Institute Road.

Figure 2 Bike and Pedestrian Connections

1.2.3 Transit

The Burlington School District works cooperatively with Green Mountain Transit (GMT) to provide bus transportation options for students traveling to and from school. At the Institute Road site, this includes School Tripper routes as well as Route 7. In the past, a BHS students have received 100% subsidized bus rides by showing their student ID. Since COVID-19, Green Mountain Transit has operated fare-free for all and will maintain that policy through June 2023.

Green Mountain Transit offers bus routes coordinated with school start and end times referred to as "School Trippers". The routes that include the current downtown location of Burlington High School are 334, 336, and 337 as shown in Figure 3. GMT has historically offered School Trippers from the Old North End, New North End, South End, and downtown to the Institute Road site. Students can transfer at the Downtown Transit Center to routes serving the greater Chittenden County area.

Figure 3 Burlington High School District GMT Bus Routes



Green Mountain/BSD Transit, Burlington School District Travel Plan

As shown in **Figure 4**, Route 7 travels along North Avenue from the Downtown Transit Center to the New North End. On school days, it stops at the high school every 10 minutes during peak periods (20 minutes when school is not in session). **Figure 5** shows the existing southbound bus shelter located to the south of Institute Road. This stop and shelter will be relocated to the north to minimize the number of street crossings when boarding or alighting at this stop. A northbound bus shelter is provided approximately 300 feet to the south of Institute Road. Due to right-of-way constraints further north, it will not be relocated.

Figure 4 Burlington North Avenue Bus Route

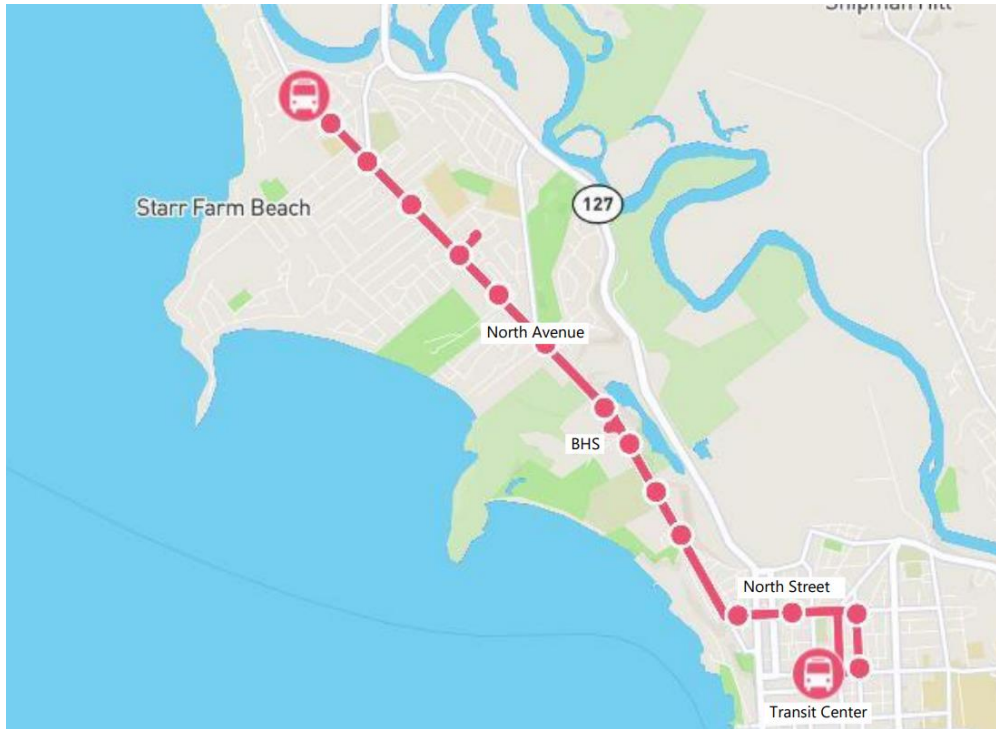


Figure 5 Bus Stop Located at North Avenue and Institute Road



2

Project Trip Generation

Site generated trips for the high school were calculated using Institute of Transportation Engineers (ITE) Trip Generation Manual standards. These trips were distributed through the intersection of North Avenue and Institute Road based on a previous count and the intersection's performance was analyzed under build (2023) and future year (2028) conditions. This chapter outlines the trip generation, distribution, and analyses processes.

2.1 Trip Generation

The new high school is expected to enroll up to 1,150 students. Trip generation estimates were calculated using rates published by ITE in Trip Generation Manual¹ for Land Use Code (LUC) 525 (High School). Calculations supporting the proposed trip generation estimates are provided in the Appendix. **Table 1** summarizes the estimated AM and PM peak hour trips.

¹ Trip Generation Manual, 11th Edition, Institute of Transportation Engineers, 2021.

Table 1 Burlington High School Trip Generation

Peak Hour / Direction	Total Trips
Weekday AM	
Enter	403
Exit	190
Total	593
Weekday PM	
Enter	121
Exit	257
Total	378

2.2 Trip Distribution

Prior to closure of the previous high school building, RSG conducted a turning movement count at North Avenue and Institute Road during the afternoon dismissal period. Because the traffic volumes entering and exiting the school were lower in the count data than estimated by ITE, the ITE data was used for this analysis. However, the count data was used as the basis for distributing future trips through the intersection. During RSG's count, 30% of entering trips and 40% of exiting trips had a trip end north of the site. The remaining 70% of entering trips and 60% of exiting trips had a trip end to the south. This directional distribution was applied to new trips to evaluate intersection performance.

3

Future Conditions

Traffic volumes were projected to the opening (2023) and future (2028) years. Conditions with and without the proposed project were determined. The capacity analysis was completed using the Highway Capacity Manual (HCM) 2000 methodology and results are presented in terms of Level of Service (LOS), volume-to-capacity (v/c) ratio, and delay per vehicle.

3.1 Traffic Networks

The base traffic volumes on North Avenue were determined by reviewing VTrans short-term count data. These volumes were more conservative than the short-term RSG count. Data was available for North Avenue, south of Institute Road, in August 2021 at VTrans location D045. Two-way traffic was counted on North Avenue from 8/5/21-8/6/21 and 8/9/21-8/10/21. The peak AM and PM hours from this short-term count were DHV-adjusted and grown to 2023 and 2028 volumes using VTrans factors for urban roadways.

Volumes for the other movements at the intersection were developed using trip generation estimates. Traffic volumes on the City Bluffs approach were conservatively estimated using the ITE trip generation rates for LUC 215 (Single-Family Attached Housing) because historic counts were lower than ITE estimates. The traffic volumes associated with Burlington High School were developed using the trip estimates determined Chapter 2.

The 2023 No Build and Build networks are shown in **Figure 6** and **Figure 7**. The 2028 No Build and Build volumes are shown in **Figure 8** and **Figure 9**.

Figure 6 2023 No Build Volumes

\\vhb.com\gbl\proj\SBurlington\58736.00 FFF Burl High School\cad\ts\BHS Turning
Diagram.dwg

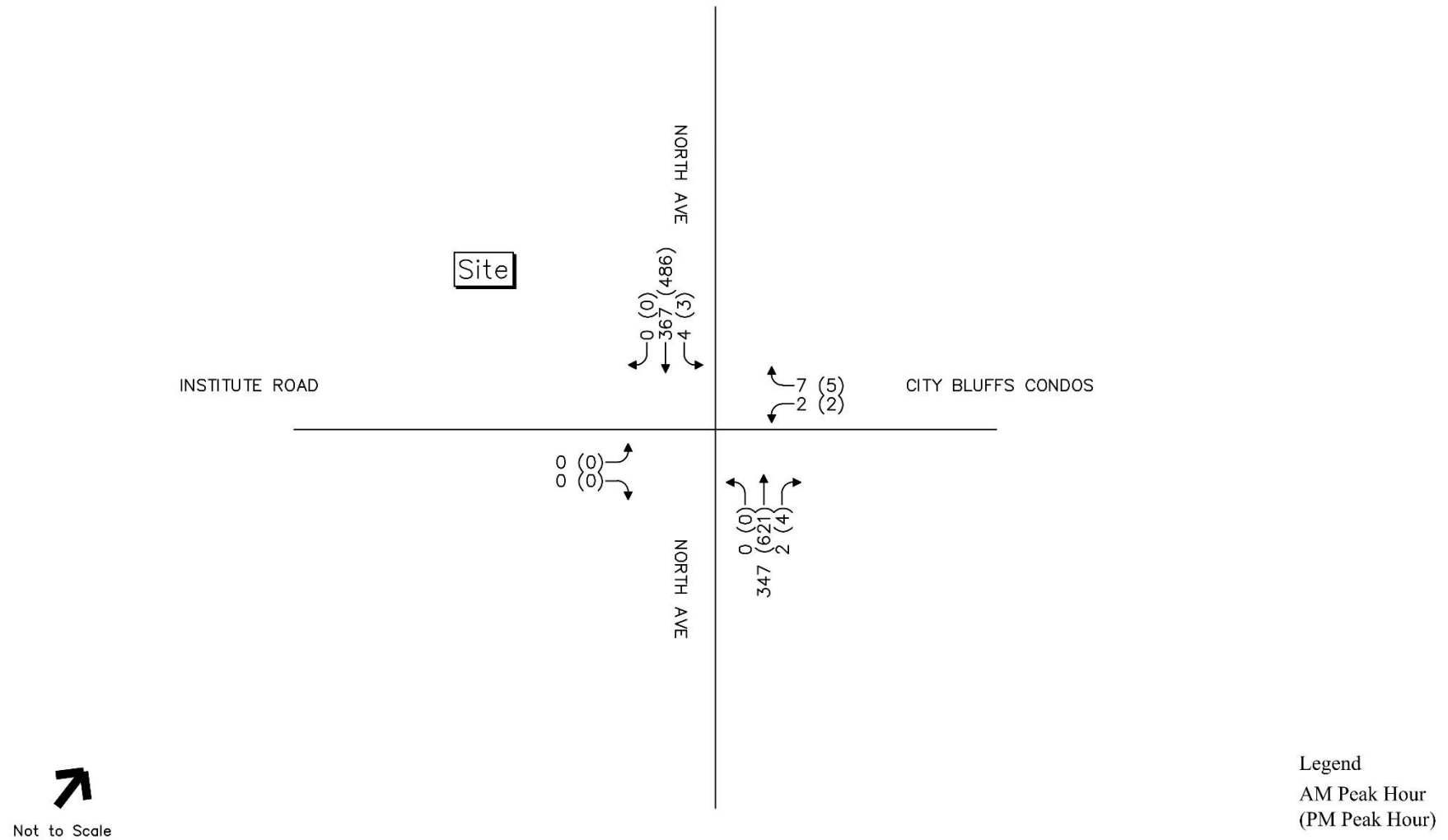


Figure 7 2023 Build Volumes

\\vhb.com\gbl\proj\SBurlington\58736.00 FFF Burl High School\cad\ts\BHS Turning
Diagram.dwg

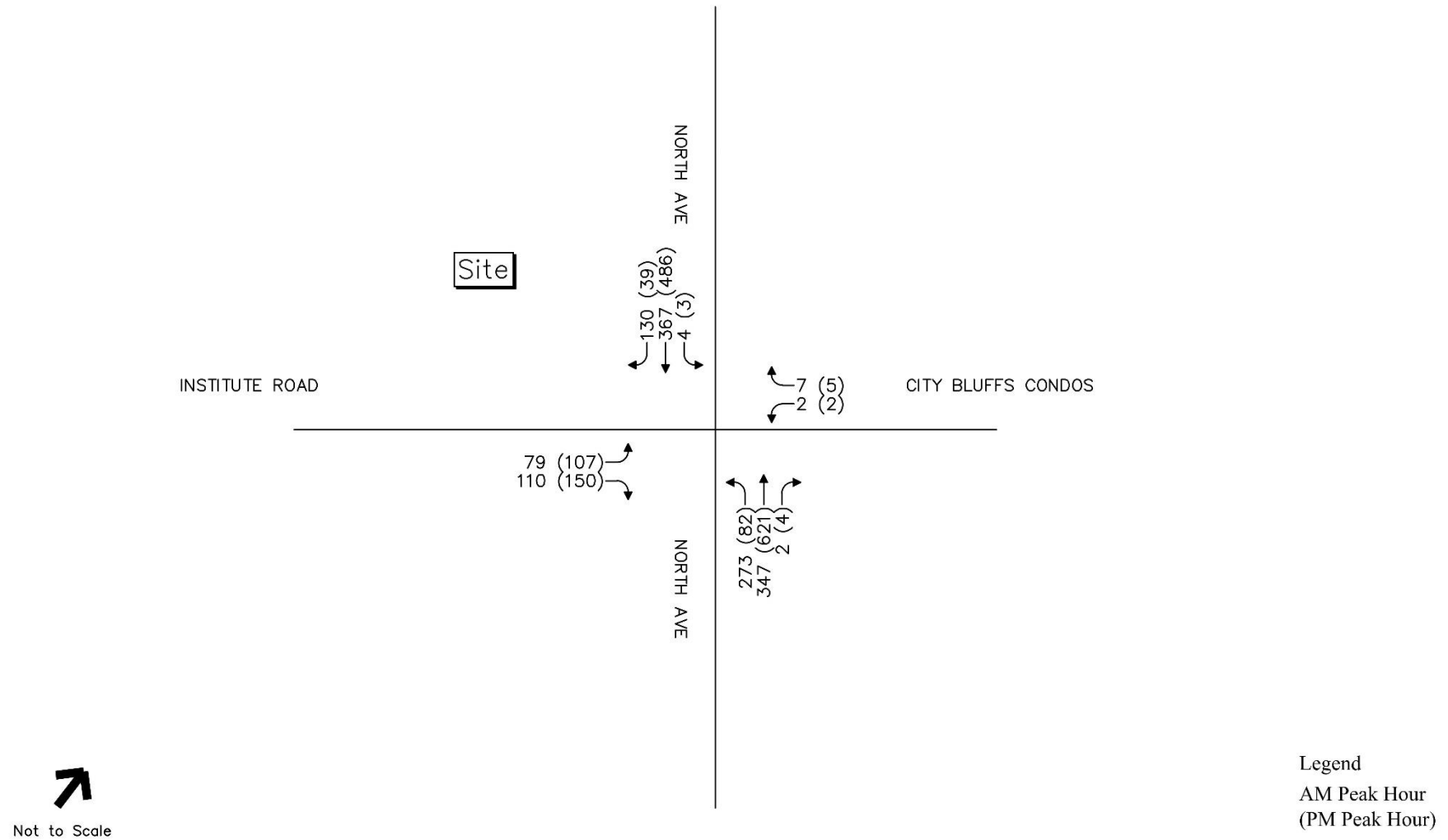


Figure 8 2028 No Build Volumes

\\vhb.com\gbl\proj\SBurlington\58736.00 FFF Burl High School\cad\ts\BHS Turning
Diagram.dwg

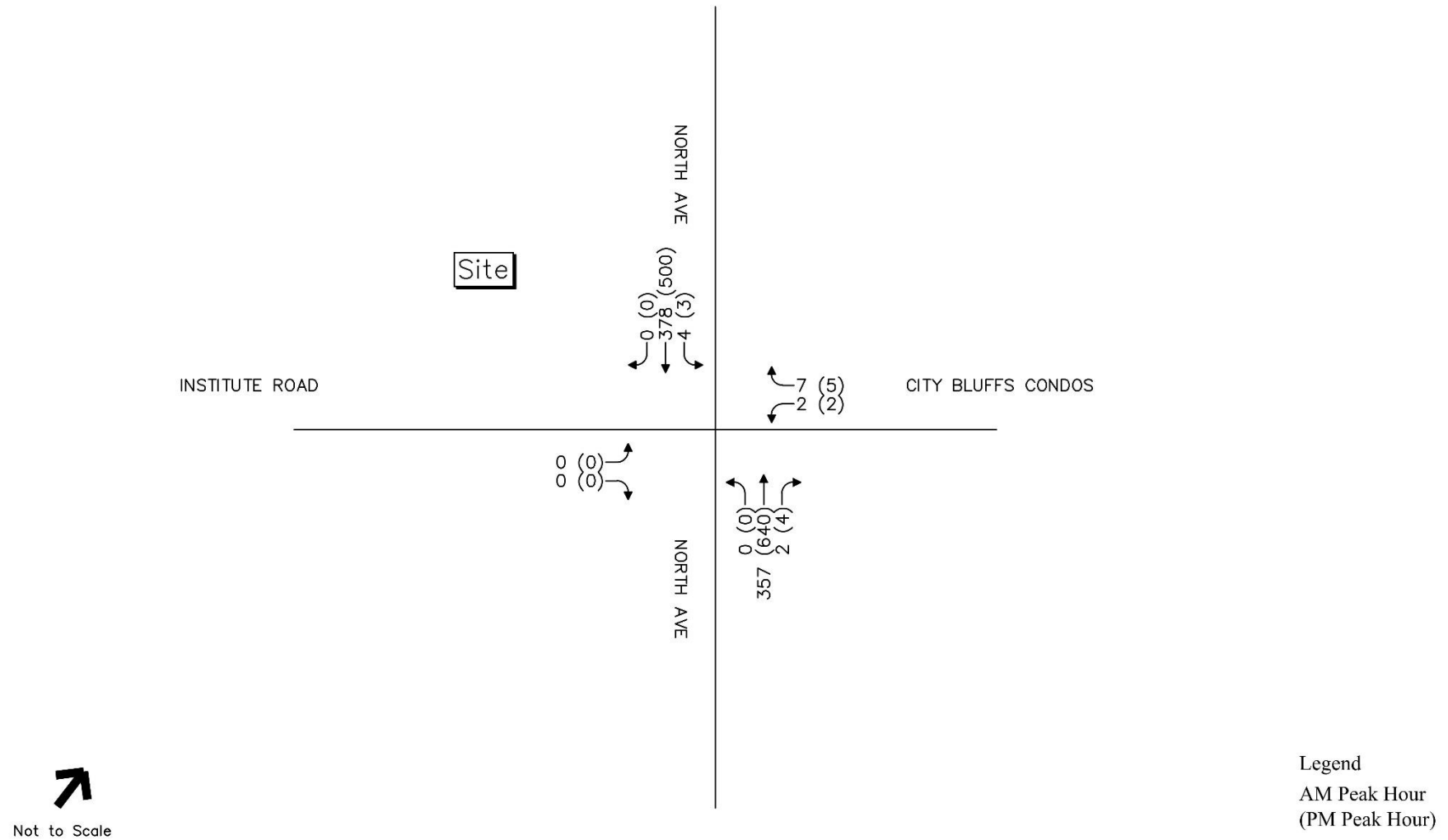
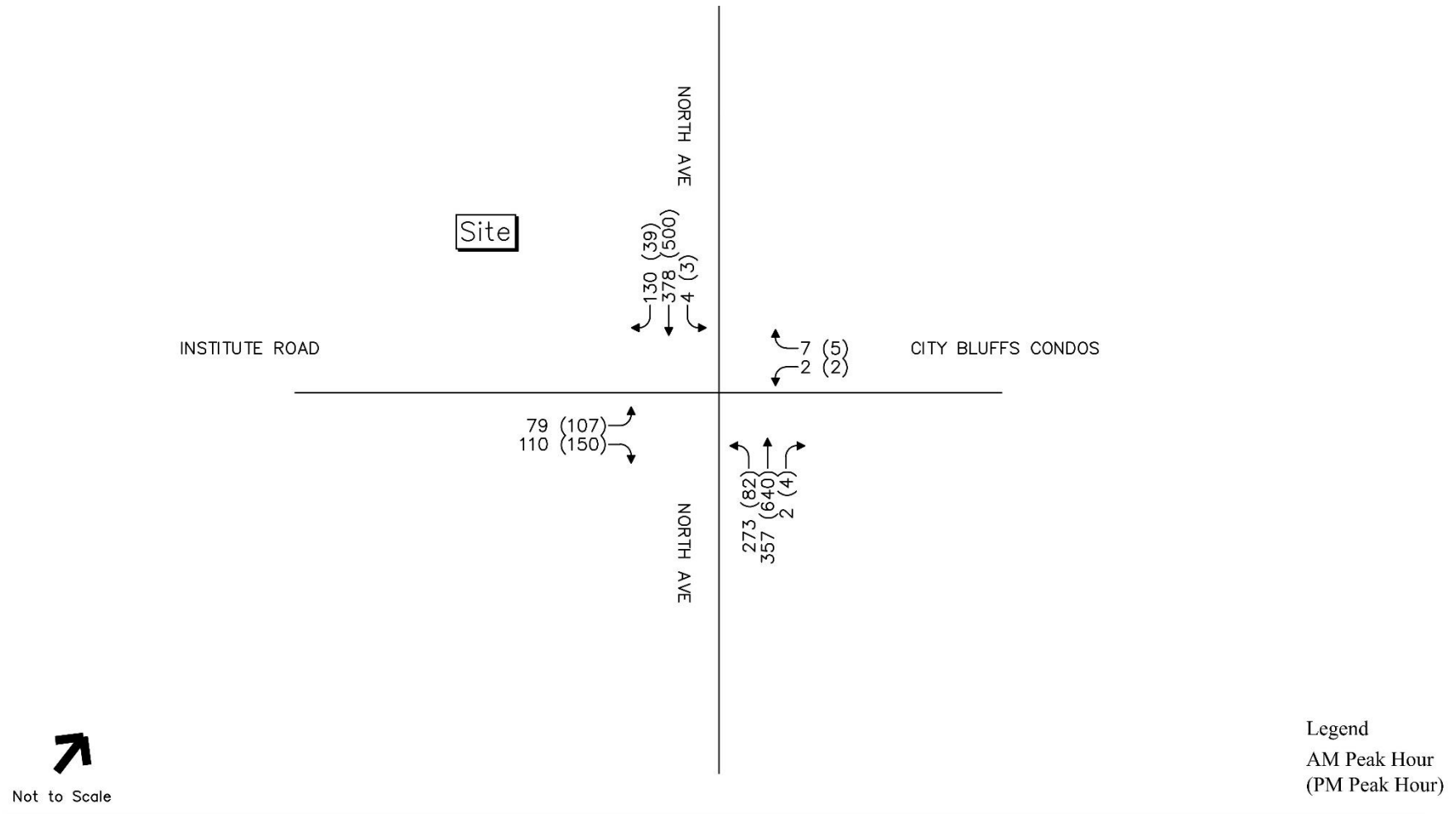


Figure 9 2028 Build Volumes



3.2 Traffic Analyses

A capacity analysis was performed for the intersection of North Avenue and Institute Road. Because the signal's timing plan includes an exclusive pedestrian phase, the HCM 6 method could not be used. Level of service (LOS) was calculated based on criteria published in the *Highway Capacity Manual 2000*². Levels of service range from A to F, with LOS A representing generally free flowing operating conditions and LOS F representing generally congested conditions. Copies of the intersection analysis results are provided in the Appendix. In addition to LOS, the volume-to-capacity ratio, average delay per vehicle, and 95th percentile queue length were calculated for each condition. The results of the analysis are summarized in **Table 2**.

This analysis found that all approaches operate at LOS C or better in each scenario. One result that requires explanation is that LOS for the westbound approach (City Bluffs Condos) improves from the No Build to Build scenarios. Without the high school, volumes on Institute Road and the City Bluffs driveway are less than 10 vehicles per hour. Such low volumes result in minimal green time for WB movements. In the Build condition, the addition of eastbound traffic leads to longer green times (up to the maximum split), increasing capacity and reducing delay for the small volume of westbound traffic.

² *Highway Capacity Manual 2000*. Federal Highway Administration, Transportation Research Board, 1997.

Table 2 North Avenue and Institute Road Intersection Analysis Summary

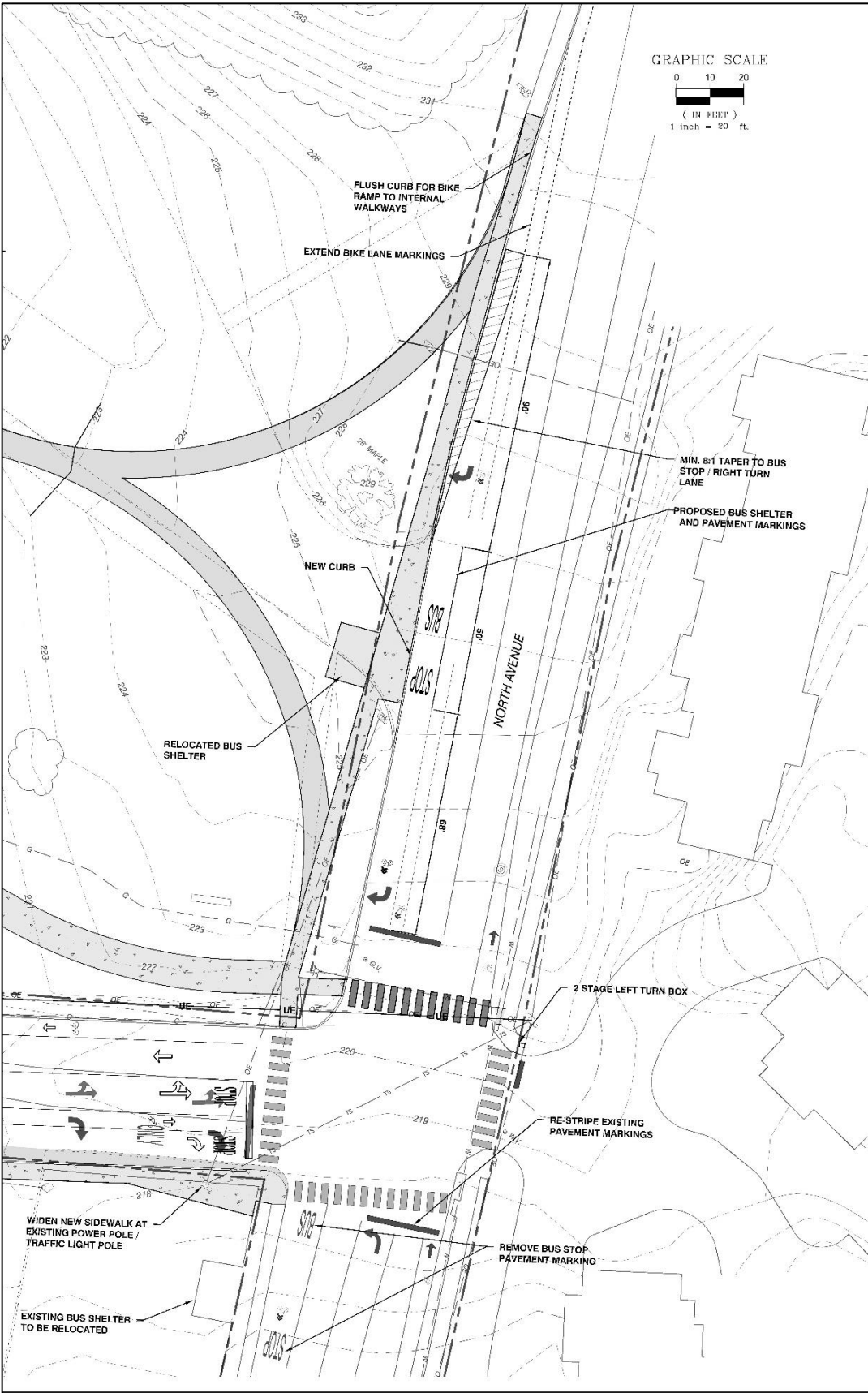
		2023				2028			
		AM		PM		AM		PM	
		No Build	Build	No Build	Build	No Build	Build	No Build	Build
Approach	Metric	No Build	Build	No Build	Build	No Build	Build	No Build	Build
Overall	LOS	A	B	A	C	A	B	A	C
	v/c	0.32	0.87	0.54	0.98	0.33	0.88	0.52	0.96
	Delay (s/veh)	1.9	15.9	2.3	23.5	1.9	16.2	2.1	24.6
North Ave	NB								
	LOS	A	B	A	B	A	B	A	B
	v/c	0.25	0.74	0.45	0.74	0.26	0.76	0.44	0.71
	Delay (s/veh)	1.5	12.7	2.4	16.9	1.6	13.3	2.1	15.2
	Queue (ft)	48	147	106	303	50	151	106	312
North Ave	SB								
	LOS	A	B	A	C	A	B	A	C
	v/c	0.27	0.63	0.35	0.88	0.27	0.65	0.35	0.78
	Delay (s/veh)	1.6	18.5	1.9	34.3	1.6	18.9	1.7	25.4
	Queue (ft)	52	209	73	344	54	220	73	388
Institute Rd	EB								
	LOS	A	B	A	C	A	B	A	C
	v/c	0.00	0.70	0.00	0.85	0.00	0.70	0.00	0.92
	Delay (s/veh)	0.0	16.9	0.0	22.5	0.0	16.9	0.0	31.3
	Queue (ft)	0	34	0	45	0	34	0	50
City Bluffs	WB								
	LOS	C	B	C	B	C	B	C	B
	v/c	0.01	0.01	0.00	0.00	0.01	0.01	0.00	0.00
	Delay (s/veh)	26.4	13.1	26.4	12.4	26.4	13.1	31.9	14.6
	Queue (ft)	0	0	0	0	0	0	0	0

3.3 Site Circulation

The plans for Burlington High School and Technical Center include removal of parking and addition of bicycle lanes on Institute Road. Although good levels of service for vehicular traffic can be achieved without further modifying the geometry of North Avenue and Institute Road, modifications are recommended to the pedestrian and bicycle facilities for safety and convenience of these users. First, parking will be removed on Institute Road to accommodate separate bike lanes in each direction. To make the northbound left turn movement easier and safer for cyclists, a two-stage left turn box will be marked on the northeast corner. In addition, a crosswalk, pedestrian signal heads, and push buttons should be added to the north leg of the intersection and pedestrian signal heads and push buttons should be added to the existing east and west crossings. These changes will be accompanied by a new sidewalk along the north side of Institute Road to better match desired travel path.

The planned removal of the bus pull-off is an opportunity to relocate the bus stops to more convenient locations. Historically, GMT has operated both local buses and special school trips to Burlington High School. Special school trips formerly used the bus pull-off on North Avenue just north of the intersection. These routes start and end at the high school, therefore needing a space for brief layovers. With the pull-off removed, these buses should use the proposed driveway in front of the school's south entrance. This location is a practical option because of its convenience for riders and because buses can pull straight through without having to reverse direction. Local buses (Route #7) stop along North Avenue. The southbound bus stop is located south of the intersection, leaving riders to cross Institute Road. To reduce pedestrian conflicts, this bus stop and shelter will be relocated to the north side of the intersection. The northbound bus stop is located over 300 feet south of the intersection. Although this is farther than desired, it is the closest location that is wide enough to accommodate a bus shelter. The proposed intersection improvements are shown in **Figure 10**.

Figure 10 North Avenue and Institute Road Improvements



Parking lot exits to Institute Road will all be located further from the intersection than the 95th percentile queue anticipated at North Avenue, which means that they should not typically be blocked by queued traffic.

The traffic signal at North Avenue and Institute Road should be re-timed to improve performance for the opening of Burlington High School and Technical Center at this location. The main constraints are (1) an exclusive pedestrian phase is needed due to the high volume of turning traffic, and (2) the northbound left turn movement should operate in protected-permitted mode that gives turning vehicles a protected period with a green arrow while southbound traffic is stopped, and also allows lefts on a green ball condition when gaps are available. Timing should be optimized with new count data once the school is open, but the timing plan used for this study's analysis is shown in the Appendix.

4

Conclusions

The intersection of North Avenue and Institute Road has sufficient capacity to handle the additional high school trips without falling below Level of Service C for any movement. Recommended measures to improve traffic flow and access for pedestrians, cyclists, and transit users include additional sidewalks, a relocated bus stop, new bike lanes, an exclusive pedestrian phase at North Avenue and Institute Road, and retiming of that signal.

The proposed replacement of Burlington High School at the 52 Institute Road campus would bring students back from downtown. The campus has not held classes since 2020. As evaluated in this TIS, the new school would be projected to provide for up to 1,150 students and 150 staff.

The trip generation estimates conducted for this study indicate that the proposed development program will generate 593 trips (403 entering and 190 exiting) in the AM peak hour and 378 trips (121 entering and 257 exiting) in the PM peak hour. Intersection analysis with these trips added found that North Avenue and Institute Road can perform at an acceptable Level of Service if the signal timing plan is calibrated to the new conditions. All approaches are expected to operate at LOS C or better through 2028 with and without the Burlington High School project.

In conclusion, based on the results of this TIS, the replacement of Burlington High School at the 52 Institute Road campus is not expected to generate unreasonable congestion or unsafe conditions on the City of Burlington's transportation system.

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A.1

Appendix 1: Trip Generation Detail

Trip Generation - Project Specific

Total Site generated trips (not accounting for internal, pass-by, or diverted trips)

Site Land Uses and Descriptions				AM PK HR OF GENERATOR												PM PK HR OF GENERATOR																			
Code	Land Use	Size	Unit	directional dist.		average				regression		# trips				directional dist.		average				regression		# trips											
				% enter	% exit	# studies	Avg Rate	Std Dev.	Total by Avg	r ²	total by Eq'n	Method Chosen	Total Trips	Entering	Exiting	% enter	% exit	# studies	Avg Rate	Std Dev.	Total by Avg	r ²	total by Eq'n	Method Chosen	Total Trips	Entering	Exiting								
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28								
New Burlington High School				68%	32%	51	0.51	0.17	587	0.56	592.70	regression	593	403	190	32%	68%	65	0.32	0.11	368	0.62	378	regression	378	121	257								
City Bluffs Condos (Peak hour of adjacent street traffic)				31%	69%	46	0.48	0.14	13	0.92	8	average	13	4	9	57%	43%	51	0.57	0.18	15	0.91	12	average	15	9	7								
525	High School	1150	Students																																
215	Single-Family Attached Housing	27	Dwelling Units																																
total															entering	exiting																			
AM Peak Hour Total Site Trips:															607	408	199	PM Peak Hour Total Site Trips:															394	130	264

A.2

Appendix 2: VTrans Count Data

Location Info

Location ID D045_NB
 Type I-SECTION
 Functional Class 4
 Located On NORTH AVE
 BETWEEN CAMBRIAN WAY AND INSTITUTE RD
 Direction Two-Way
 Community Burlington
 MPO_ID
 HPMS ID
 Agency Vermont Agency of Transportation

Date	Start Time	End Time	NB Count	SB Count	Traffic Count
8/6/2021	15:00	15:15	120	103	223
8/6/2021	15:15	15:30	118	110	228
8/6/2021	15:30	15:45	124	104	228
8/6/2021	15:45	16:00	124	121	245
8/6/2021	16:00	16:15	119	93	212
8/6/2021	16:15	16:30	136	117	253
8/6/2021	16:30	16:45	139	112	251
8/6/2021	16:45	17:00	142	107	249
8/6/2021	17:00	17:15	118	102	220
8/6/2021	17:15	17:30	151	109	260
8/6/2021	17:30	17:45	115	82	197
8/6/2021	17:45	18:00	120	87	207
8/6/2021	18:00	18:15	104	100	204
8/6/2021	18:15	18:30	107	99	206
8/6/2021	18:30	18:45	110	81	191
8/6/2021	18:45	19:00	100	97	197
8/6/2021	19:00	19:15	74	78	152
8/10/2021	6:00	6:15	14	21	35
8/10/2021	6:15	6:30	12	39	51
8/10/2021	6:30	6:45	18	39	57
8/10/2021	6:45	7:00	29	51	80
8/10/2021	7:00	7:15	34	51	85
8/10/2021	7:15	7:30	28	72	100
8/10/2021	7:30	7:45	41	89	130
8/10/2021	7:45	8:00	55	86	141
8/10/2021	8:00	8:15	53	74	127
8/10/2021	8:15	8:30	49	104	153
8/10/2021	8:30	8:45	51	67	118
8/10/2021	8:45	9:00	80	93	173
8/10/2021	9:00	9:15	72	89	161
8/10/2021	9:15	9:30	86	72	158
8/10/2021	9:30	9:45	69	71	140
8/10/2021	9:45	10:00	71	88	159

PM Peak Hour
 4:30 - 5:30 pm
 NB Volume:
 SB Volume:

550
 430

AM Peak Hour
 8:45 - 9:45 am
 NB Volume:
 SB Volume:

307
 325

A.3

Appendix 3: Traffic Analysis Results

Lanes, Volumes, Timings

1: Institute Rd/City Bluffs & North Ave

09/29/2022

												
Lane Group	NBL	NBT	NBR	SBL	SBT	SBR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Volume (vph)	82	640	4	3	500	39	107	0	150	2	0	5
Future Volume (vph)	82	640	4	3	500	39	107	0	150	2	0	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	200		0	0		0	0		200	0		0
Storage Lanes	1		0	0		1	0		1	0		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.999				0.850			0.850		0.904	
Flt Protected	0.950							0.950			0.986	
Satd. Flow (prot)	1770	1861	0	0	1863	1583	0	1770	1583	0	1660	0
Flt Permitted	0.180				0.997			0.753			0.924	
Satd. Flow (perm)	335	1861	0	0	1857	1583	0	1403	1583	0	1556	0
Right Turn on Red			Yes			Yes			No			Yes
Satd. Flow (RTOR)						131					131	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		374			128			378			166	
Travel Time (s)		8.5			2.9			8.6			3.8	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.25	0.25	0.25	0.92	0.92	0.92
Adj. Flow (vph)	89	696	4	3	543	42	428	0	600	2	0	5
Shared Lane Traffic (%)												
Lane Group Flow (vph)	89	700	0	0	546	42	0	428	600	0	7	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2		1	2	1	1	2	1	1	2	
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru	Right	Left	Thru	
Leading Detector (ft)	20	100		20	100	20	20	100	20	20	100	
Trailing Detector (ft)	0	0		0	0	0	0	0	0	0	0	
Detector 1 Position(ft)	0	0		0	0	0	0	0	0	0	0	
Detector 1 Size(ft)	20	6		20	6	20	20	6	20	20	6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	pm+pt	NA		Perm	NA	Perm	Perm	NA	pm+ov	Perm	NA	
Protected Phases	5	2			6			4	5		8	
Permitted Phases	2			6		6	4		4	8		

Lanes, Volumes, Timings
1: Institute Rd/City Bluffs & North Ave

09/29/2022

Lane Group	Ø9
Lane Configurations	
Traffic Volume (vph)	
Future Volume (vph)	
Ideal Flow (vphpl)	
Storage Length (ft)	
Storage Lanes	
Taper Length (ft)	
Lane Util. Factor	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Right Turn on Red	
Satd. Flow (RTOR)	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Peak Hour Factor	
Adj. Flow (vph)	
Shared Lane Traffic (%)	
Lane Group Flow (vph)	
Enter Blocked Intersection	
Lane Alignment	
Median Width(ft)	
Link Offset(ft)	
Crosswalk Width(ft)	
Two way Left Turn Lane	
Headway Factor	
Turning Speed (mph)	
Number of Detectors	
Detector Template	
Leading Detector (ft)	
Trailing Detector (ft)	
Detector 1 Position(ft)	
Detector 1 Size(ft)	
Detector 1 Type	
Detector 1 Channel	
Detector 1 Extend (s)	
Detector 1 Queue (s)	
Detector 1 Delay (s)	
Detector 2 Position(ft)	
Detector 2 Size(ft)	
Detector 2 Type	
Detector 2 Channel	
Detector 2 Extend (s)	
Turn Type	
Protected Phases	9
Permitted Phases	

Lanes, Volumes, Timings

1: Institute Rd/City Bluffs & North Ave

09/29/2022

												
Lane Group	NBL	NBT	NBR	SBL	SBT	SBR	NEL	NET	NER	SWL	SWT	SWR
Detector Phase	5	2		6	6	6	4	4	5	8	8	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	
Minimum Split (s)	9.5	22.5		22.5	22.5	22.5	9.5	9.5	9.5	9.5	9.5	
Total Split (s)	10.0	39.0		29.0	29.0	29.0	26.0	26.0	10.0	26.0	26.0	
Total Split (%)	11.4%	44.6%		33.1%	33.1%	33.1%	29.7%	29.7%	11.4%	29.7%	29.7%	
Maximum Green (s)	5.5	34.5		24.5	24.5	24.5	21.5	21.5	5.5	21.5	21.5	
Yellow Time (s)	3.5	3.5		3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	
All-Red Time (s)	1.0	1.0		1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	
Lost Time Adjust (s)	0.0	0.0			0.0	0.0		0.0	0.0		0.0	
Total Lost Time (s)	4.5	4.5			4.5	4.5		4.5	4.5		4.5	
Lead/Lag	Lead			Lag	Lag	Lag			Lead			
Lead-Lag Optimize?	Yes			Yes	Yes	Yes			Yes			
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	Max		Max	Max	Max	None	None	None	None	None	
Walk Time (s)		7.0		7.0	7.0	7.0						
Flash Dont Walk (s)		11.0		11.0	11.0	11.0						
Pedestrian Calls (#/hr)		0		0	0	0						
Act Effect Green (s)	34.5	34.5			24.5	24.5		21.5	31.5		21.5	
Actuated g/C Ratio	0.53	0.53			0.38	0.38		0.33	0.48		0.33	
v/c Ratio	0.30	0.71			0.78	0.06		0.92	0.78		0.01	
Control Delay	10.3	16.5			27.8	0.2		50.7	23.3		0.0	
Queue Delay	0.0	0.0			0.0	0.0		0.0	0.0		0.0	
Total Delay	10.3	16.5			27.8	0.2		50.7	23.3		0.0	
LOS	B	B			C	A		D	C		A	
Approach Delay		15.8			25.8			34.7				
Approach LOS		B			C			C				

Intersection Summary

Area Type: Other

Cycle Length: 87.5

Actuated Cycle Length: 65

Natural Cycle: 140

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.92

Intersection Signal Delay: 26.2

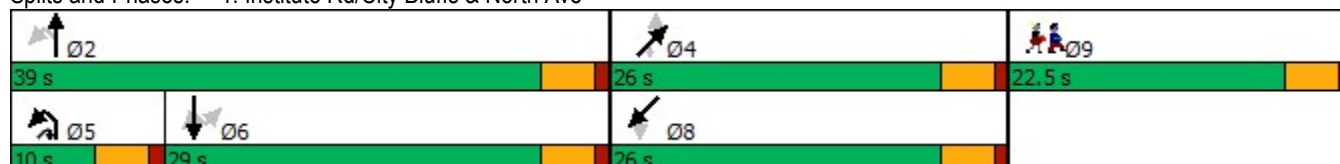
Intersection LOS: C

Intersection Capacity Utilization 84.3%

ICU Level of Service E

Analysis Period (min) 15

Splits and Phases: 1: Institute Rd/City Bluffs & North Ave



Lanes, Volumes, Timings
1: Institute Rd/City Bluffs & North Ave

09/29/2022

Lane Group	Ø9
Detector Phase	
Switch Phase	
Minimum Initial (s)	5.0
Minimum Split (s)	22.5
Total Split (s)	22.5
Total Split (%)	26%
Maximum Green (s)	18.0
Yellow Time (s)	3.5
All-Red Time (s)	1.0
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	
Lead-Lag Optimize?	
Vehicle Extension (s)	3.0
Recall Mode	None
Walk Time (s)	7.0
Flash Dont Walk (s)	11.0
Pedestrian Calls (#/hr)	0
Act Effct Green (s)	
Actuated g/C Ratio	
v/c Ratio	
Control Delay	
Queue Delay	
Total Delay	
LOS	
Approach Delay	
Approach LOS	
Intersection Summary	

HCM Signalized Intersection Capacity Analysis

2023 AM No Build

06/29/2022

1: Institute Rd/City Bluffs & North Ave

												
Movement	NBL	NBT	NBR	SBL	SBT	SBR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Volume (vph)	0	347	2	4	367	0	0	0	0	2	0	7
Future Volume (vph)	0	347	2	4	367	0	0	0	0	2	0	7
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.5			4.5						4.5	
Lane Util. Factor		1.00			1.00						1.00	
Frt		1.00			1.00						0.89	
Flt Protected		1.00			1.00						0.99	
Satd. Flow (prot)		1861			1862						1645	
Flt Permitted		1.00			1.00						1.00	
Satd. Flow (perm)		1861			1858						1662	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.25	0.25	0.25	0.92	0.92	0.92
Adj. Flow (vph)	0	377	2	4	399	0	0	0	0	2	0	8
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	10	0
Lane Group Flow (vph)	0	379	0	0	403	0	0	0	0	0	0	0
Turn Type	pm+pt	NA		Perm	NA	Perm				pm+ov	Perm	NA
Protected Phases	5	2			6			4	5			8
Permitted Phases	2			6		6	4		4	8		
Actuated Green, G (s)		44.7			44.7						1.0	
Effective Green, g (s)		44.7			44.7						1.0	
Actuated g/C Ratio		0.82			0.82						0.02	
Clearance Time (s)		4.5			4.5						4.5	
Vehicle Extension (s)		3.0			3.0						3.0	
Lane Grp Cap (vph)		1520			1518						30	
v/s Ratio Prot		0.20										
v/s Ratio Perm					c0.22						c0.00	
v/c Ratio		0.25			0.27						0.01	
Uniform Delay, d1		1.1			1.2						26.4	
Progression Factor		1.00			1.00						1.00	
Incremental Delay, d2		0.4			0.4						0.1	
Delay (s)		1.5			1.6						26.4	
Level of Service		A			A						C	
Approach Delay (s)		1.5			1.6			0.0			26.4	
Approach LOS		A			A			A			C	
Intersection Summary												
HCM 2000 Control Delay		1.9			HCM 2000 Level of Service			A				
HCM 2000 Volume to Capacity ratio		0.32										
Actuated Cycle Length (s)		54.7			Sum of lost time (s)			18.0				
Intersection Capacity Utilization		34.2%			ICU Level of Service			A				
Analysis Period (min)		15										
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

2023 AM Build

1: Institute Rd/City Bluffs & North Ave

06/29/2022

												
Movement	NBL	NBT	NBR	SBL	SBT	SBR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Volume (vph)	273	347	2	4	367	130	79	0	110	2	0	7
Future Volume (vph)	273	347	2	4	367	130	79	0	110	2	0	7
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5			4.5	4.5		4.5	4.5		4.5	
Lane Util. Factor	1.00	1.00			1.00	1.00		1.00	1.00		1.00	
Frt	1.00	1.00			1.00	0.85		1.00	0.85		0.89	
Flt Protected	0.95	1.00			1.00	1.00		0.95	1.00		0.99	
Satd. Flow (prot)	1770	1861			1862	1583		1770	1583		1645	
Flt Permitted	0.29	1.00			1.00	1.00		0.75	1.00		0.95	
Satd. Flow (perm)	540	1861			1856	1583		1399	1583		1575	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.25	0.25	0.25	0.92	0.92	0.92
Adj. Flow (vph)	297	377	2	4	399	141	316	0	440	2	0	8
RTOR Reduction (vph)	0	0	0	0	0	93	0	0	0	0	7	0
Lane Group Flow (vph)	297	379	0	0	403	48	0	316	440	0	3	0
Turn Type	pm+pt	NA		Perm	NA	Perm	Perm	NA	pm+ov	Perm	NA	
Protected Phases	5	2			6			4	5		8	
Permitted Phases	2			6		6	4		4	8		
Actuated Green, G (s)	29.6	29.6			19.6	19.6		18.4	23.9		18.4	
Effective Green, g (s)	29.6	29.6			19.6	19.6		18.4	23.9		18.4	
Actuated g/C Ratio	0.52	0.52			0.34	0.34		0.32	0.42		0.32	
Clearance Time (s)	4.5	4.5			4.5	4.5		4.5	4.5		4.5	
Vehicle Extension (s)	3.0	3.0			3.0	3.0		3.0	3.0		3.0	
Lane Grp Cap (vph)	399	966			638	544		451	788		508	
v/s Ratio Prot	c0.07	0.20							0.05			
v/s Ratio Perm	c0.31				0.22	0.03		c0.23	0.22		0.00	
v/c Ratio	0.74	0.39			0.63	0.09		0.70	0.56		0.01	
Uniform Delay, d1	9.4	8.3			15.7	12.7		16.9	12.5		13.1	
Progression Factor	1.00	1.00			1.00	1.00		1.00	1.00		1.00	
Incremental Delay, d2	7.4	1.2			4.7	0.3		4.9	0.9		0.0	
Delay (s)	16.8	9.5			20.4	13.0		21.8	13.4		13.1	
Level of Service	B	A			C	B		C	B		B	
Approach Delay (s)		12.7			18.5			16.9			13.1	
Approach LOS		B			B			B			B	
Intersection Summary												
HCM 2000 Control Delay		15.9			HCM 2000 Level of Service			B				
HCM 2000 Volume to Capacity ratio		0.87										
Actuated Cycle Length (s)		57.0			Sum of lost time (s)			18.0				
Intersection Capacity Utilization		60.2%			ICU Level of Service			B				
Analysis Period (min)		15										
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

2023 PM No Build

06/29/2022

1: Institute Rd/City Bluffs & North Ave

												
Movement	NBL	NBT	NBR	SBL	SBT	SBR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Volume (vph)	0	621	4	3	486	0	0	0	0	2	0	5
Future Volume (vph)	0	621	4	3	486	0	0	0	0	2	0	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.5			4.5						4.5	
Lane Util. Factor		1.00			1.00						1.00	
Frt		1.00			1.00						0.90	
Flt Protected		1.00			1.00						0.99	
Satd. Flow (prot)		1861			1862						1659	
Flt Permitted		1.00			1.00						1.00	
Satd. Flow (perm)		1861			1859						1683	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.25	0.25	0.25	0.92	0.92	0.92
Adj. Flow (vph)	0	675	4	3	528	0	0	0	0	2	0	5
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	7	0
Lane Group Flow (vph)	0	679	0	0	531	0	0	0	0	0	0	0
Turn Type	pm+pt	NA		Perm	NA	Perm				pm+ov	Perm	NA
Protected Phases	5	2			6			4	5			8
Permitted Phases	2			6		6	4		4	8		
Actuated Green, G (s)		44.7			44.7						1.0	
Effective Green, g (s)		44.7			44.7						1.0	
Actuated g/C Ratio		0.82			0.82						0.02	
Clearance Time (s)		4.5			4.5						4.5	
Vehicle Extension (s)		3.0			3.0						3.0	
Lane Grp Cap (vph)		1520			1519						30	
v/s Ratio Prot		c0.36										
v/s Ratio Perm					0.29						c0.00	
v/c Ratio		0.45			0.35						0.00	
Uniform Delay, d1		1.4			1.3						26.4	
Progression Factor		1.00			1.00						1.00	
Incremental Delay, d2		1.0			0.6						0.1	
Delay (s)		2.4			1.9						26.4	
Level of Service		A			A						C	
Approach Delay (s)		2.4			1.9			0.0			26.4	
Approach LOS		A			A			A			C	
Intersection Summary												
HCM 2000 Control Delay		2.3			HCM 2000 Level of Service			A				
HCM 2000 Volume to Capacity ratio		0.54										
Actuated Cycle Length (s)		54.7			Sum of lost time (s)			18.0				
Intersection Capacity Utilization		44.6%			ICU Level of Service			A				
Analysis Period (min)		15										
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

1: Institute Rd/City Bluffs & North Ave

2023 PM Build

06/29/2022

												
Movement	NBL	NBT	NBR	SBL	SBT	SBR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Volume (vph)	82	621	4	3	486	39	107	0	150	2	0	5
Future Volume (vph)	82	621	4	3	486	39	107	0	150	2	0	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5			4.5	4.5		4.5	4.5		4.5	
Lane Util. Factor	1.00	1.00			1.00	1.00		1.00	1.00		1.00	
Frt	1.00	1.00			1.00	0.85		1.00	0.85		0.90	
Flt Protected	0.95	1.00			1.00	1.00		0.95	1.00		0.99	
Satd. Flow (prot)	1770	1861			1862	1583		1770	1583		1659	
Flt Permitted	0.17	1.00			1.00	1.00		0.75	1.00		0.92	
Satd. Flow (perm)	310	1861			1856	1583		1403	1583		1557	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.25	0.25	0.25	0.92	0.92	0.92
Adj. Flow (vph)	89	675	4	3	528	42	428	0	600	2	0	5
RTOR Reduction (vph)	0	0	0	0	0	28	0	0	0	0	4	0
Lane Group Flow (vph)	89	679	0	0	531	14	0	428	600	0	3	0
Turn Type	pm+pt	NA		Perm	NA	Perm	Perm	NA	pm+ov	Perm	NA	
Protected Phases	5	2			6			4	5		8	
Permitted Phases	2			6		6	4		4	8		
Actuated Green, G (s)	29.5	29.5			19.5	19.5		21.5	27.0		21.5	
Effective Green, g (s)	29.5	29.5			19.5	19.5		21.5	27.0		21.5	
Actuated g/C Ratio	0.49	0.49			0.32	0.32		0.36	0.45		0.36	
Clearance Time (s)	4.5	4.5			4.5	4.5		4.5	4.5		4.5	
Vehicle Extension (s)	3.0	3.0			3.0	3.0		3.0	3.0		3.0	
Lane Grp Cap (vph)	286	914			603	514		502	831		557	
v/s Ratio Prot	0.03	0.36							c0.07			
v/s Ratio Perm	0.12				c0.29	0.01		c0.31	0.31		0.00	
v/c Ratio	0.31	0.74			0.88	0.03		0.85	0.72		0.00	
Uniform Delay, d1	10.8	12.2			19.1	13.8		17.8	13.4		12.4	
Progression Factor	1.00	1.00			1.00	1.00		1.00	1.00		1.00	
Incremental Delay, d2	0.6	5.4			16.8	0.1		13.2	3.1		0.0	
Delay (s)	11.4	17.6			35.9	13.9		30.9	16.6		12.4	
Level of Service	B	B			D	B		C	B		B	
Approach Delay (s)		16.9			34.3			22.5			12.4	
Approach LOS		B			C			C			B	
Intersection Summary												
HCM 2000 Control Delay			23.5				HCM 2000 Level of Service			C		
HCM 2000 Volume to Capacity ratio			0.98									
Actuated Cycle Length (s)			60.0				Sum of lost time (s)			18.0		
Intersection Capacity Utilization			82.5%				ICU Level of Service			E		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

2028 AM No Build

06/29/2022

1: Institute Rd/City Bluffs & North Ave

												
Movement	NBL	NBT	NBR	SBL	SBT	SBR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Volume (vph)	0	357	2	4	378	0	0	0	0	2	0	7
Future Volume (vph)	0	357	2	4	378	0	0	0	0	2	0	7
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.5			4.5						4.5	
Lane Util. Factor		1.00			1.00						1.00	
Frt		1.00			1.00						0.89	
Flt Protected		1.00			1.00						0.99	
Satd. Flow (prot)		1861			1862						1645	
Flt Permitted		1.00			1.00						1.00	
Satd. Flow (perm)		1861			1858						1662	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.25	0.25	0.25	0.92	0.92	0.92
Adj. Flow (vph)	0	388	2	4	411	0	0	0	0	2	0	8
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	10	0
Lane Group Flow (vph)	0	390	0	0	415	0	0	0	0	0	0	0
Turn Type	pm+pt	NA		Perm	NA	Perm				pm+ov	Perm	NA
Protected Phases	5	2			6			4	5			8
Permitted Phases	2			6		6	4		4	8		
Actuated Green, G (s)		44.7			44.7						1.0	
Effective Green, g (s)		44.7			44.7						1.0	
Actuated g/C Ratio		0.82			0.82						0.02	
Clearance Time (s)		4.5			4.5						4.5	
Vehicle Extension (s)		3.0			3.0						3.0	
Lane Grp Cap (vph)		1520			1518						30	
v/s Ratio Prot		0.21										
v/s Ratio Perm					c0.22						c0.00	
v/c Ratio		0.26			0.27						0.01	
Uniform Delay, d1		1.2			1.2						26.4	
Progression Factor		1.00			1.00						1.00	
Incremental Delay, d2		0.4			0.4						0.1	
Delay (s)		1.6			1.6						26.4	
Level of Service		A			A						C	
Approach Delay (s)		1.6			1.6			0.0			26.4	
Approach LOS		A			A			A			C	
Intersection Summary												
HCM 2000 Control Delay		1.9			HCM 2000 Level of Service			A				
HCM 2000 Volume to Capacity ratio		0.33										
Actuated Cycle Length (s)		54.7			Sum of lost time (s)			18.0				
Intersection Capacity Utilization		34.8%			ICU Level of Service			A				
Analysis Period (min)		15										
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

2028 AM Build

1: Institute Rd/City Bluffs & North Ave

06/29/2022

												
Movement	NBL	NBT	NBR	SBL	SBT	SBR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Volume (vph)	273	357	2	4	378	130	79	0	110	2	0	7
Future Volume (vph)	273	357	2	4	378	130	79	0	110	2	0	7
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5			4.5	4.5		4.5	4.5		4.5	
Lane Util. Factor	1.00	1.00			1.00	1.00		1.00	1.00		1.00	
Frt	1.00	1.00			1.00	0.85		1.00	0.85		0.89	
Flt Protected	0.95	1.00			1.00	1.00		0.95	1.00		0.99	
Satd. Flow (prot)	1770	1861			1862	1583		1770	1583		1645	
Flt Permitted	0.28	1.00			1.00	1.00		0.75	1.00		0.95	
Satd. Flow (perm)	517	1861			1856	1583		1399	1583		1575	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.25	0.25	0.25	0.92	0.92	0.92
Adj. Flow (vph)	297	388	2	4	411	141	316	0	440	2	0	8
RTOR Reduction (vph)	0	0	0	0	0	93	0	0	0	0	7	0
Lane Group Flow (vph)	297	390	0	0	415	48	0	316	440	0	3	0
Turn Type	pm+pt	NA		Perm	NA	Perm	Perm	NA	pm+ov	Perm	NA	
Protected Phases	5	2			6			4	5		8	
Permitted Phases	2			6		6	4		4	8		
Actuated Green, G (s)	29.6	29.6			19.6	19.6		18.4	23.9		18.4	
Effective Green, g (s)	29.6	29.6			19.6	19.6		18.4	23.9		18.4	
Actuated g/C Ratio	0.52	0.52			0.34	0.34		0.32	0.42		0.32	
Clearance Time (s)	4.5	4.5			4.5	4.5		4.5	4.5		4.5	
Vehicle Extension (s)	3.0	3.0			3.0	3.0		3.0	3.0		3.0	
Lane Grp Cap (vph)	389	966			638	544		451	788		508	
v/s Ratio Prot	c0.07	0.21							0.05			
v/s Ratio Perm	c0.32				0.22	0.03		c0.23	0.22		0.00	
v/c Ratio	0.76	0.40			0.65	0.09		0.70	0.56		0.01	
Uniform Delay, d1	9.5	8.3			15.8	12.7		16.9	12.5		13.1	
Progression Factor	1.00	1.00			1.00	1.00		1.00	1.00		1.00	
Incremental Delay, d2	8.6	1.3			5.1	0.3		4.9	0.9		0.0	
Delay (s)	18.2	9.6			20.9	13.0		21.8	13.4		13.1	
Level of Service	B	A			C	B		C	B		B	
Approach Delay (s)		13.3			18.9			16.9			13.1	
Approach LOS		B			B			B			B	
Intersection Summary												
HCM 2000 Control Delay			16.2				HCM 2000 Level of Service			B		
HCM 2000 Volume to Capacity ratio			0.88									
Actuated Cycle Length (s)			57.0				Sum of lost time (s)			18.0		
Intersection Capacity Utilization			61.3%				ICU Level of Service			B		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

2028 PM No Build

06/29/2022

1: Institute Rd/City Bluffs & North Ave

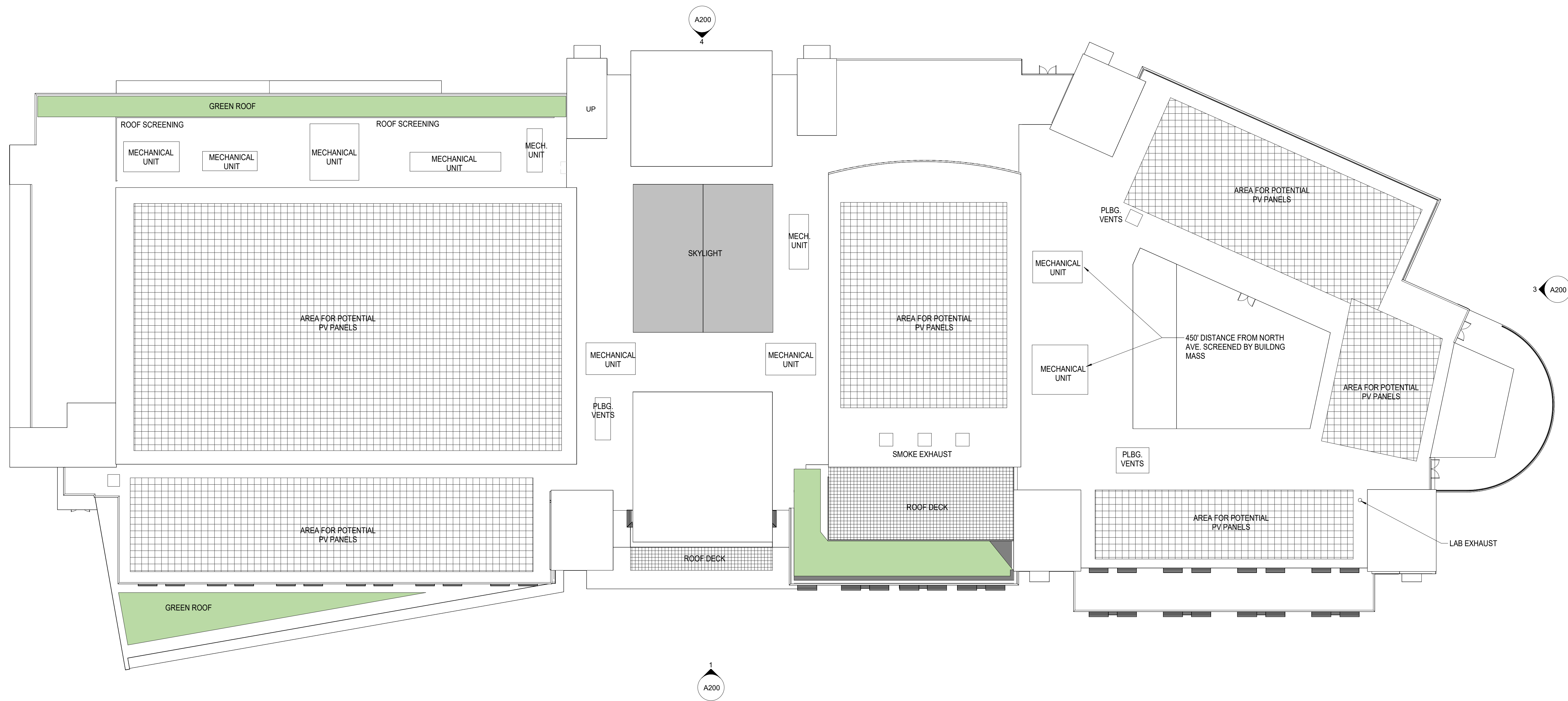
												
Movement	NBL	NBT	NBR	SBL	SBT	SBR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Volume (vph)	0	640	4	3	500	0	0	0	0	2	0	5
Future Volume (vph)	0	640	4	3	500	0	0	0	0	2	0	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.5			4.5						4.5	
Lane Util. Factor		1.00			1.00						1.00	
Frt		1.00			1.00						0.90	
Flt Protected		1.00			1.00						0.99	
Satd. Flow (prot)		1861			1862						1659	
Flt Permitted		1.00			1.00						1.00	
Satd. Flow (perm)		1861			1859						1683	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.25	0.25	0.25	0.92	0.92	0.92
Adj. Flow (vph)	0	696	4	3	543	0	0	0	0	2	0	5
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	7	0
Lane Group Flow (vph)	0	700	0	0	546	0	0	0	0	0	0	0
Turn Type	pm+pt	NA		Perm	NA	Perm				pm+ov	Perm	NA
Protected Phases	5	2			6			4	5			8
Permitted Phases	2			6		6	4		4	8		
Actuated Green, G (s)		55.7			55.7						1.0	
Effective Green, g (s)		55.7			55.7						1.0	
Actuated g/C Ratio		0.85			0.85						0.02	
Clearance Time (s)		4.5			4.5						4.5	
Vehicle Extension (s)		3.0			3.0						3.0	
Lane Grp Cap (vph)		1577			1576						25	
v/s Ratio Prot		c0.38										
v/s Ratio Perm					0.29						c0.00	
v/c Ratio		0.44			0.35						0.00	
Uniform Delay, d1		1.2			1.1						31.9	
Progression Factor		1.00			1.00						1.00	
Incremental Delay, d2		0.9			0.6						0.1	
Delay (s)		2.1			1.7						31.9	
Level of Service		A			A						C	
Approach Delay (s)		2.1			1.7			0.0			31.9	
Approach LOS		A			A			A			C	
Intersection Summary												
HCM 2000 Control Delay		2.1			HCM 2000 Level of Service			A				
HCM 2000 Volume to Capacity ratio		0.52										
Actuated Cycle Length (s)		65.7			Sum of lost time (s)			18.0				
Intersection Capacity Utilization		44.8%			ICU Level of Service			A				
Analysis Period (min)		15										
c Critical Lane Group												

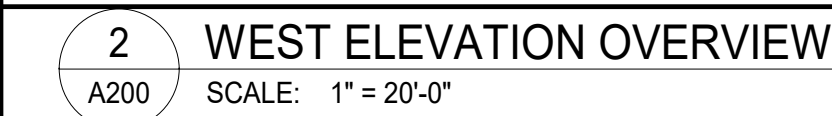
HCM Signalized Intersection Capacity Analysis

1: Institute Rd/City Bluffs & North Ave

2028 PM Build
06/29/2022

												
Movement	NBL	NBT	NBR	SBL	SBT	SBR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Volume (vph)	82	640	4	3	500	39	107	0	150	2	0	5
Future Volume (vph)	82	640	4	3	500	39	107	0	150	2	0	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5			4.5	4.5		4.5	4.5		4.5	
Lane Util. Factor	1.00	1.00			1.00	1.00		1.00	1.00		1.00	
Frt	1.00	1.00			1.00	0.85		1.00	0.85		0.90	
Flt Protected	0.95	1.00			1.00	1.00		0.95	1.00		0.99	
Satd. Flow (prot)	1770	1861			1862	1583		1770	1583		1659	
Flt Permitted	0.18	1.00			1.00	1.00		0.75	1.00		0.92	
Satd. Flow (perm)	336	1861			1857	1583		1403	1583		1555	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.25	0.25	0.25	0.92	0.92	0.92
Adj. Flow (vph)	89	696	4	3	543	42	428	0	600	2	0	5
RTOR Reduction (vph)	0	0	0	0	0	26	0	0	0	0	5	0
Lane Group Flow (vph)	89	700	0	0	546	16	0	428	600	0	2	0
Turn Type	pm+pt	NA		Perm	NA	Perm	Perm	NA	pm+ov	Perm	NA	
Protected Phases	5	2			6			4	5		8	
Permitted Phases	2			6		6	4		4	8		
Actuated Green, G (s)	34.5	34.5			24.5	24.5		21.5	27.0		21.5	
Effective Green, g (s)	34.5	34.5			24.5	24.5		21.5	27.0		21.5	
Actuated g/C Ratio	0.53	0.53			0.38	0.38		0.33	0.42		0.33	
Clearance Time (s)	4.5	4.5			4.5	4.5		4.5	4.5		4.5	
Vehicle Extension (s)	3.0	3.0			3.0	3.0		3.0	3.0		3.0	
Lane Grp Cap (vph)	299	987			699	596		464	767		514	
v/s Ratio Prot	0.03	c0.38							c0.07			
v/s Ratio Perm	0.13				0.29	0.01		c0.31	0.31		0.00	
v/c Ratio	0.30	0.71			0.78	0.03		0.92	0.78		0.00	
Uniform Delay, d1	10.2	11.5			17.9	12.7		20.9	16.5		14.6	
Progression Factor	1.00	1.00			1.00	1.00		1.00	1.00		1.00	
Incremental Delay, d2	0.6	4.3			8.5	0.1		23.9	5.2		0.0	
Delay (s)	10.8	15.8			26.3	12.8		44.8	21.7		14.6	
Level of Service	B	B			C	B		D	C		B	
Approach Delay (s)		15.2			25.4			31.3			14.6	
Approach LOS		B			C			C			B	
Intersection Summary												
HCM 2000 Control Delay			24.6				HCM 2000 Level of Service			C		
HCM 2000 Volume to Capacity ratio			0.96									
Actuated Cycle Length (s)			65.0				Sum of lost time (s)			18.0		
Intersection Capacity Utilization			84.3%				ICU Level of Service			E		
Analysis Period (min)			15									
c Critical Lane Group												





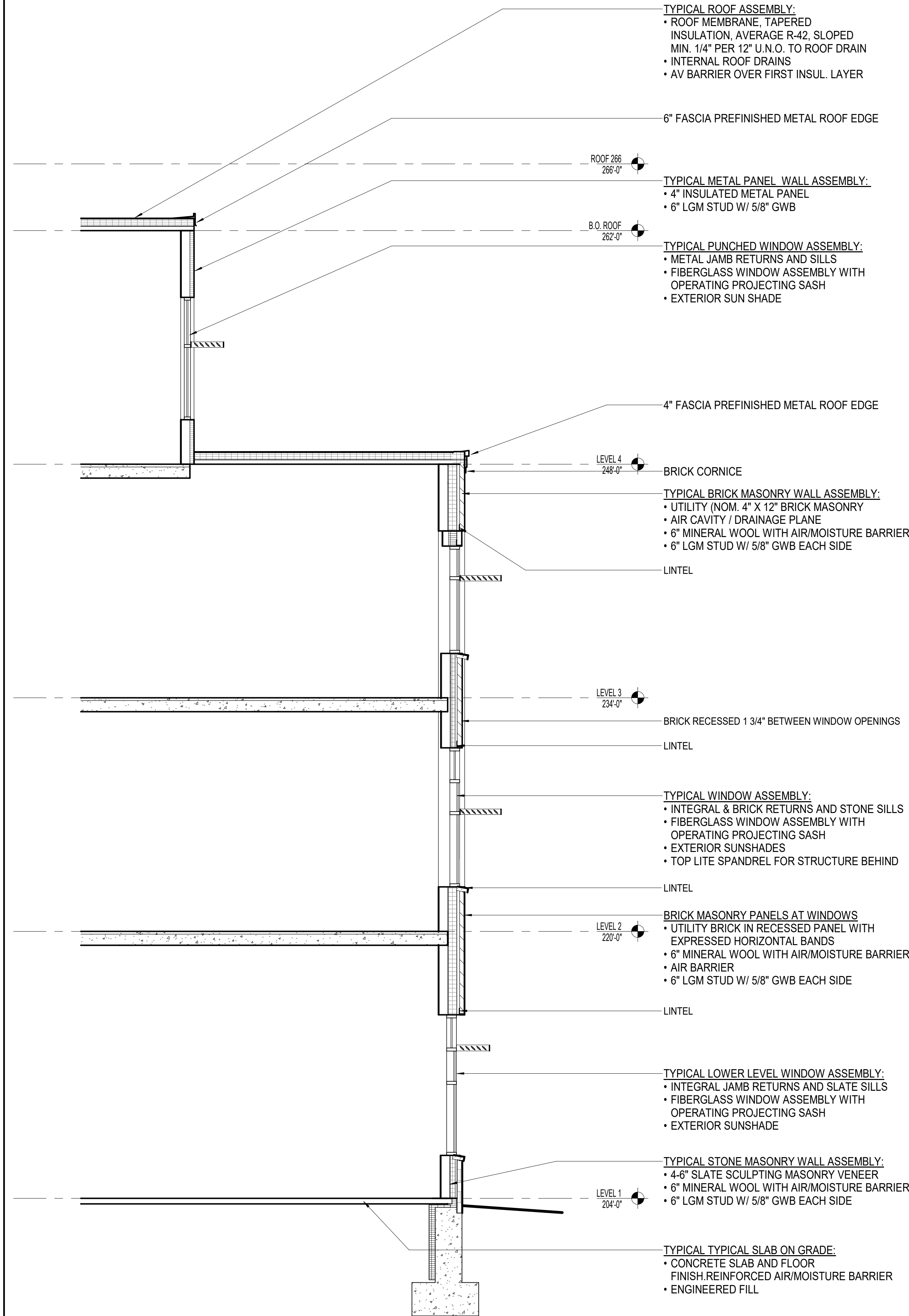
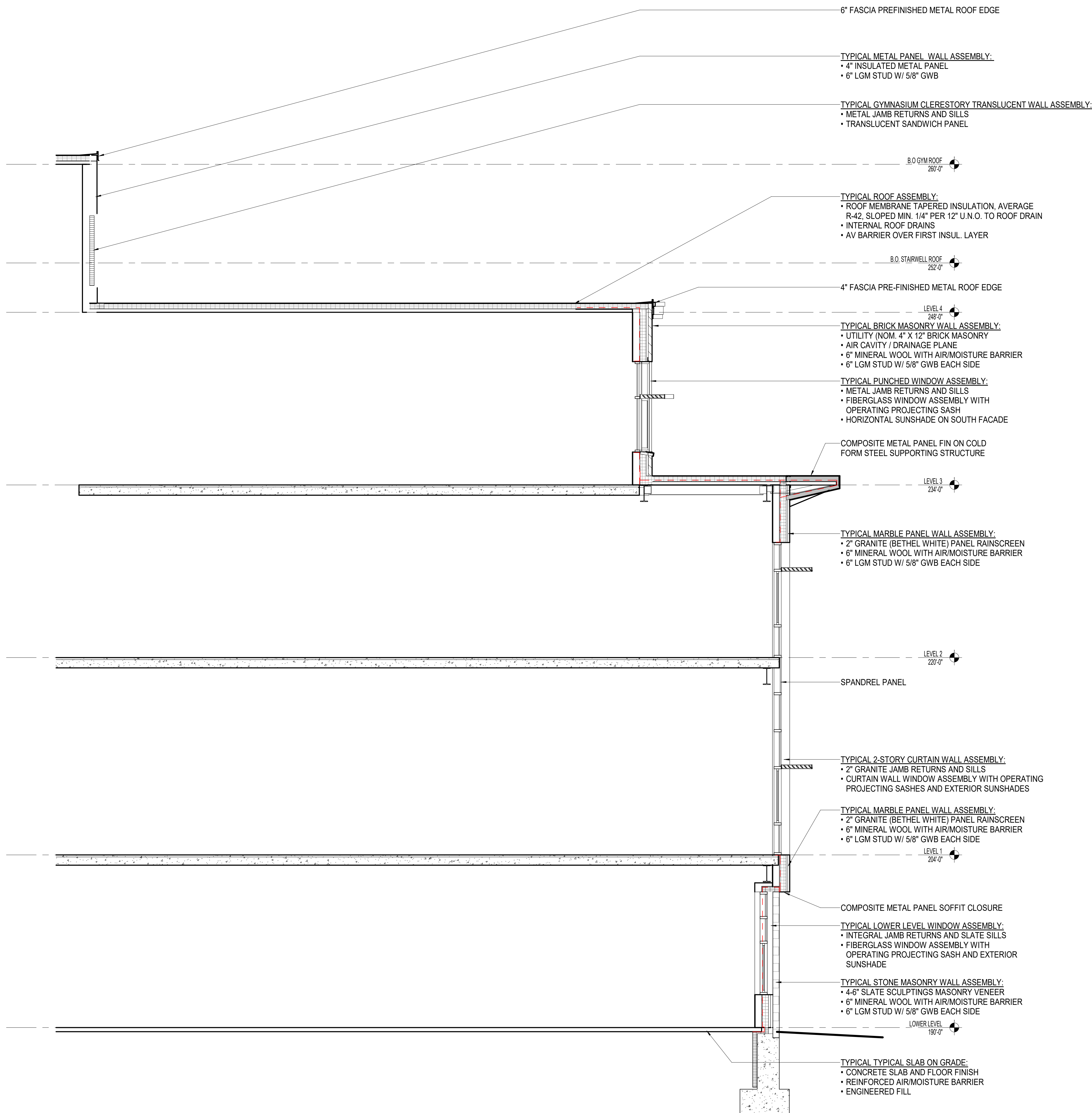
9/20/2022 2:22:07 PM

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
-
NOT FOR
CONSTRUCTION

fff

freeman | french | freeman
81 Maple Street • Burlington VT 05401
802-464-4844 • www.fffinc.com
Architects • Planning • Interiors

CLA

Colin Lindberg Architects
208 Pines Ave # 20
Burlington, VT 05401
(802) 864-4950

DRA

Drumheller Design Associates, Inc.
4000 10th Street, Suite 100
Burlington, VT 05401
802-864-4950

BURLINGTON HIGH
SCHOOL &
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

SHEET CONTENTS:

WALL SECTIONS -
TYPICAL

SHEET NO:

A320

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Bethel White Granite Co., Ltd.

[HOME](#)[Products show room](#)

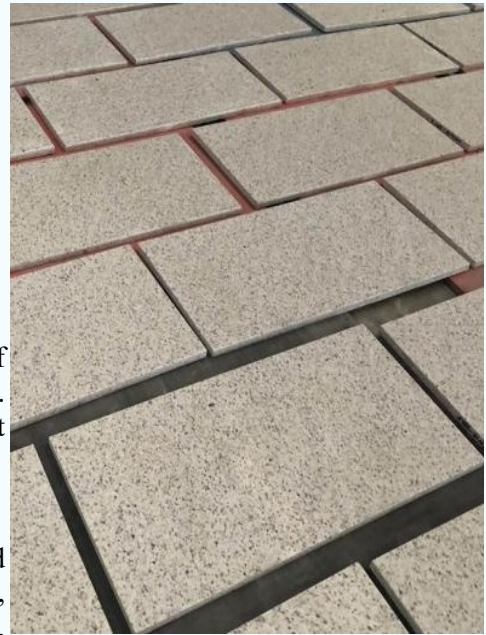
Bethel White Granite Co., Ltd.

Stone Name: **Bethel white granite**
Pseudonym: Hartwick, Hartwick White, Lord, Lord Granit
Main color: White
Classification: Granite
Availability: good
Texture: medium
Maximum size: 280 x 150 cm
Application: Suitable for interior and exterior applications

Bethel White granite displays a flawless, even grain and purity of color that truly makes it the most prized white granite in the world. Its unrivaled beauty and uncommon strength and durability make it the perfect choice for any project where quality is the specification.

Bethel White Granite is a kind of white granite quarried in United States. This stone is especially good for Countertops, monuments, mosaic, exterior - interior wall and floor applications, fountains, pool and wall capping, stairs, window sills and other design projects. It also called White Bethel . Bethel White Granite can be processed into Polished, Sawn Cut, Sanded, Rockfaced, Sandblasted, Tumbled and so on.

Additional Names: **White Bethel** granite



General Usage for Bethel White Granite tiles and slabs

It is mainly used for flooring, cladding, kitchen counters and table tops. It looks best when it is glossy however honed, flamed and river-washed finishes are also available. Available in both white granite slabs and tiles. This stone is used worldwide in a number of large projects.



Granite - the very name suggests unyielding permanence and endurance. Bethel White granite is an extremely hard igneous stone. Formed of molten stone under the intense heat and pressure of inner earth, the magma slowly cooled and crystallized, forming granite. Bethel White granite is durable, weather resist and beautiful.

One of the hardest of stones, Bethel White granite is excellent for stone cladding, curtain walls, water features, counter tops, furniture, elevator panels



and wherever a long lasting, naturally beautiful stone is needed. Bethel White granite is cut thin and bonded to high strength aluminum honeycomb

panels. The stone panels are light weight, easy to handle and incredibly strong.

Technical Specification of Bethel White Granite

CompressiveStrength: 1910kg/cm²

WaterAbsorption: 1.28%

Density: 2680kg/m³

FlexuralStrength: 165kg/cm²

Bethel White granite is widely used in interior and exterior for flooring, paving, facading, tombstone , monuments , fountain and other landscape for garden, kitchen countertops, vanity tops ,worktops for its affordable cost and color consistency.

Bethel White Granite Countertops is great for heavily used surfaces such as kitchen countertops, also Bethel White granite is one of the most popular shades of granite.

Bethel White granite is available for various finsh types catering to different applications,these include polished, honed, flamed, bush hammered, sandblast, tumbled, natural split etc.

We are the leading supplier for Bethel White granite, we have our own quarry and professsional factory since 1992. There are always Bethel white granite big gangsaw slabs in stock ..

Bethel White Granite tiles

12" x 12" x 3/10"(305 x 305 x 8mm)

12" x 12" x 3/8" (305 x 305 x 10mm)

12" x 12" x 1/2" (305 x 305 x 12mm)

18" x 18" x 1/2" (457 x 457 x 12mm)

Finish : polished, flamed, honed, bush hammered .

Bethel White countertops, worktops

Bethel White granite worktops tone in beautifully with creams and natural wood finishes to compliment a country kitchen but can also equally make a dramatic statement with gloss doors in a contemporary setting. The subtle tones of the new cappuccino and latte gloss doors that are now available for kitchens can be dramatically brought alive by the beauty of the natural pattern of Bethel White. Shown here with a warmer wood finish it is a lively contrast to the plain cream used on the walls.

China marble Landscape stone

White granite : Pearl white granite, White solar granite ,G603 granite

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As the original “aluminum composite material,” ALUCOBOND PLUS consists of two sheets of smooth .020” aluminum thermo-bonded to a solid, fire retardant core and has been developed exclusively to allow architects and designers to meet today’s fire performance requirements set by the International Building Code (IBC) while using ACM as the material of choice. Proven product properties and benefits of ALUCOBOND PLUS include:

- Flatness & Rigidity
- Durability
- Ability to be perforated
- Formability
- Ease of fabrication
- Wide range of colors & finishes

The versatile characteristics of ALUCOBOND PLUS provide for a plethora of applications such as exterior and interior cladding, column covers, canopies, soffits and even signage, allowing architects to offer inspiring, creative, and innovative designs while meeting the standards of sustainable planning.

ALUCOBOND PLUS is available in all of our current finishes and custom colors.

PRODUCT DESCRIPTION

MATERIAL COMPOSITION

- Aluminum interior and exterior facings in 0.020” nominal thickness
- 4mm total nominal thickness, including proprietary fire retardant core

SHEET WIDTHS

- Standard coil-coated width of 62”*
- * Some finishes are stocked in 40”, 49.2” or 50”. Please refer to stock material list
- Custom widths of 40” and 50” available on request

SHEET LENGTHS

- Standard coil-coated length of 196”
- Reflect Mirror is offered in 146”
- Custom lengths for coil coating: maximum 400”
- Custom lengths for anodized: maximum 216”

MINIMUM BENDING RADIUS

- The minimum bending radius of ALUCOBOND PLUS without routing the interior skin is 15 times the thickness
- The minimum bending radius for 4mm ALUCOBOND PLUS material without routing the back skin is 4”

MANUFACTURING

- ALUCOBOND PLUS is made in Benton, Kentucky USA

TECHNICAL SUMMARY

TEMPERATURE RESISTANCE

- Withstands environmental temperature changes from -55°F to +180°F
- Coefficient of linear expansion is governed by the aluminum sheet

TECHNICAL PROPERTIES

- Nominal thickness: 4mm
- Nominal weight: 1.56 lb/ft²
- Moment of inertia: .000212 in⁴/in
- Section of modulus: .00275 in³/in
- Rigidity: 2143 lb-in²/in

SUSTAINABILITY DESIGN

- LEED 3
- LEED v4/4.1
 - LCA Industry Standard
 - EPD Industry Standard

ACCEPTED EVALUATION REPORTS

- ICC-ES: 1185
- Florida Product Approval: FL29842
- Miami Dade County NOA: 15-0923.03
- Los Angeles Research Report: 24868
- Underwriters Laboratory: 19980

WALL ASSEMBLY FIRE TESTING

- CAN/ULC S134**
- NFPA 285**

To download PDF or AutoCAD details and specifications, visit our [website](#).

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TRIFAB® VG (VERSAGLAZE®)
TRIFAB® VG 450, 451 & 451T (THERMAL) FRAMING SYSTEMS &
TRIFAB® 451UT (ULTRA THERMAL) FRAMING SYSTEM



Design + Performance

Versatility with Unmatched Fabrication Flexibility



Geisinger Professional Building
Jenkins Township, Pennsylvania
ARCHITECT
Mericle Commercial Real Estate Services
Wilkes-Barre, Pennsylvania
GLAZING CONTRACTOR
Sterling Glass, Inc., Scranton, Pennsylvania
PHOTOGRAPHER
© Perzel Photography Group

Trifab® VersaGlaze® is built on the proven and successful Trifab® platform – with all the versatility its name implies. There are enough framing system choices, fabrication methods, design options and performance levels to please the most discerning building owner, architect and installer. The 4.5" depth Trifab® VersaGlaze® Framing System family is available with non-thermal, thermal and ultra-thermal performance levels. The ultra-thermal Trifab® 451UT Framing System, is designed for the most demanding thermal performance and employs a dual Isolock® thermal break.

AESTHETICS

Trifab® VersaGlaze® Framing Systems offer designers a choice of front-, center-, back- or multi-plane glass applications. Structural silicone

glazing (SSG) and weatherseal glazing options further expand designers' choices, allowing for a greater range of possibilities for specific project requirements and architectural styles. All systems have a 4-1/2" frame depth; Trifab® VersaGlaze® 450 has 1-3/4" sightlines, while Trifab® VersaGlaze® 451/451T and Trifab® 451UT have 2" sightlines.

With seamless incorporation of Kawneer entrances or windows, including GLASSvent® visually frameless ventilators, Trifab® framing can be used on almost any project. These framing systems can also be packaged with Kawneer curtain walls and overhead glazing, thereby providing a full range of proven, and tested, quality products for the owner, architect and installer from a single-source supplier.

ECONOMY

Trifab® VersaGlaze® 450/451/451T/451UT Framing Systems offer a variety of fabrication choices to suit your project:

- **Screw Spline** – for economical continuous runs utilizing two-piece vertical members that provide the option to pre-assemble units with controlled shop labor costs and smaller field crews for handling and installation. (available for all systems)
- **Shear Block** – for punched openings or continuous runs using tubular moldings with shear block clips that provide tight joints for transporting large pre-assembled multi-lite units. (available for 450/451/451T systems)
- **Stick** – for fast, easy field fabrication. Field measurements and material cuts can be done when metal is on the jobsite. (available for 450/451/451T systems)
- **Pre-glazed** – The combination of screw spline construction with pre-glazing in the shop accelerates installation and reduces field labor time while minimizing disruption to the surrounding area or existing tenants. Making it an exceptional choice for new or retrofit applications, particularly in urban areas or where space is limited. (available for 451/451T/451UT framing)



Brighton Landing
Cambridge, Massachusetts
ARCHITECT
ADD Inc., Cambridge, Massachusetts
GLAZING CONTRACTOR
Ipswich Bay Glass Company, Inc., Rowley, Massachusetts
PHOTOGRAPHER
© Gordon Schenck, Jr.

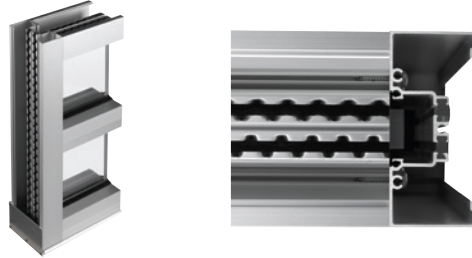
All systems can be flush glazed from either the inside or outside. The weatherseal option provides an alternative to SSG vertical mullions for Trifab® VersaGlaze® 450/451/451T. This ABS/ASA rigid polymer extrusion allows complete inside glazing and creates a flush glass appearance on the building exterior without the added labor of scaffolding or swing stages. Additionally, high-performance flashing options are engineered to eliminate perimeter sill fasteners and associated blind seals.

FOR THE FINISHING TOUCH

Architectural Class I anodized aluminum and painted finishes in fluoropolymer (AAMA 2605) and solvent-free powder coatings (AAMA 2604) offer a variety of color choices.

PERFORMANCE

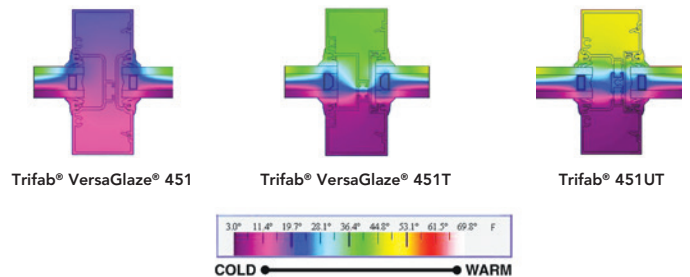
Kawneer's Isolock® thermal break technology creates a composite section, prevents dry shrinkage and is available on Trifab® VersaGlaze® 451T. For even greater thermal performance, a dual Isolock® thermal break is used on Trifab® 451UT.



Trifab® 451UT uses a dual Isolock® thermal break (right) and features a new high-performance sill design, which incorporates a screw-applied end dam (left), ensuring positive engagement and tight joints between the sill flashing and end dam.

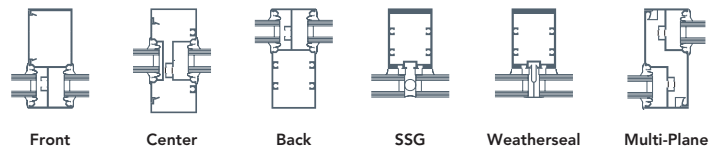
U-factor, CRF values and STC ratings for Trifab® framing systems vary depending upon the glass plane application. Project-specific U-factors can be determined for each individual project. (See the Kawneer Architectural Manual or Kawneer.com for additional information.)

Thermal simulations showing temperature variations from exterior/cold side to interior/warm side.



PERFORMANCE TEST STANDARDS

Air Infiltration	ASTM E283
Water	AAMA 501, ASTM E331
Structural	ASTM E330
Thermal	AAMA 1503
Thermal Break	AAMA 505, AAMA TIR-A8
Acoustical	AAMA 1801, ASTM E1425



Features

- 1600UT System®2 is a high thermal performance, structural silicone glazed curtain wall system
- Innovative design delivers high thermal performance while leveraging 1600 Wall System architecture
- Multiple thermal performance levels resulting from a combination of:
 - 1" (25.4), 1-1/4" (31.8), 1-5/16" (33.34) double or 1-3/4" (44.5), triple glazed insulating glass units
 - Aluminum or fiberglass pressure plates
- Thermal barrier design ensures high thermal performance without being susceptible to thermal fatigue
- Offers integrated entrance framing systems
- Corners and splays
- Comprehensively tested to latest high performance air, water, structural and thermal standards
- Glass chairs support insulating glass units enabling larger expanses of glass
- Pressure equalized system tested with vapor barrier
- Two color option
- Permanodic® anodized finishes in seven choices
- Painted finishes in standard and custom choices

Optional Features

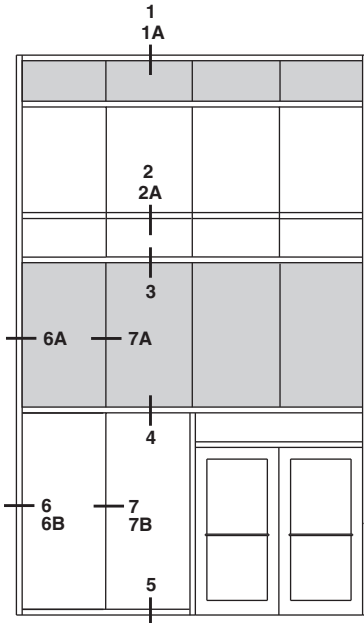
- Steel reinforcing
- Rain screen and backpans
- Deep profile covers and bull nose covers
- Deep and heavy-weight mullions
- Integrates with standard Kawneer windows and GLASSvent® Windows for curtain wall
- Profit\$Maker® Plus die sets
- Seismic performance tested with AAMA 501.4 and AAMA 501.6 standards

Product Applications

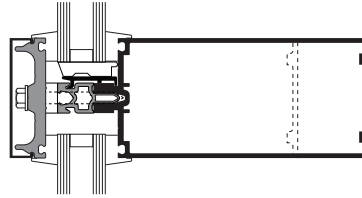
- Ideal for low to mid-rise applications where high thermal performance is desired
- High span applications

For specific product applications,
consult your Kawneer representative.

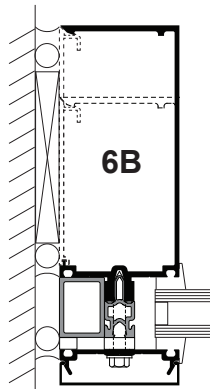
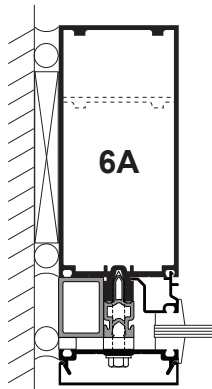
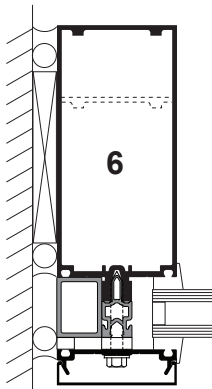
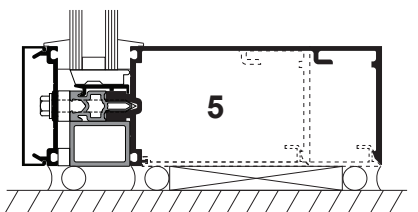
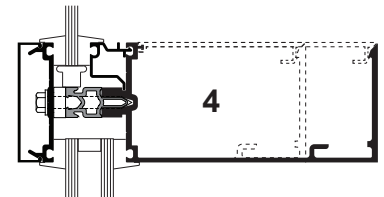
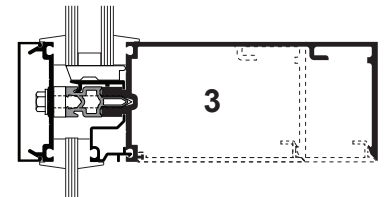
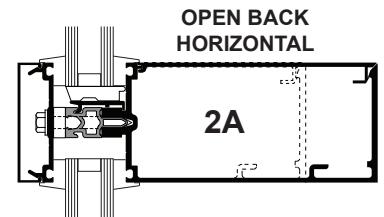
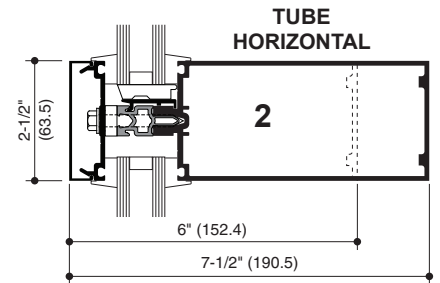
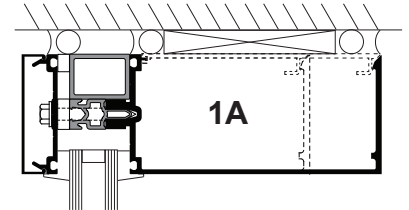
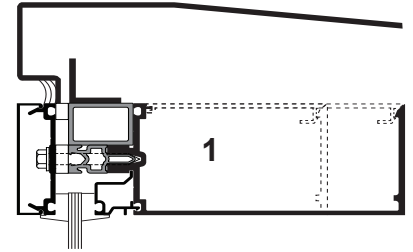
Additional information and CAD details are available at www.kawneer.com



ELEVATION IS NUMBER KEYED TO DETAILS

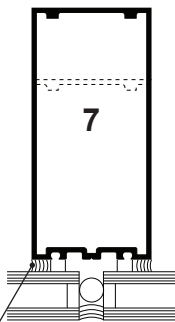


OPTIONAL
FIBERGLASS
PRESSURE PLATE

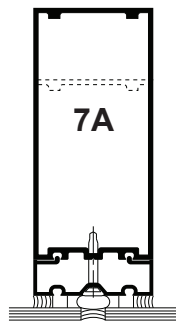


1/4" INFILL
ADAPTER

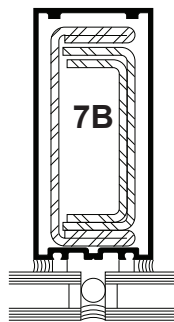
OPEN BACK JAMB



Structural Silicone
Sealant (by Others)*



1/4" INFILL
ADAPTER

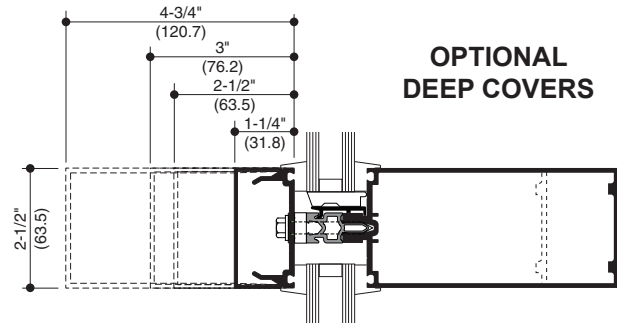


STEEL
REINFORCING
AS REQUIRED

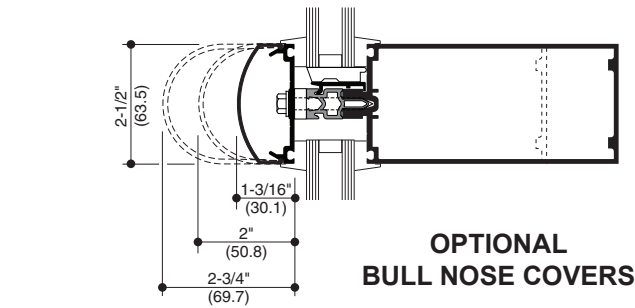
* **INSTALLER NOTE:** Installer is responsible for all required compatibility review and approvals with the Structural Silicone Manufacturer and the Insulating Glass Unit Manufacturer.

Additional information and CAD details are available at www.kawneer.com

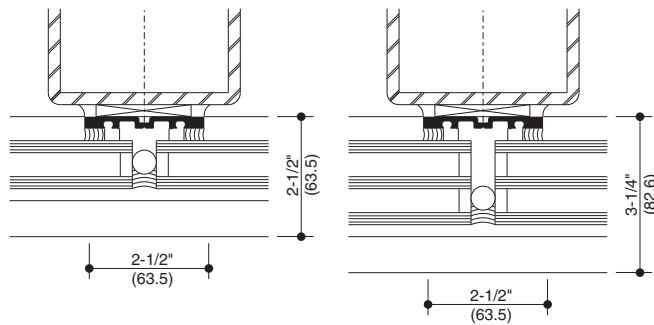
Architects – Most extrusion and window types illustrated in this catalog are standard products for Kawneer. These concepts have been expanded and modified to afford you design freedom. Some miscellaneous details are non-standard and are intended to demonstrate how the system can be modified to expand design flexibility. Please contact your Kawneer representative for further assistance.



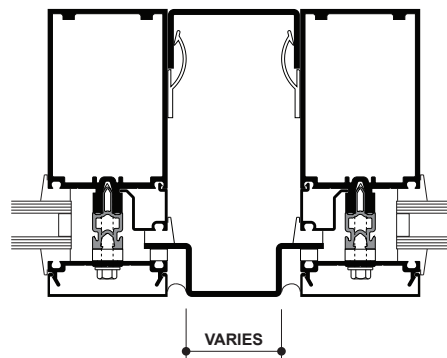
**OPTIONAL
DEEP COVERS**



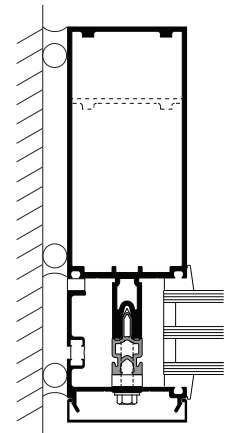
**OPTIONAL
BULL NOSE COVERS**



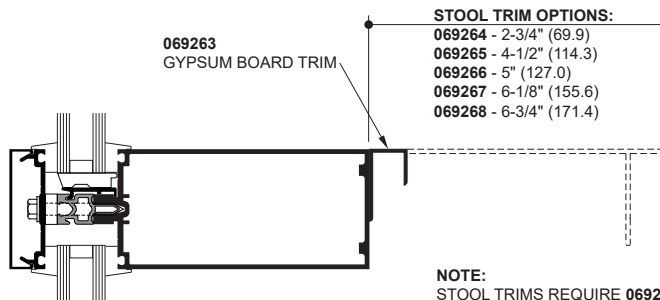
VENEER SYSTEM



DOUBLE MULLION



**THERMAL
PERIMETER
PRESSURE PLATE**



INTERIOR STOOL TRIM

*** INSTALLER NOTE:** Installer is responsible for all required compatibility review and approvals with the Structural Silicone Manufacturer and the Insulating Glass Unit Manufacturer.

Structural Silicone Sealant (by Others)*

Laws and building and safety codes governing the design and use of Kawneer products, such as glazed entrance, window, and curtain wall products, vary widely. Kawneer does not control the selection of product configurations, operating hardware, or glazing materials, and assumes no responsibility therefor.

Kawneer reserves the right to change configuration without prior notice when deemed necessary for product improvement.

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Unit Features**Modern Abbreviations**

Casement Crank-out: MCA

Casement Push-out: MCAPO

Awning Crank-out: MAWN

Awning Push-out: MAWNPO

Modern Casement/Awning Picture: MCAP

Frame:

- High-Density Fiberglass exterior with aluminum interior covers
- Jamb Depth: 4 1/2" (114)
- Frame Thickness: 1 7/16" (37)
- Vinyl Nailing Fin: 2" (51)
- Optional Frame Filler

Glass and Glazing:

- All glass is of select quality complying with commercial industry standards.
- Glazing seal: Black silicone beading.
- Black Stainless Steel Spacer
- Dual-pane insulating glass thickness: 15/16" (23).
- Triple-pane insulating glass thickness: 1 1/4" (32).
- Insulating Glass Coatings: Low E1, Low E2, Low E3, Low ERS, Low ELR
- Gas Fill: Air, Argon, Argon-Krypton
- Other Glass Types: Gray or Bronze Tint, Obscure, Frost
- Glass panes are based on overall unit size and may be 3.1, 3.9, 4.7, and 5.7 mm thicknesses
 - Low ELR units to 5.7mm sizes and below
 - Tint limited to 5.7mm pane thickness and 15/16" glass make-up.
 - Frost is limited to 5.7mm and 3.9mm pane thicknesses
 - Obscure (Pattern 62) glass is limited to 4.7mm pane thickness and below

Mulling:

For mull performance, refer to the General Mulling chapter of the ADM.

Unit Features Continued

PUSH-OUT HARDWARE

Casement and Awning Hardware:

- Concealed handle and receiver
 - Color: Matte Black, Matte Bronze, Silver, Satin Nickel, Stone White
- Lever(s) with concealed multi-point locks.
- Stainless steel

Casement Specific:

- Casement hardware includes a friction limiter that allows the window to be opened and locked into several different positions.
- Casement hinges allow the user the ability to slide the sash across the frame opening so the sash exterior will rotate toward the user for the easy wash mode
- Hinges are stainless steel
- Casement hinges are designed to support up to a 145 pound sash

Awning Specific:

- Hinges are stainless steel
- Awning hinges are designed to support up to 130 pound sash

Custodial Sash Limiters:

- Available with Casement and Awning.
- If Casement frame OM is larger than 36" (914) x 102" (2591), 40" (1016) x 96" (2438), or 44" (1118) x 72" (1829) custodial limiters will be applied, limiting travel
- If Awning frame OM is larger than 72" (1829) x 72" (1829) custodial limiters will be applied, limiting travel

Weather strip:

- Frame weather strip is made of a foamed EPDM material with a hollow built in to reduce compression force. The material is UV resistant, durable, has a low COE, and is flexible enough to be bent around 90 degree corners to allow for fewer seams in it around the frame
 - Color: Black
- Sash weather strip is made of glass filled polypropylene material and is formulated to be UV resistant, have low COE, and slide easily in and out of frame.
 - Color: Black

Screen:

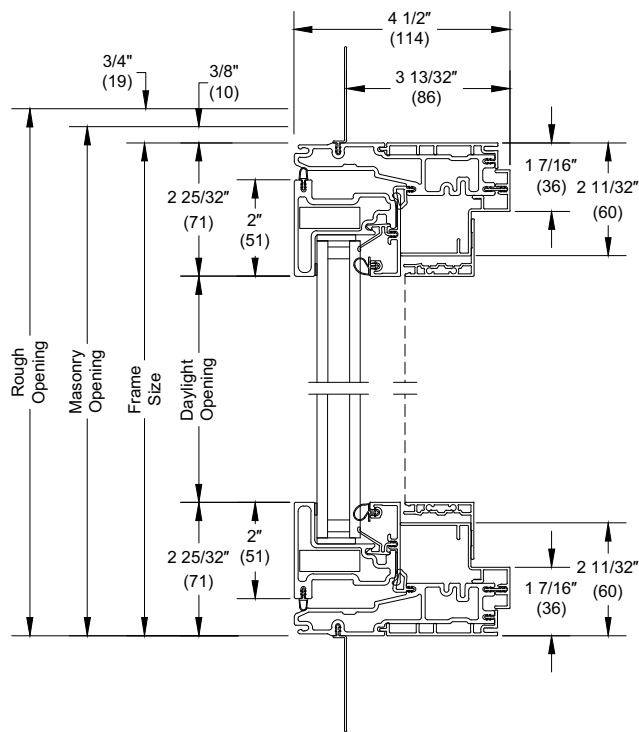
- Fixed screen is an extruded aluminum full surround with an integrated flush latch to secure the screen into the frame opening
 - Available on the crank out casement and awning
- Inswing screen is an extruded aluminum full surround with an integrated continuous extruded aluminum hinge and an integrated flush latch to secure the screen into the frame opening.
 - Available on the push out casement and awning
- Screen frame is color matched to the interior frame color.
- Standard screen mesh is high transparency

Lock Status Sensor (Optional):

- Available for All casement and awning operating units
- Refer to Lock Status Sensor Installation Instructions for requirements.
- Lock Status Sensor detects a locked or unlocked status. It allows easy integration with home automation systems using a wired or wireless connection.
 - For wired options, check with local codes on potential contractor requirements for low voltage networking connections.
 - Wireless option available. Requires purchase of secondary transmitter for operation. Marvin will prep for this.
- Wireless Lock Status sensor within the frame.
- Sensor Location
 - Casement - will be on locking side.
 - Awning - will be on both sides.
- For Wired or Wireless, Black or White Magnet Covers available only visible from secondary surfaces. Cover color dependent upon interior finish.
 - White: Stone White Painted Interior Finish
 - Black: All other finish options

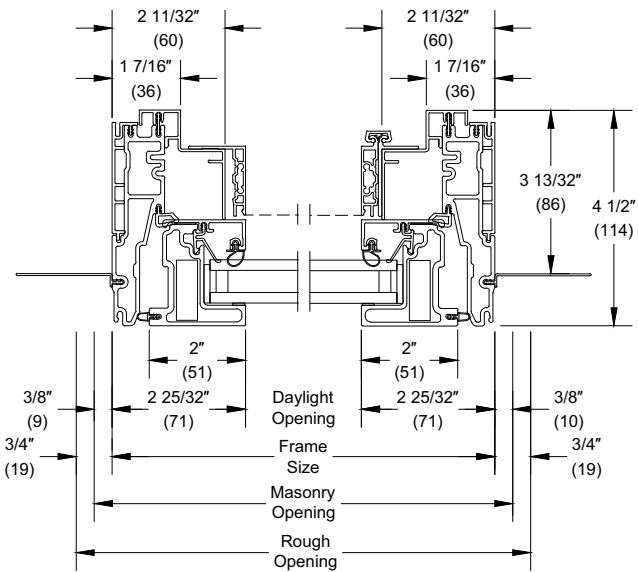
Section Details: Operating Push-out with Screen

Scale: 3" = 1' 0"

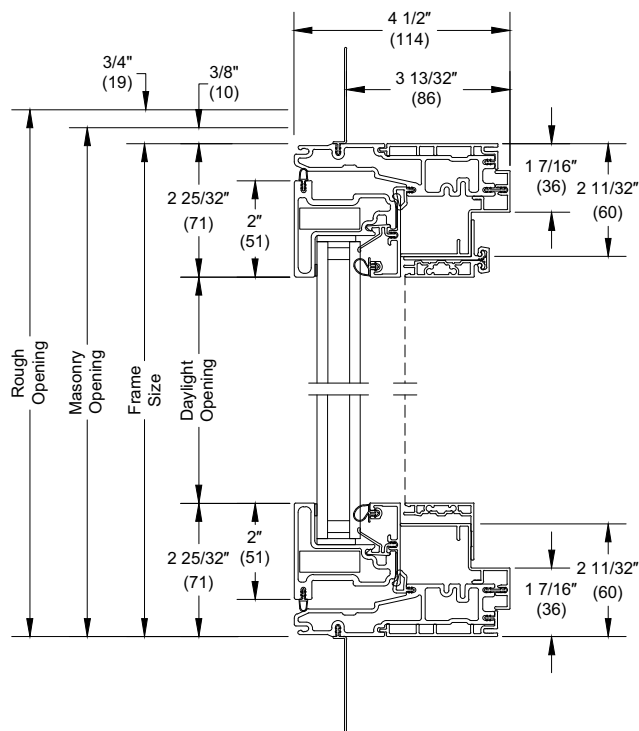


Head Jamb and Sill

Casement

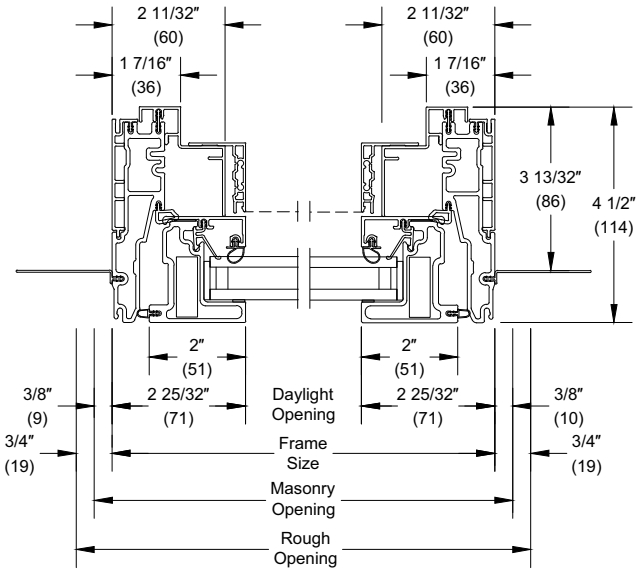


Jamb



Head Jamb and Sill

Awning



Jamb

Unit Features: Modern Direct Glaze Rectangle and Polygon

Modern Direct Glaze Polygon: MDG POLY

Modern Direct Glaze Rectangle/Square: MDG RECT

Frame:

- High-Density Fiberglass exterior with aluminum interior covers
- Jamb Depth: 4 1/2" (114)
- Frame thickness: 1 7/16" (37)
- Minimum frame angle 15°
- Vinyl Nailing Fin: 2" (51)
- Optional Frame Filler

Glass and Glazing:

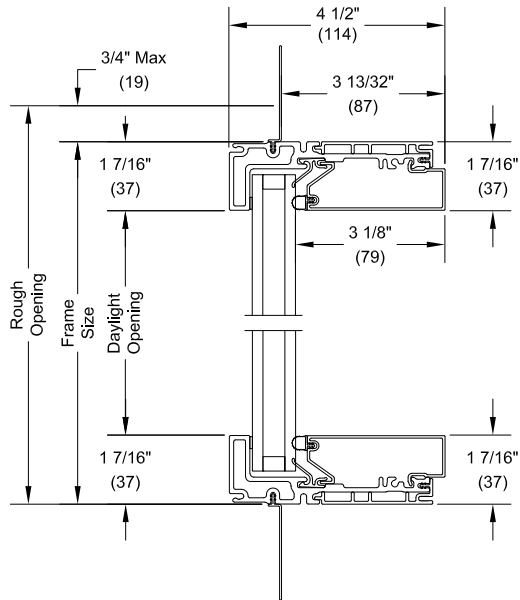
- All glass is of select quality complying with commercial industry standards.
- Glazing seal: Black silicone beading, exterior
- Dual-pane insulating glass thickness: 15/16" (23) or 1 1/4" (32).
- Triple-pane insulating glass thickness: 1 1/4" (32).
- Insulating Glass Coatings: Low E1, Low E2, Low E3, Low ERS, Low ELR
- Gas Fill: Air, Argon, Argon-Krypton
- Other Available Glass Types: Laminated, Tempered, Tints (Gray or Bronze, Obscure, Frost)
- Glass panes are based on overall unit size and may be 3.1, 3.9, 4.7, 5.7 and 8.0 mm thicknesses
- Low ELR units to 5.7mm sizes and below
- Tint limited to 5.7mm pane thickness and 15/16" glass make-up.
- Frost is limited to 5.7mm and 3.9mm pane thicknesses
- Obscure (Pattern 62) glass is limited to 4.7mm pane thickness and below
- Black Spacer Bar
 - Black Stainless Steel Spacer on shapes with angles greater than 45 degrees
 - Black Aluminum spacer on shapes with angle less than 45 degrees

Mulling Options:

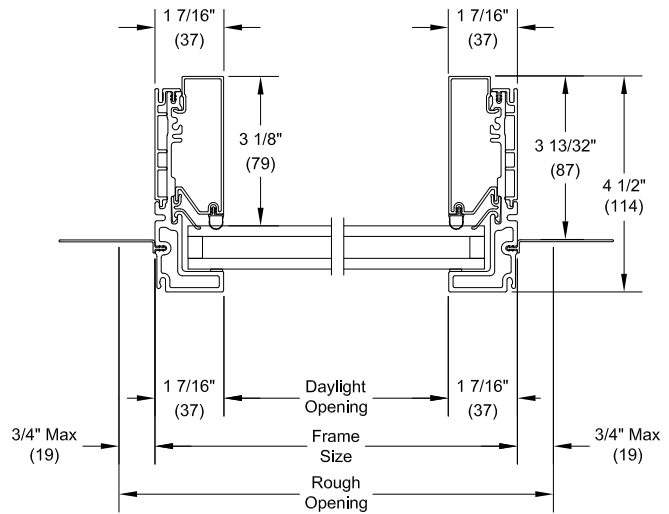
- For mull performance, refer to the General Mulling chapter of the ADM.

Section Details: Modern Direct Glaze - Rectangle (Dual-Pane)

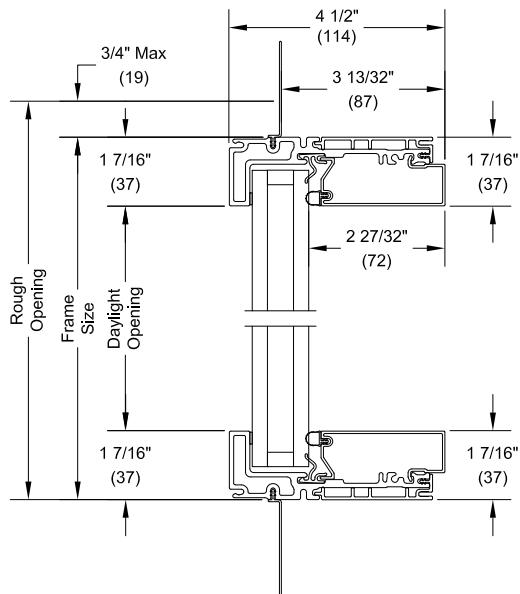
Scale: 3' = 1' 0"



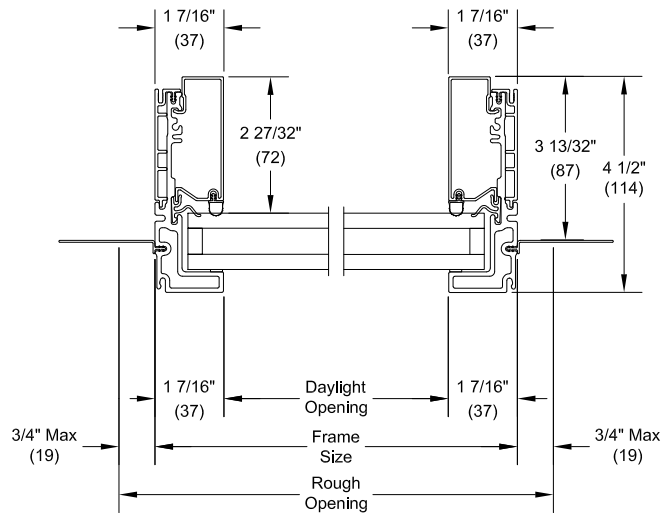
Direct Glaze Rectangle
Head Jamb and Sill with 15/16" Dual-Pane



Direct Glaze Rectangle
Jambs with 15/16" Dual-Pane

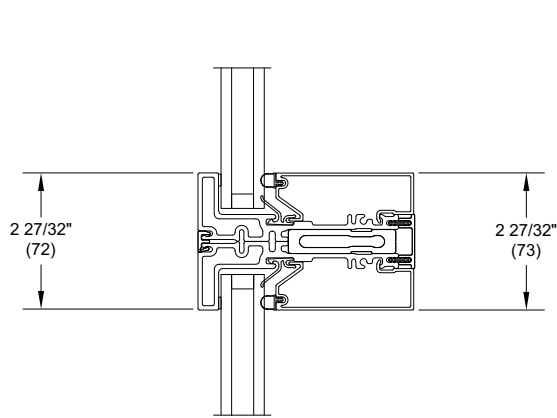


Direct Glaze Rectangle
Head Jamb and Sill with 1 1/4" Dual-Pane

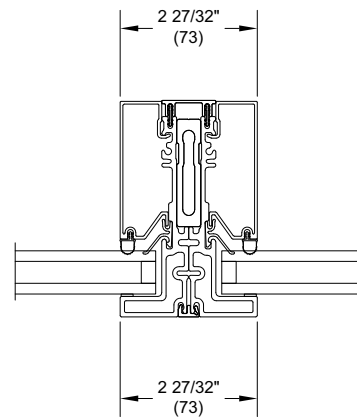


Direct Glaze Rectangle
Jambs with 1 1/4" Dual-Pane

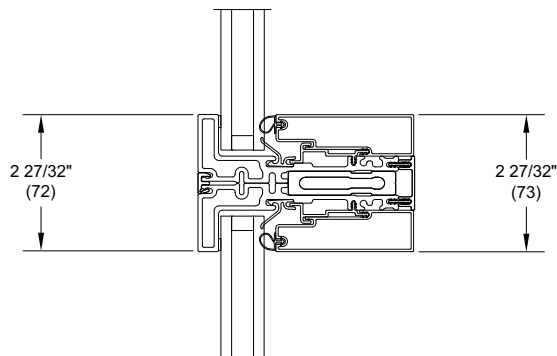
Section Details: Modern Direct Glaze - Mullions



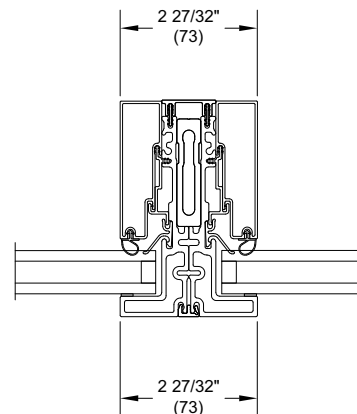
Direct Glaze Rectangle
Head Jamb and Sill



Direct Glaze Rectangle
Jambs



Direct Glaze - Polygon
Head Jamb and Sill

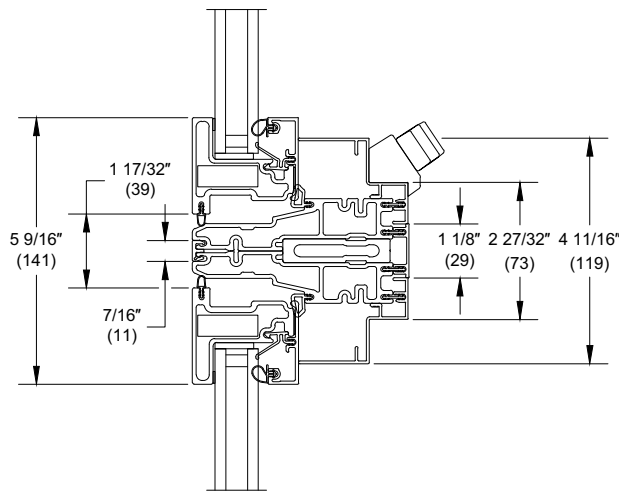


Direct Glaze Polygon
Jambs

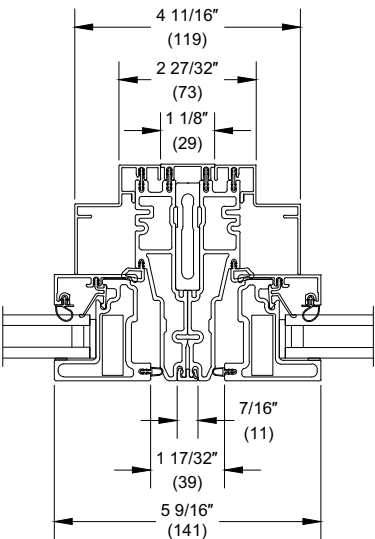
NOTE: Refer to the Mull ADM for more information on mulling options.

Section Details: Modern Casement - Mullions

15/16" Dual Pane Glass



Head Jamb and Sill



Jambs

NOTE: Refer to the Mull ADM for more information on mulling options.

Wall Systems

Translucent Wall Systems offer many budget-friendly, elegant side lighting solutions. From single story applications to mid-rise construction, Kalwall Wall Systems transform sunlight into glare-free daylight to enhance any space.

Standard Wall Systems | 2-3/4" (70mm) Standard Thickness

For certain climate zones and building types, non thermally-broken Wall Systems provide sufficient envelope performance that is both cost effective and meets energy codes.

Standard, aluminum interlocking I-beam panel grid core

Standard aluminum Clamp-tite™ fastening system

U-factors range from 0.53 - 0.18 (3.01 to 1.02 W/m²K)

Solar Heat Gain Coefficients (SHGC) from 0.65 to 0.10

Visible Light Transmission (VLT) values from 3% to 58%

STANDARD SYSTEM | BACK FASTENED SYSTEM | CONCEALED FASTENERS | KALCURVE | 1-9/16" SYSTEM



Thermally Broken Wall Systems | 2-3/4" (70mm) Standard Thickness

For more demanding climate zones and building types, Thermally-Broken Wall Systems provide enhanced envelope performance to meet or exceed the toughest energy codes.

Thermally-broken, interlocking I-beam panel grid core

Thermally-broken aluminum Clamp-tite™ fastening system

U-factors range from 0.23 - 0.05 (1.31 to 0.28 W/m²K)

Solar Heat Gain Coefficients (SHGC) from 0.36 to 0.04

Visible Light Transmission (VLT) values from 3% to 35%

THERMAL BREAK+STRUT SYSTEM | BACK FASTENED SYSTEM | CONCEALED FASTENERS | KALWALL 100 (4" SYSTEM)

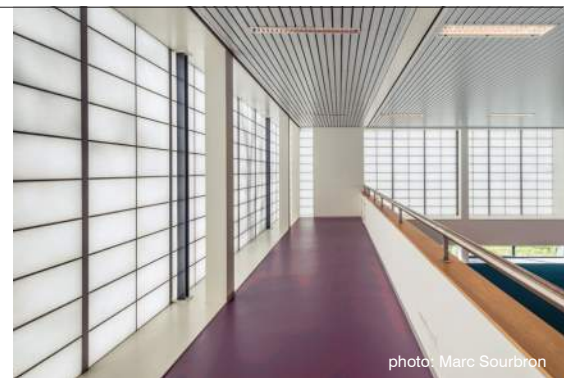


photo: Marc Sourbron

Specialty Applications | 2-3/4" (70mm) Standard Thickness

Kalwall offers many product configurations for projects that require special performance criteria to protect from extreme weather events and manage human safety+security

Class A fire ratings available for Wall Systems and Unitized Curtain Walls

Windborne debris protection - tested and certified up to large missile D

Blast resistant systems meet DOD UFC 4-010-01 anti-terrorism force protection

Factory Mutual certified systems: Class I exterior wall FM 4880 & FM 4881

Factory Mutual explosion venting / pressure release systems: FM 4440

WINDBORNE DEBRIS PROTECTION | EXPLOSION VENTING | ANTI-TERRORISM FORCE PROTECTION | FM CLASS I



photo: James Steinkamp

Design Prototyping and Testing Centre (DPTC) | University of Sheffield, UK | Bond Bryan Architects (below)

photo: Phil Grayson



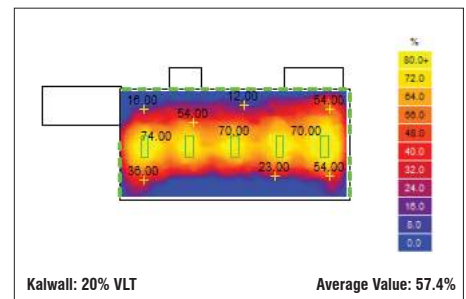
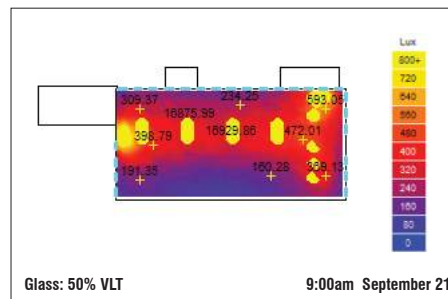
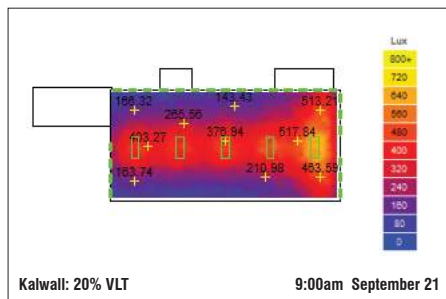
Please visit KALWALL.COM for all wall system specifications, CAD details, BIM families & performance charts online



photo: Genna Sellers

Facilities Services Complex, University of Tennessee | Knoxville, TN | Cope Architects (above)

Daylight Modeling Studies: a complimentary service to optimize your daylighting design



Radiance Illumination

Provides a “snapshot” of daylight levels at a given point in time. Typically, simulations are made to study light levels at the Fall and Spring Equinoxes during the early morning, at solar noon, and late in the afternoon on both sunny and overcast skies anywhere in the world.

Glare Pattern Analysis

Helps to identify potential problem areas where glare is a concern such as offices, classrooms, athletic facilities and other spaces where visual acuity is critical. These studies are especially useful when designers and specifiers call for a mix of translucent and vision glazing (glass).

Daylight Autonomy

Gives average daylight values and shows what percentage of the time the space can operate at the target light level with daylight alone. sDA (spatial daylight autonomy) and ASE (annual sunlight exposure) are all available for LEED® documentation for daylighting credits.

KALWALL®

KALWALL.COM



511 SOUTH 7TH STREET
DELANO MN 55328
Phone: 763.972.2981
Fax: 763.972.2911

www.industriallouvers.com
ilinfo@industriallouvers.com

MODEL 450XPI

STANDARD CONSTRUCTION

Blades to be .081" extruded aluminum 6063 mounted on 5" x 2" x 1/8" aluminum support channels.

Finish to be mill.

INSTALLATION

Model 450XPI should be installed in accordance with manufacturers recommended attachment method and in accordance with state and federal building codes.

WARRANTY

All materials and workmanship are warranted for a period of 1 year from date of completion.

MAINTENANCE

None required.

FEATURES

- All sizes are custom fabricated to meet project requirements.
- Clip angles for installation.

OPTIONAL ACCESSORIES

Many optional accessories to the basic design are available at an additional cost. They include:

- Hinged access panels.
- Cap flashing at head.
- Visible or invisible mullions for multiple section requirements.
- Anodized or Kynar finish

Please contact the factory for other special requirements.

SUGGESTED SPECIFICATIONS

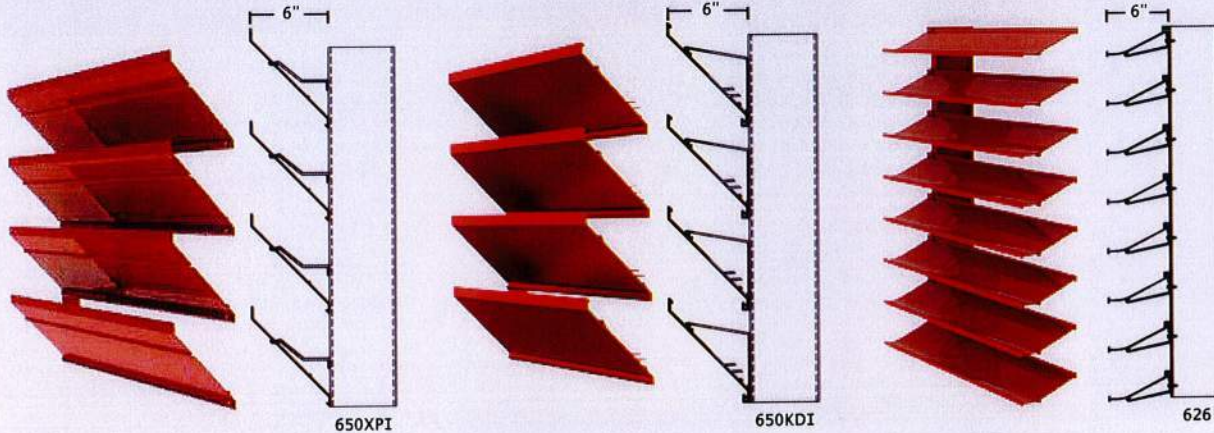
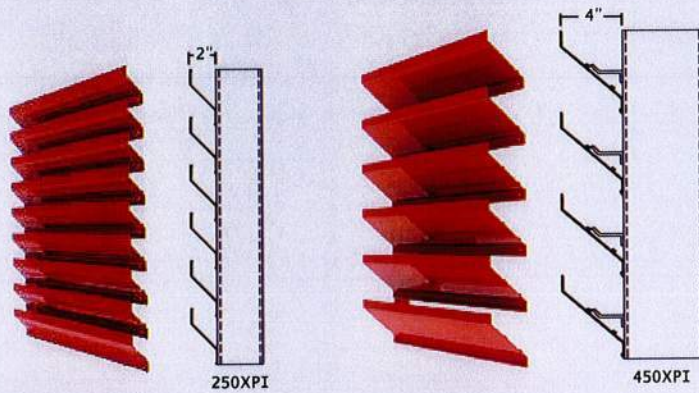
Furnish and install where indicated on the drawings ILI equipment screen Model 450-XPI inverted blade screen as manufactured by Industrial Louvers, Inc., Delano, MN. Inverted blades shall be fabricated from .081" extruded aluminum. Vertical supports shall consist of 5" x 2" x 1/8" aluminum channels at a maximum of 60" o.c.

CATALOG NO. 450XPI

Rev: AUG. 2010

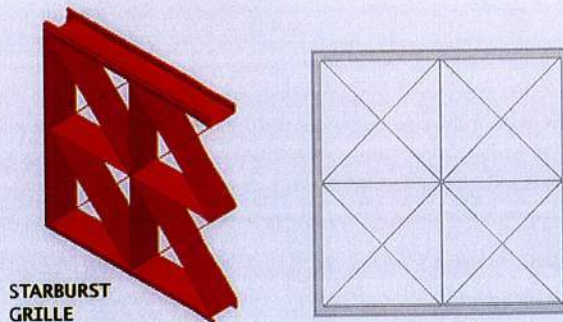
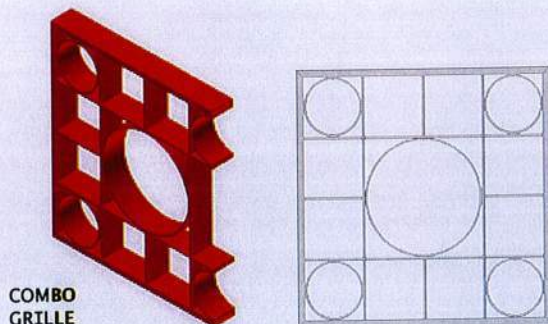
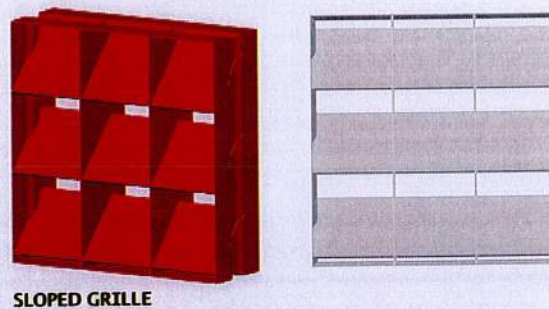
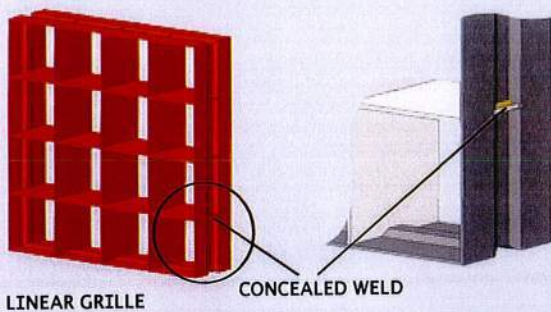
EXTRUDED ALUMINUM INVERTED BLADES

Extruded aluminum inverted blade equipment screens are designed specifically to block the views of rooftop mechanical units. However, these screens can also be used to conceal cooling towers, trash enclosures or any other item that may interfere with the building's "curb appeal." ILI extruded aluminum inverted blade equipment screens are available in a number of depths and are fabricated to size.

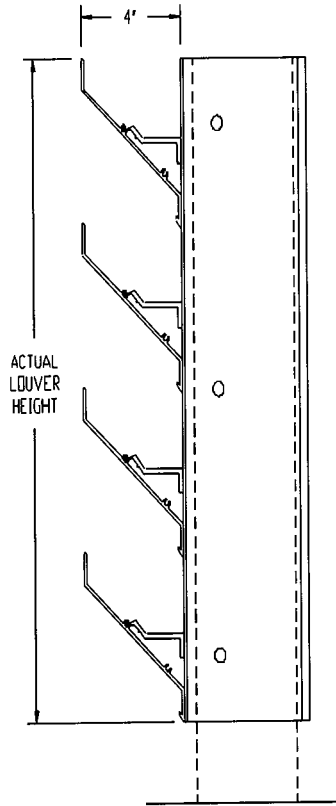


DECORATIVE GRILLES

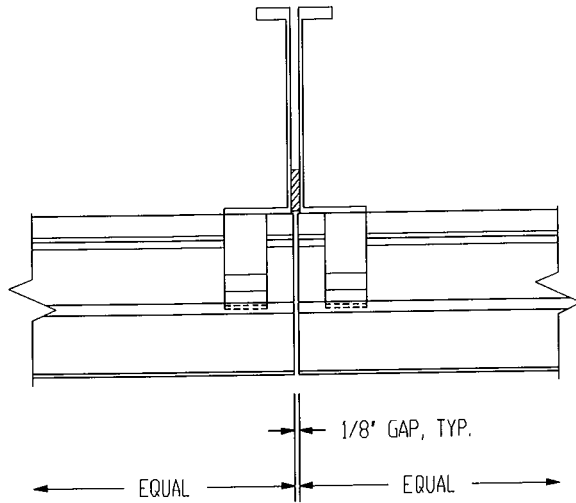
Decorative grilles add a unique architectural feature to any building. Decorative grilles can be used in a variety of applications from architectural screening to simple accents. ILI decorative grilles are fabricated from extruded aluminum and can be assembled in an unlimited number of configurations and sizes. Components range from flat bar, tubes, channels or other custom extrusions. Decorative grilles can also be fitted with bird/insect screens, hinges or any of our louver accessories.



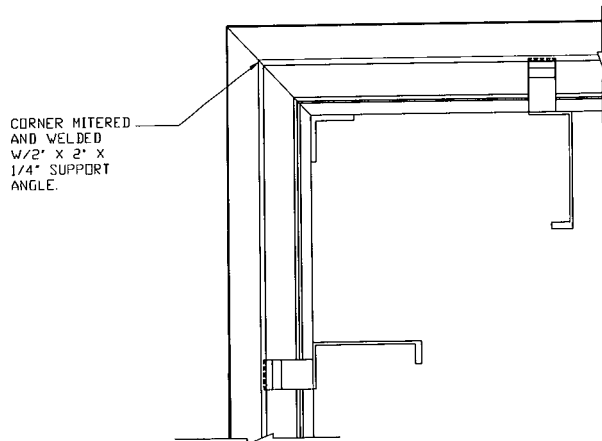
MODEL 450XPI



VERTICAL SECTION



INVISIBLE MULLION DETAIL



TYPICAL MITERED CORNER SECTION

ACCESSORIES:

- ☐ FINISH _____
- COLOR _____
- ☐ OTHER _____

ITEM NO.	QTY	SIZE		Actual ☐	M.O. ☐	MULLION TYPE	NO. OF SECTIONS	REMARKS
		WIDTH	HEIGHT					

PROJECT _____ REPRESENTATIVE _____

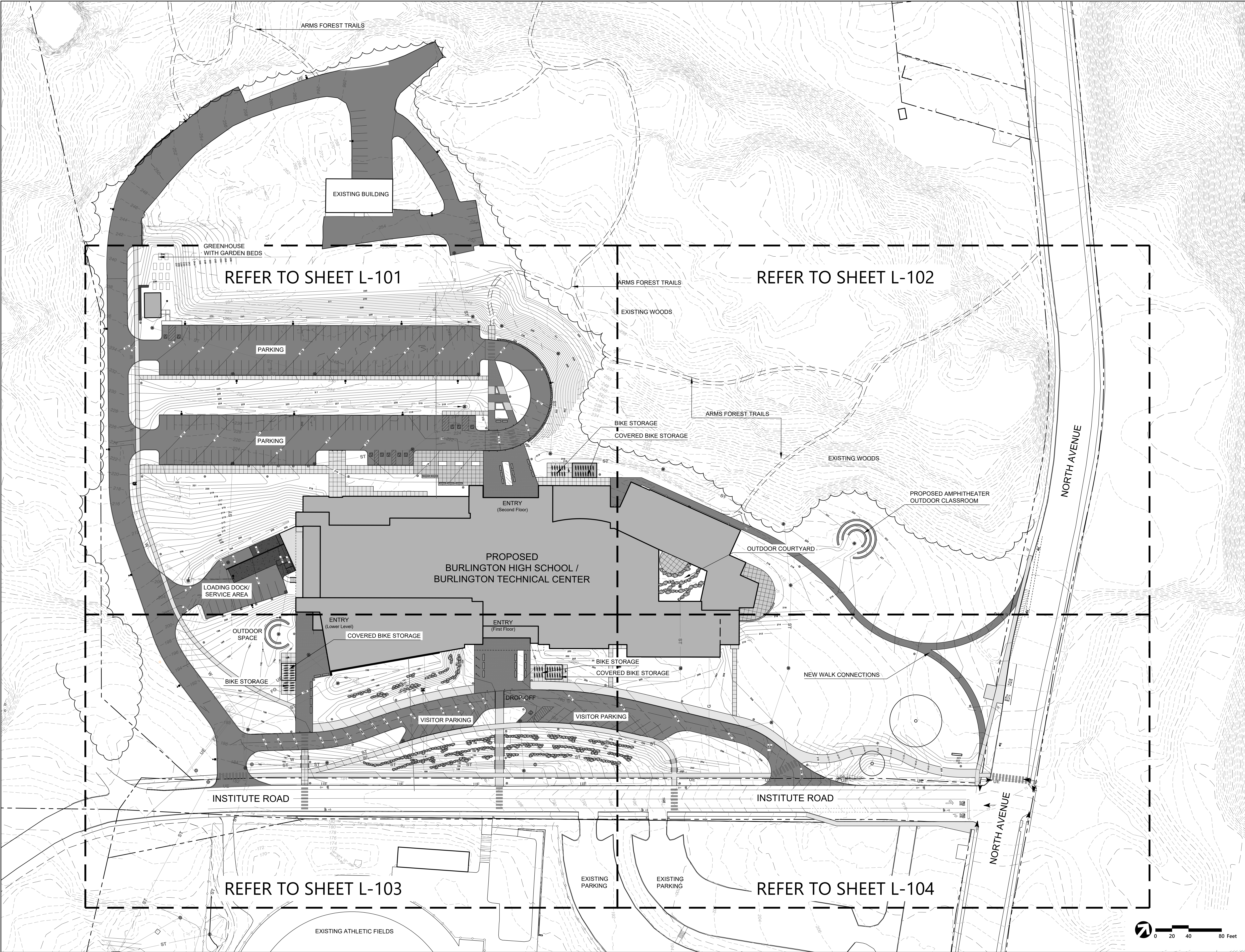
LOCATION _____ ILI JOB NO. _____ REP NO. _____

ARCH/ENGR. _____ Industrial Louvers, Inc. Phone: 763-972-2981

CONTRACTOR _____ 511 South 7th Street Fax: 763-972-2911

DATE _____ Delano, MN 55328

CATALOG NO. 450XPI Rev: AUG. 2010



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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**

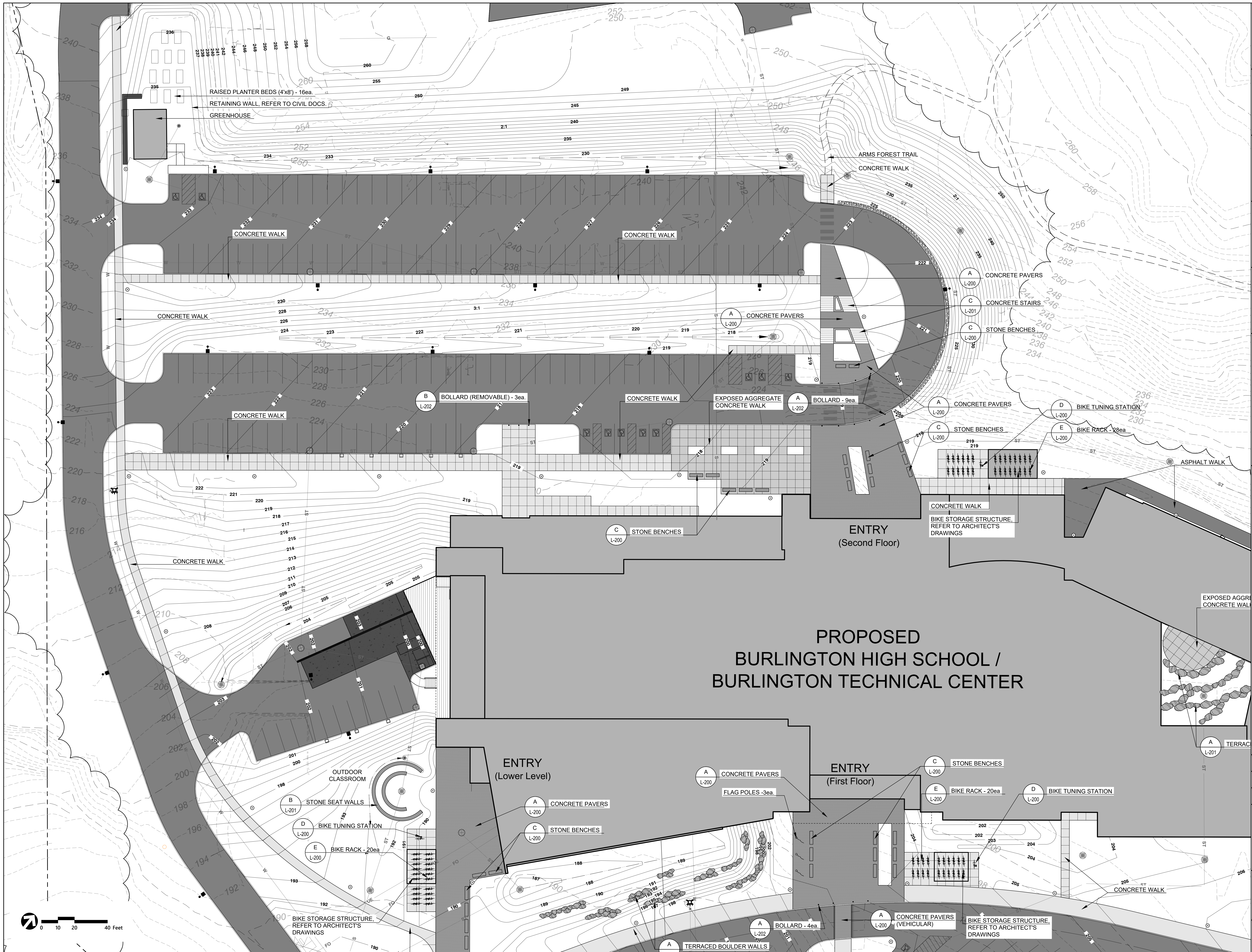
ISSUE LOG:
Zoning Permit 08/30/22

SHEET CONTAINS:

OVERALL LANDSCAPE LAYOUT PLAN

SHEET NO: **L-100**

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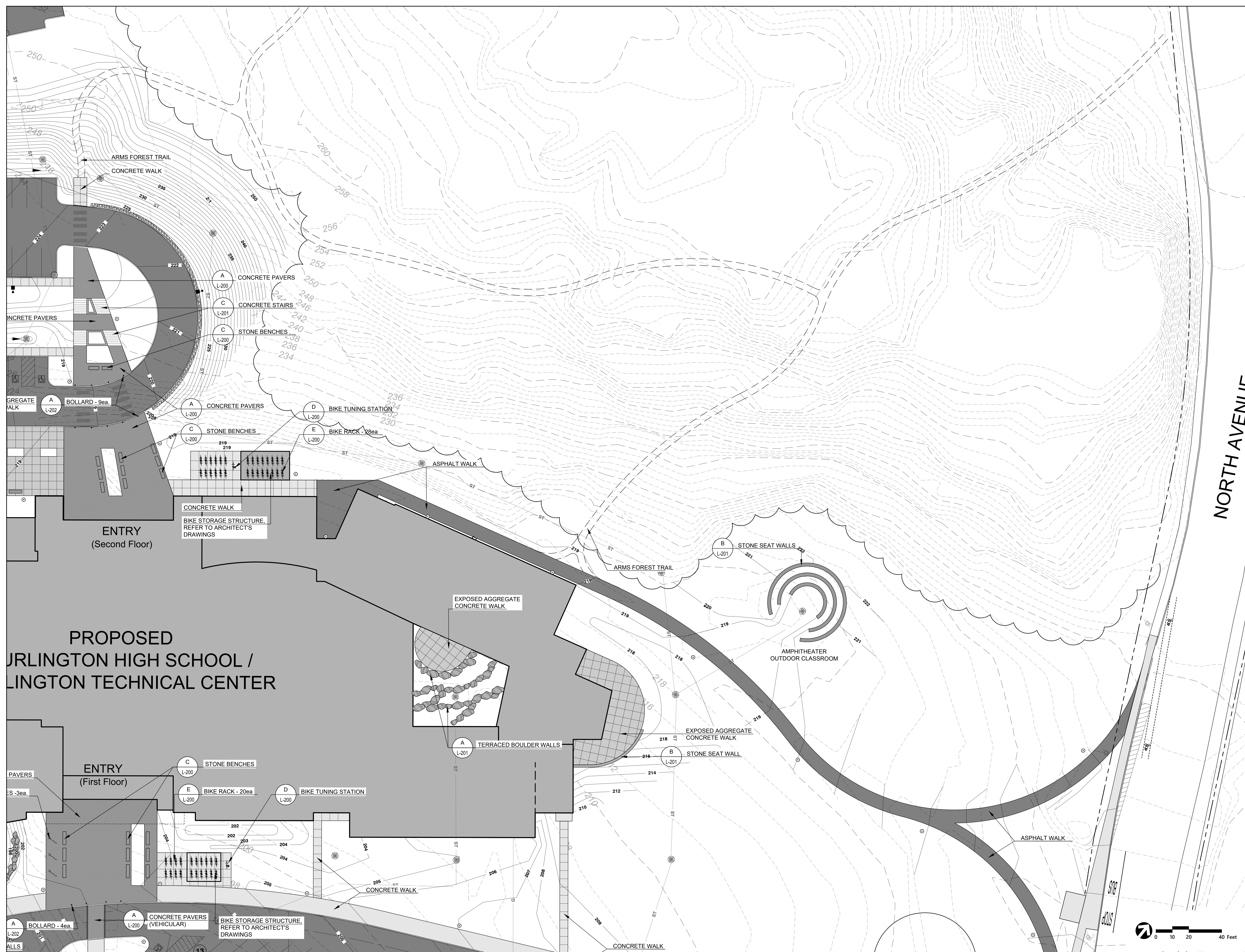
BURLINGTON HIGH SCHOOL & BURLINGTON TECHNICAL CENTER

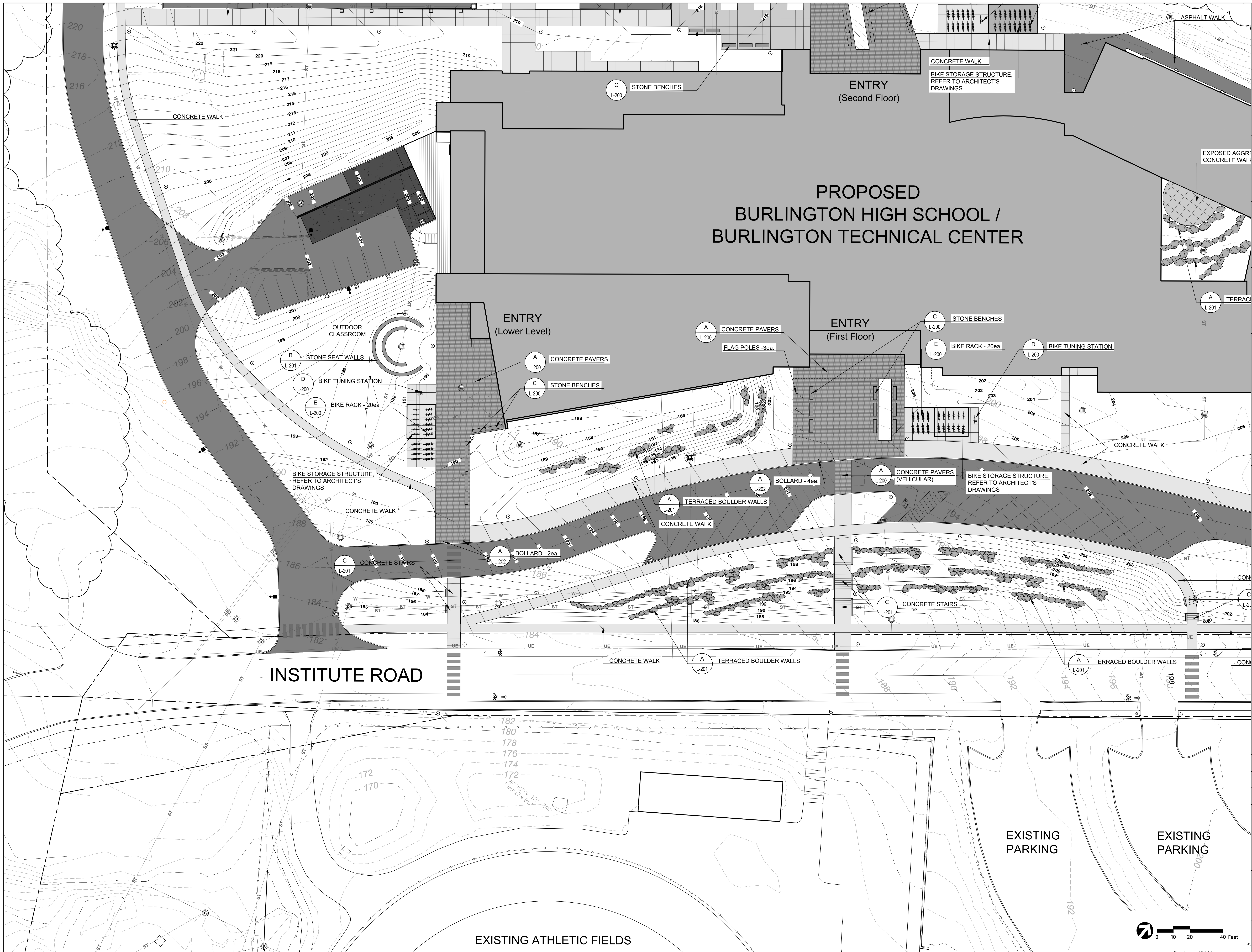
BURLINGTON, VT

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 NO: **L-101**

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Suite 200
South Burlington, VT 05403

BURLINGTON HIGH SCHOOL & BURLINGTON TECHNICAL CENTER

BURLINGTON, VT

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

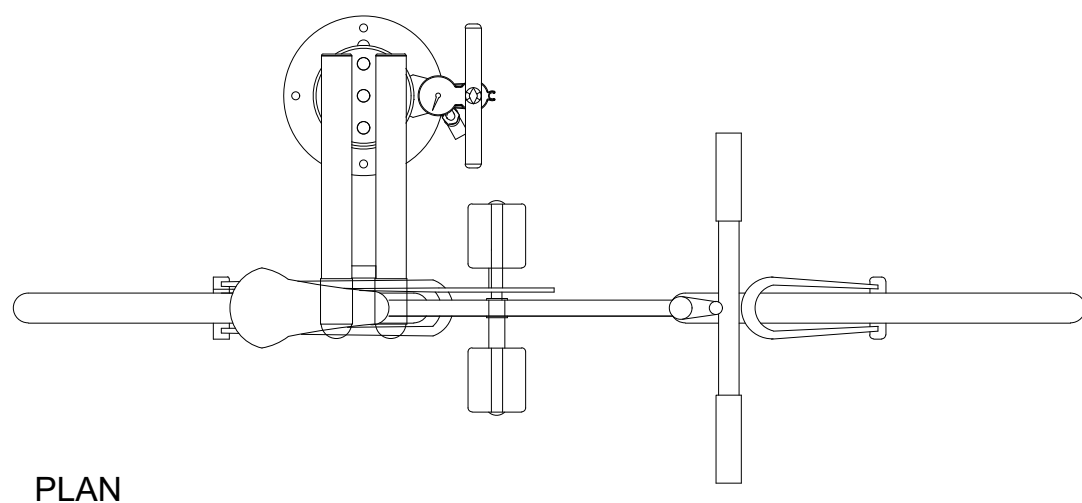
SHEET CONTAINS:
LANDSCAPE LAYOUT PLAN

SHEET NO:
L-103

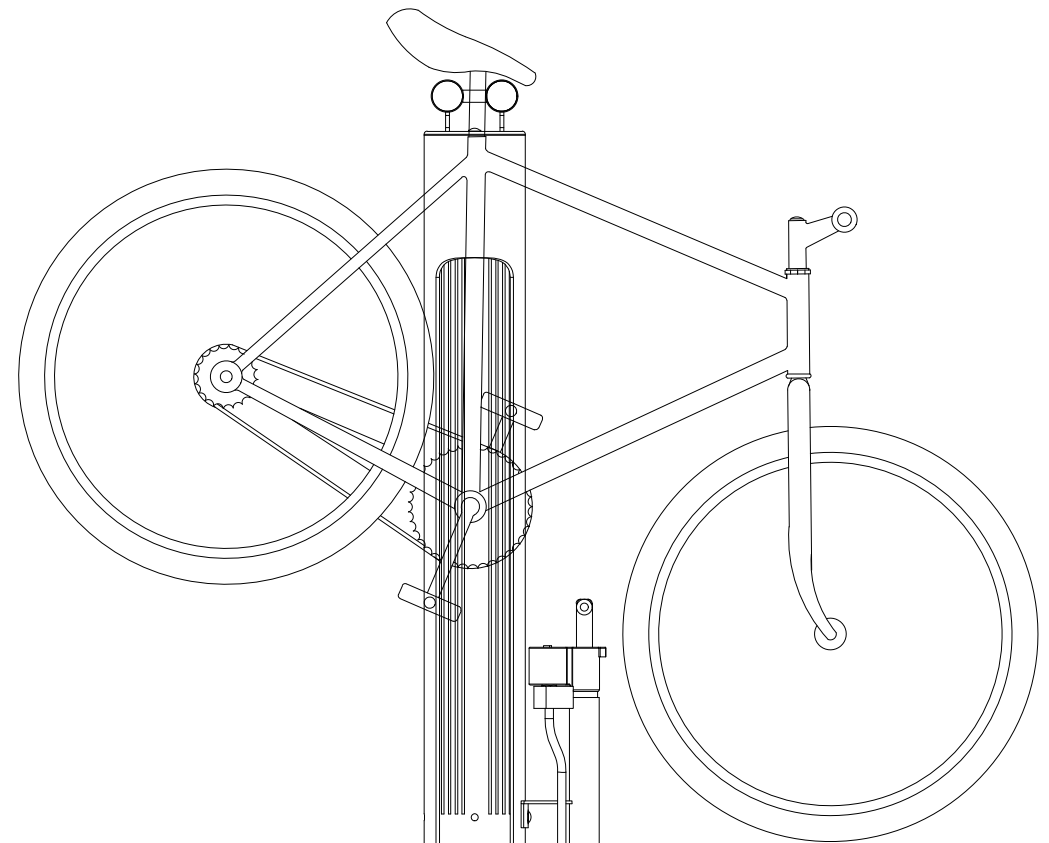
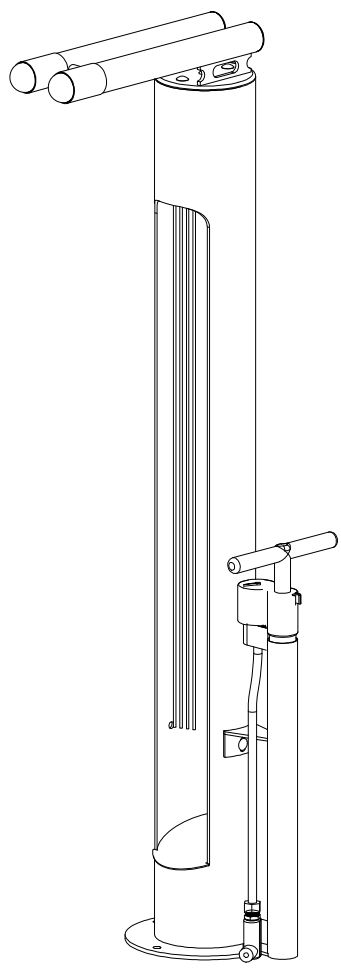
-104

-104

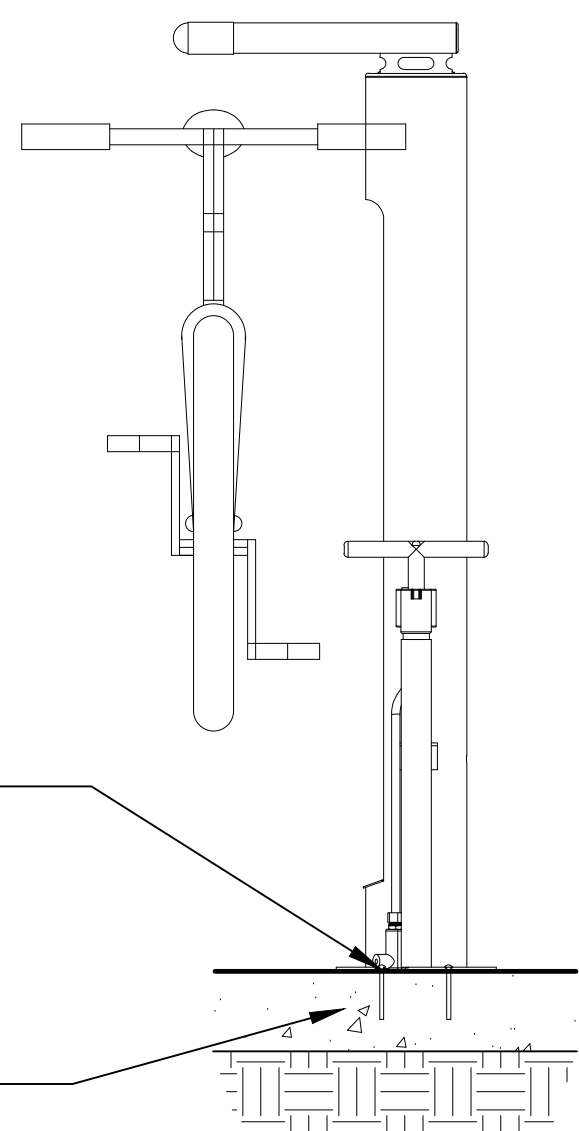
- NOTES:
1. COLOR TO BE BLACK POWDER COAT.
2. LOCATION TO BE VERIFIED BY LANDSCAPE ARCHITECT PRIOR TO INSTALLATION.
3. REFER TO SPECIFICATIONS.



PLAN



ELEVATION

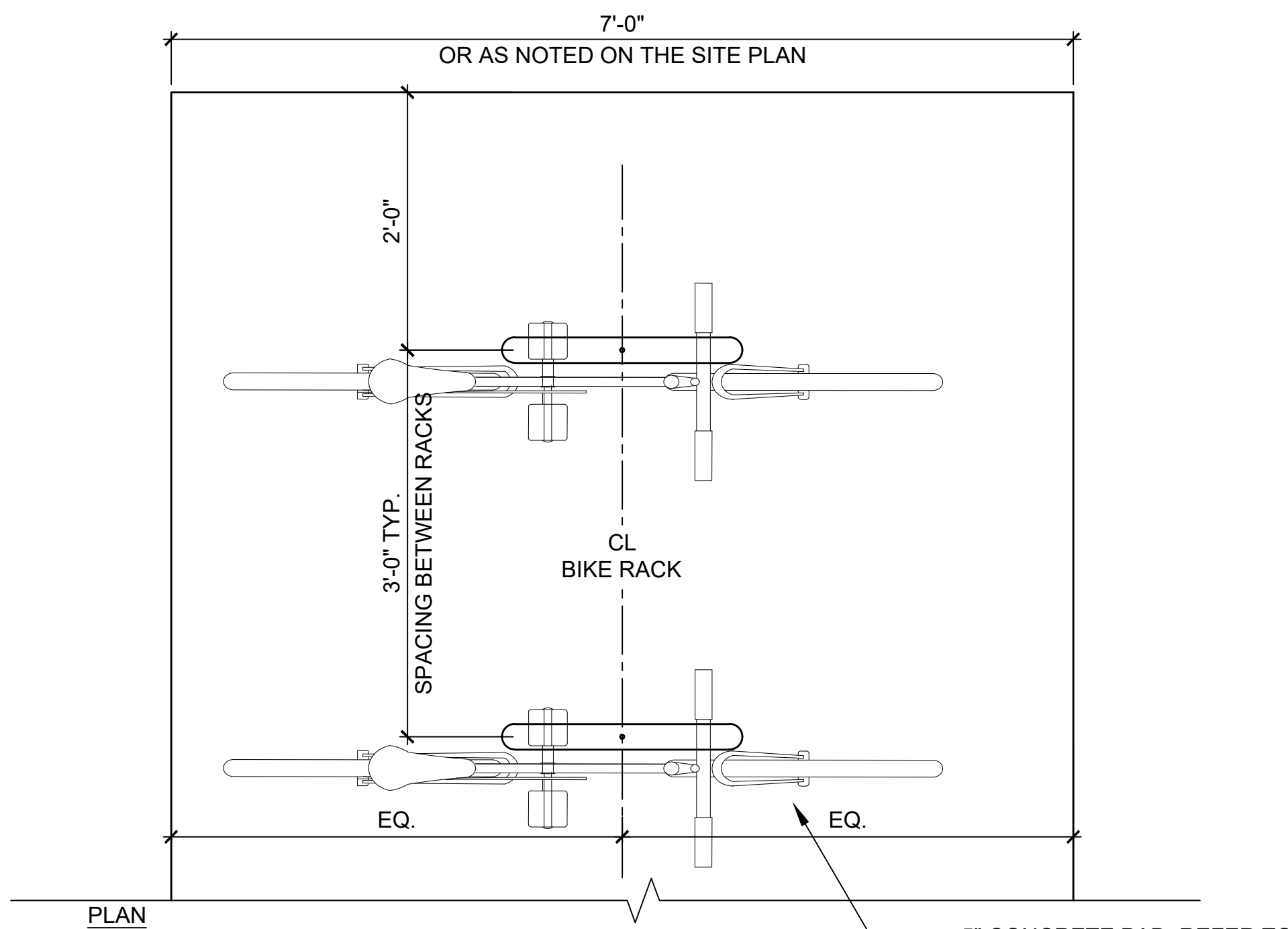


ELEVATION

SURFACE MOUNT,
INSTALL USING
MANUFACTURER'S
RECOMMENDATIONS
FOR NEW SIDEWALK
INSTALLATIONS.

EXPOSED AGGREGATE
CONCRETE WALK,
REFER TO TYPICAL BIKE
PATH DETAILS

D BIKE TUNING STATION
SCALE 1" = 1'



PLAN

5" CONCRETE PAD, REFER TO
TYPICAL BIKE PATH DETAILS

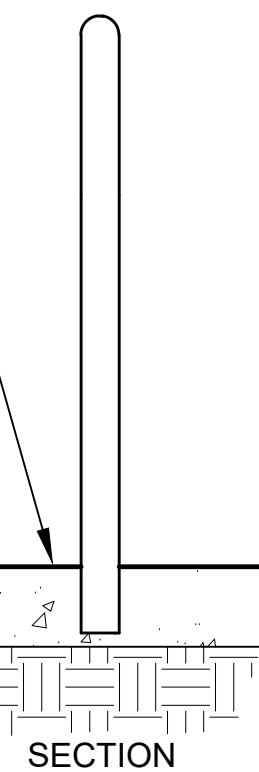
- NOTES:
1. COLOR TO BE BLACK POWDER COAT.
2. LOCATIONS TO BE VERIFIED BY LANDSCAPE ARCHITECT PRIOR TO INSTALLATION.
3. INSTALL PER MANUFACTURER'S RECOMMENDATIONS.

LOOP BIKE RACK,
REFER TO SPECIFICATIONS

IN-GROUND MOUNT
CORE DRILLED AND
SET W/ EPOXY GROUT

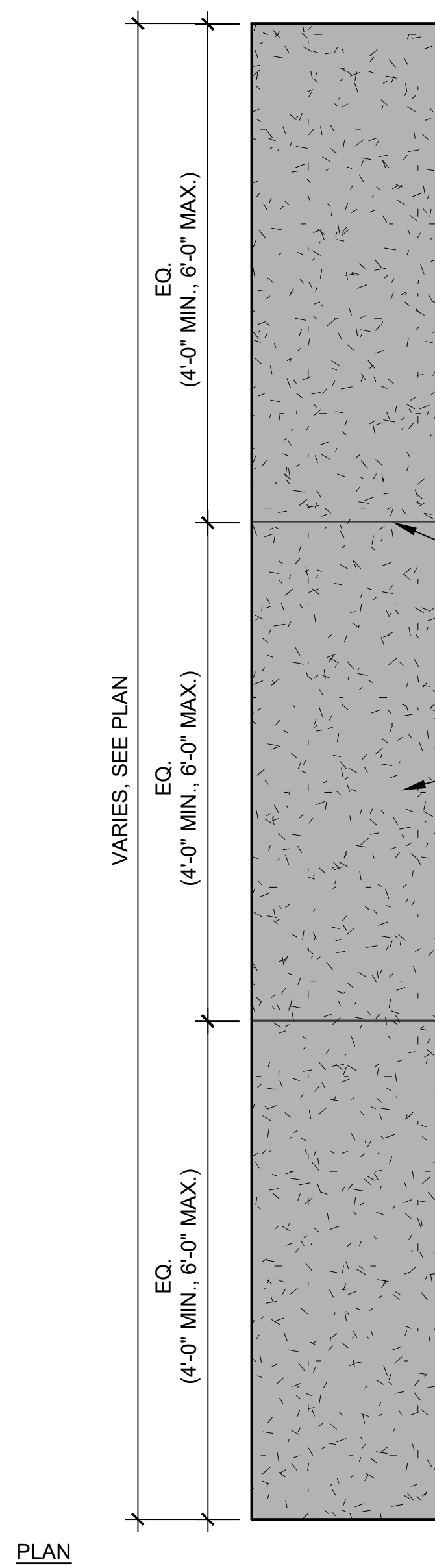
ELEVATION

5" CONCRETE PAD, REFER TO
TYPICAL BIKE PATH DETAILS



SECTION

E BIKE RACK
SCALE 1" = 1'

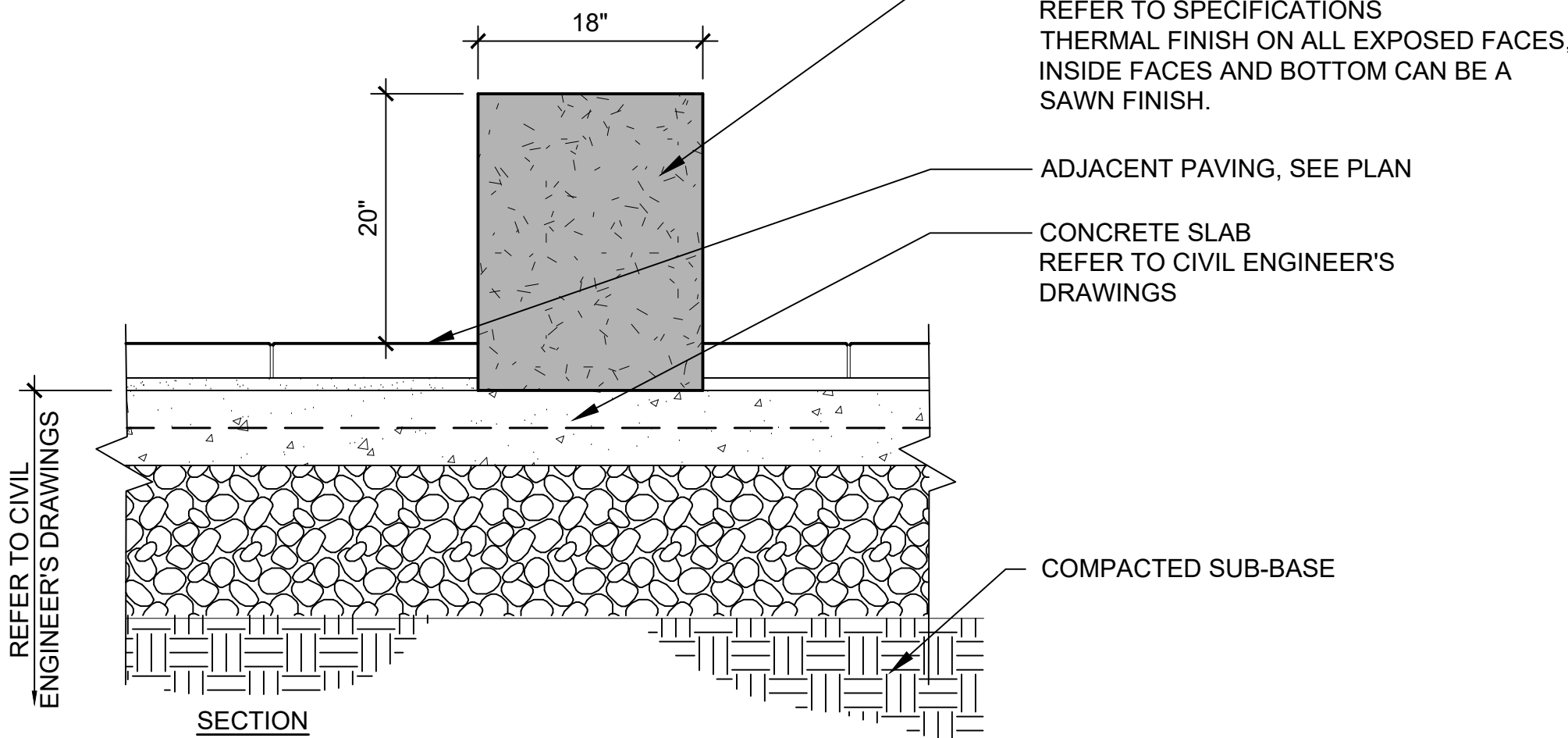


PLAN

STONE SECTIONS SHOULD FIT
TOGETHER VERY TIGHTLY
WITH A MAX JOINT OF 1/8".

CUT STONE SEAT WALL
REFER TO SPECIFICATIONS
THERMAL FINISH ON ALL EXPOSED FACES,
INSIDE FACES CAN BE A SAWN FINISH.

- NOTES:
1. REFER TO LAYOUT DRAWINGS FOR
HORIZONTAL LAYOUT INFORMATION
2. COORDINATE FINISHED GRADES WITH
GRADING PLAN DRAWINGS
3. DRILL MARKS ARE NOT ACCEPTABLE ON
ANY FACE OF STONE MATERIAL
4. SAW CUT INTERIOR ENDS OF STONE PIECES.
5. DIVIDE STONE WALL INTO EQUAL SECTIONS
(4'-0" MIN., 6'-0" MAX.)
6. CONTRACTOR TO SUBMIT SHOP DRAWINGS
FOR REVIEW AND APPROVAL BY LANDSCAPE
ARCHITECT PRIOR TO FABRICATION.



SECTION

CUT STONE SEAT WALL
REFER TO SPECIFICATIONS
THERMAL FINISH ON ALL EXPOSED FACES,
INSIDE FACES AND BOTTOM CAN BE A
SAWN FINISH.

ADJACENT PAVING, SEE PLAN

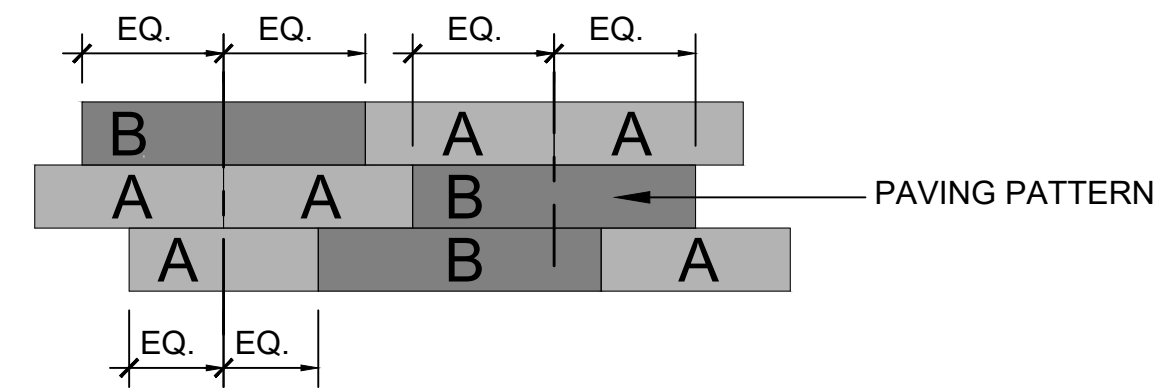
CONCRETE SLAB
REFER TO CIVIL ENGINEER'S
DRAWINGS

COMPACTED SUB-BASE

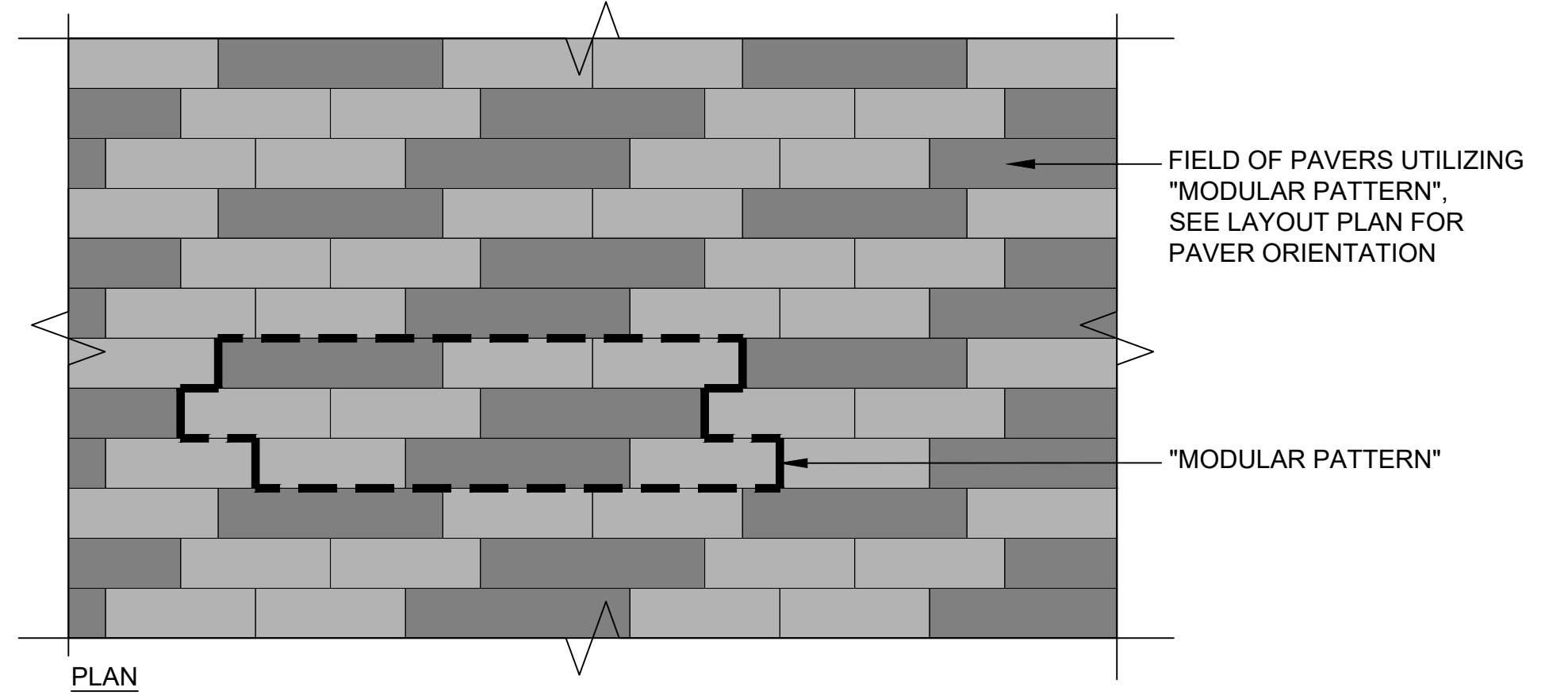
C STONE BENCH
SCALE 1" = 1'-0"

- NOTES:
1. SLOPE TOP OF CONCRETE SLAB IN ACCORDANCE WITH GRADING PLAN
2. INSTALL PAVER EDGE RESTRAINT WHERE NECESSARY
3. REFER TO CIVIL ENGINEER'S DRAWINGS FOR CONCRETE THICKNESS, REINFORCING & SUB-BASE MATERIAL
4. CONTRACTOR TO PROVIDE SUBMITTALS AND PHYSICAL SAMPLES OF PAVERS FOR REVIEW AND APPROVAL PRIOR TO ORDERING.

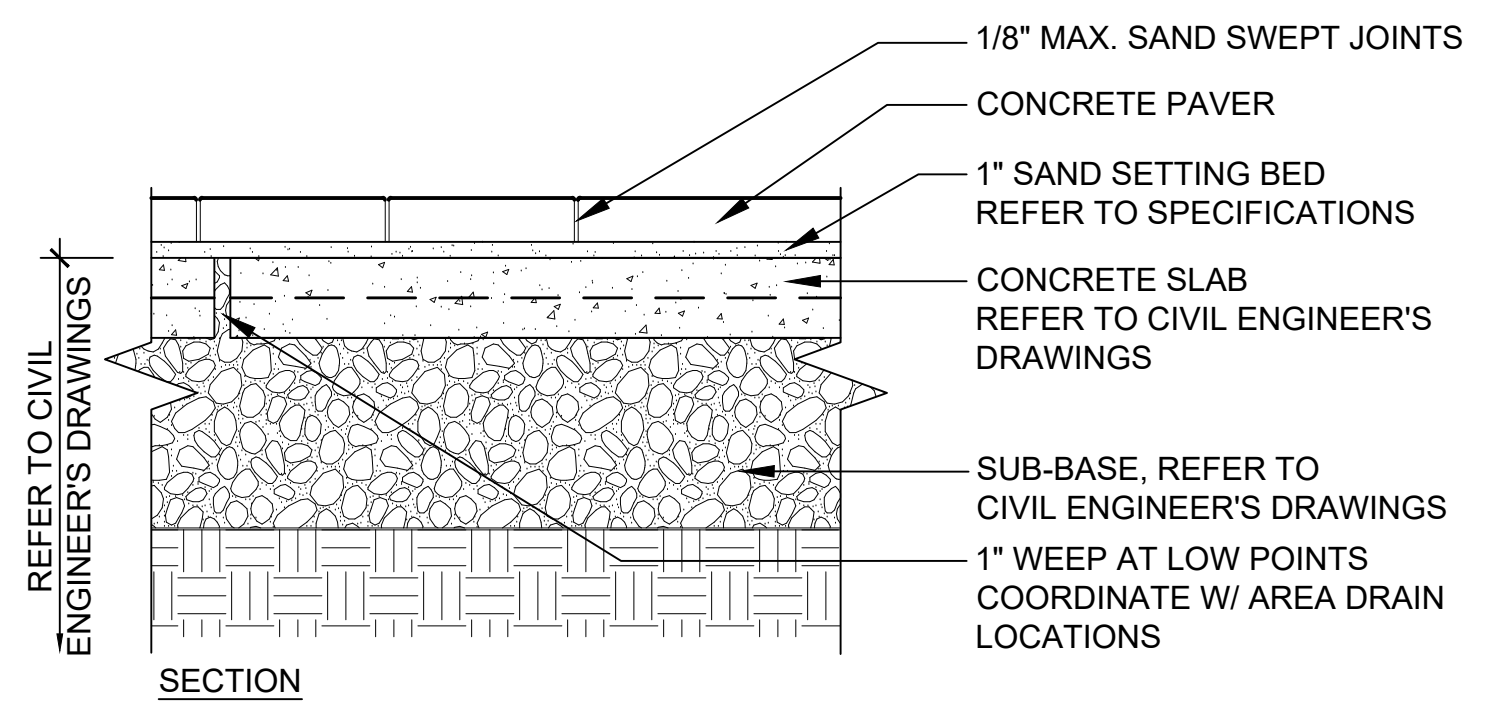
CONCRETE PAVER:
Manufacturer: TECHO BLOC
Paver: Industria Granitex Commercial
Color: Shale Grey
Type A: 300 X 100 (3 1/8" x 11 1/8" x 3 1/8")
Type B: 450 X 100 (3 1/8" x 17 1/8" x 3 1/8")



PAVING PATTERN



PLAN



REFER TO CIVIL
ENGINEER'S DRAWINGS

1/8" MAX. SAND SWEEP JOINTS

CONCRETE PAVER

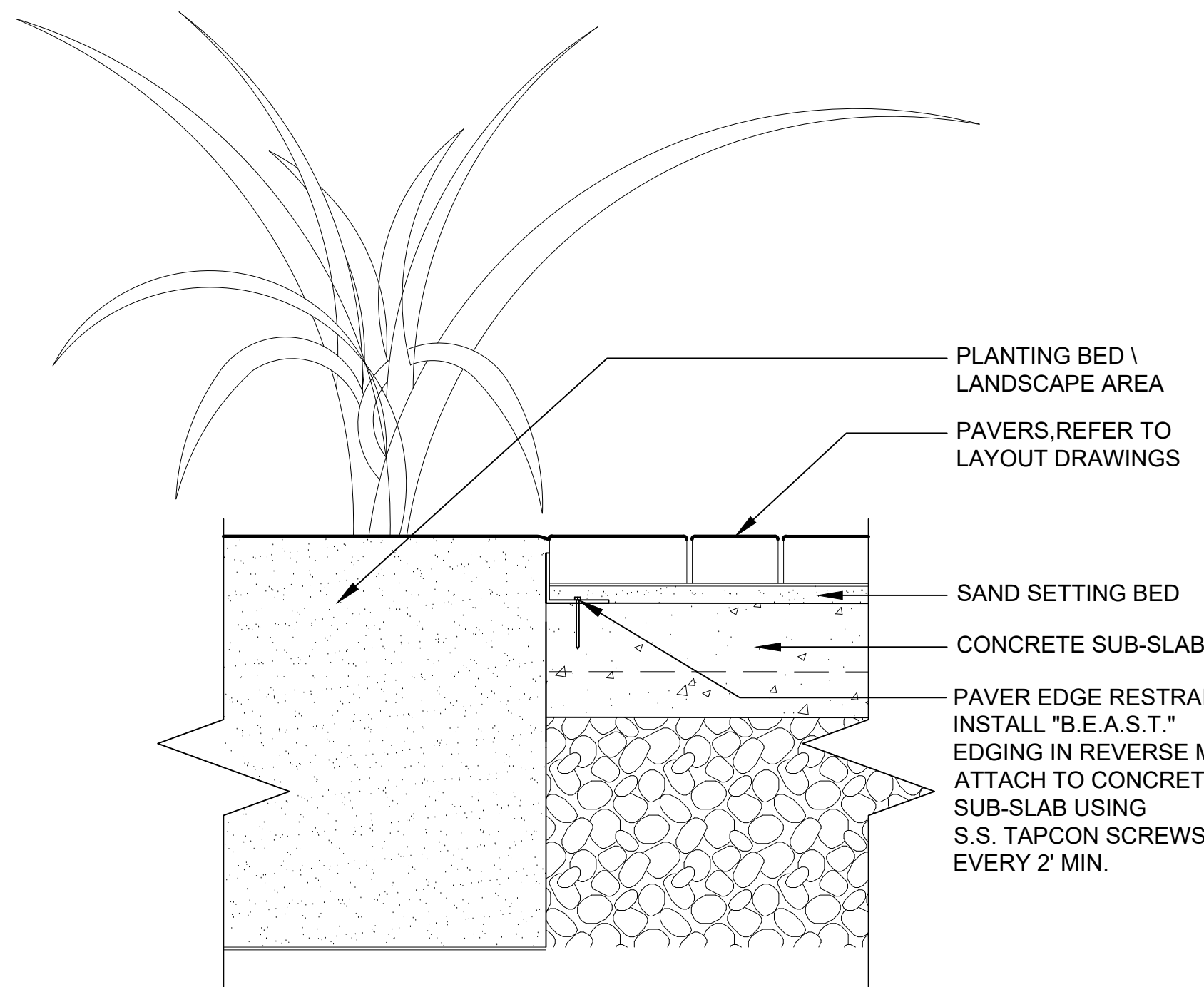
1" SAND SETTING BED
REFER TO SPECIFICATIONS

CONCRETE SLAB
REFER TO CIVIL ENGINEER'S
DRAWINGS

SUB-BASE, REFER TO
CIVIL ENGINEER'S DRAWINGS

1" WEEP AT LOW POINTS
COORDINATE W/ AREA DRAIN
LOCATIONS

A CONCRETE PAVERS OVER CONCRETE
SCALE 1" = 1'-0"



SECTION

PLANTING BED \
LANDSCAPE AREA

PAVERS, REFER TO
LAYOUT DRAWINGS

SAND SETTING BED

CONCRETE SUB-SLAB

PAVER EDGE RESTRAINT
INSTALL "B.E.A.S.T."
EDGING IN REVERSE MODE
ATTACH TO CONCRETE
SUB-SLAB USING
S.S. TAPCON SCREWS
EVERY 2' MIN.

B PAVER EDGE RESTRAINT
SCALE 2" = 1'-0"

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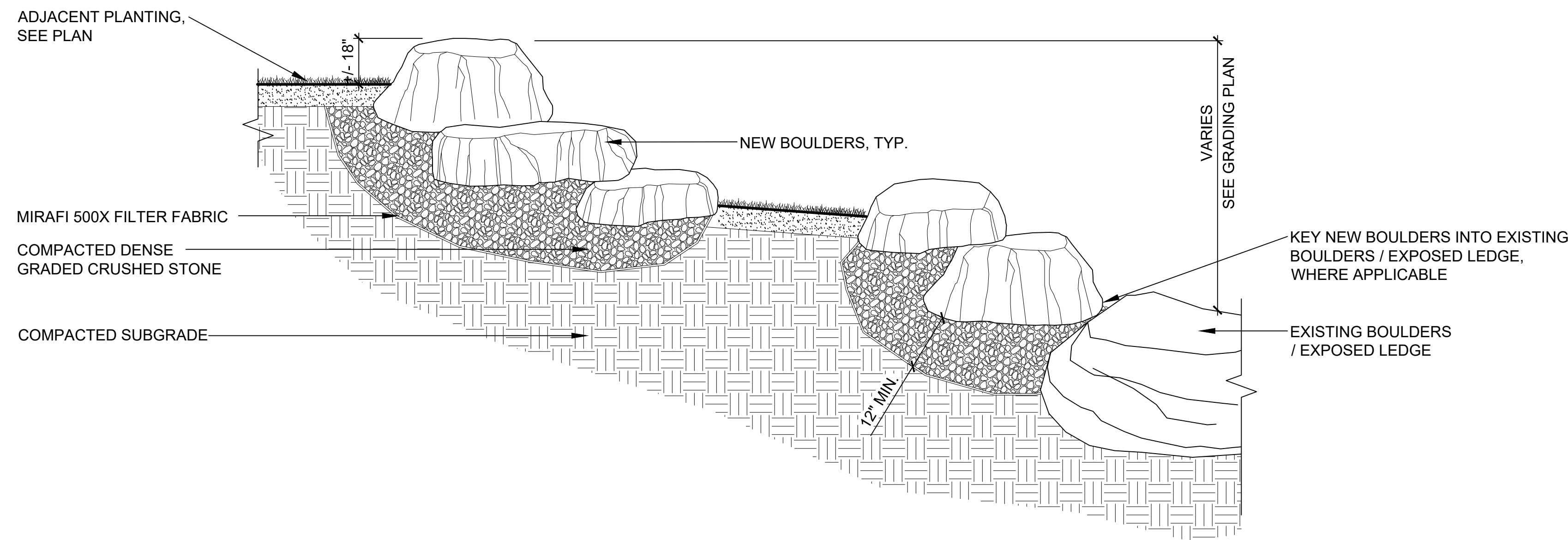
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BURLINGTON, VT

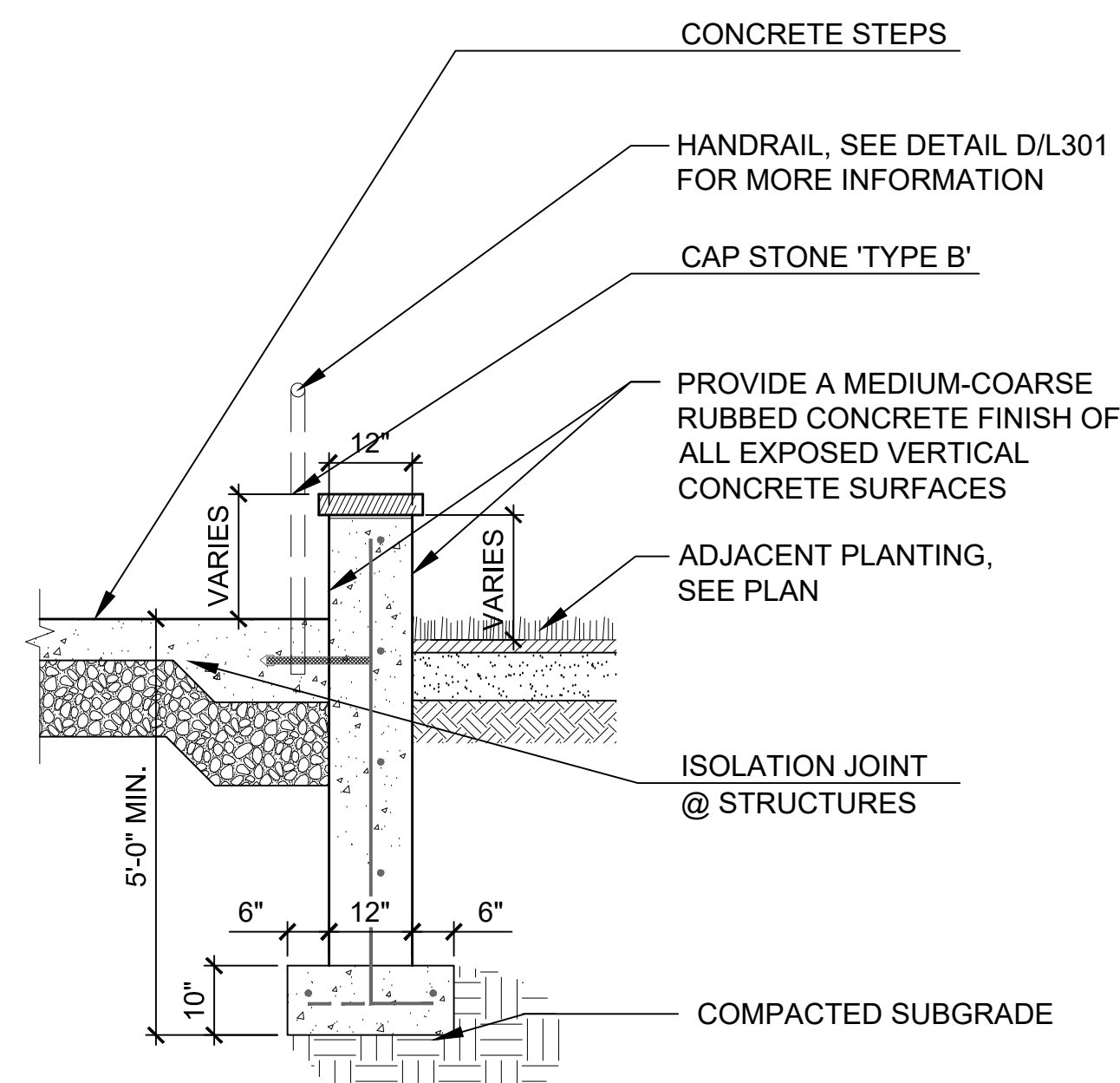
111 PROJECT NO: **2170**
ORIGINATION DATE: **07/01/2022** SCALE: **AS NOTED**
DRAWN BY: **JRD/MKW** CHECKED BY: **MKW**
ISSUE LOG:
Zoning Permit 08/30/22

SHEET CONTAINS:
**LANDSCAPE
DETAILS**

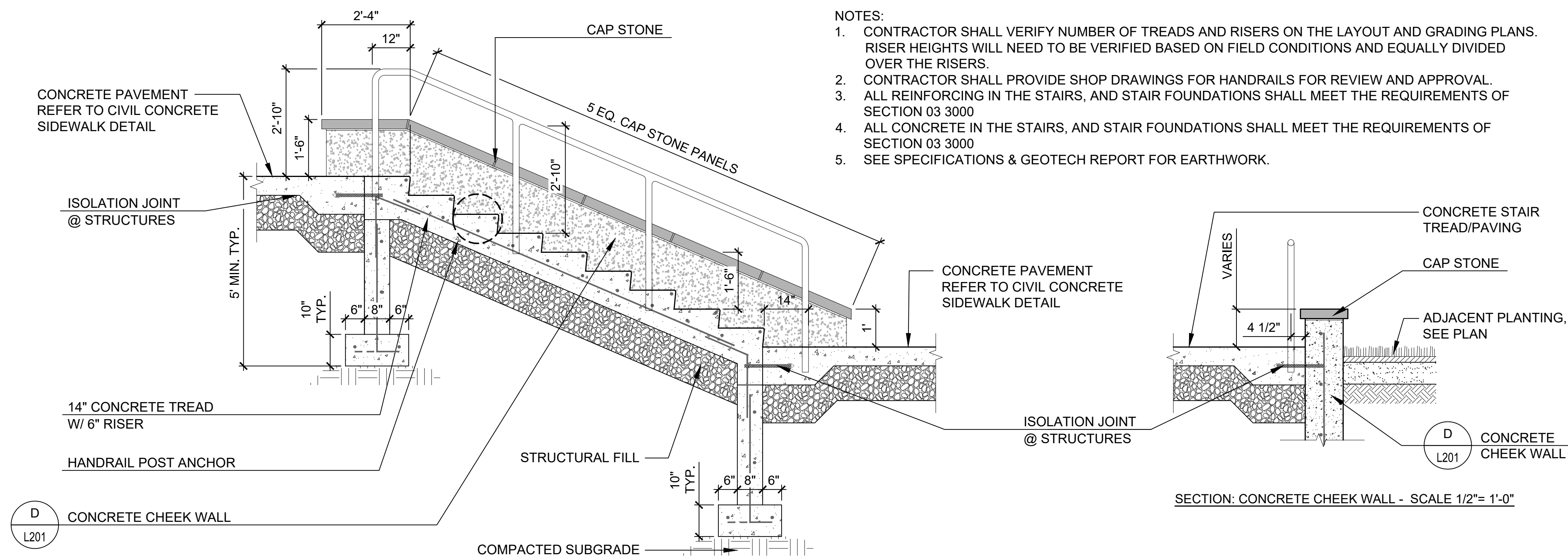
SHEET NO:
L-200
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A TERRACED BOULDER WALL
SCALE 1/2" = 1'-0"



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

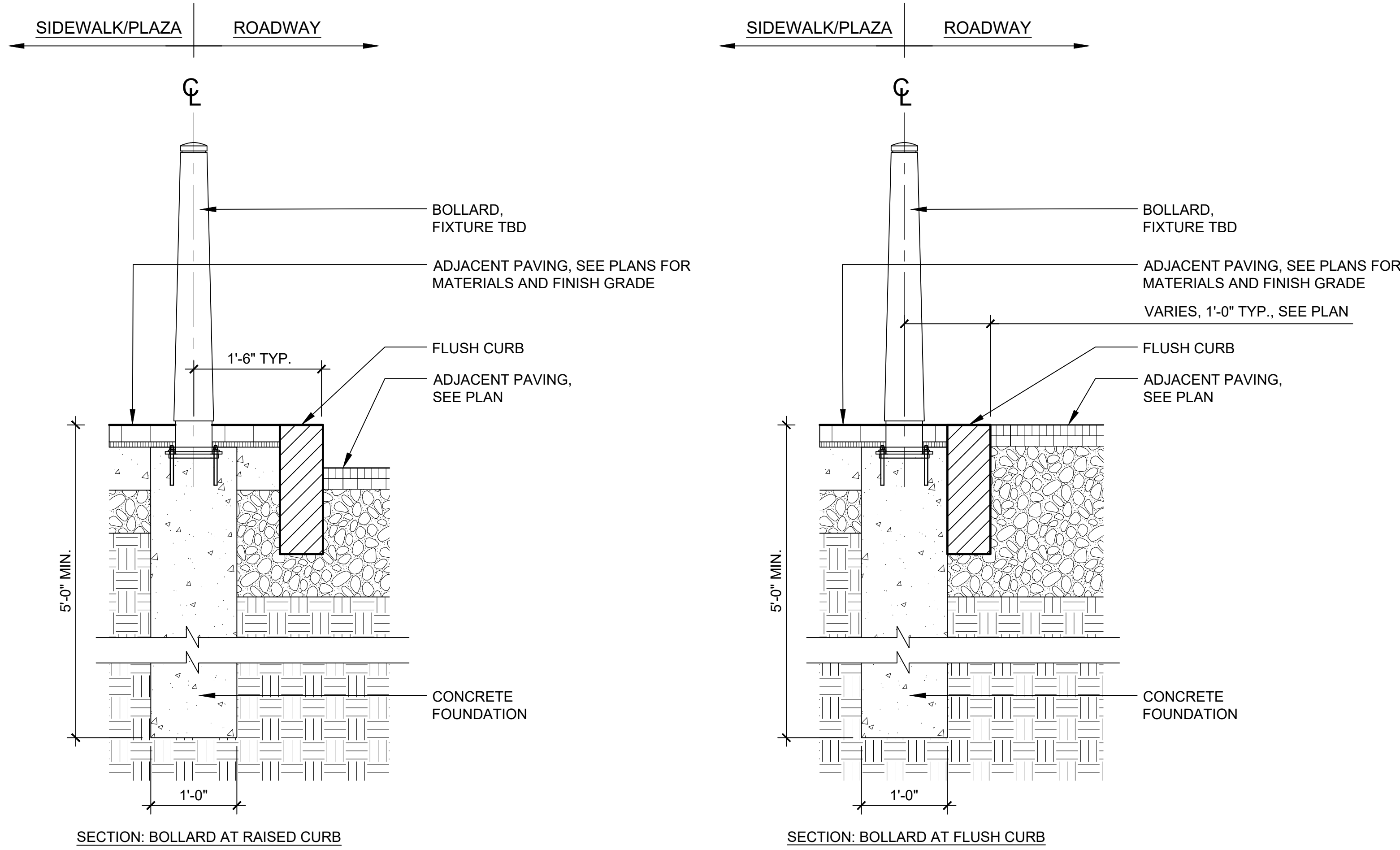
SHEET CONTENTS:

LANDSCAPE
DETAILS

SHEET NO:

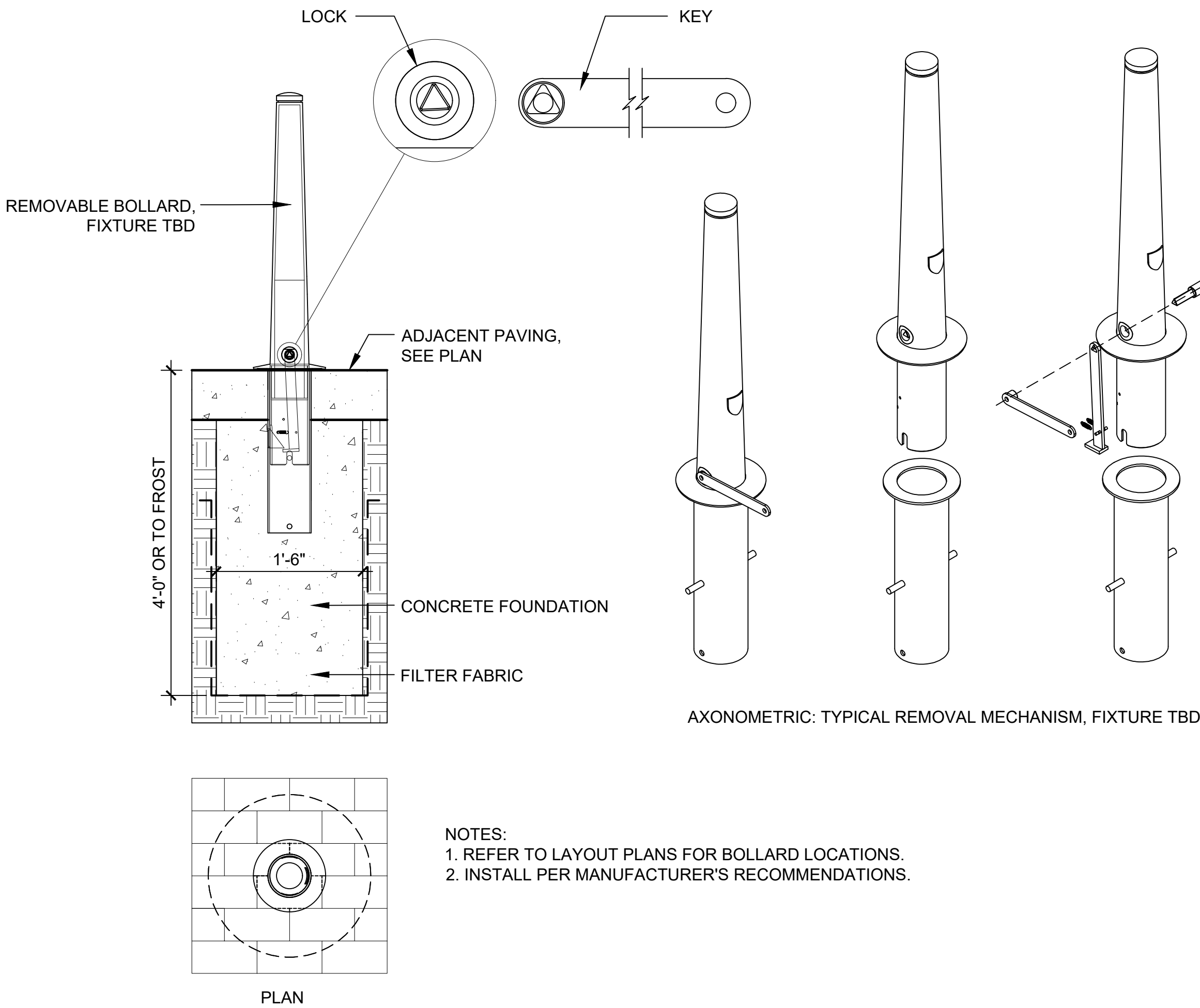
L-201

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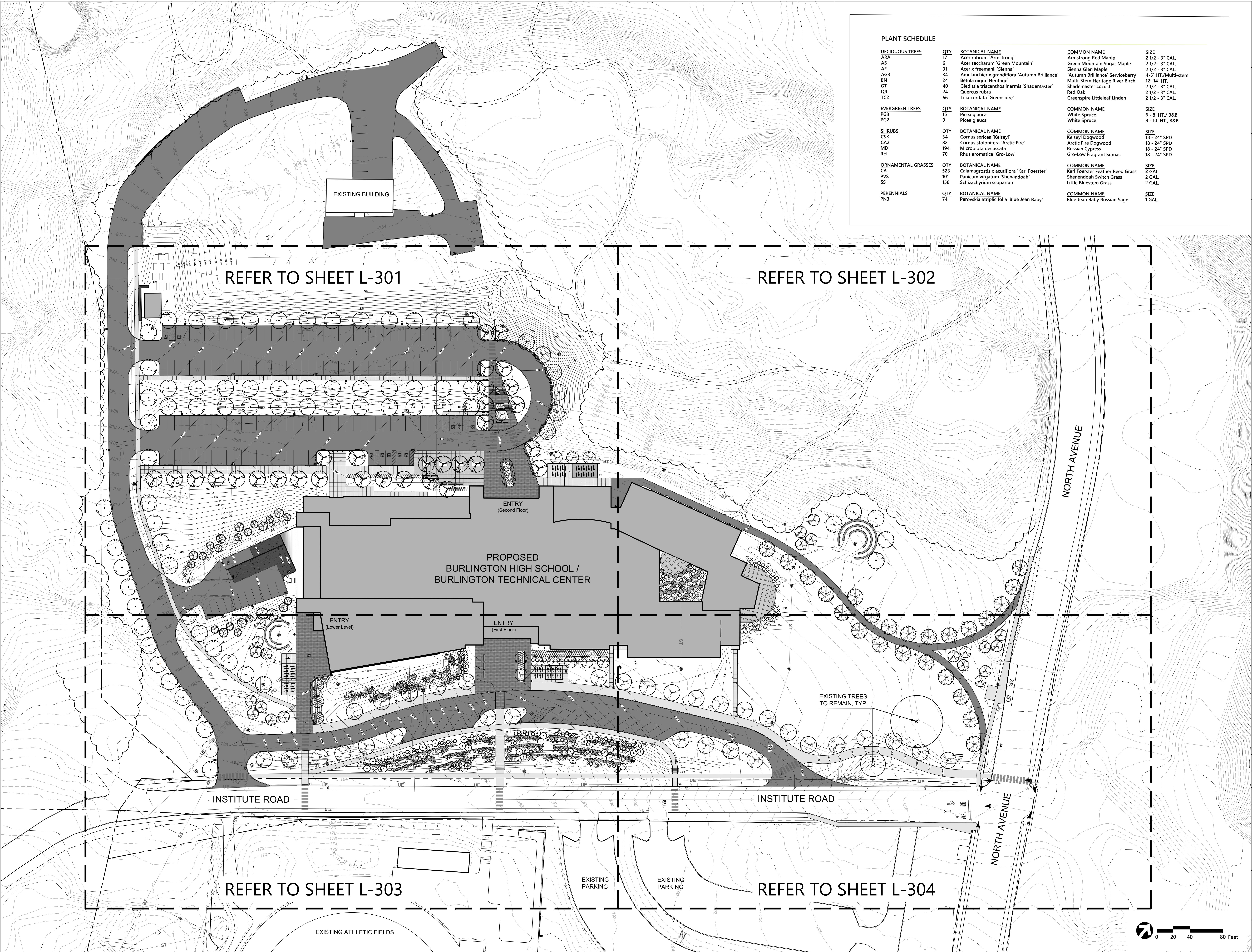


NOTES:
1. REFER TO LAYOUT PLANS FOR BOLLARD LOCATIONS.
2. INSTALL PER MANUFACTURER'S RECOMMENDATIONS.

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
			2 1/2 - 3" CAL.
EVERGREEN TREES			
PG3	QTY 15	BOTANICAL NAME	COMMON NAME
PG2	9	Picea glauca	White Spruce
		Picea glauca	White Spruce
			6 - 8' HT./ B&B
			8 - 10' HT., B&B
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
			18 - 24" SPD
			18 - 24" SPD
			18 - 24" SPD
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
			2 GAL.
PERENNIALS			
PN3	QTY 74	BOTANICAL NAME	COMMON NAME
		Perovskia atriplicifolia 'Blue Jean Baby'	Blue Jean Baby Russian Sage
			SIZE
			1 GAL.

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BURLINGTON, VT

111 PROJECT NO: **2170**

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

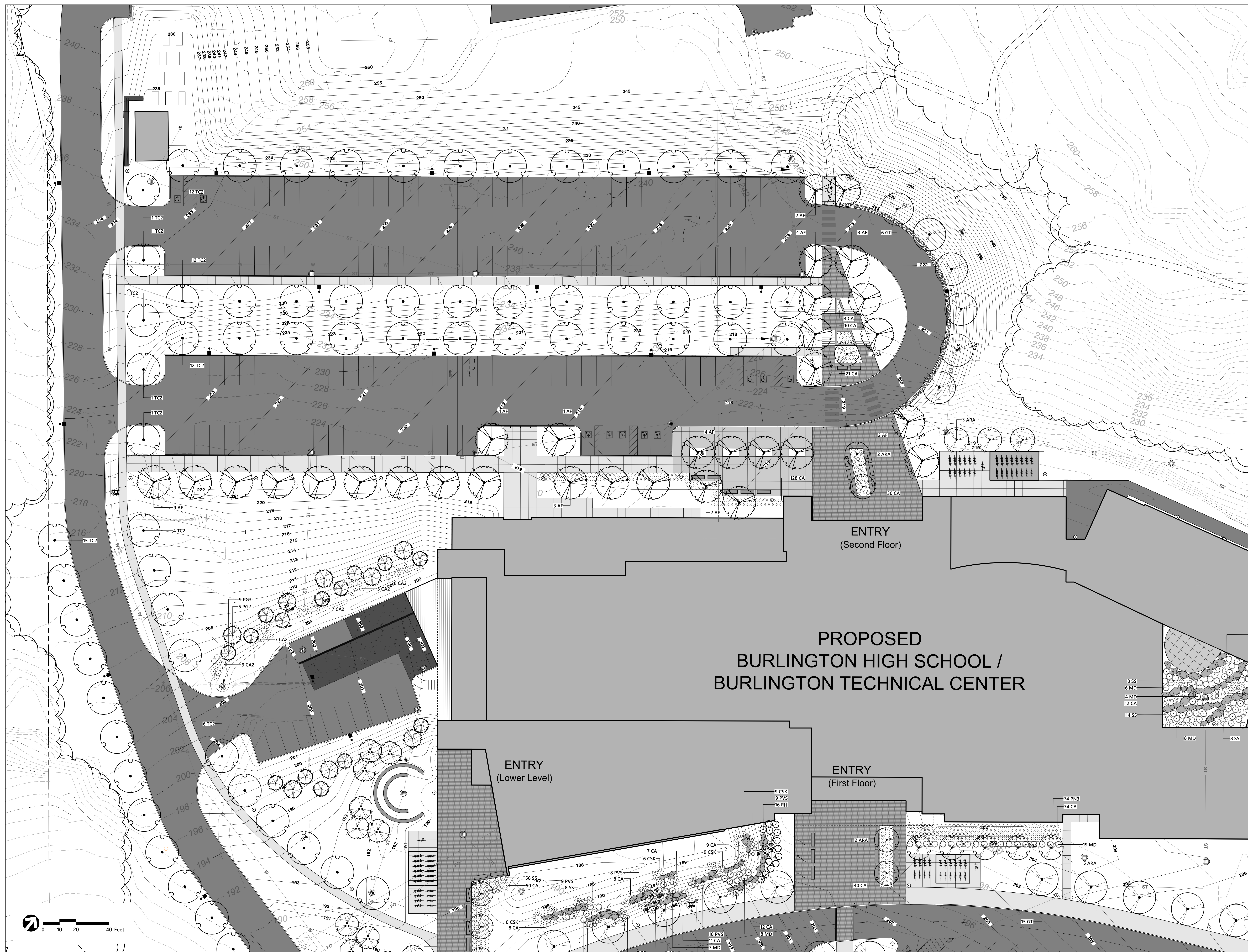
DRAWN BY: **JRD/MKW** CHECKED BY: **MKW**

ISSUE LOG:
Zoning Permit 08/30/22

SHEET NO: **L-300**

OVERALL PLANTING PLAN

0 20 40 80 Feet



Level of Agreement	Percentage of Respondents
Strongly agree	10%
Agree	15%
Disagree	20%
Strongly disagree	55%

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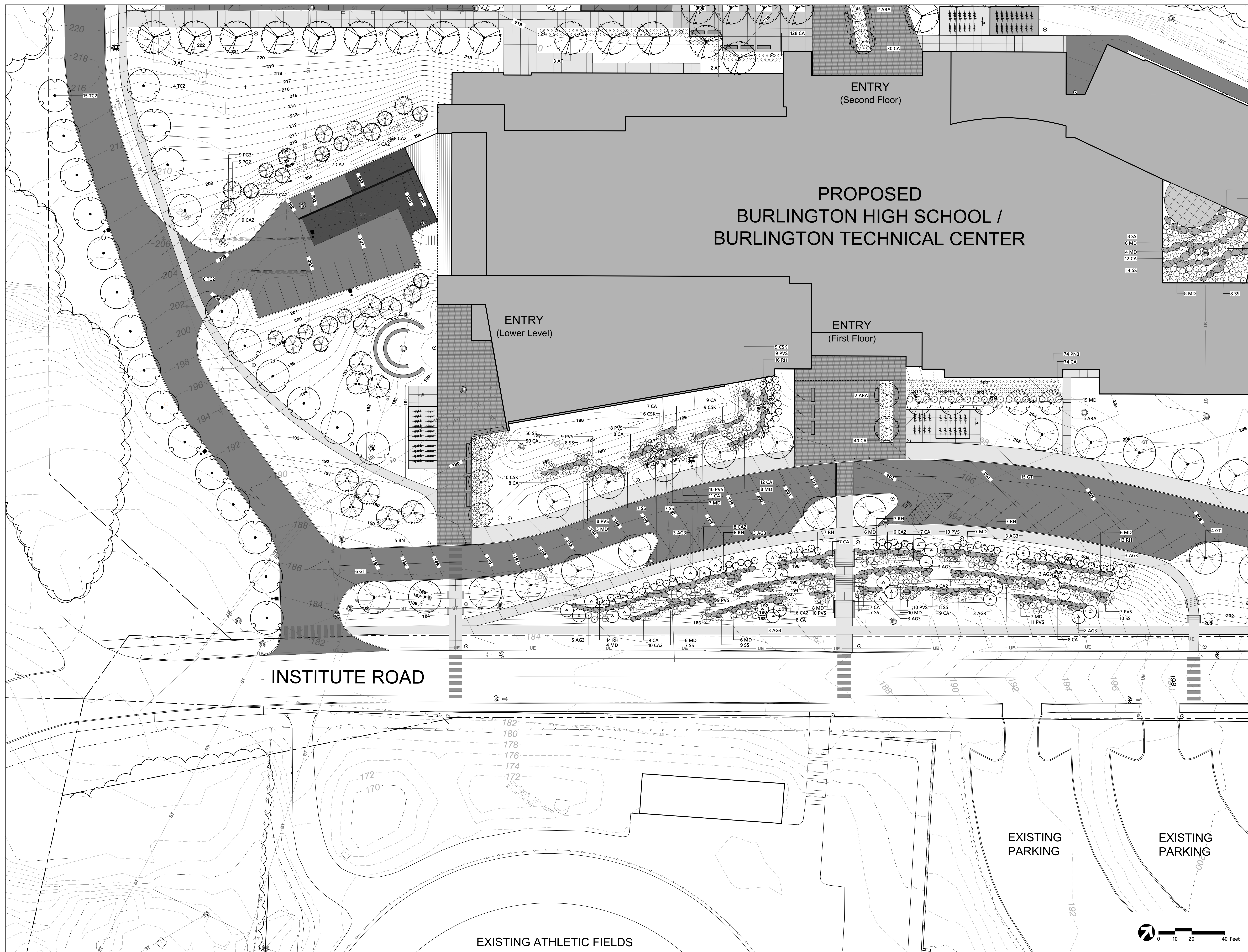
BURLINGTON, VT

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

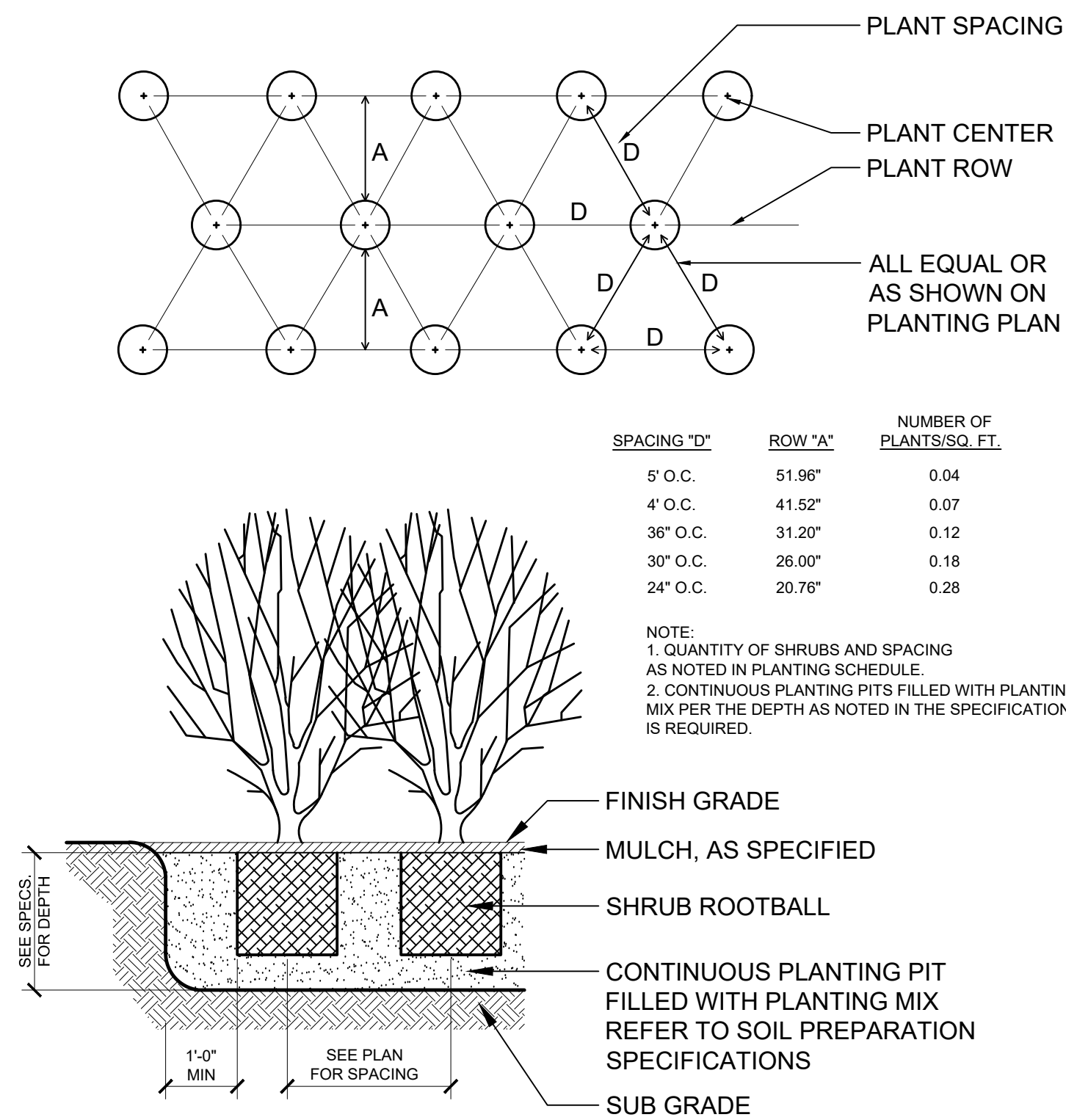
PLANTING PLAN

SHEET NO:

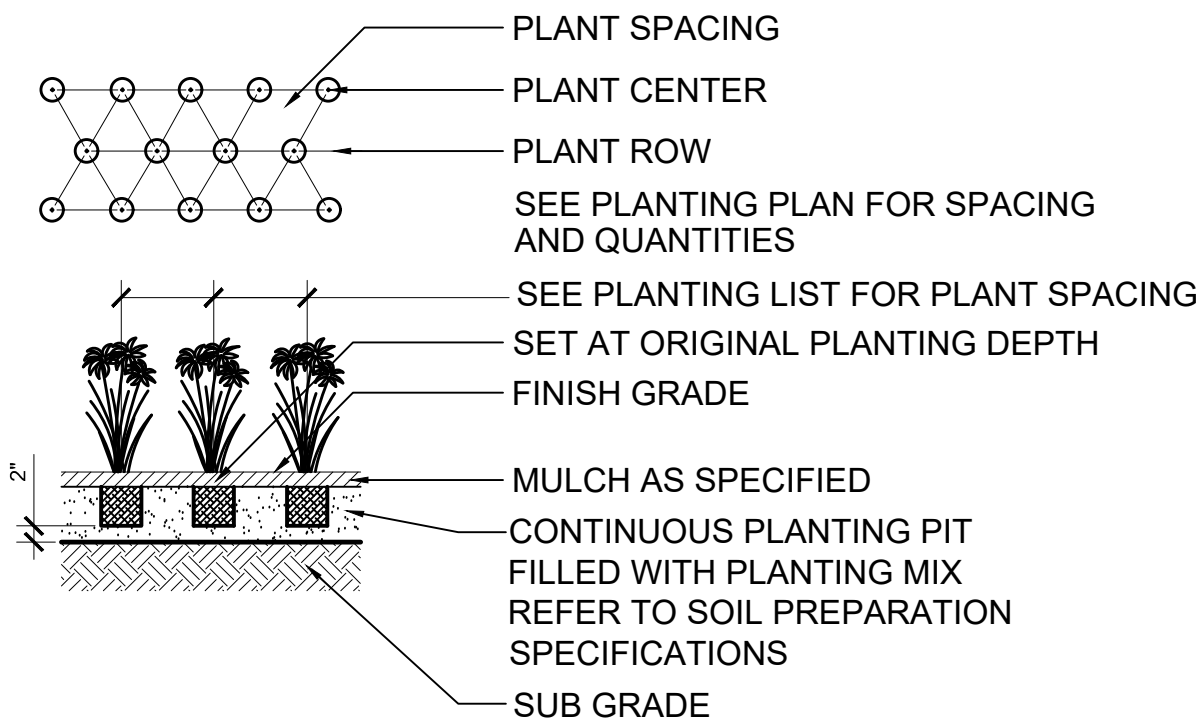
L-303



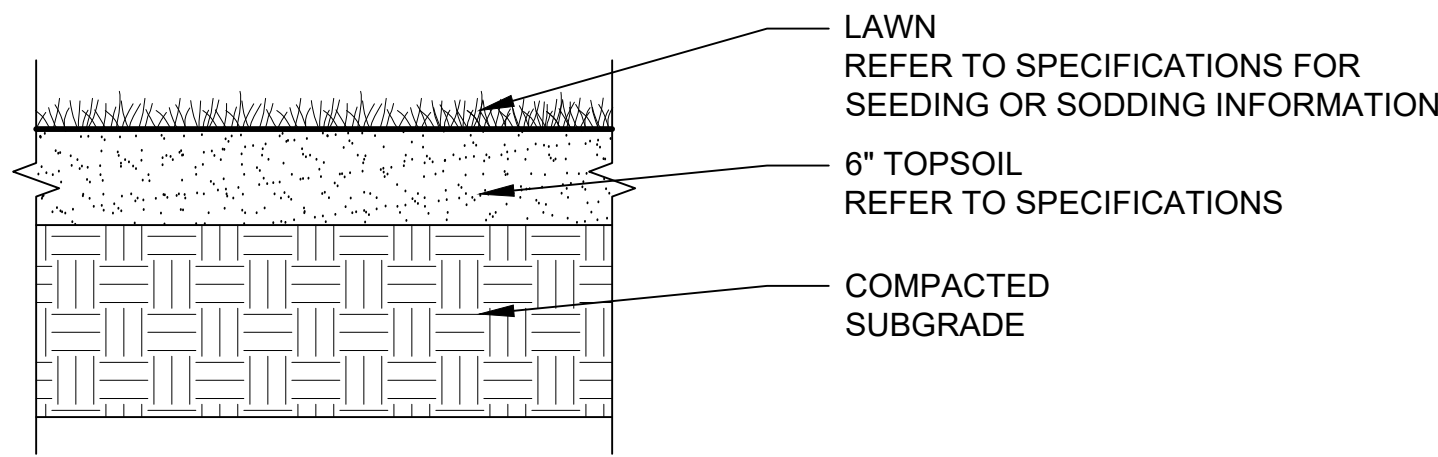
L-304



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

NOTE: EXAMINE ENTIRE TREE AND REMOVE ALL NURSERY TAGS, ROPE, STRING, OR SURVEYORS TAPE TO PREVENT FUTURE GIRDLING.

SURROUNDING SOIL SHOULD NOT EXCEED 80% COMPACTION. DRAINAGE WILL BE REQUIRED IF COMPACTED SOILS ARE PRESENT

NYLON STRAP WITH 3/4" GROMMETS. REFER TO SPECIFICATIONS

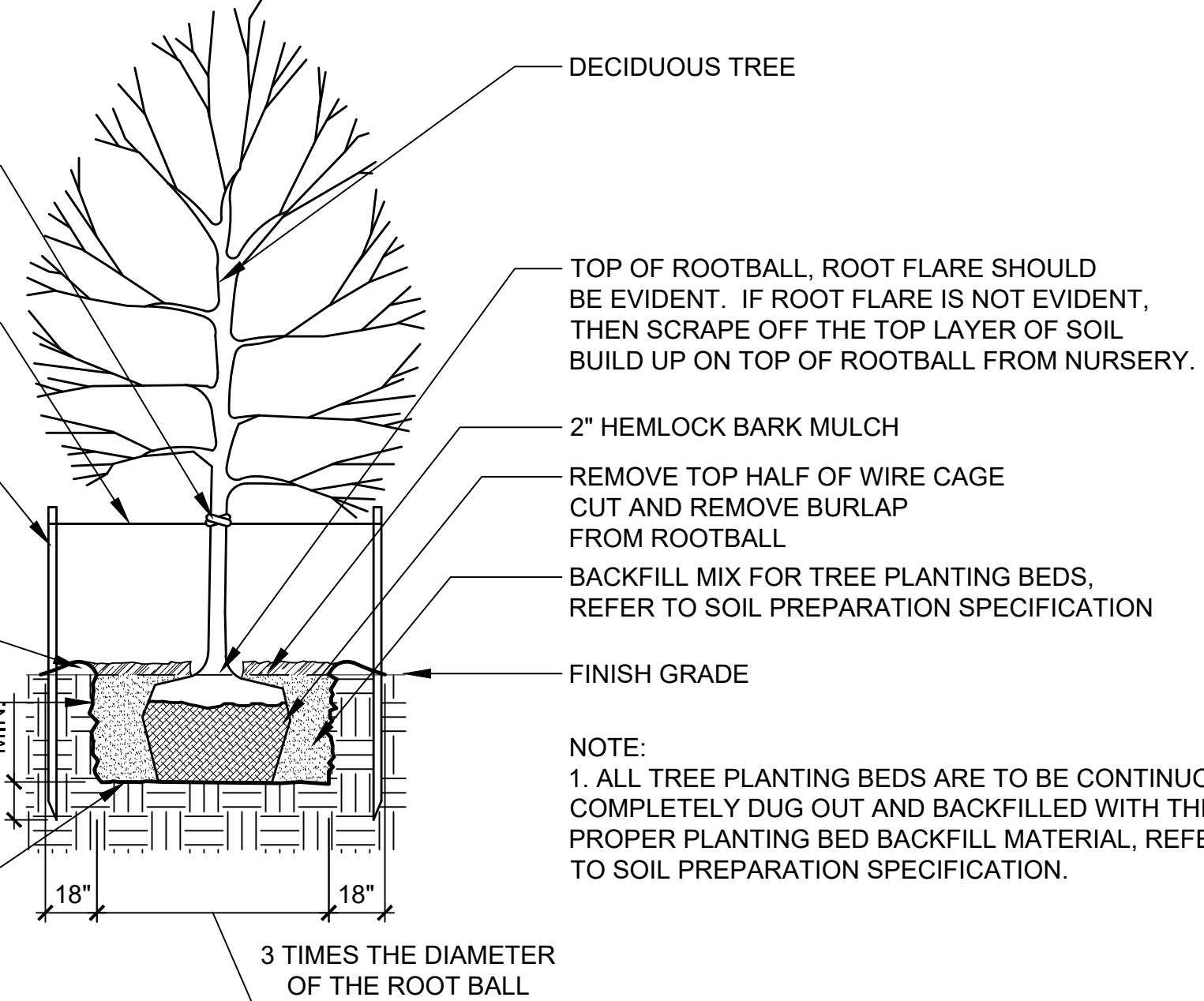
FASTEN WIRE BELOW POINT OF MAJOR BRANCHING OR TO MAJOR OUTSIDE TRUNK.

2 1/2" HARDWOOD STAKES. ALIGN STAKES PARALLEL W/ ROAD/ WALKS OR PARALLEL W/ DIRECTION OF PREVAILING WIND. REFER TO TREE STAKING DETAIL

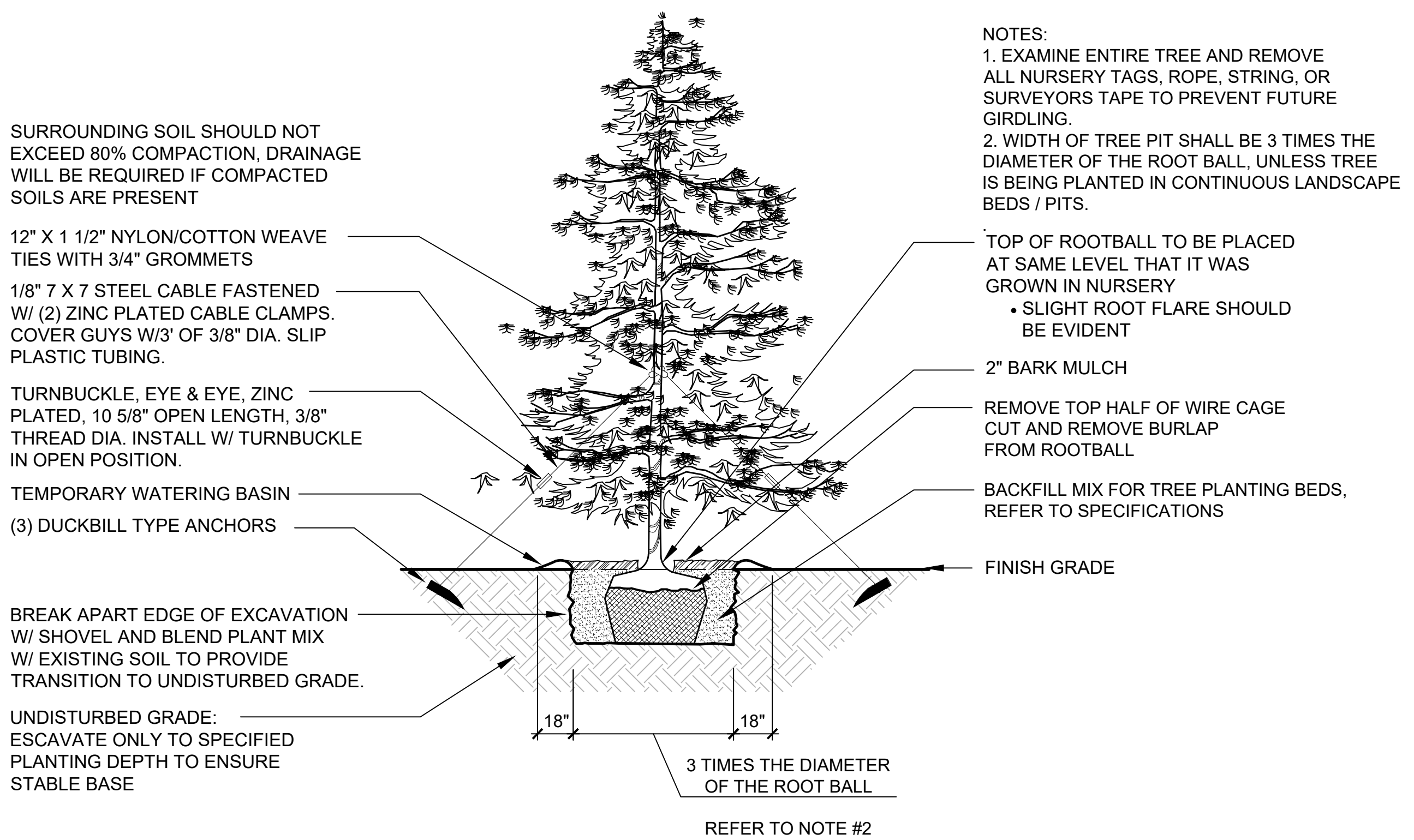
TEMPORARY WATERING BASIN

BREAK APART EDGE OF EXCAVATION W/ SHOVEL AND BLEND PLANT MIX W/ EXISTING SOIL TO PROVIDE TRANSITION TO UNDISTURBED GRADE

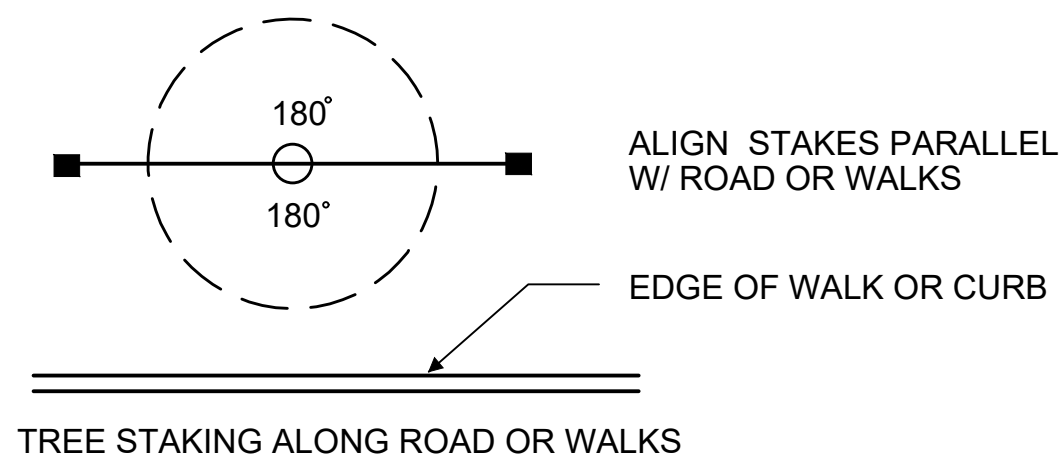
UNDISTURBED GRADE
EXCAVATE ONLY TO SPECIFIED PLANTING DEPTH TO ENSURE STABLE BASE



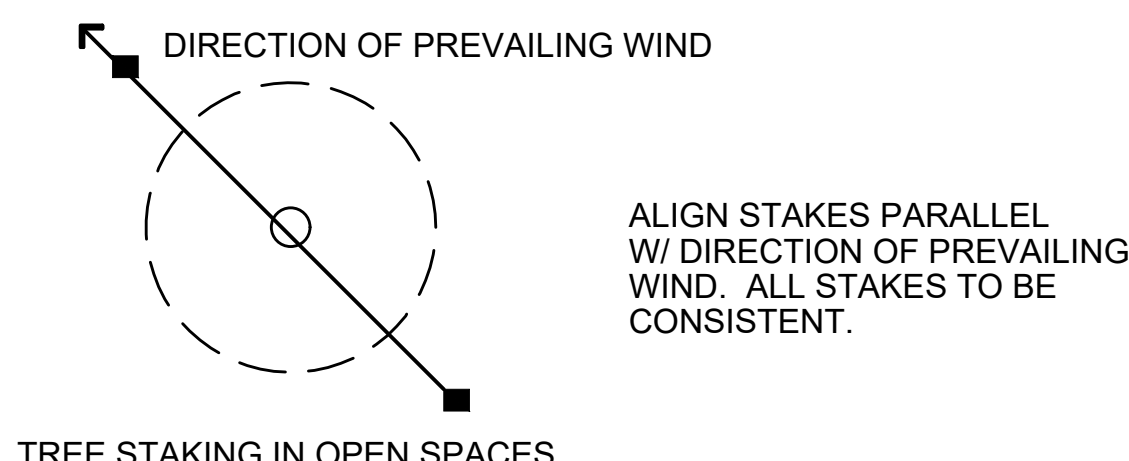
A TREE PLANTING
SCALE 1/4" = 1'-0"



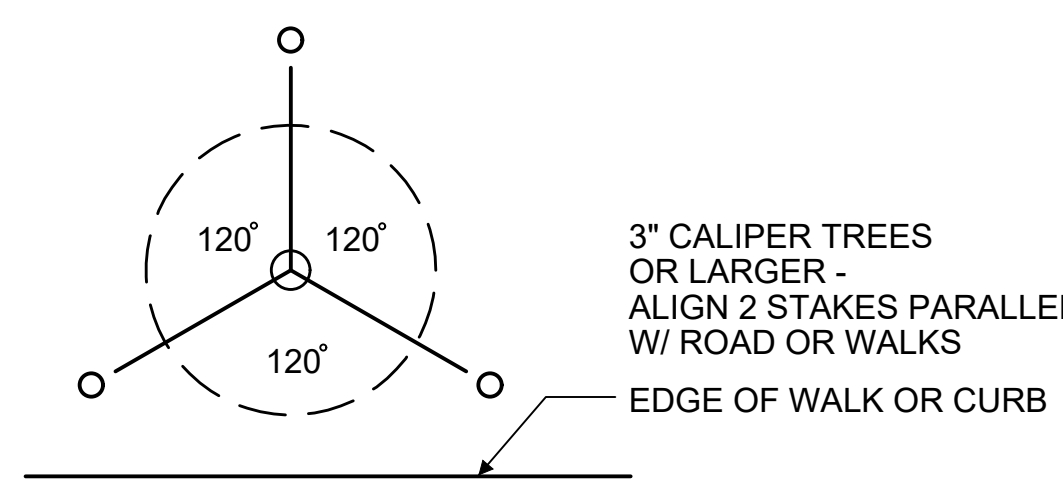
B EVERGREEN PLANTING
SCALE 1/4" = 1'-0"



A. TREE STAKING ALONG ROAD OR WALKS



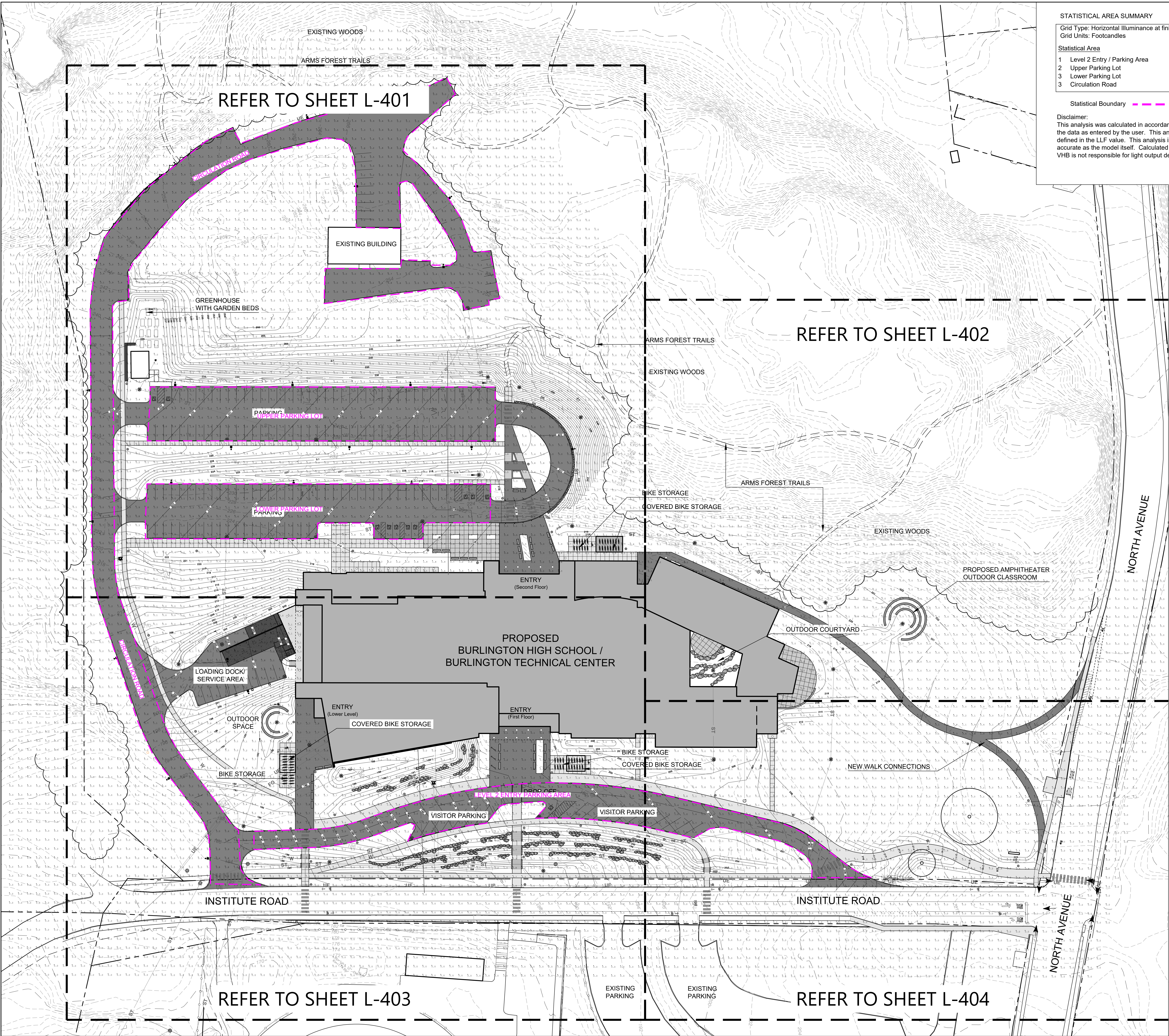
B. TREE STAKING IN OPEN SPACES



C. TREE GUYING

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 LLP 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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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

ISSUE LOG:
Zoning Permit

SCALE: 1"=20'

CHECKED BY: MKW

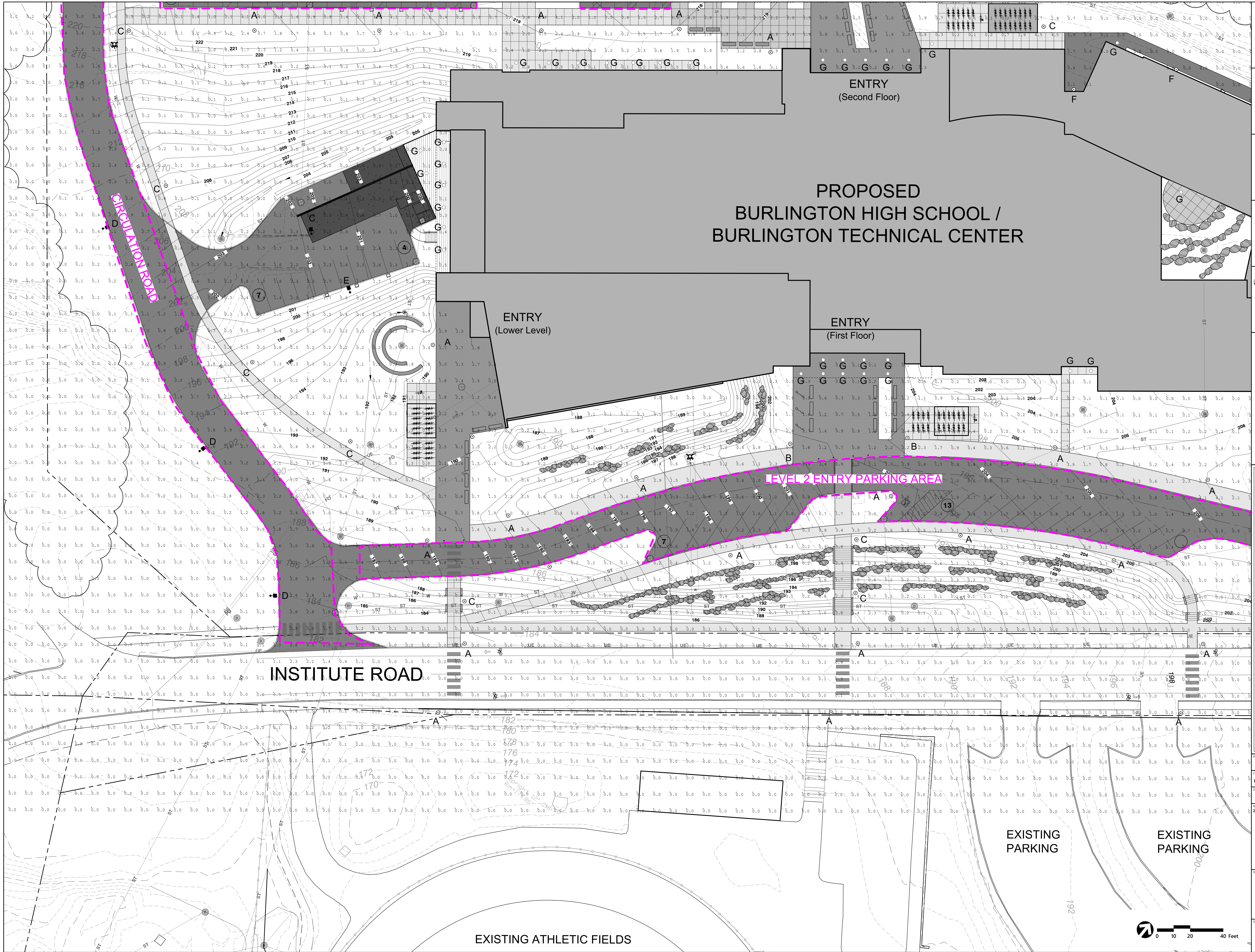
09/30/22

SHEET CONTENTS:

LANDSCAPE LIGHTING PLAN

SHEET NO: L-402

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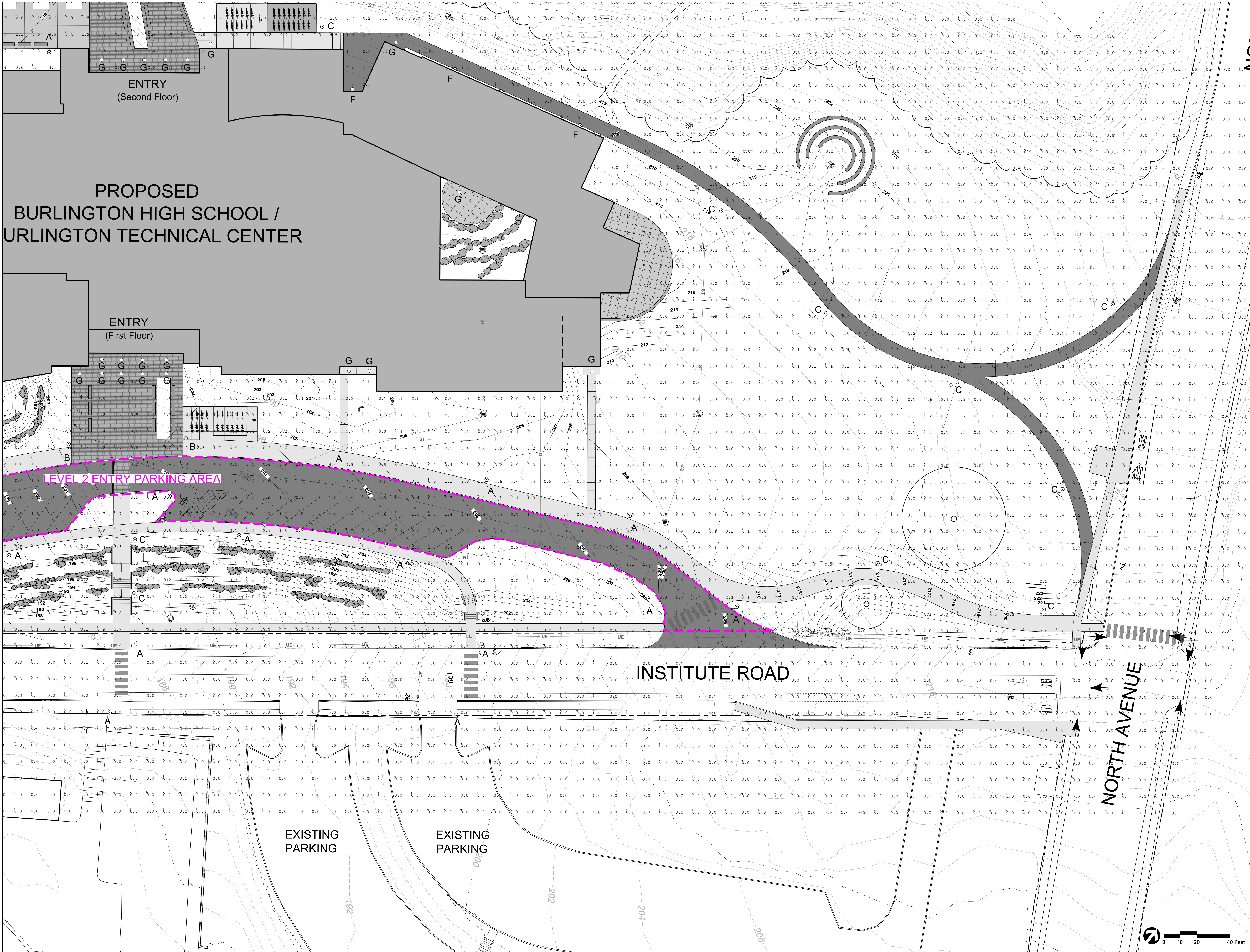
BURLINGTON HIGH SCHOOL & BURLINGTON TECHNICAL CENTER

BURLINGTON, VT

111 PROJECT NO: **2170**
ORIGINATOR DATE: **07/01/2022** SCALE: **1"=20'**
DRAWN BY: **JRD/MKW** CHECKED BY: **MKW**
ISSUE LOG:
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SHEET CONTENTS:
LANDSCAPE LIGHTING PLAN

SHEET NO: **L-403**
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BURLINGTON, VT

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ISSUE LOG:
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SCALE: 1"=20'

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08/30/22

SHEET NO. L-404

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.

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.

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 downgradient 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.
- iii. Chipping with a minimum of four (4) feet of cover material.

- 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
 - a. 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 to final grade or 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 or seed on all parts of the slope and on the underlying 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 for 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

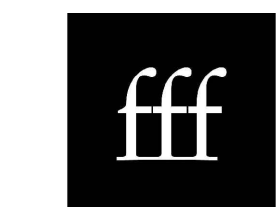
- A. Sediment wattles shall be King Fibre Corporation silt trapper sediment wattles or approved equal.

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.

SCHEMATIC DESIGN

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83 Maple Street - Burlington VT 054

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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

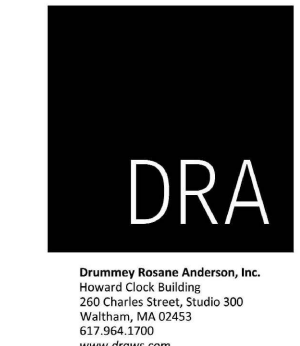
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HIGH SCHOOL
&
BURLINGTON
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BURLINGTON, VT

111 PROJECT NO:

21255

ORIGINATION DATE:

07/22/2022

SCALE:

AS SHOWN

DRAWN BY:

MAB

CHECKED BY:

DSM

ISSUE LOG:

200ING PERMIT DRAFT

08/23/22

200ING PERMIT

09/30/22

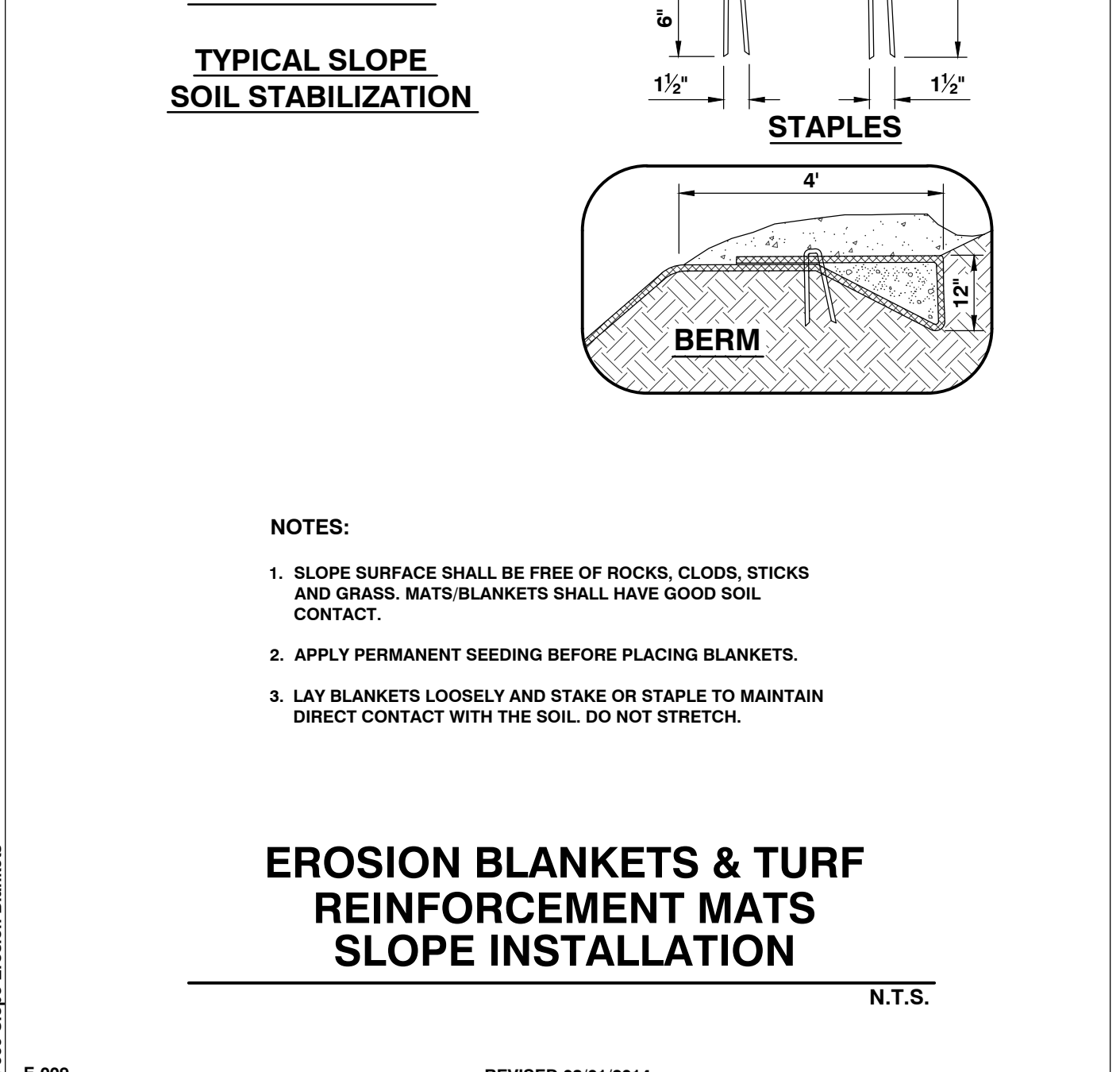
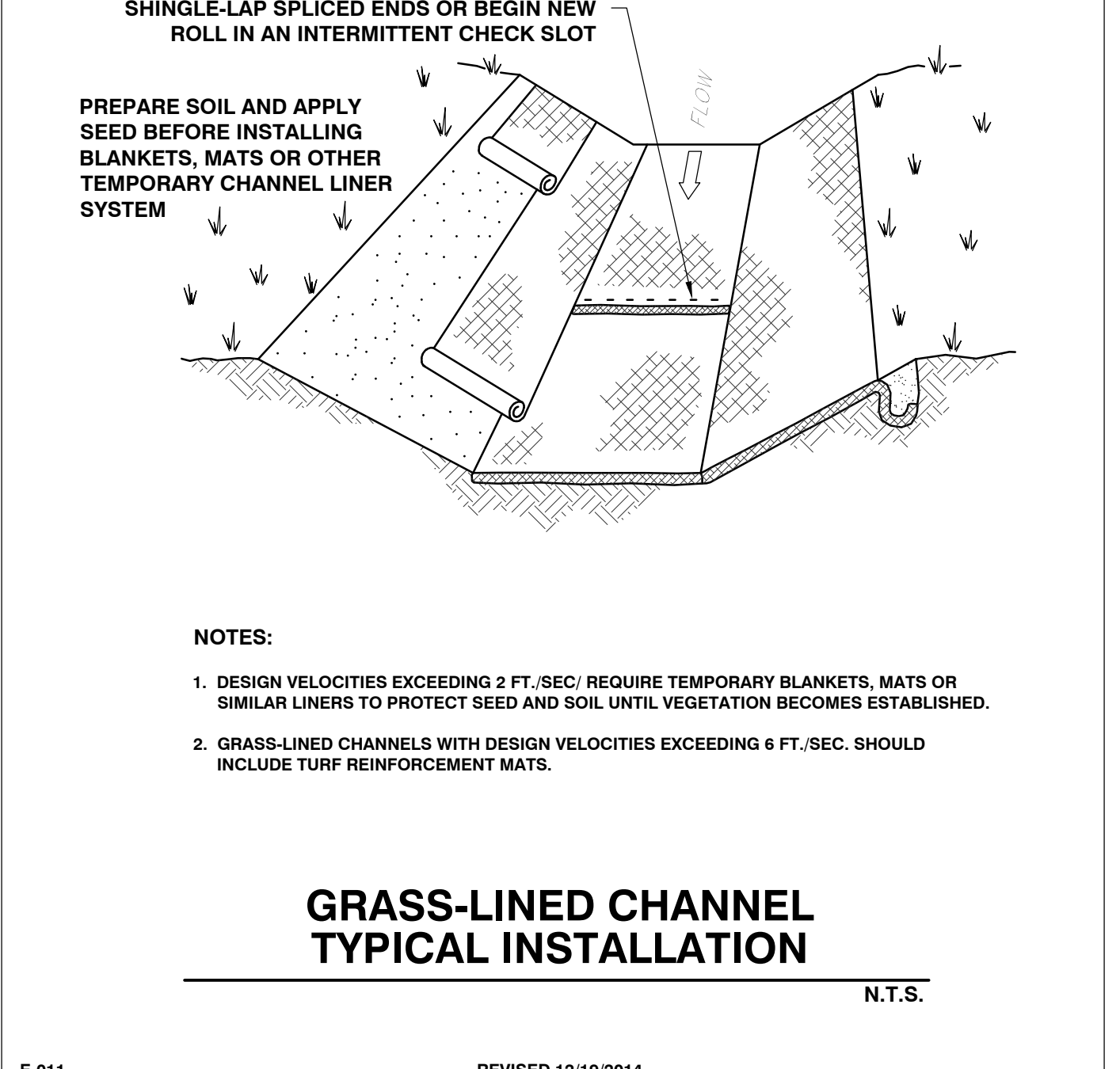
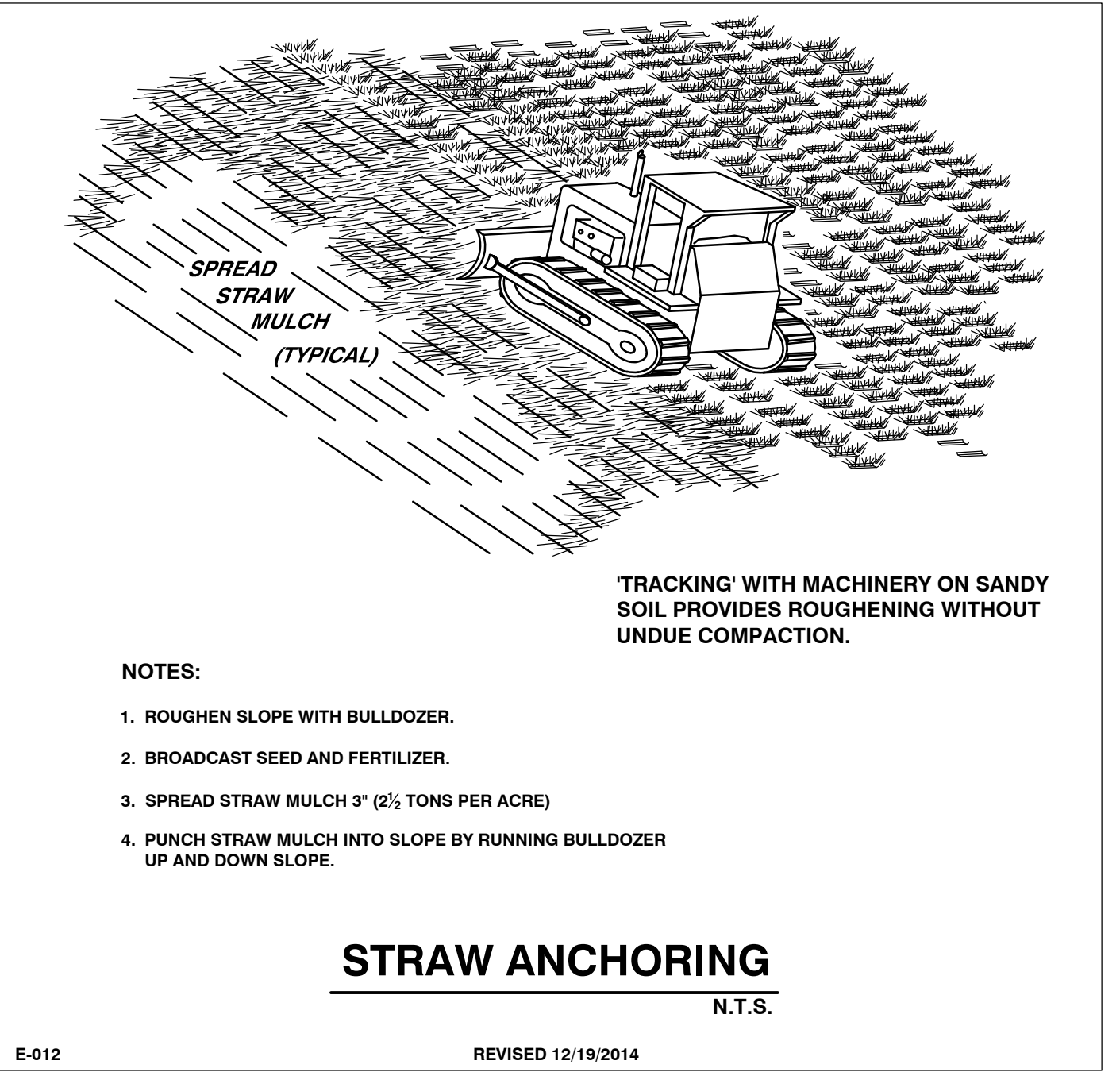
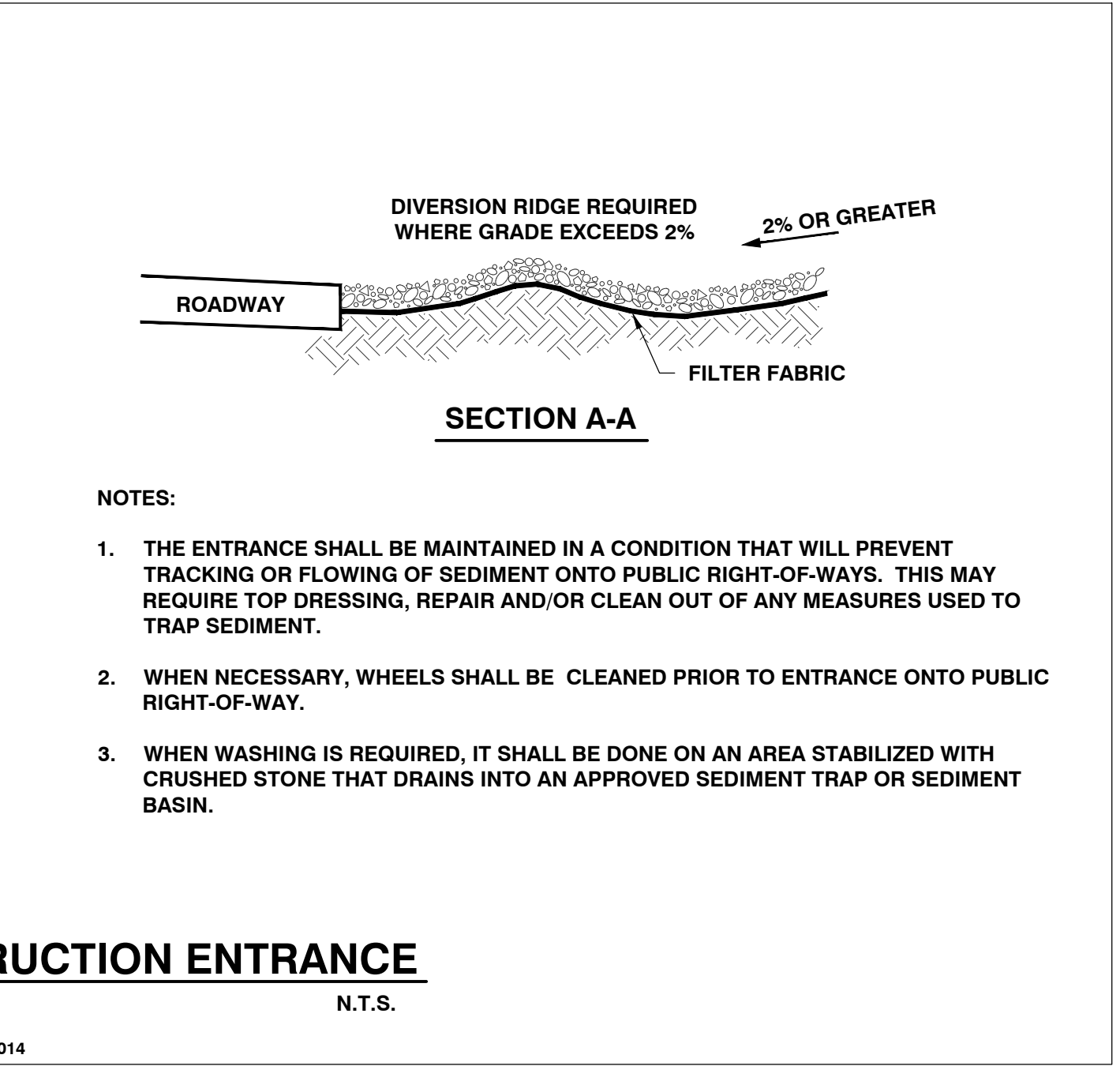
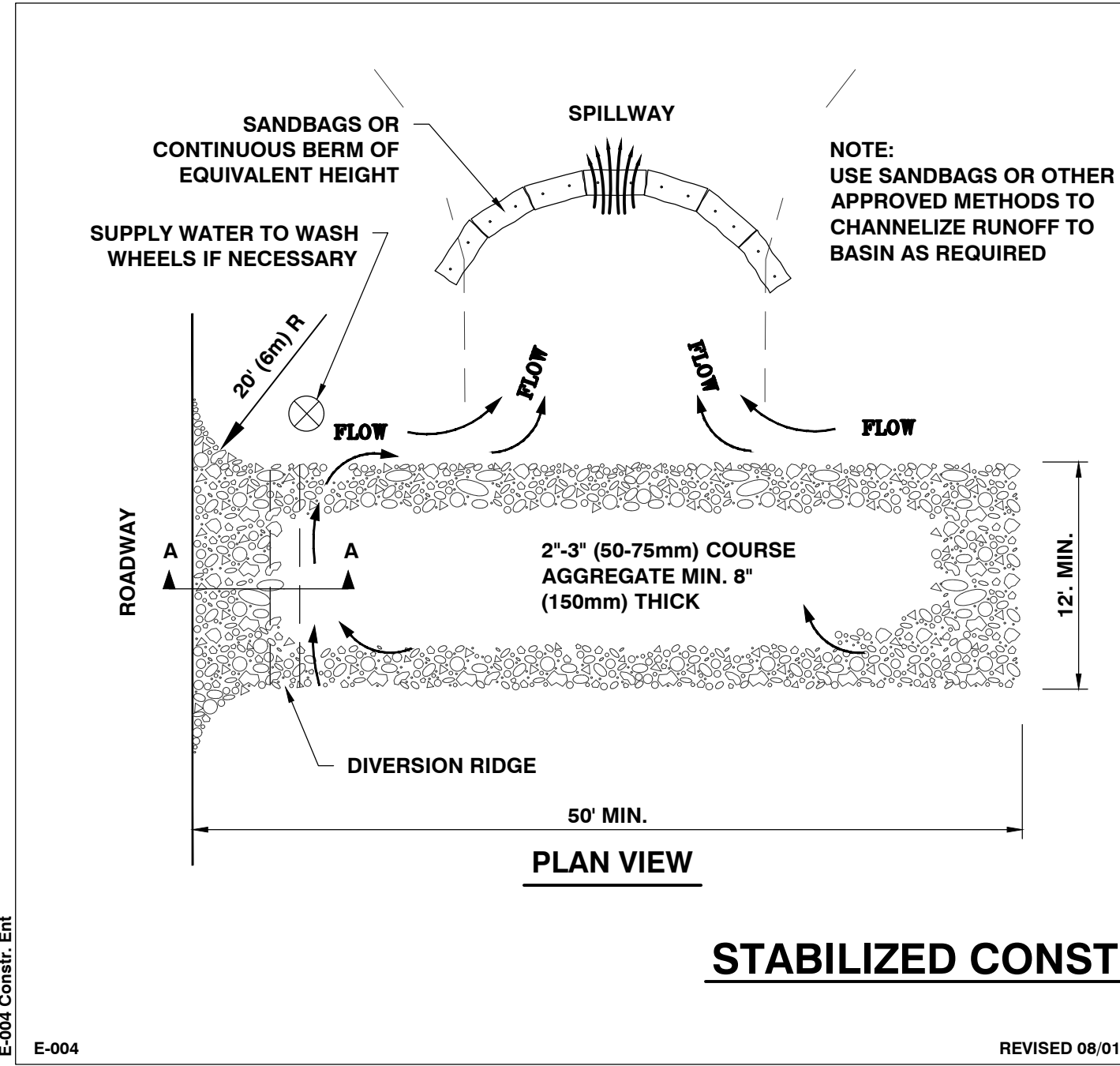
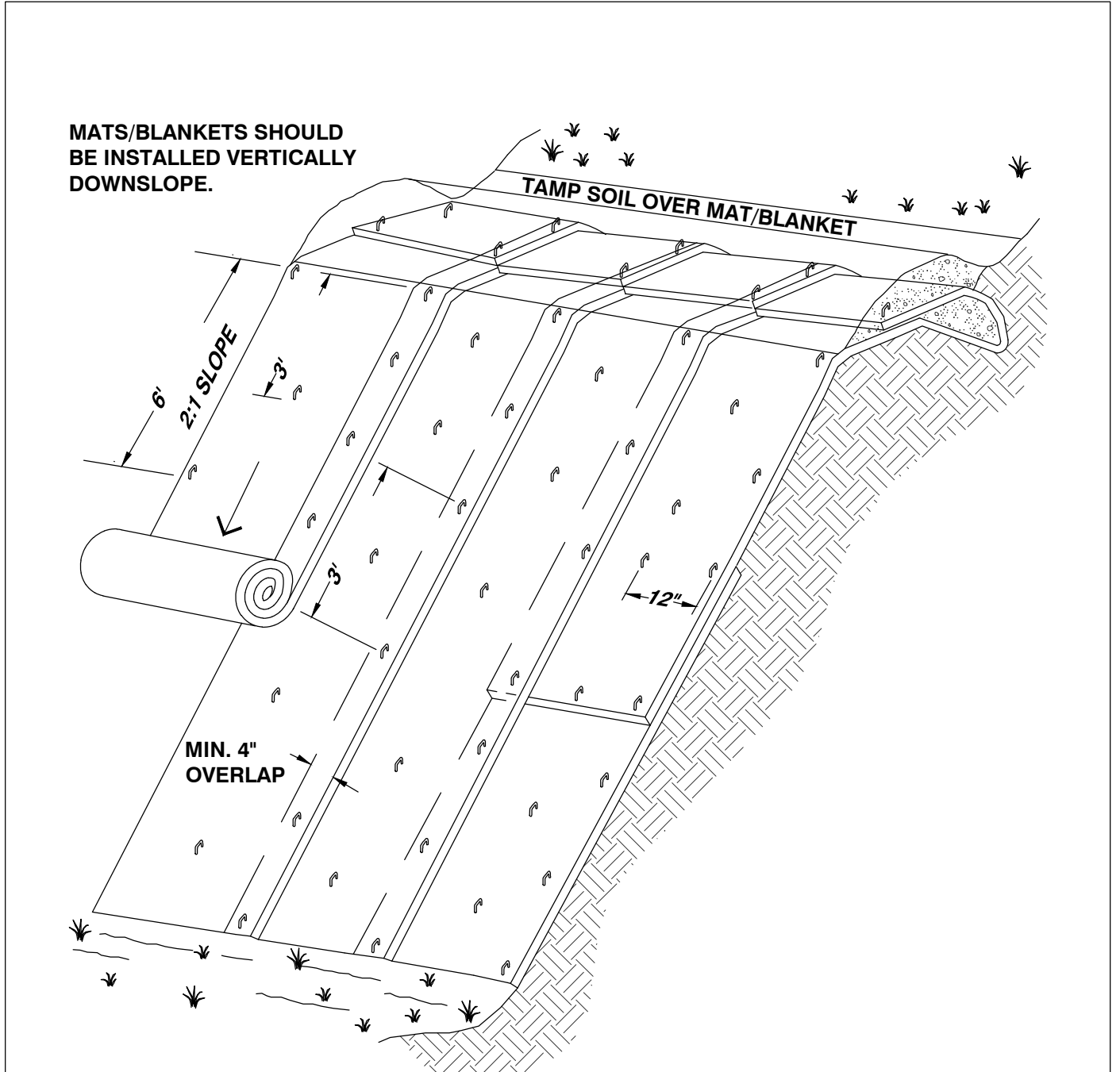
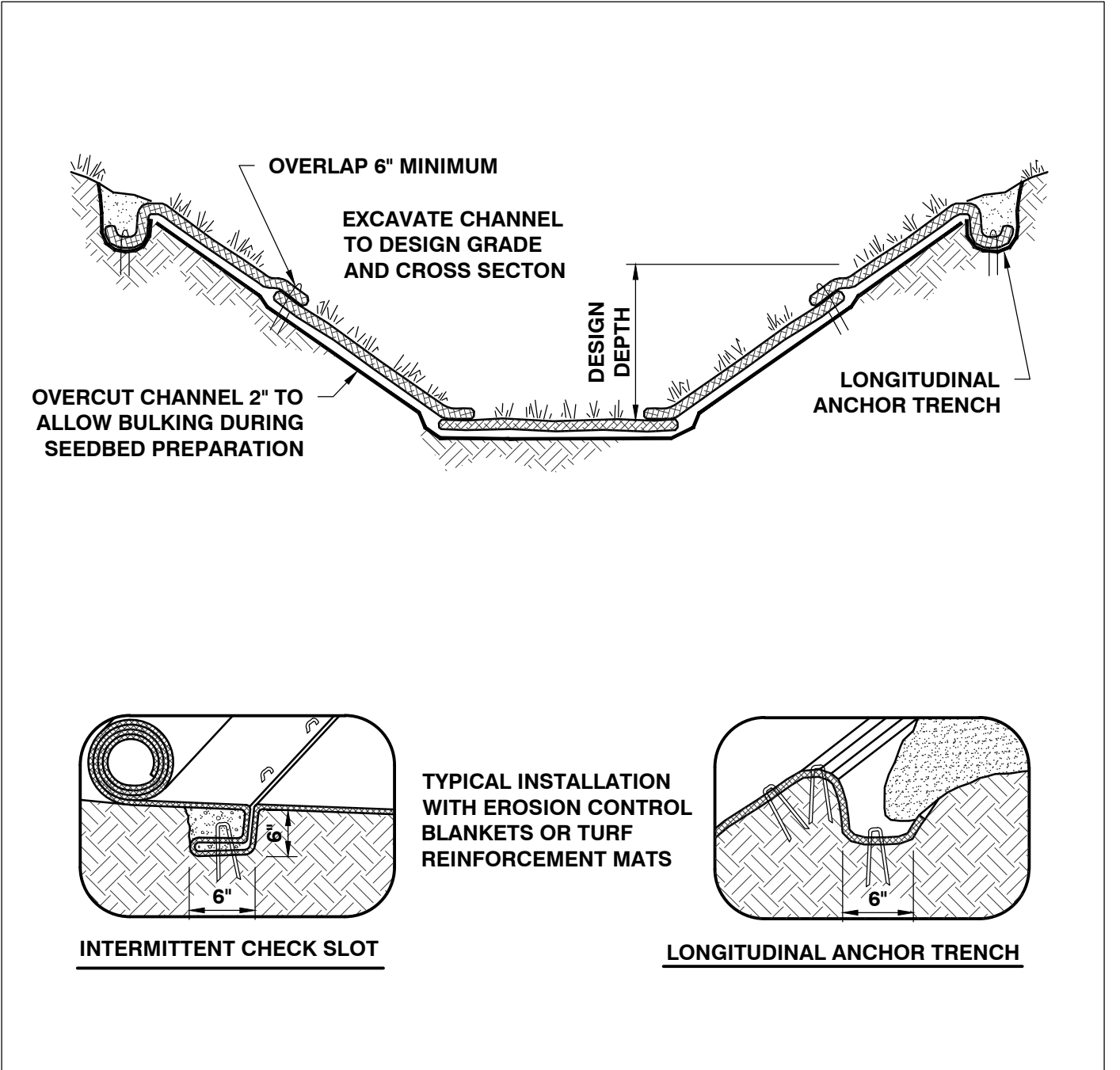
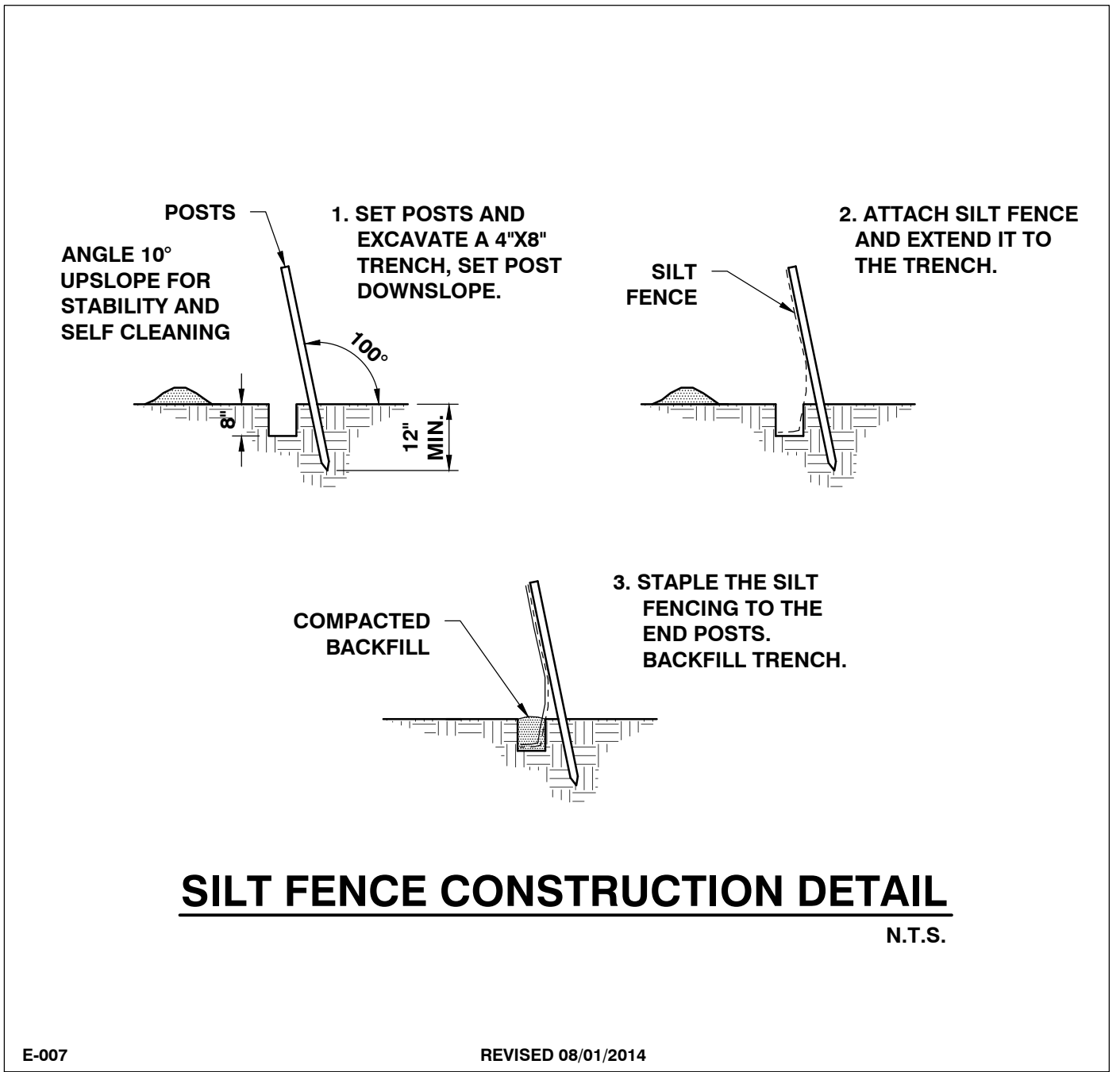
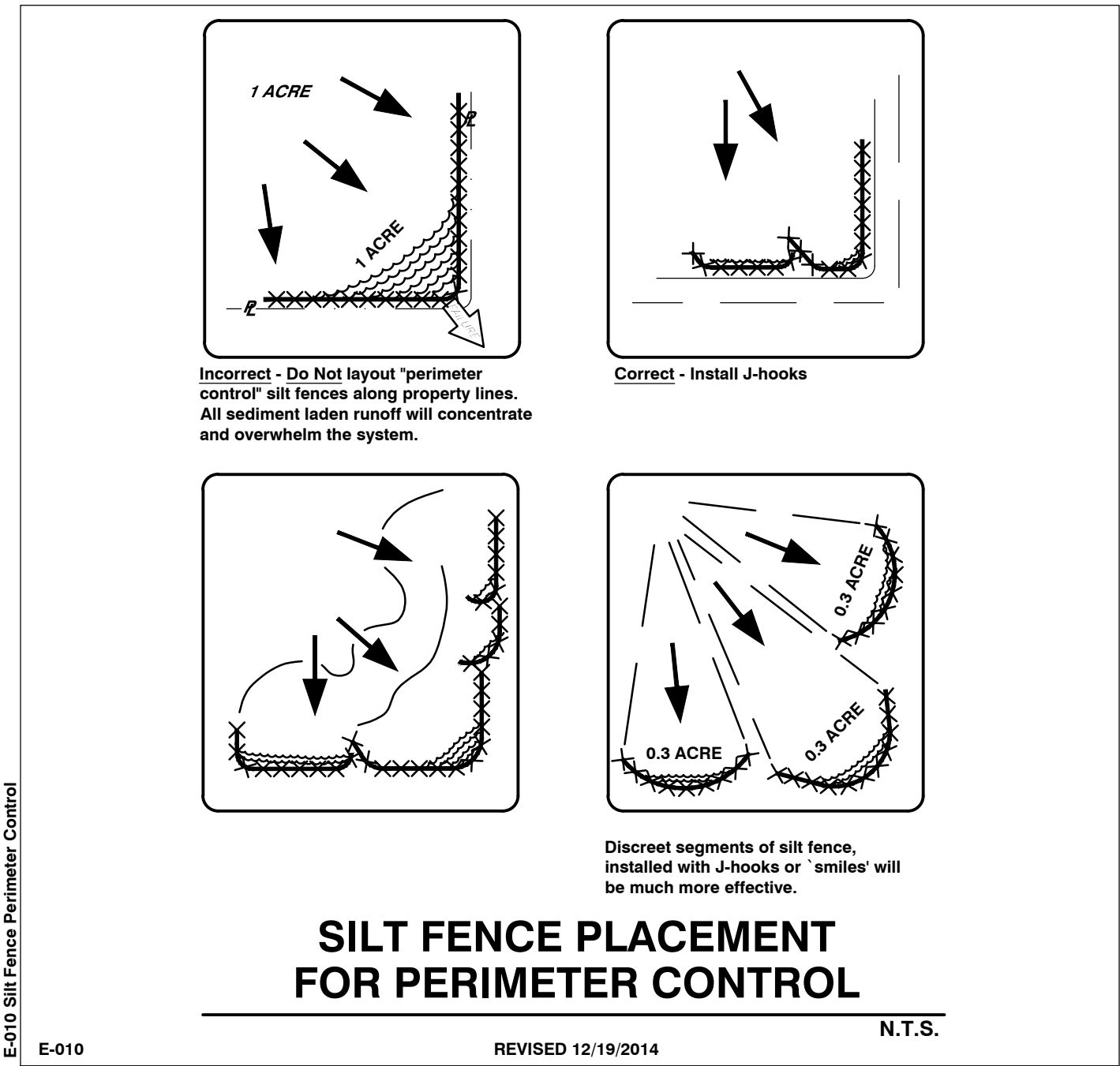
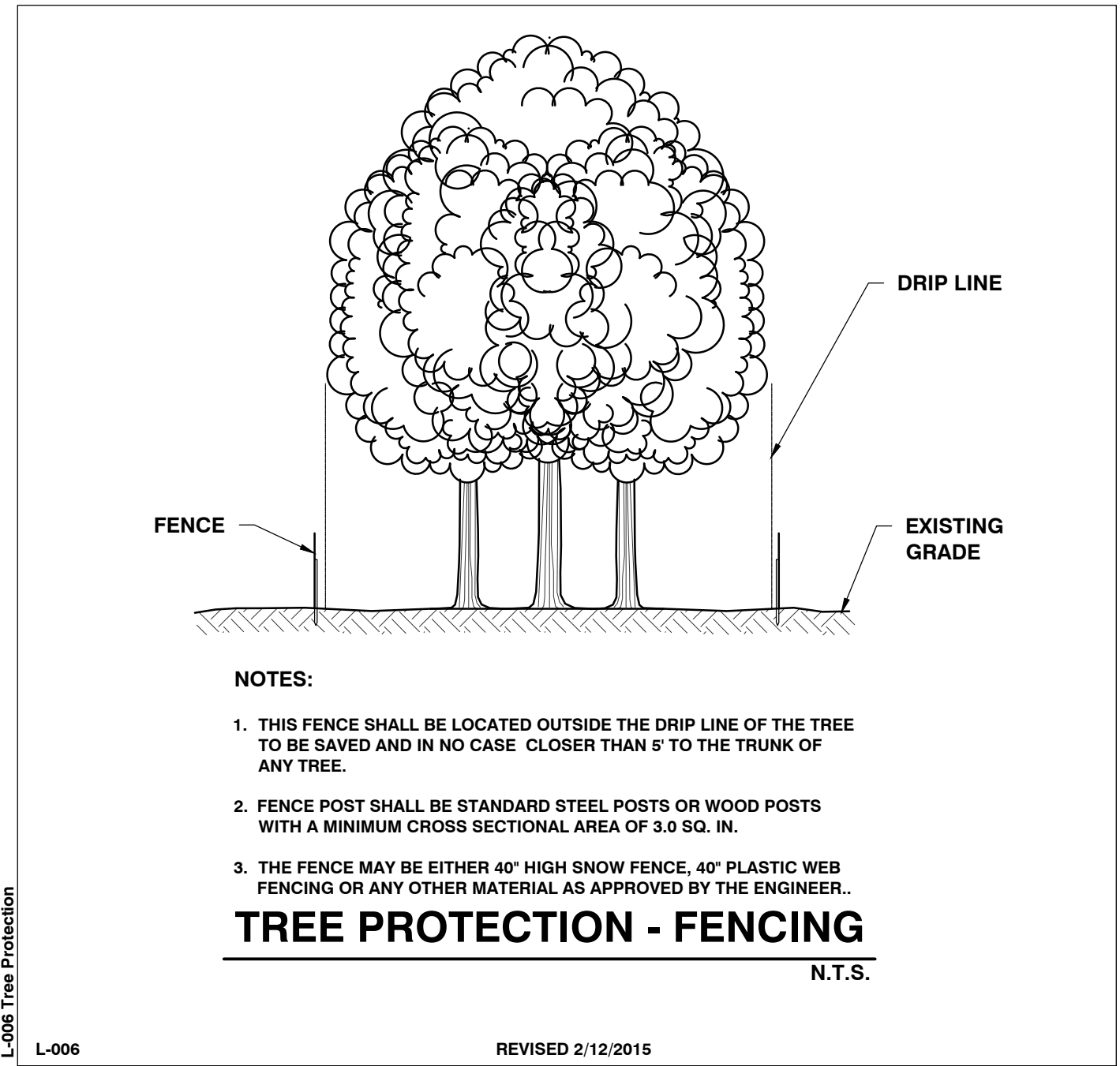
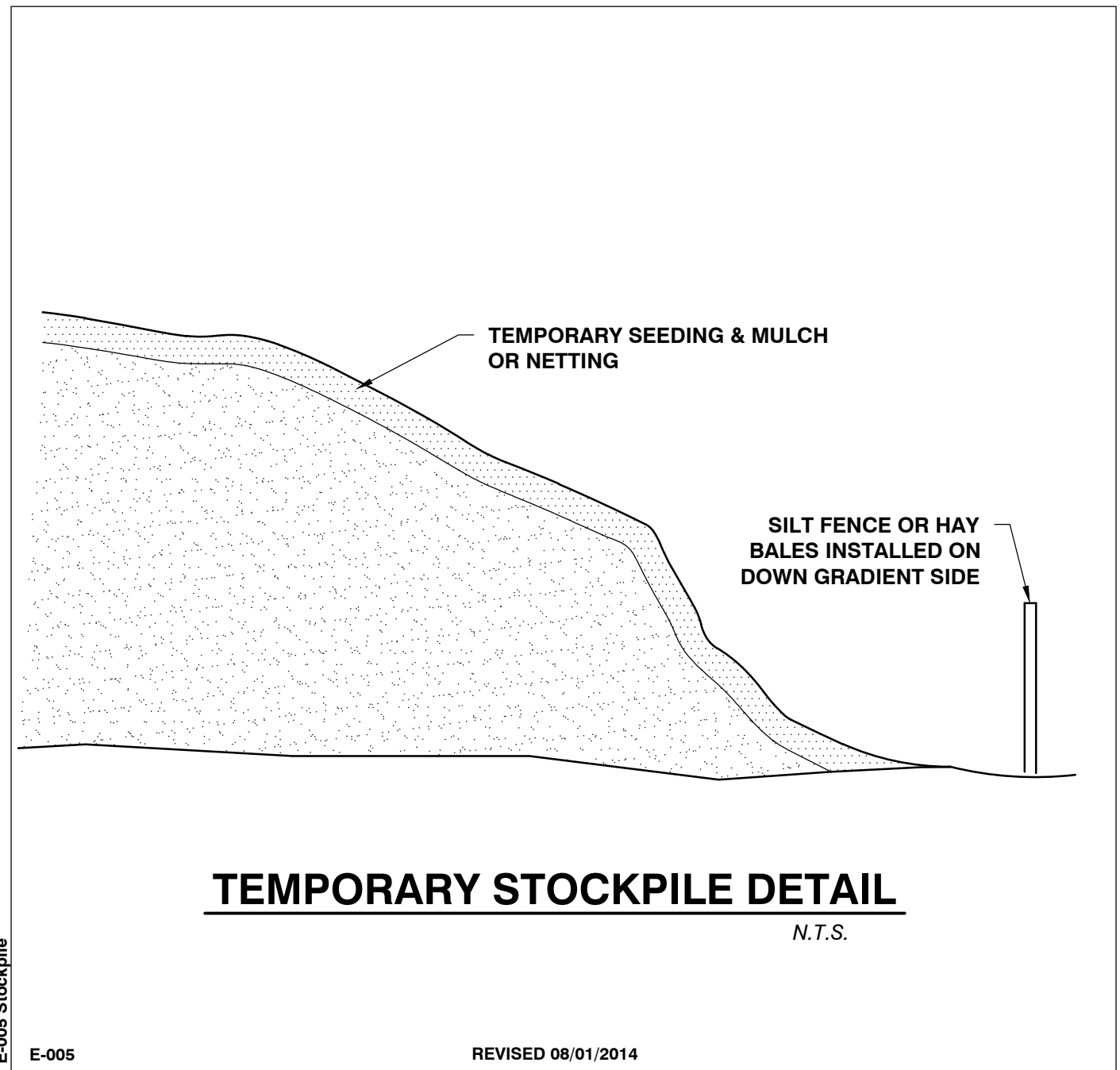
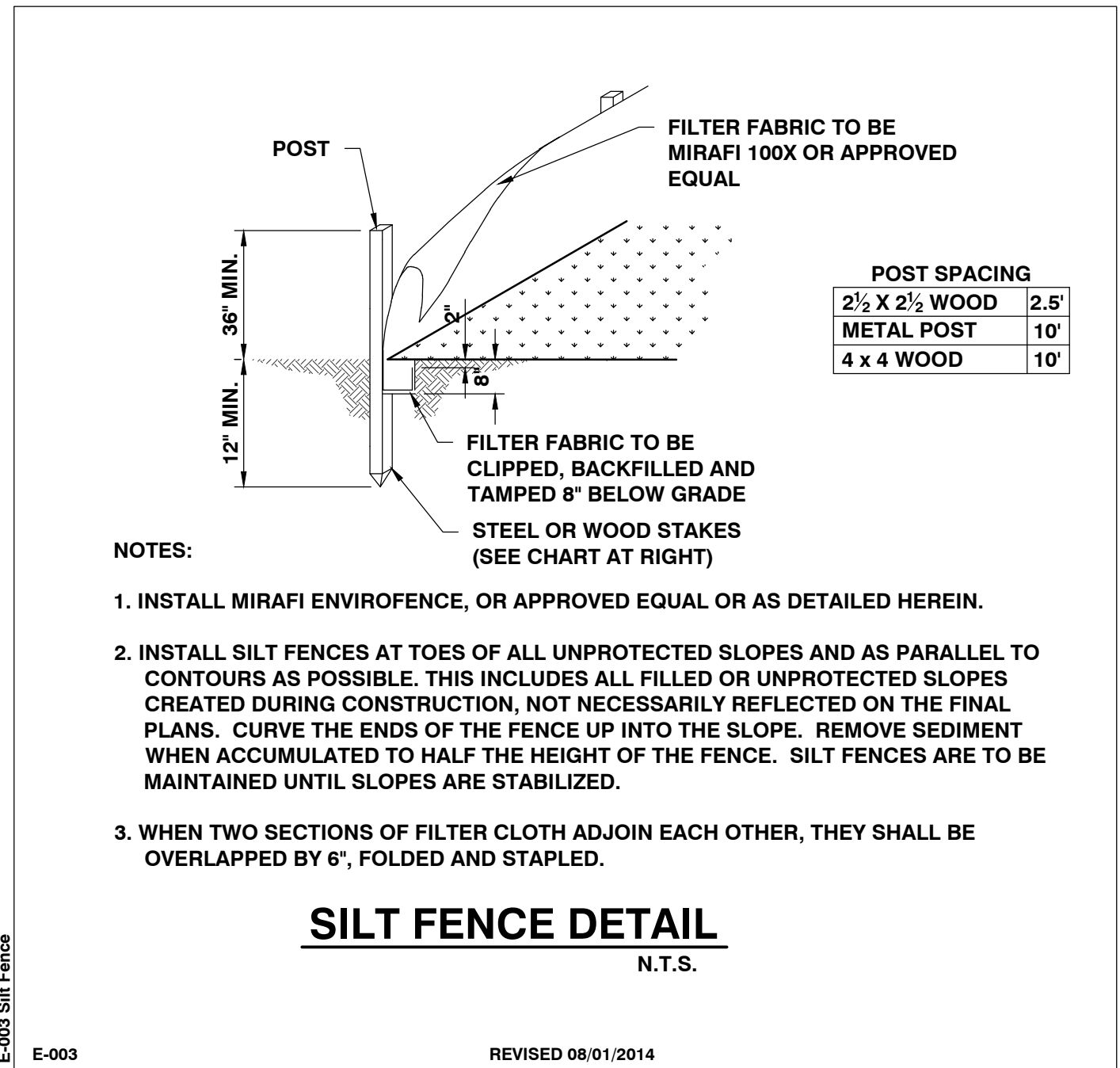
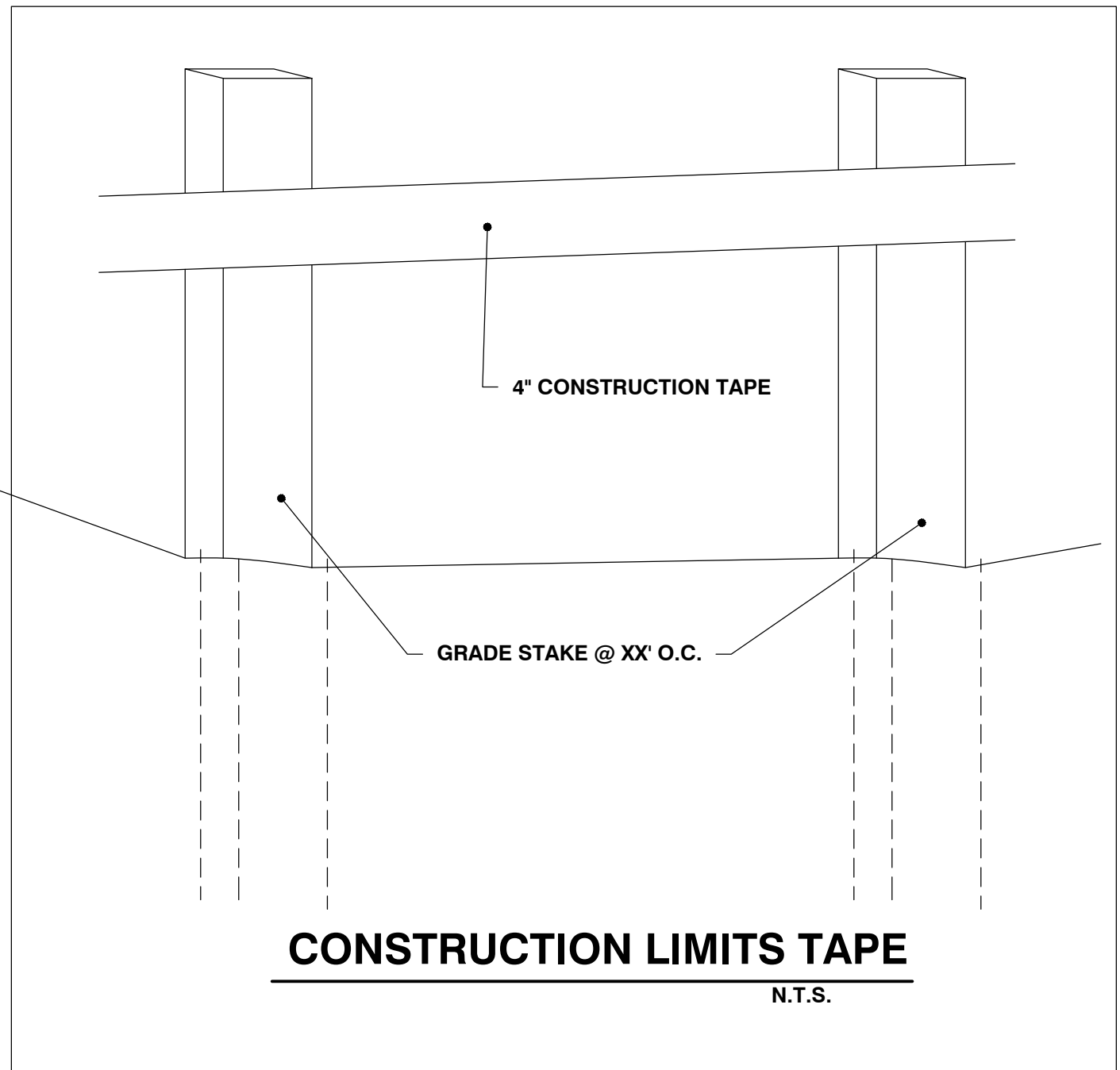
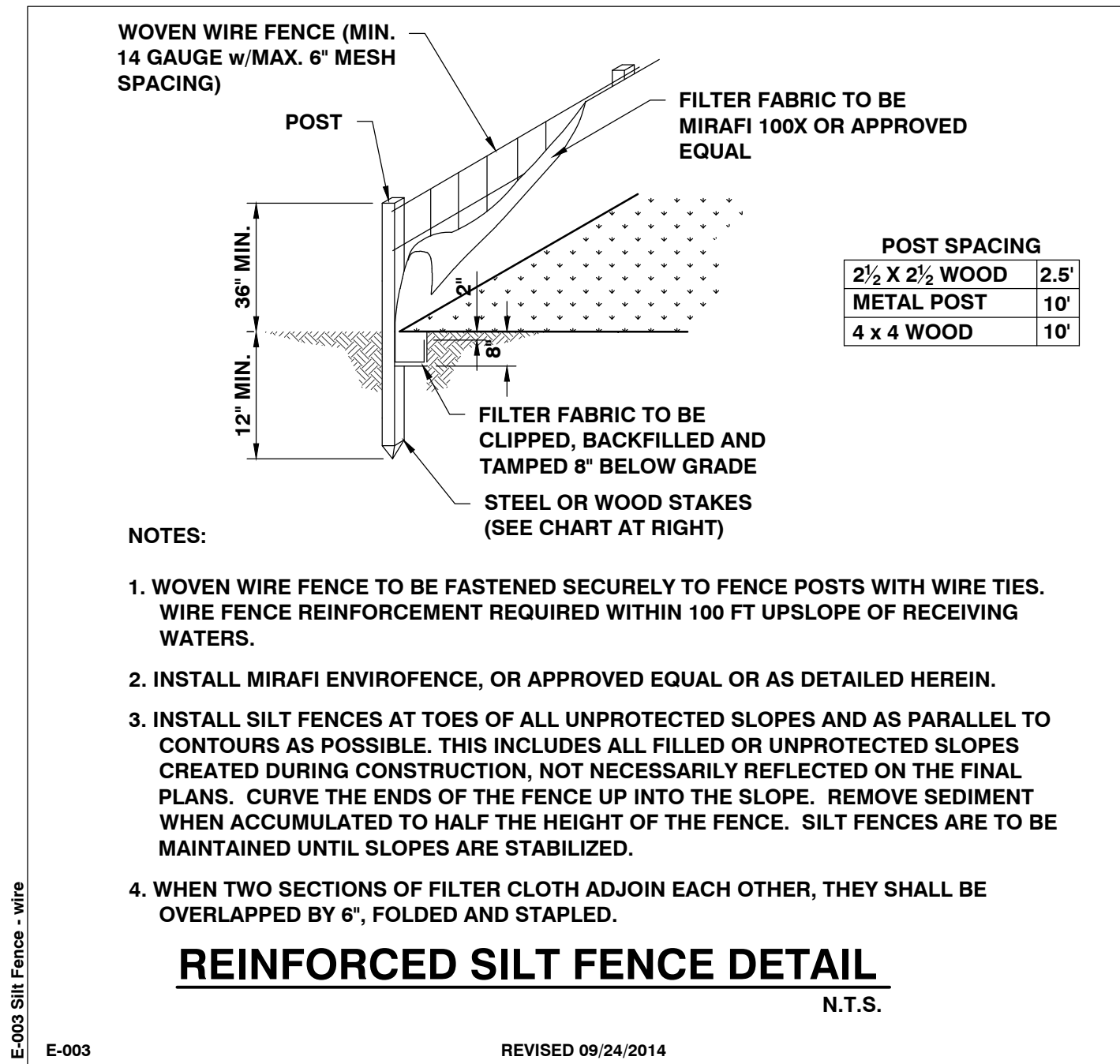
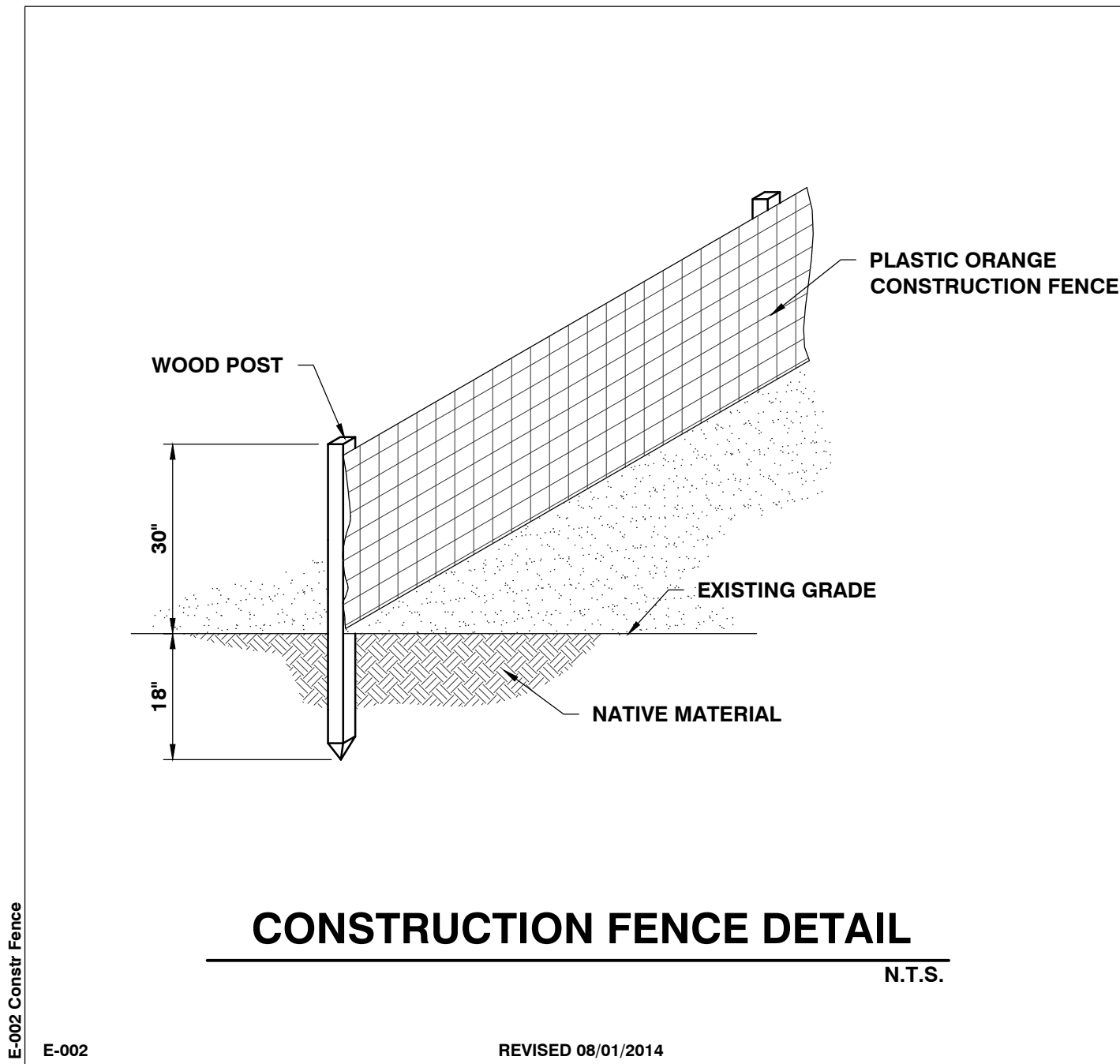
SHEET CONTENTS:

EPSC
NARRATIVE

SHEET NO:

C4.3

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BURLINGTON, VT

111 PROJECT NO: 21255

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

DRAWN BY: MAB CHECKED BY: DSM

ISSUE LOG: 2020 PERMIT DRAFT 08/23/22

2020 PERMIT 09/30/22

SHEET CONTENTS:

EPSC DETAILS

SHEET NO:

C4.4

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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.

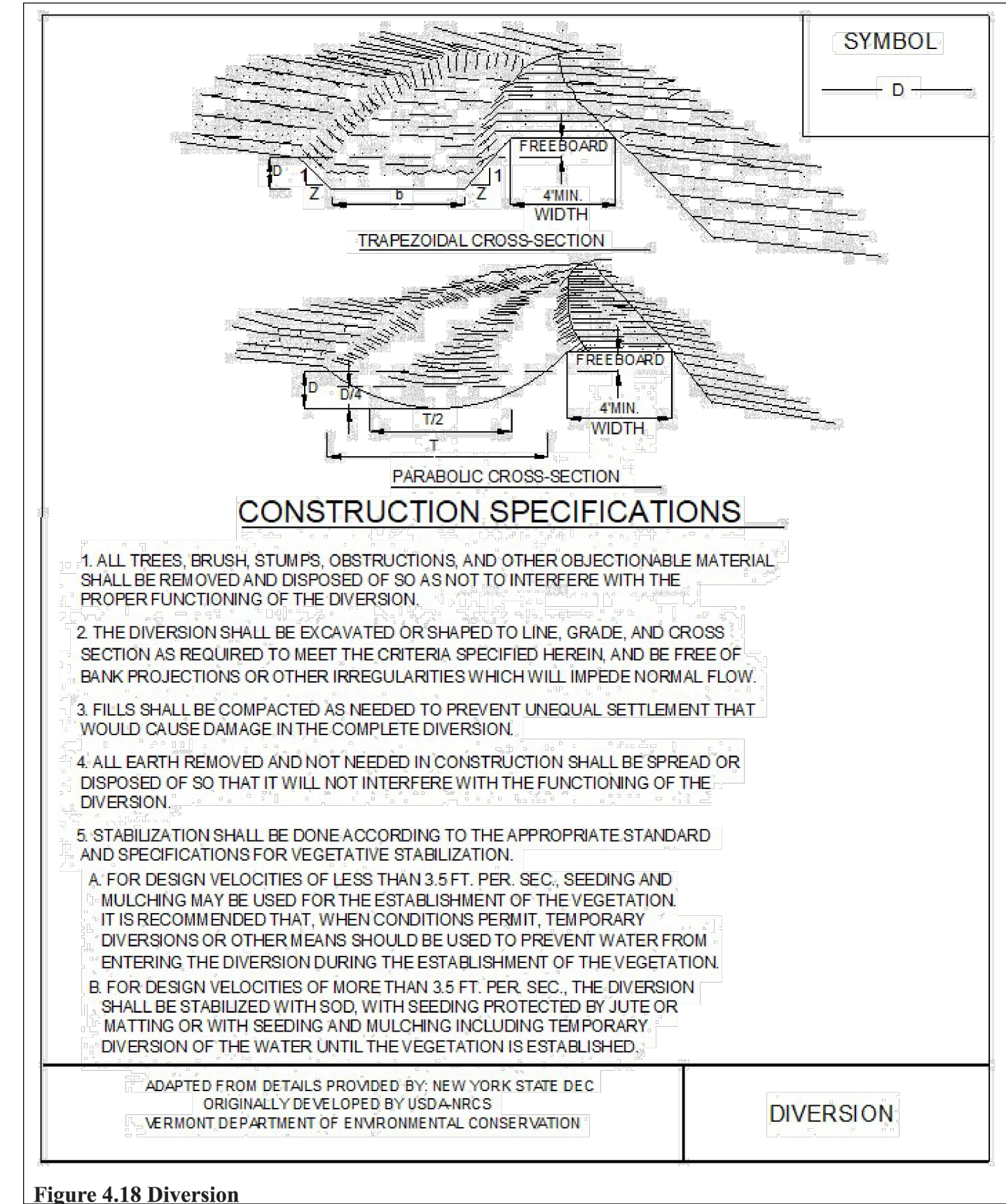
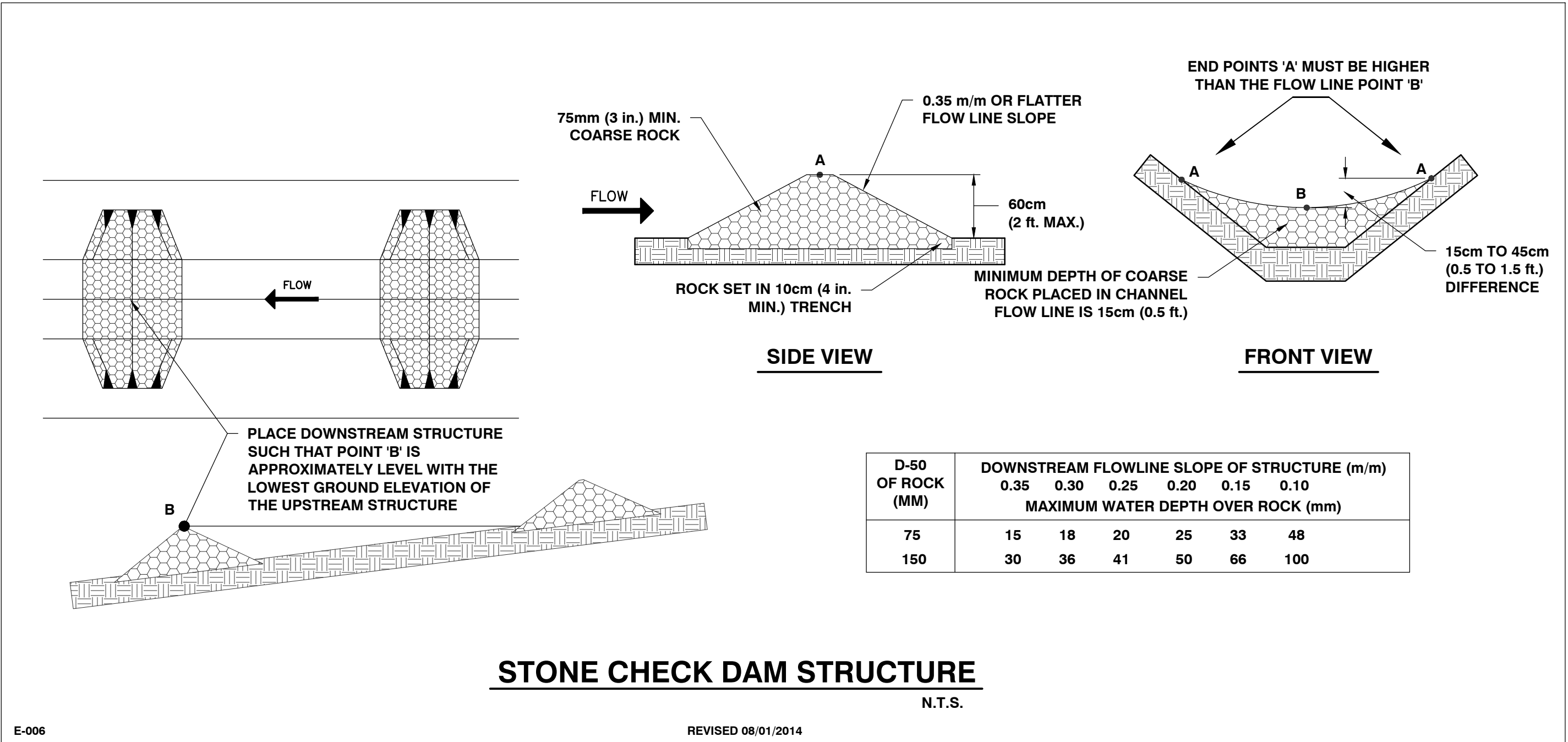
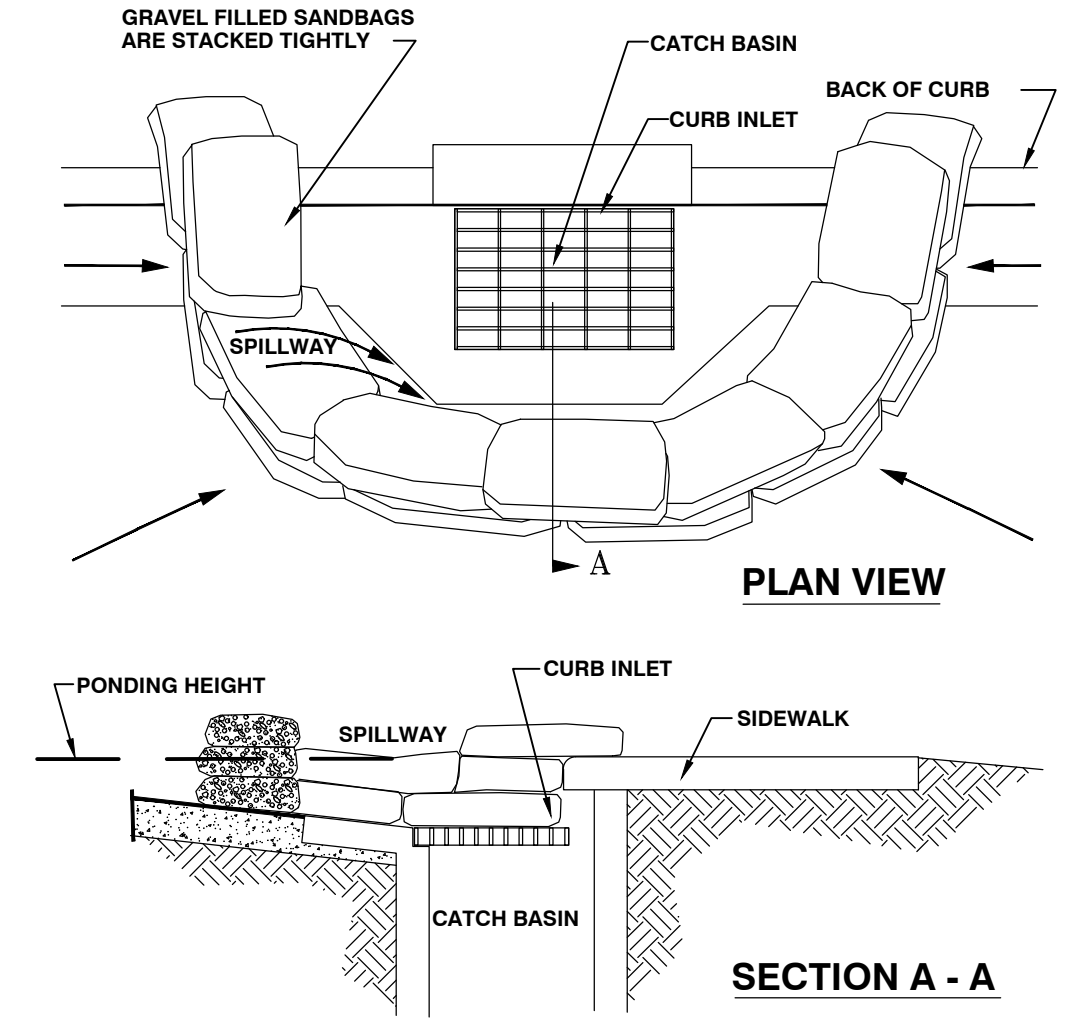
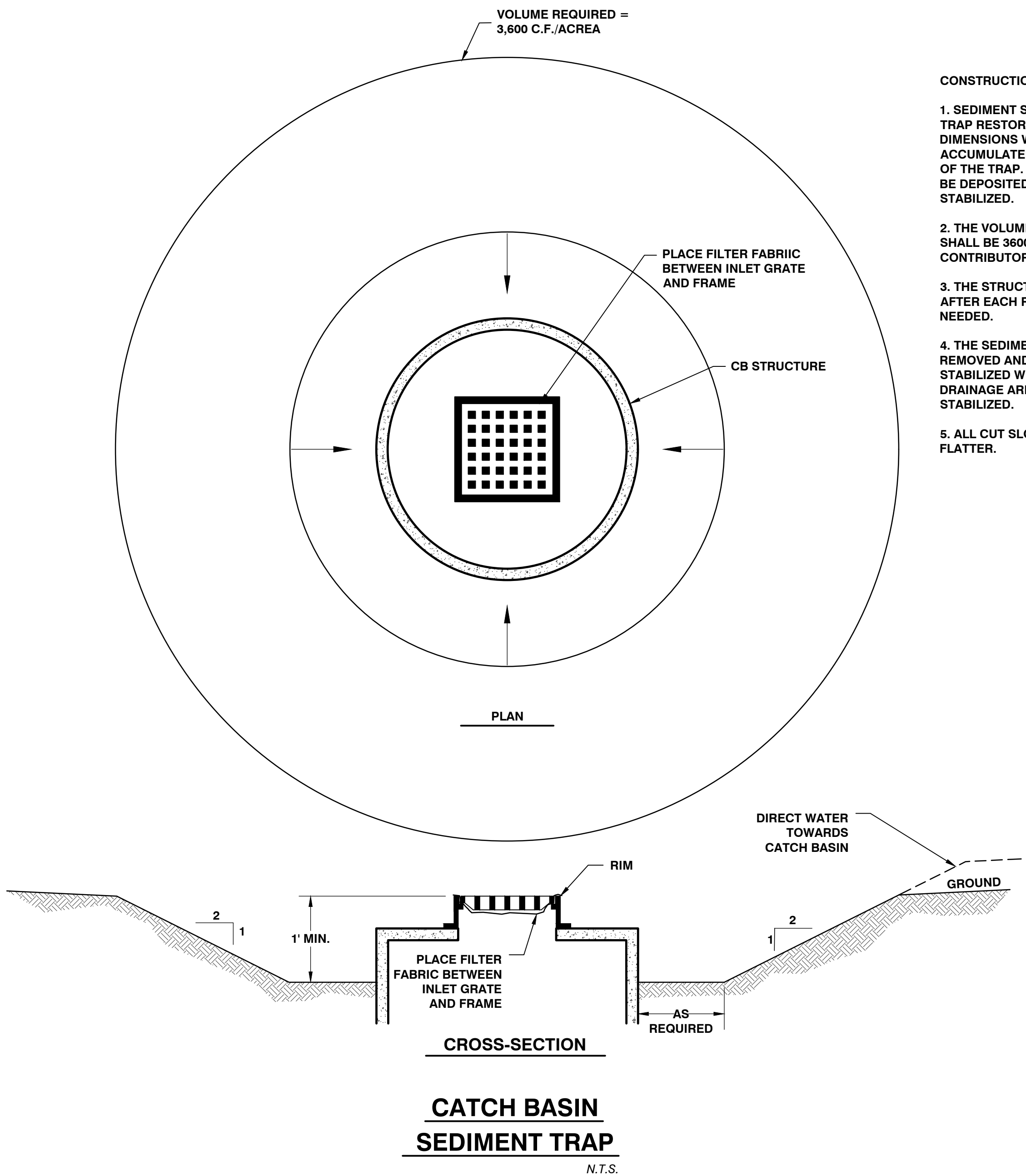
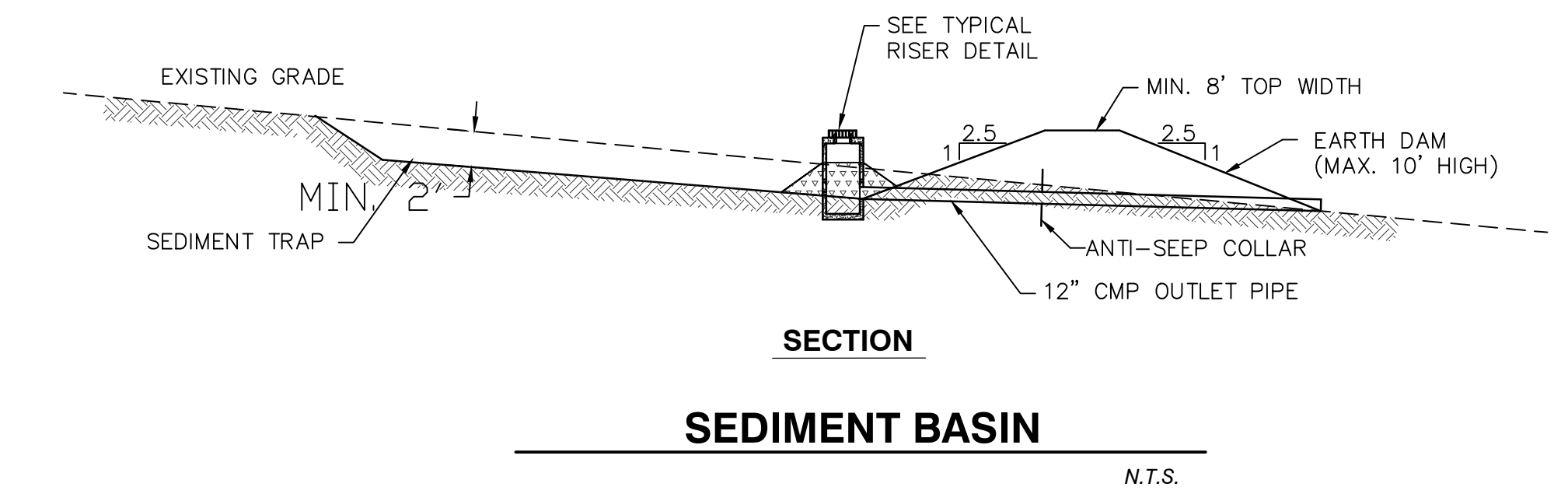
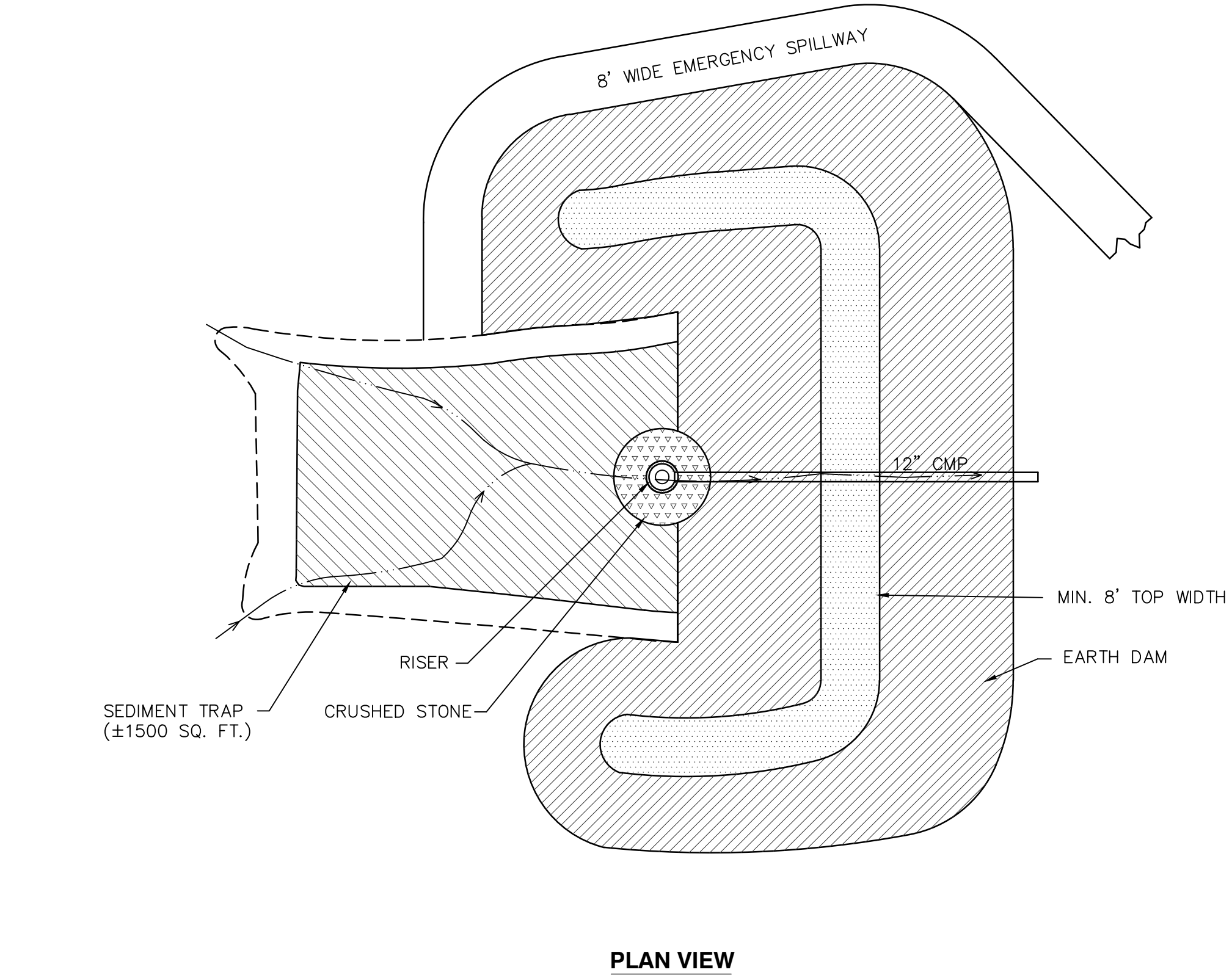
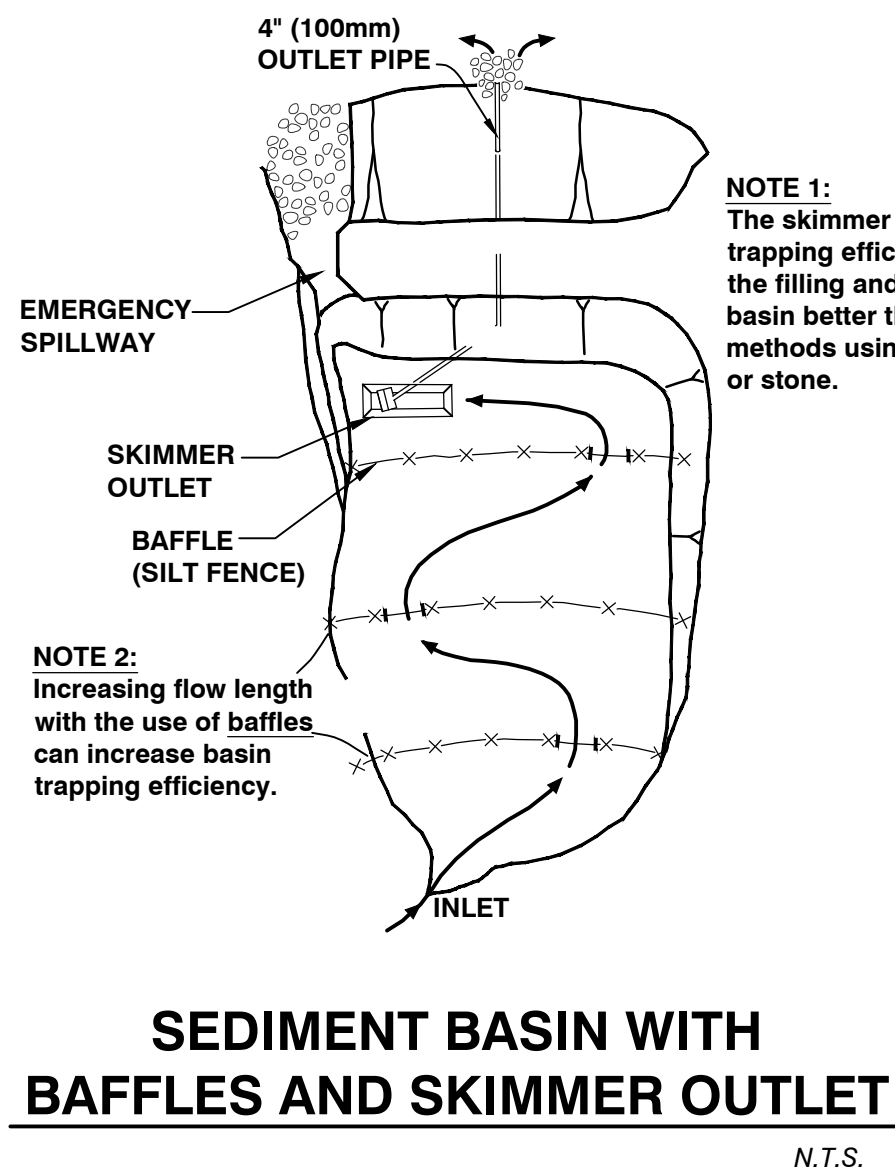
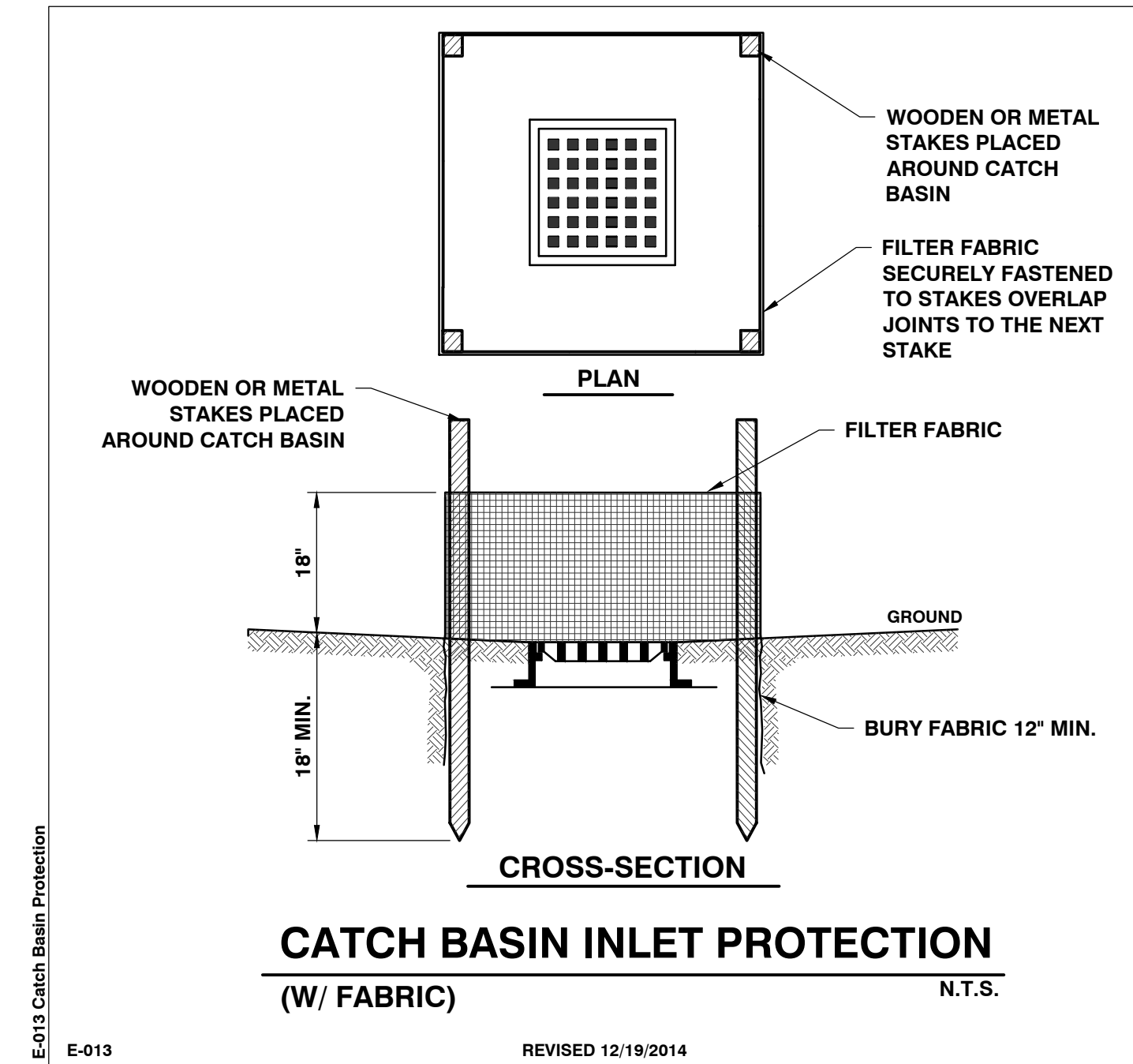


Figure 4.18 Diversion



- CONSTRUCTION NOTES:
- SEDIMENT SHALL BE REMOVED AND THE TRAP RESTORED TO ITS ORIGINAL DIMENSIONS WHEN THE SEDIMENT HAS ACCUMULATED TO 1/2 THE DESIGN DEPTH OF THE TRAP. REMOVED SEDIMENT SHALL BE DEPOSITED IN A SUITABLE AREA AND STABILIZED.
 - THE VOLUME OF SEDIMENT STORAGE SHALL BE 3600 CUBIC FEET PER ACRE OF CONTRIBUTORY DRAINAGE.
 - THE STRUCTURE SHALL BE INSPECTED AFTER EACH RAIN AND REPAIRS MADE AS NEEDED.
 - THE SEDIMENT TRAP SHALL BE REMOVED AND THE AREA STABILIZED WHEN THE CONSTRUCTED DRAINAGE AREA HAS BEEN PROPERLY STABILIZED.
 - ALL CUT SLOPES SHALL BE 1:1 OR FLATTER.

SCHEMATIC DESIGN

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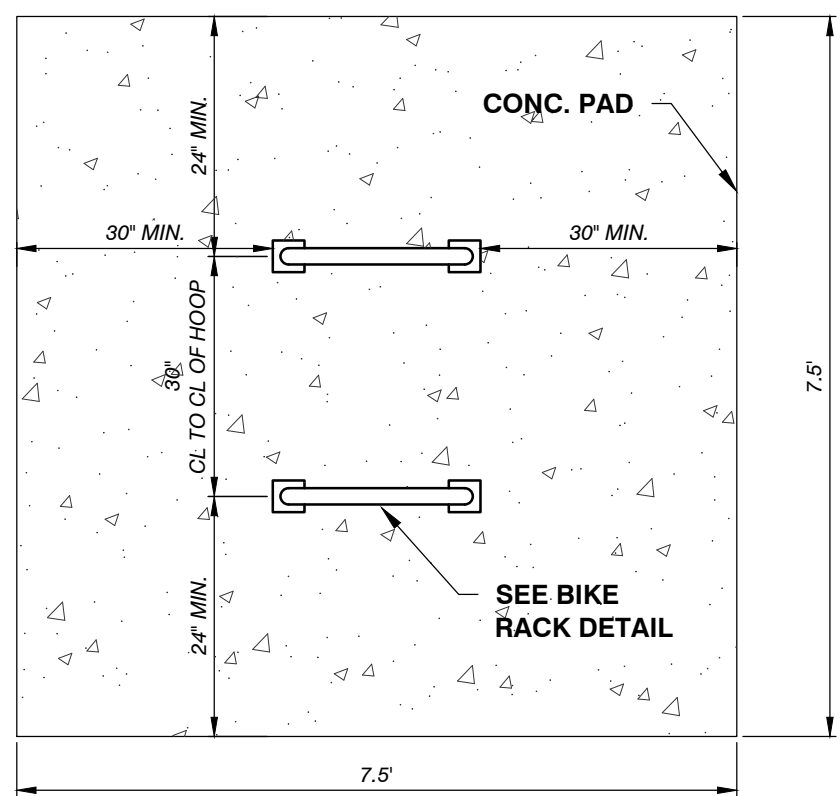
BURLINGTON HIGH SCHOOL & BURLINGTON TECHNICAL CENTER

BURLINGTON, VT

111 PROJECT NO:	21255
ORIGINATION DATE:	07/22/2022
SCALE:	AS SHOWN
DRAWN BY:	MAB
CHECKED BY:	DSM
ISSUE LOG:	
2020 PERMIT DRAFT	08/23/22
2020 PERMIT	09/30/22

EPSC DETAILS AND SPECIFICATIONS

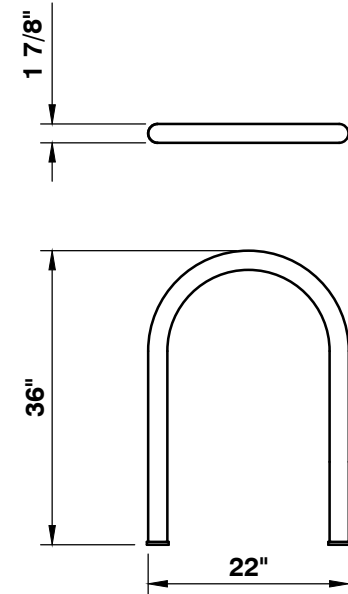
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BIKE RACK (PLAN VIEW)
N.T.S.

M-016

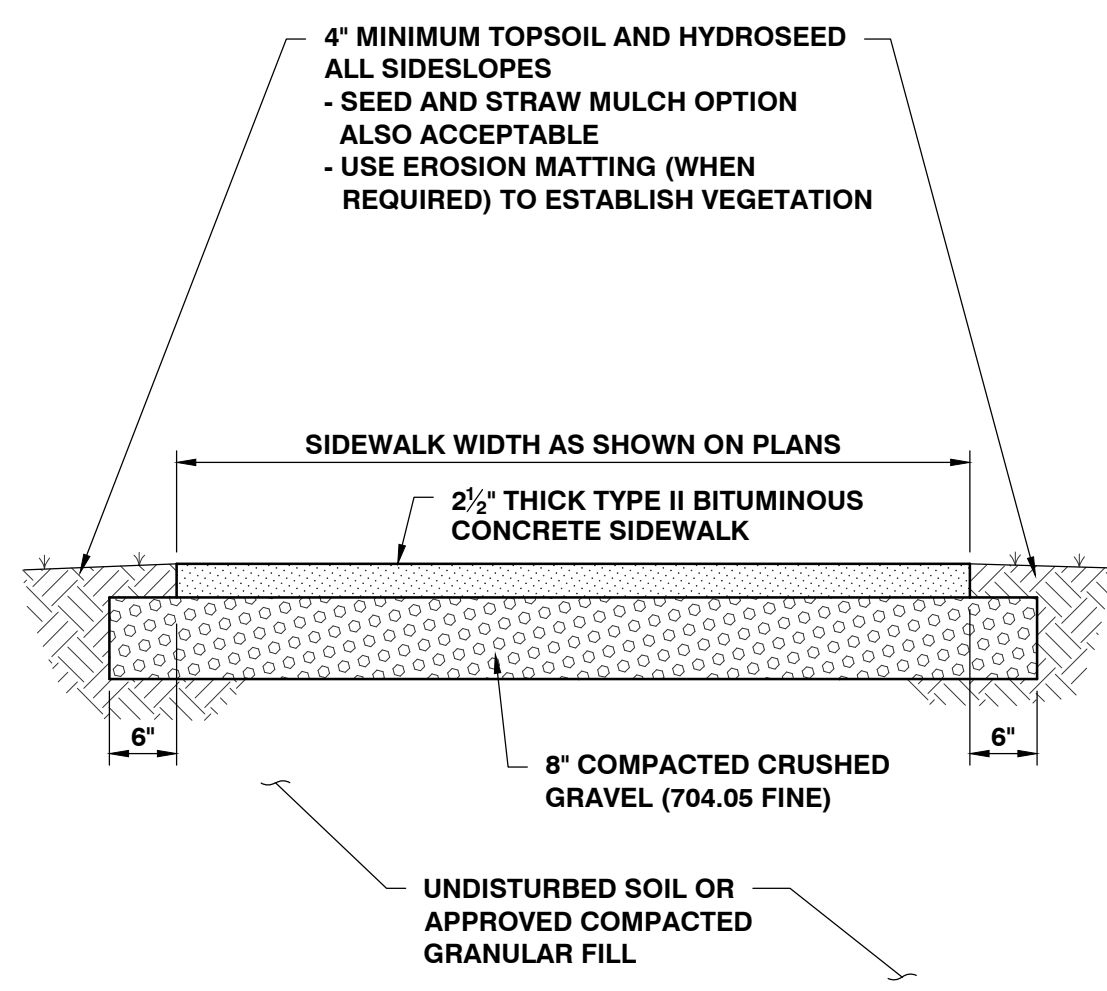
REVISED 10/21/2019



**BIKE RACK (PARK-IT BIKE RACKS)
OR APPROVED EQUAL**
N.T.S.

M-015a

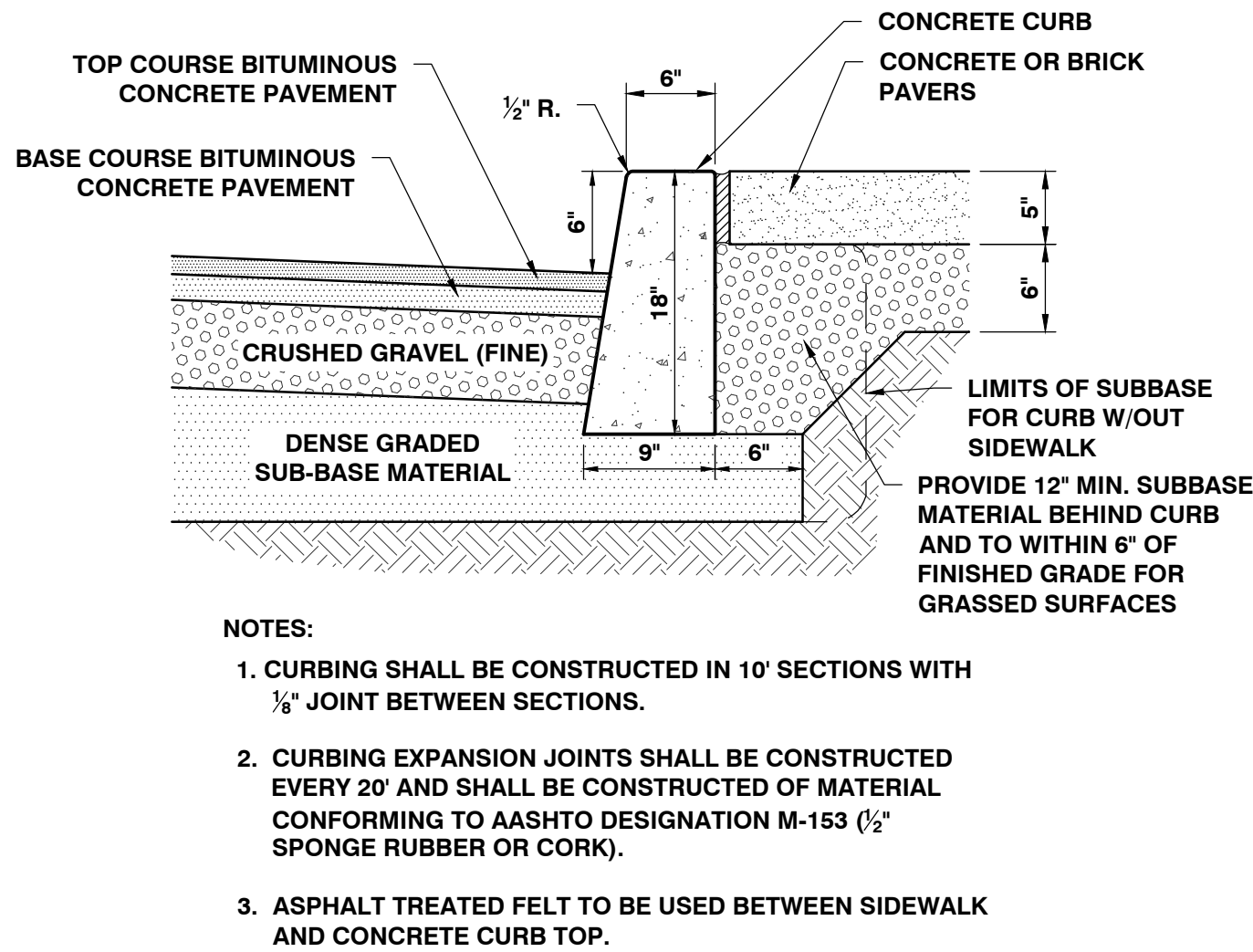
REVISED 8/9/2015



BITUMINOUS CONCRETE SIDEWALK DETAIL
N.T.S.

S-002b

REVISED 1/28/2021

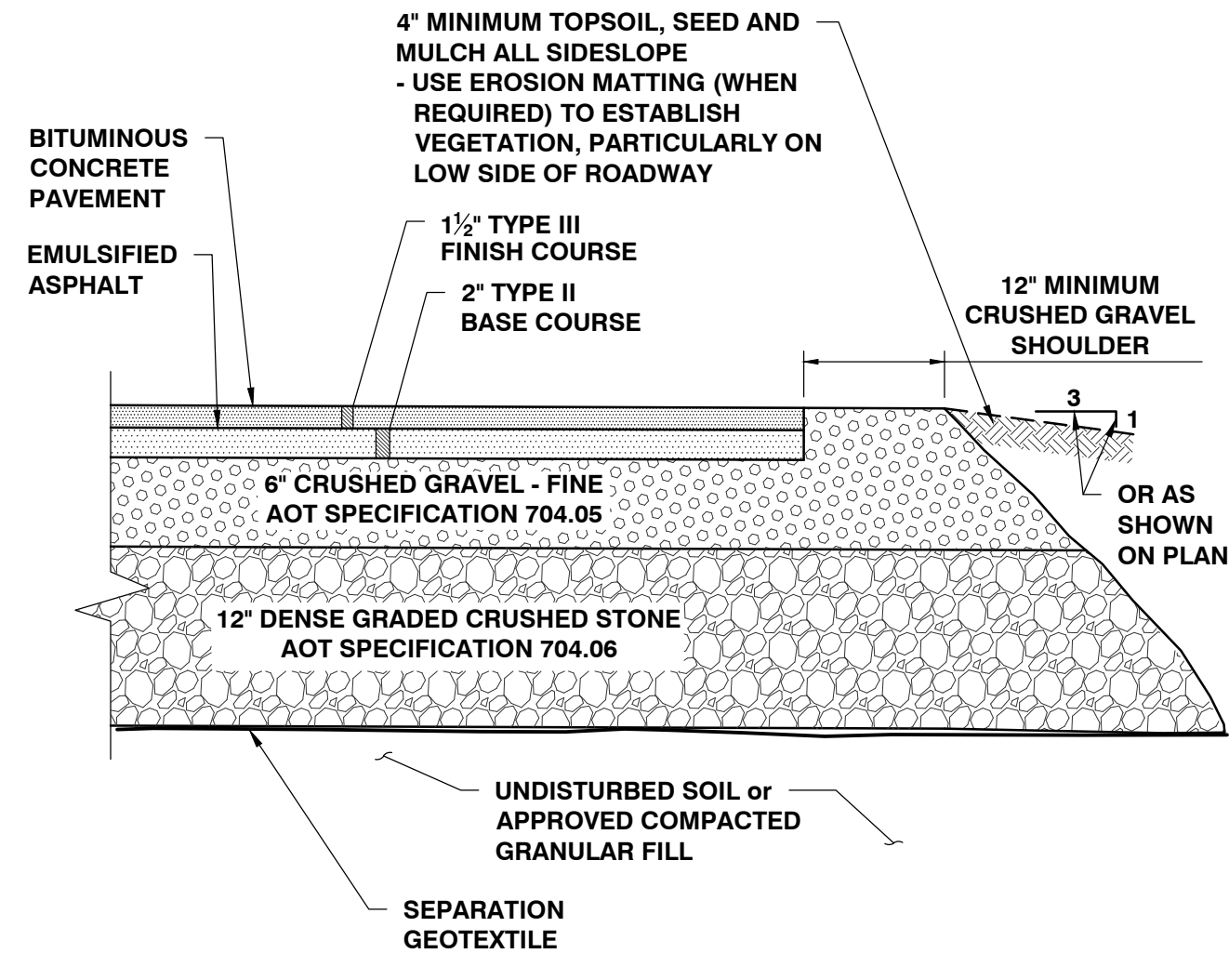


- NOTES:
- CURBING SHALL BE CONSTRUCTED IN 10' SECTIONS WITH 1/2" JOINT BETWEEN SECTIONS.
 - CURBING EXPANSION JOINTS SHALL BE CONSTRUCTED EVERY 20' AND SHALL BE CONSTRUCTED OF MATERIAL CONFORMING TO AASHTO DESIGNATION M-153 (1/2" SPONGE RUBBER OR CORK).
 - ASPHALT TREATED FELT TO BE USED BETWEEN SIDEWALK AND CONCRETE CURB TOP.

CURB w/SIDEWALK DETAIL
(SIMILAR WITH OUT SIDEWALK)
N.T.S.

S-001

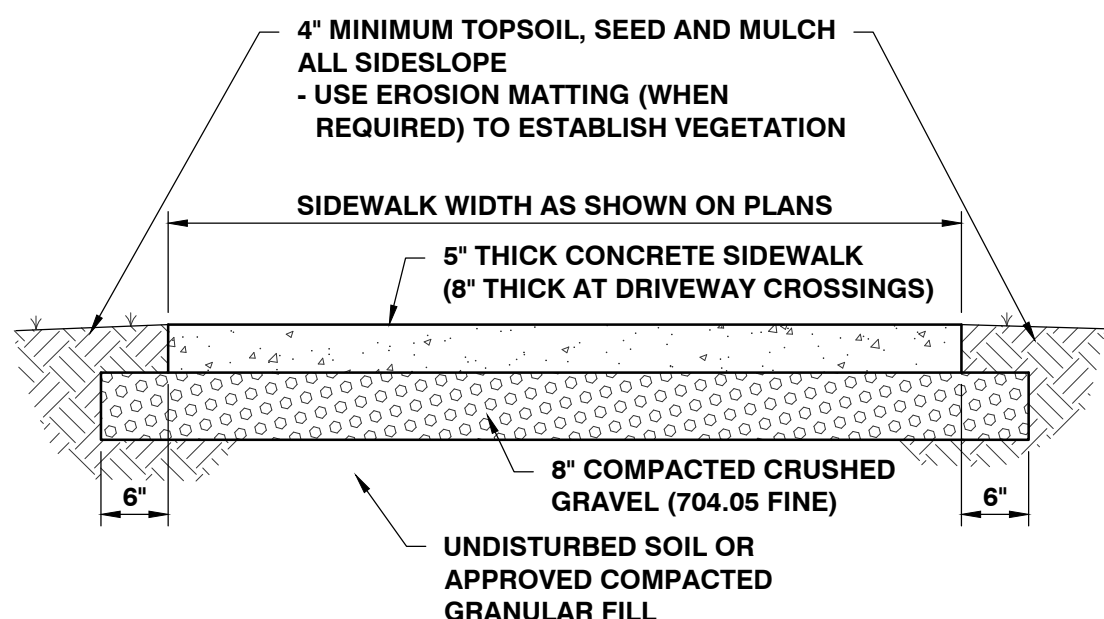
REVISED 10/07/2015



TYPICAL PAVEMENT SECTION
(FULL DEPTH CONSTRUCTION SECTION)
N.T.S.

S-003

REVISED 12/03/2020

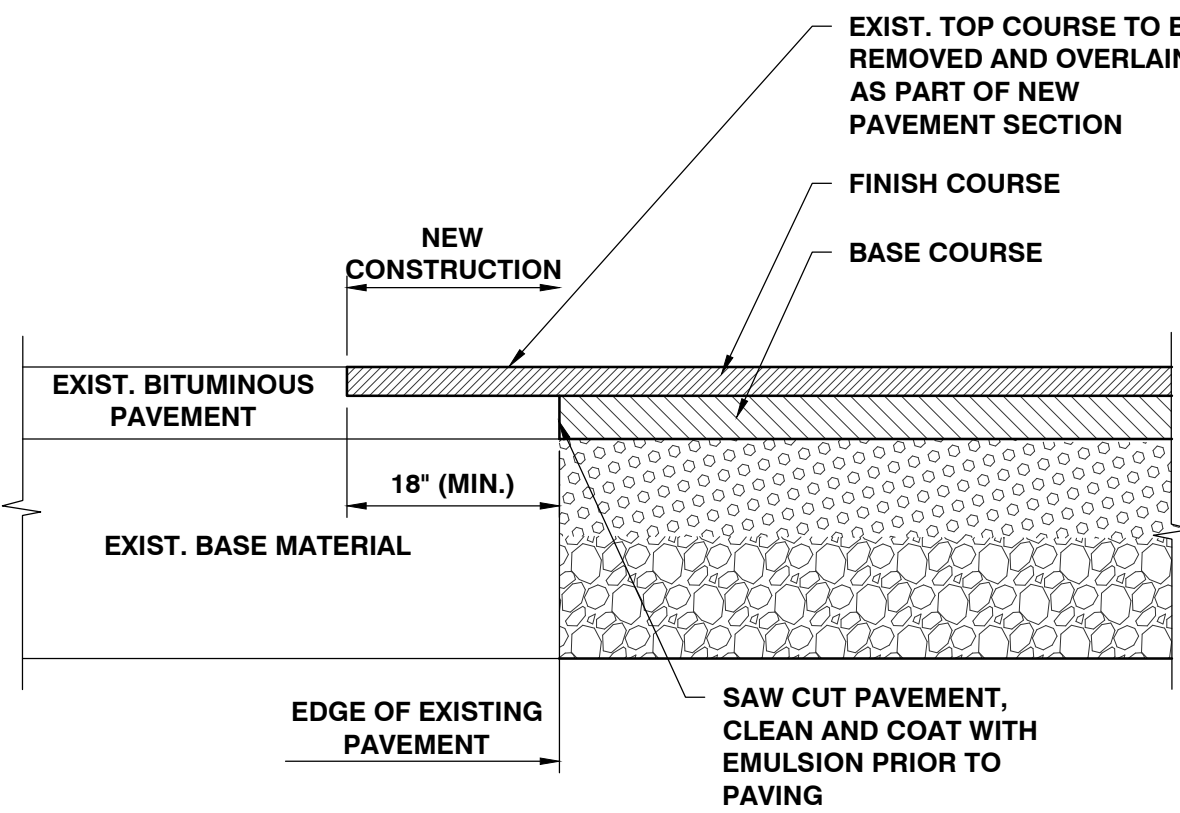


- NOTES:
- SIDEWALK JOINTS:
 - CONSTRUCTION JOINTS: SET CONSTRUCTION JOINTS AT SIDE AND END TERMINATIONS OF PAVING AND AT LOCATIONS WHERE PAVING OPERATIONS ARE STOPPED FOR MORE THAN ONE-HALF HOUR UNLESS PAVING TERMINATES AT ISOLATION JOINTS.
 - ISOLATION JOINTS: FORM ISOLATION JOINTS OF PREFORMED JOINT-FILLER STRIPS ABUTTING CONCRETE CURBS, CATCH BASINS, MANHOLES, INLETS, STRUCTURES, OTHER FIXED OBJECTS, AND WHERE INDICATED.
 - CONTRACTION JOINTS: FORM WEAKENED-PLANE CONTRACTION JOINTS, SECTIONING CONCRETE INTO AREAS AS INDICATED. TYPICAL JOINT SPACING IS 8 FEET BUT MAY BE INDICATED DIFFERENTLY ON PLANS FOR WIDER SIDEWALKS OR PLAZA AREAS. CONSTRUCT CONTRACTION JOINTS FOR A DEPTH EQUAL TO AT LEAST ONE-FOURTH OF THE CONCRETE THICKNESS. CONTRACTION JOINTS MAY BE EITHER GROOVED OR SAWED JOINTS.
 - NO DEICER SHALL BE APPLIED TO SIDEWALK UNTIL AT LEAST 30 DAYS OF AIR DRYING TIME HAS OCCURRED.
 - 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. TWO COATS SHALL BE APPLIED AT RIGHT ANGLES FOR EVEN COVERAGE. INSTALL IN CONFORMANCE WITH MANUFACTURERS RECOMMENDATIONS.
 - INSTALL POLYURETHANE ELASTOMERIC SEALANT AT ALL SAWED JOINTS.

CONCRETE SIDEWALK DETAIL
N.T.S.

S-002

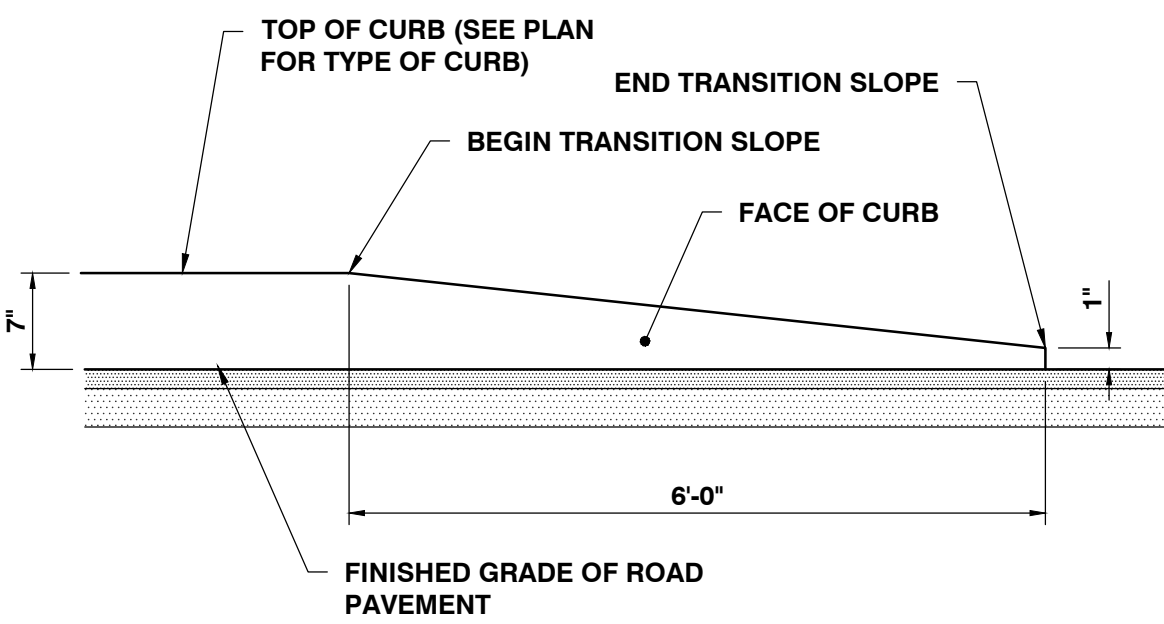
REVISED 7/01/2019



**TRANSITION FROM NEW PAVEMENT
TO EXISTING PAVEMENT**
N.T.S.

S-014

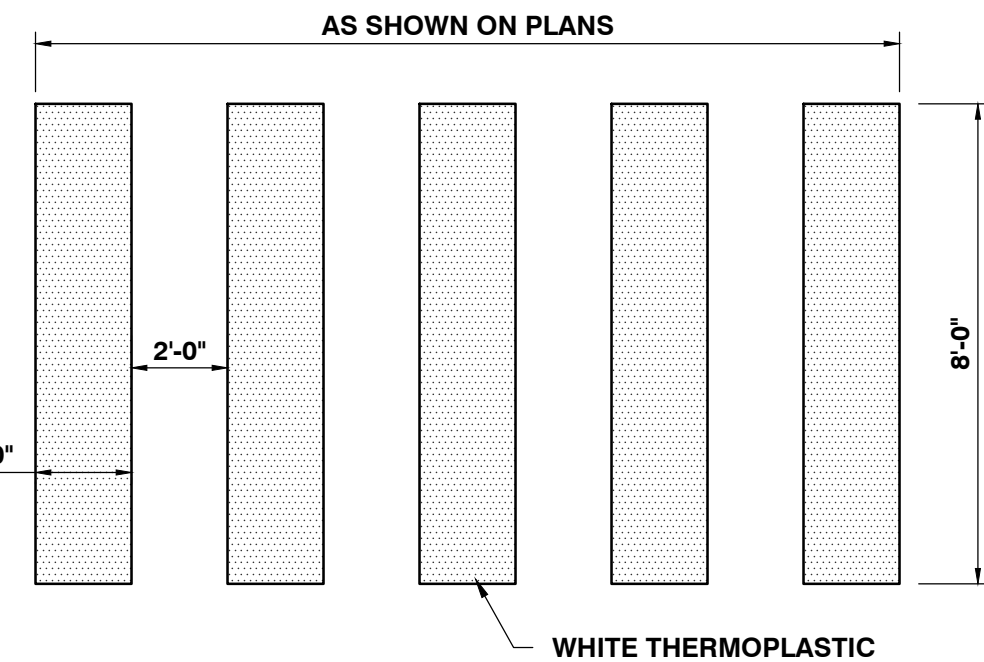
REVISED 6/16/2017



TRANSITION CURB DETAIL
N.T.S.

S-006

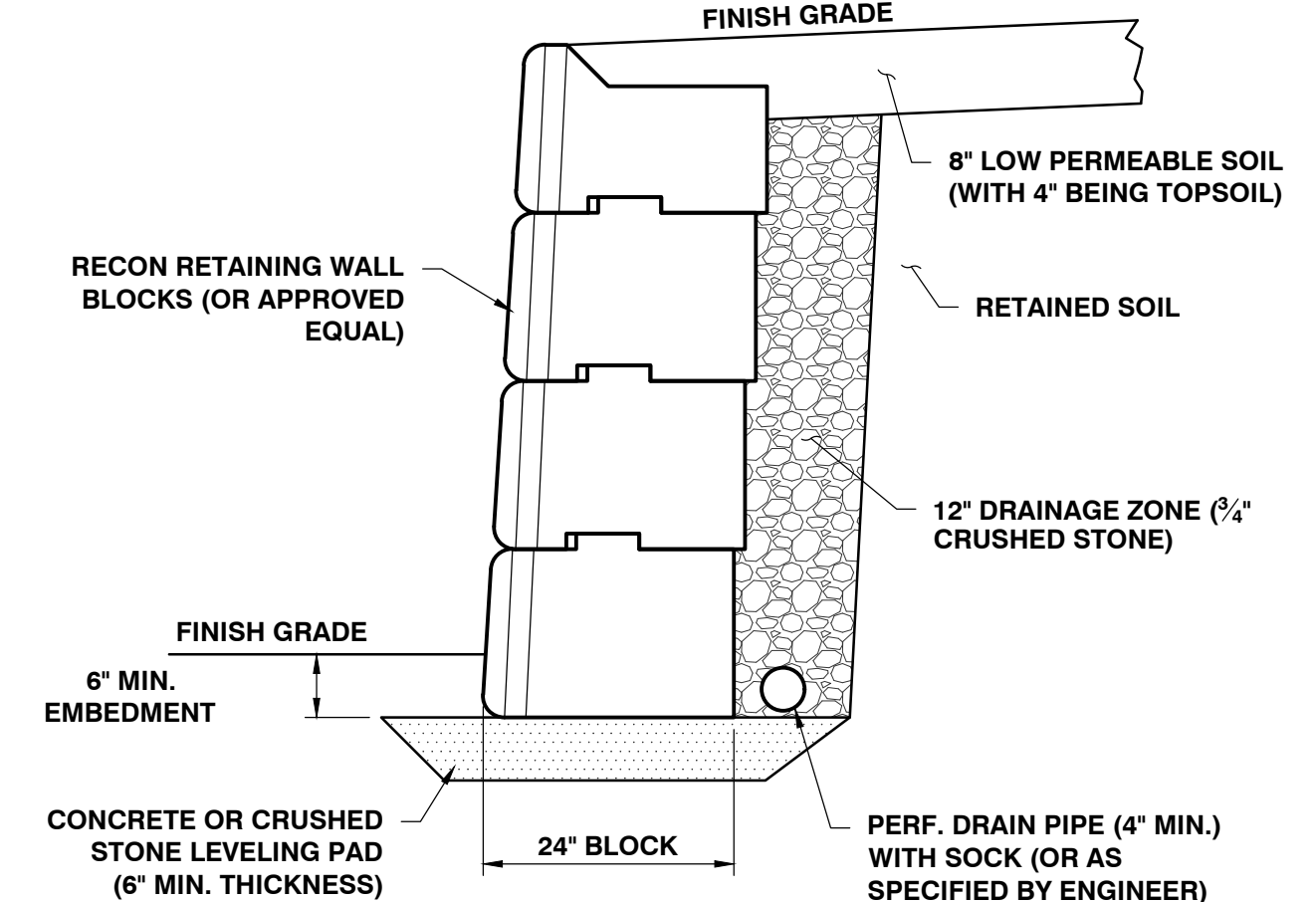
REVISED 08/01/2014



CROSSWALK DETAIL
N.T.S.

S-008

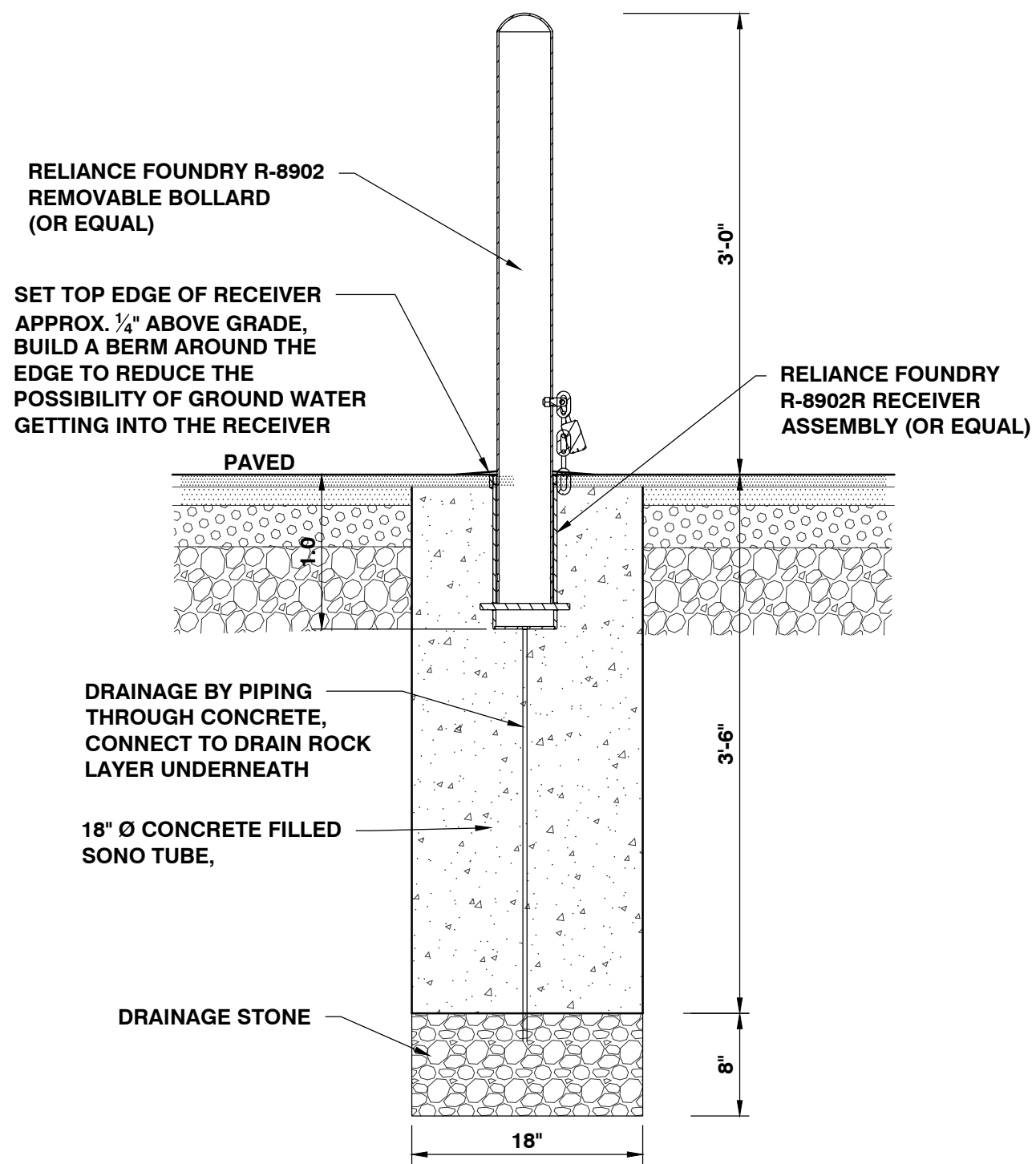
REVISED 12/19/2014



RETAINING WALL DETAIL
N.T.S.

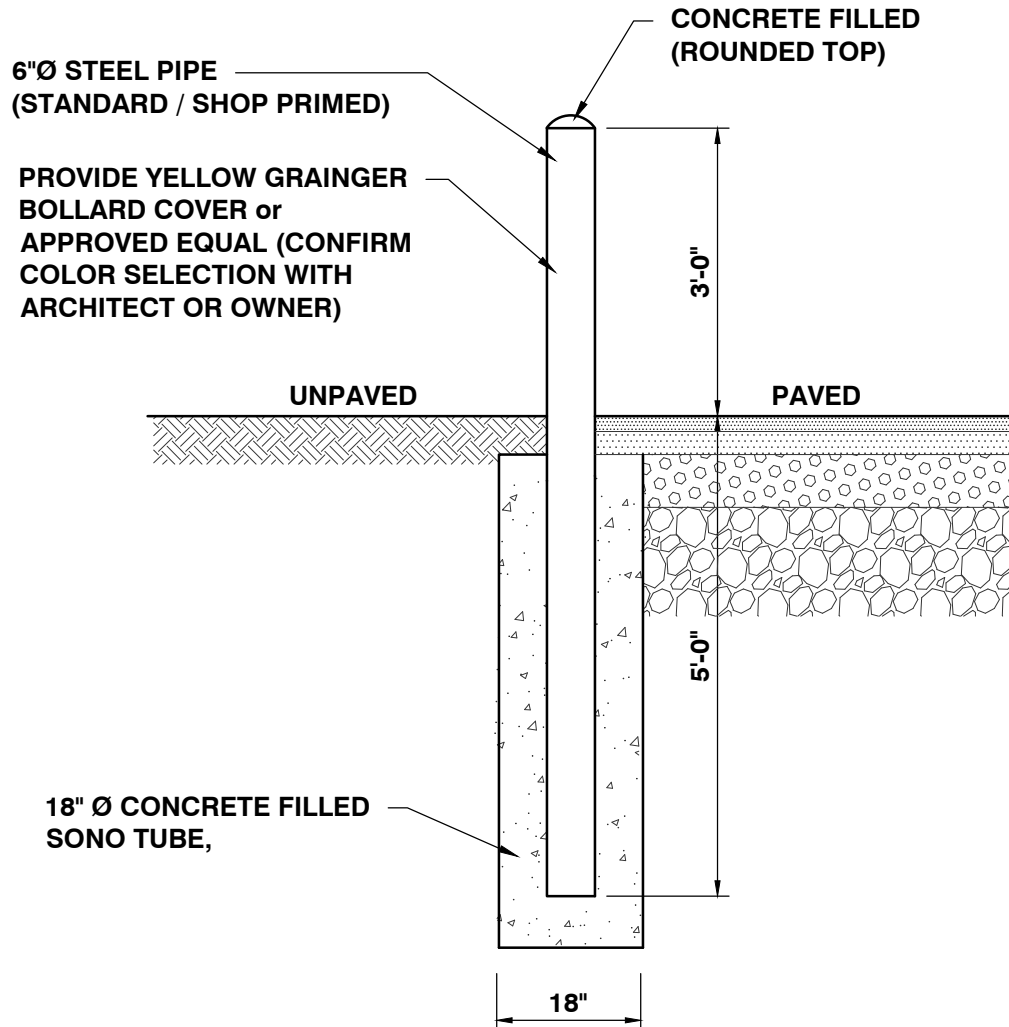
S-025

REVISED 4/17/15



REMOVABLE BOLLARD DETAIL
N.T.S.

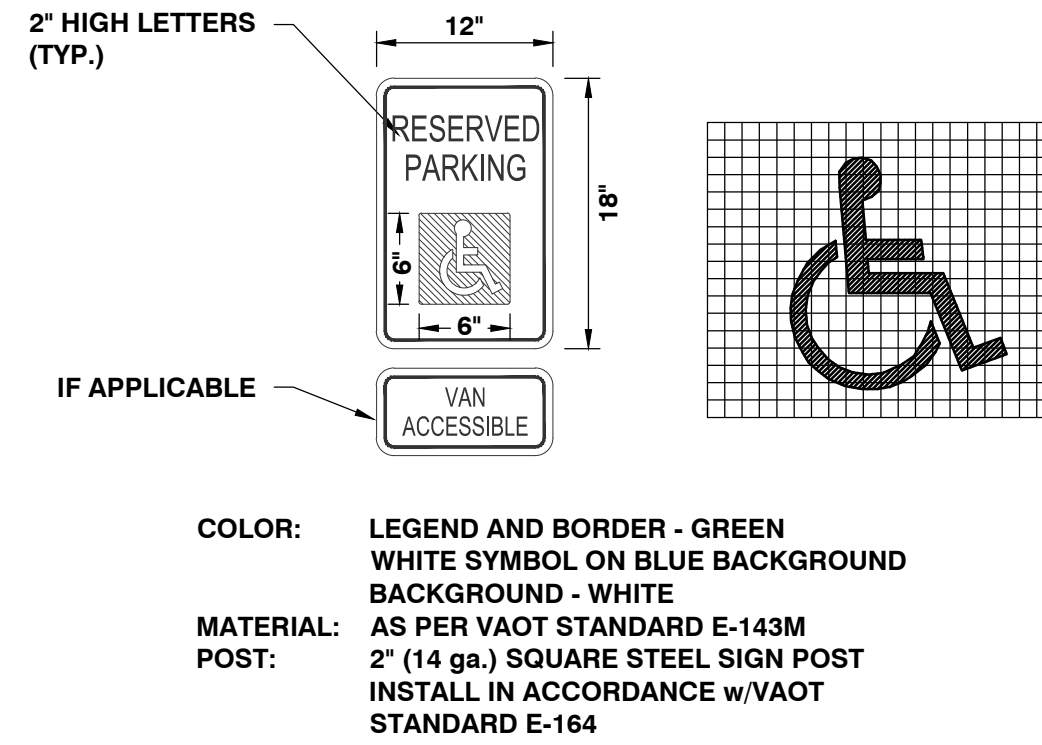
S-012



BOLLARD DETAIL
N.T.S.

S-011

REVISED 06/08/2015



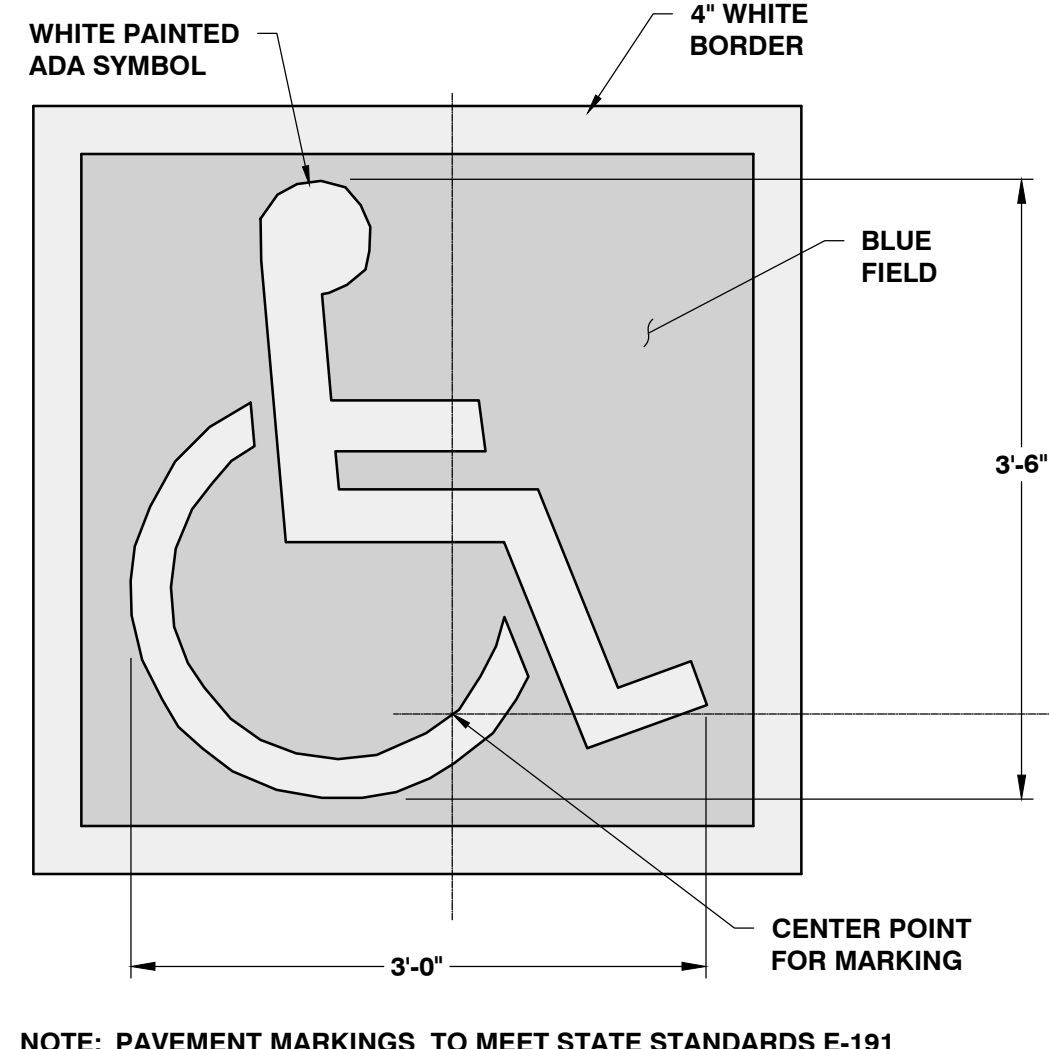
- COLOR: LEGEND AND BORDER - GREEN
WHITE SYMBOL ON BLUE BACKGROUND
BACKGROUND - WHITE
- MATERIAL: AS PER VAOT STANDARD E-143M
- POST: 2" (14 ga.) SQUARE STEEL SIGN POST
INSTALL IN ACCORDANCE w/VAOT STANDARD E-164

ACCESSIBLE PARKING SIGN DETAIL
N.T.S.

SIGN SHALL BE POSTED AT THE HEAD OF EACH ACCESSIBLE SPACE.
MOUNTING HEIGHT IS 60" MINIMUM TO BOTTOM OF SIGN.

S-015b

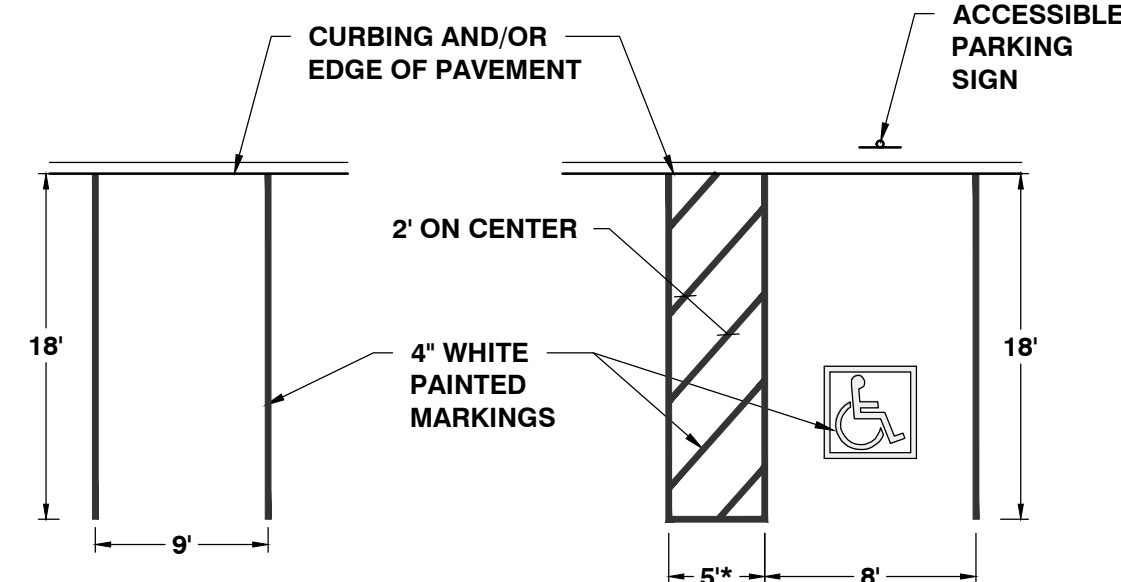
REVISED 2/27/2020



ACCESSIBLE PARKING MARKING DETAIL
N.T.S.

S-015a

REVISED 2/27/2020



STANDARD PARKING SPACE ACCESSIBLE PARKING SPACE

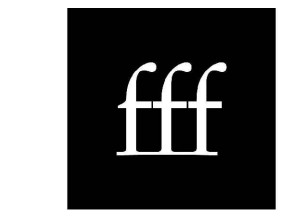
TRAFFIC MARKING PAINT TO BE READY-MIXED TRAFFIC PAINT SUITABLE FOR MARKING ON EITHER BITUMINOUS OR PORTLAND CEMENT CONCRETE PAVEMENT. READY-MIXED LOW VOC TRAFFIC PAINT SHALL CONSIST OF 100% ACRYLIC TYPE, FAST DRYING TRAFFIC PAINT.

LINE STRIPING DETAIL
N.T.S.

S-015

REVISED 2/27/2020

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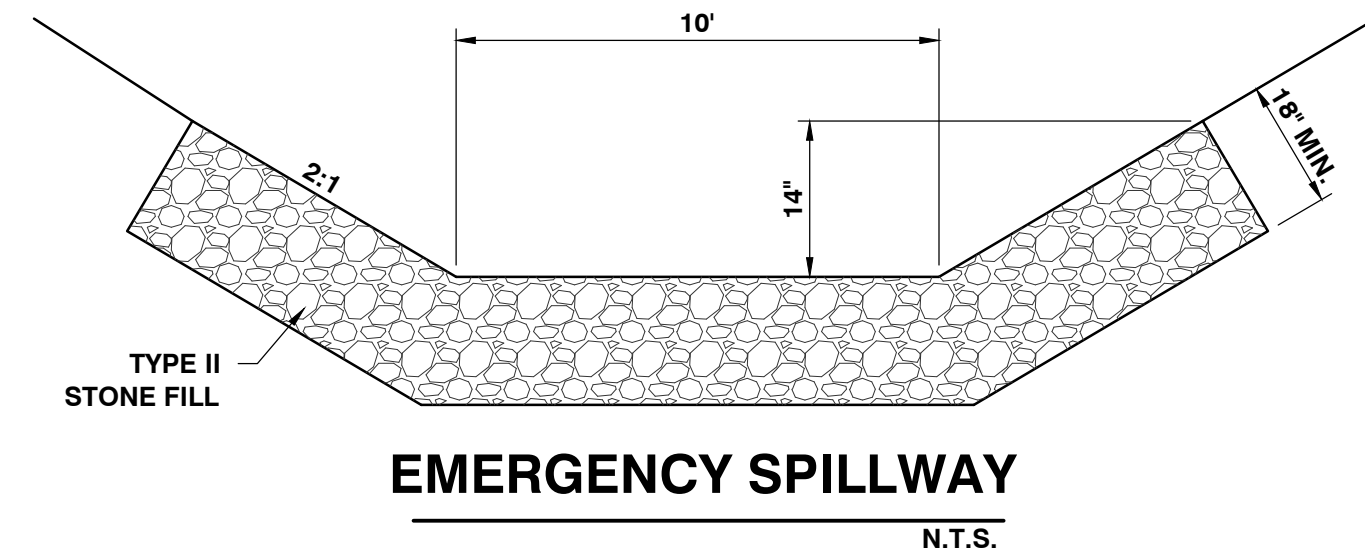
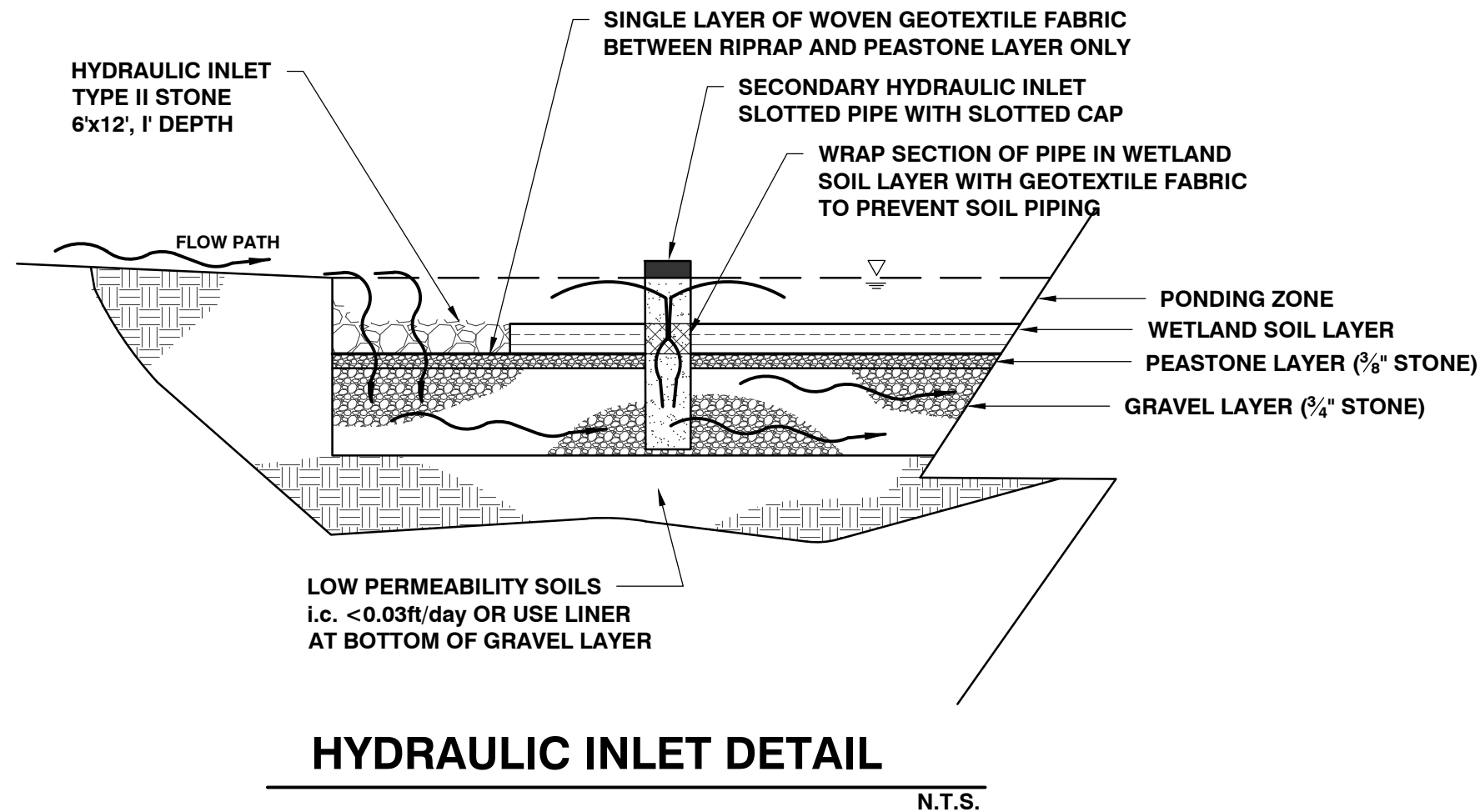
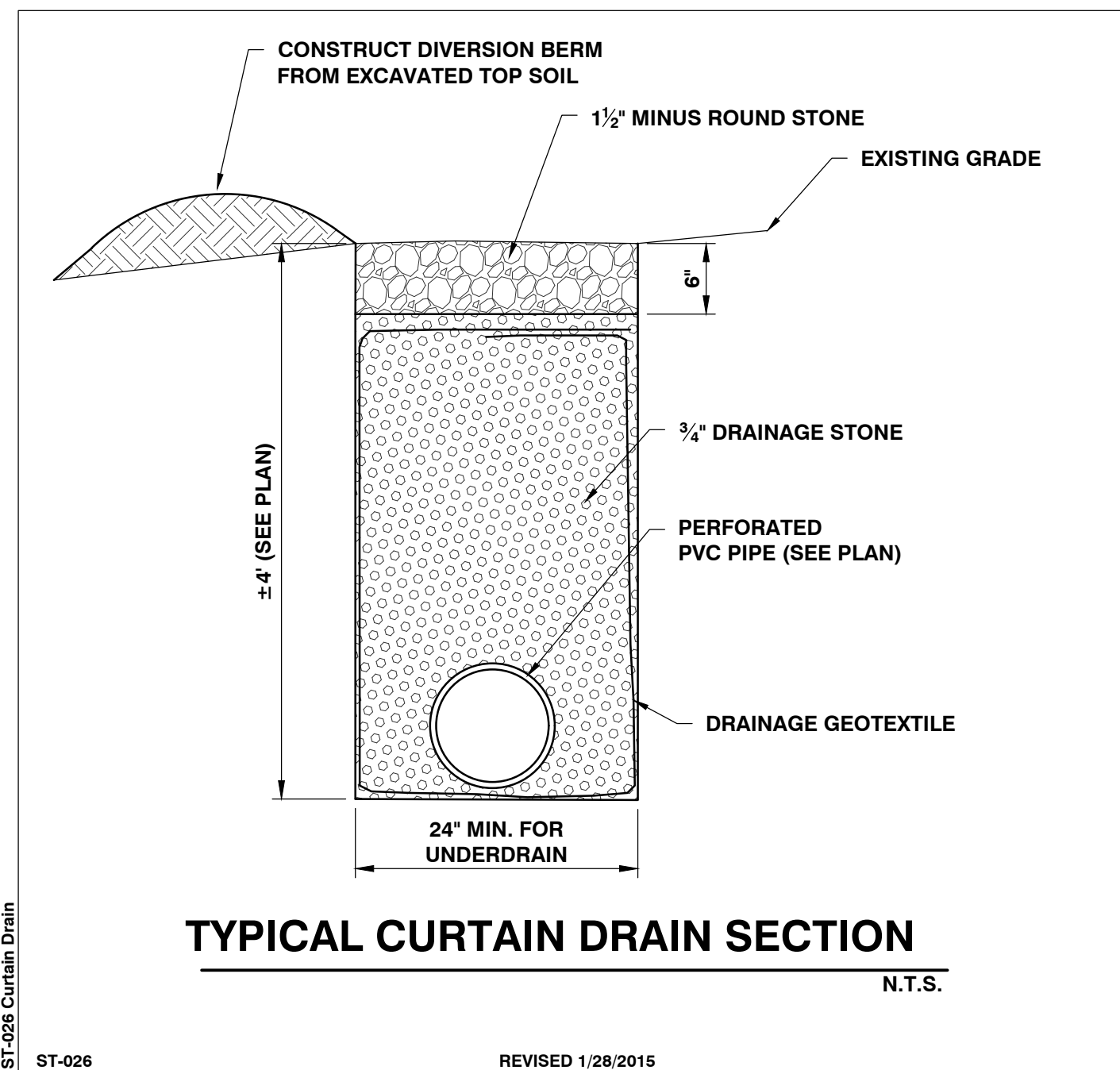
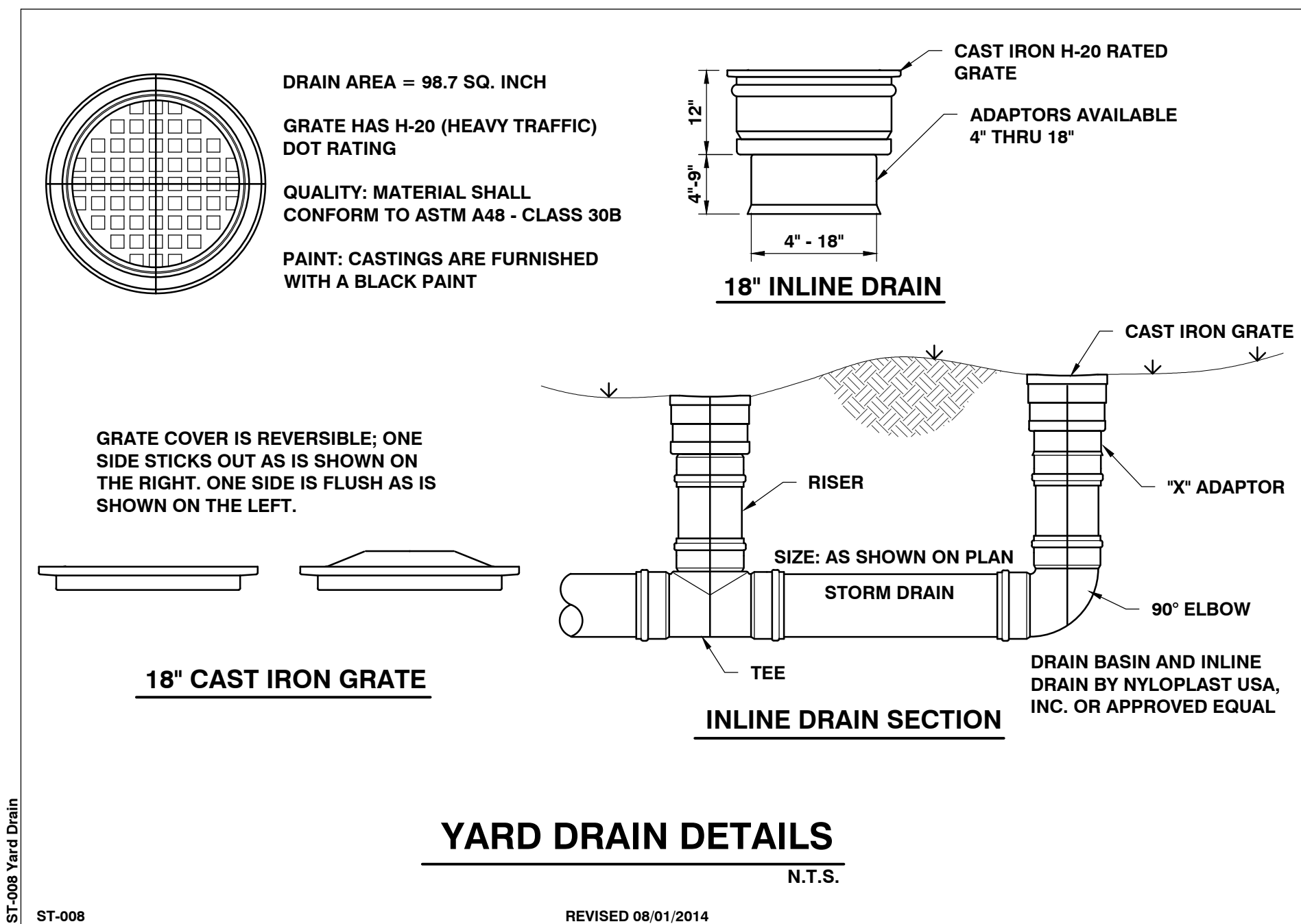
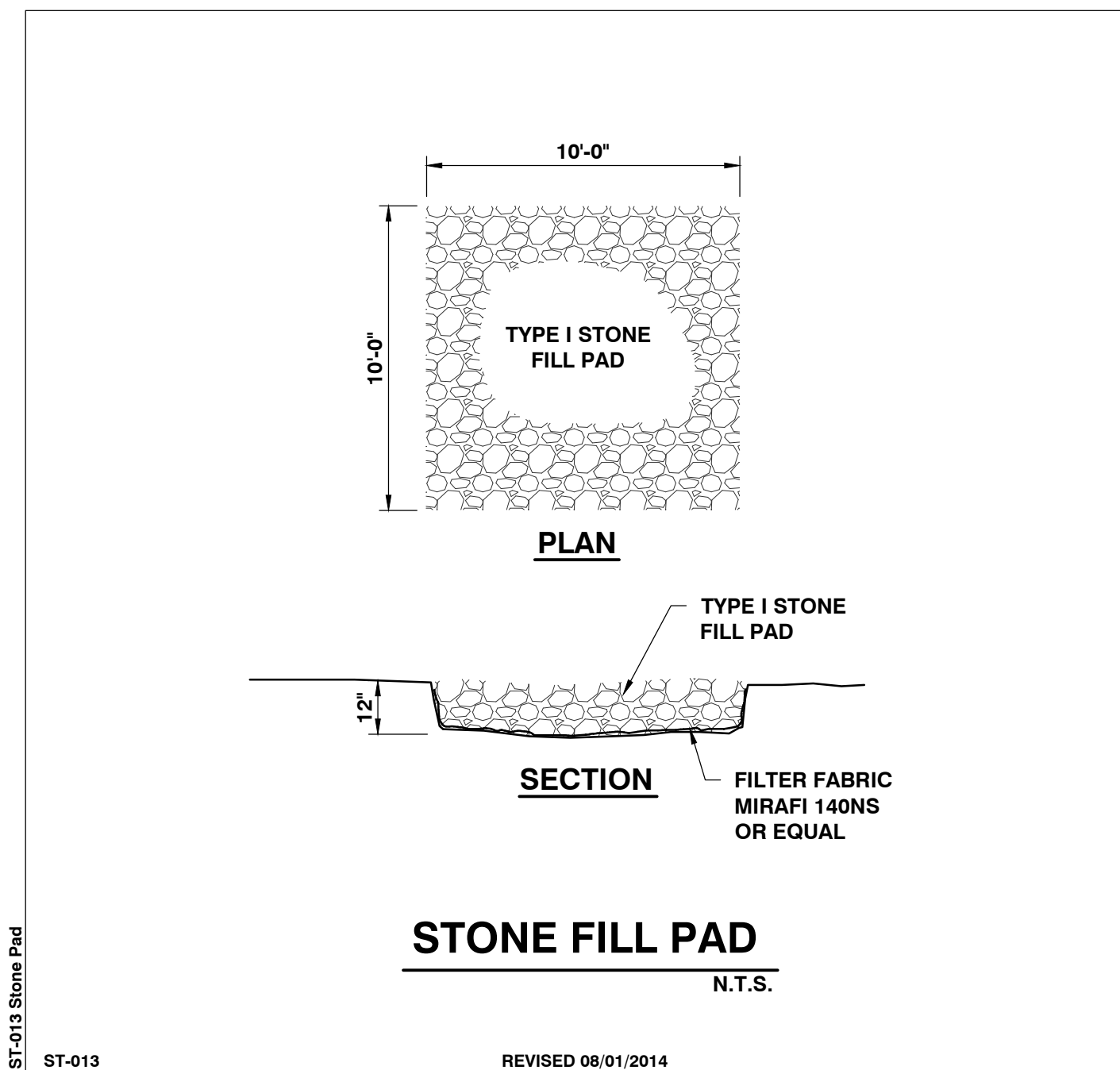
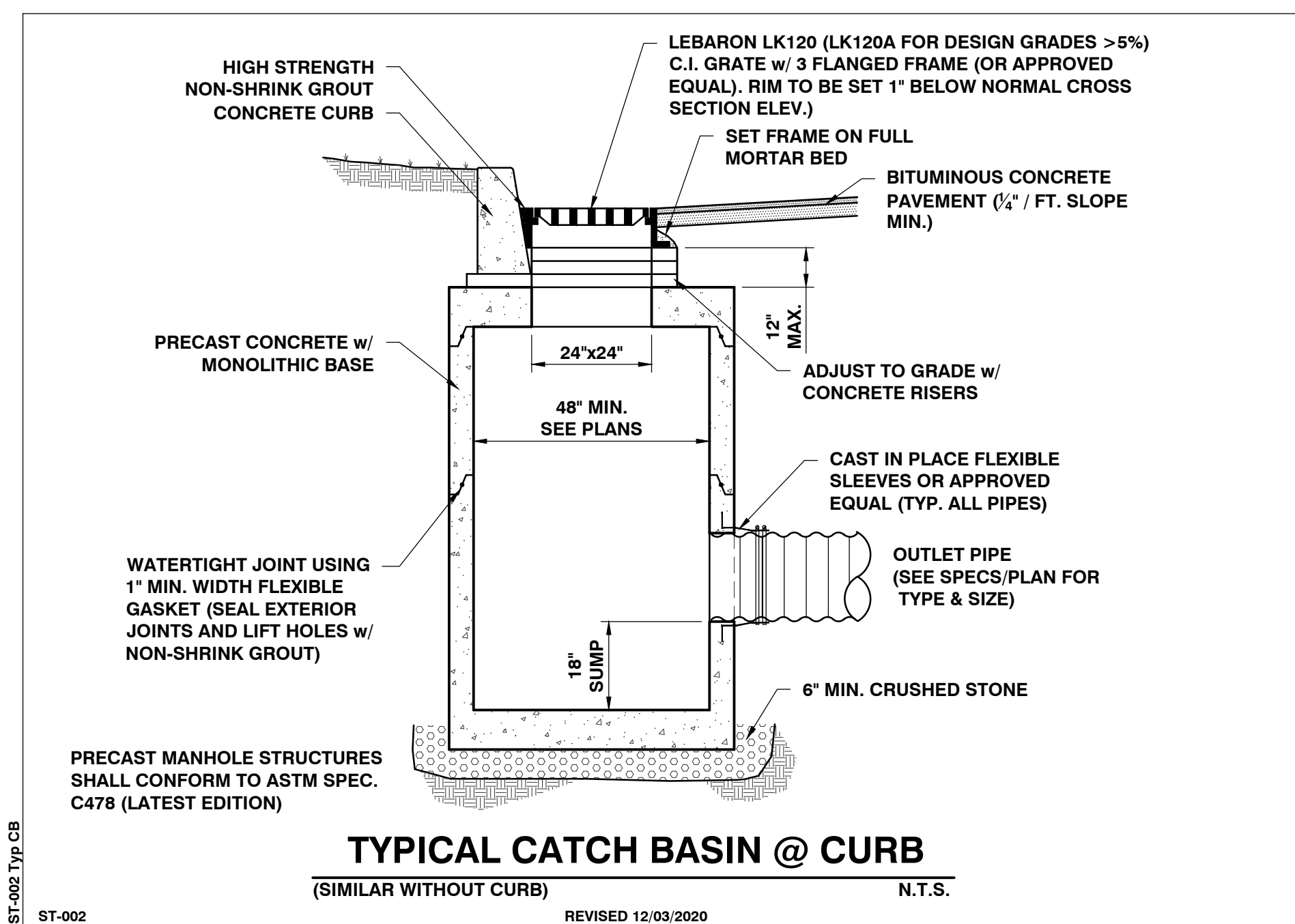
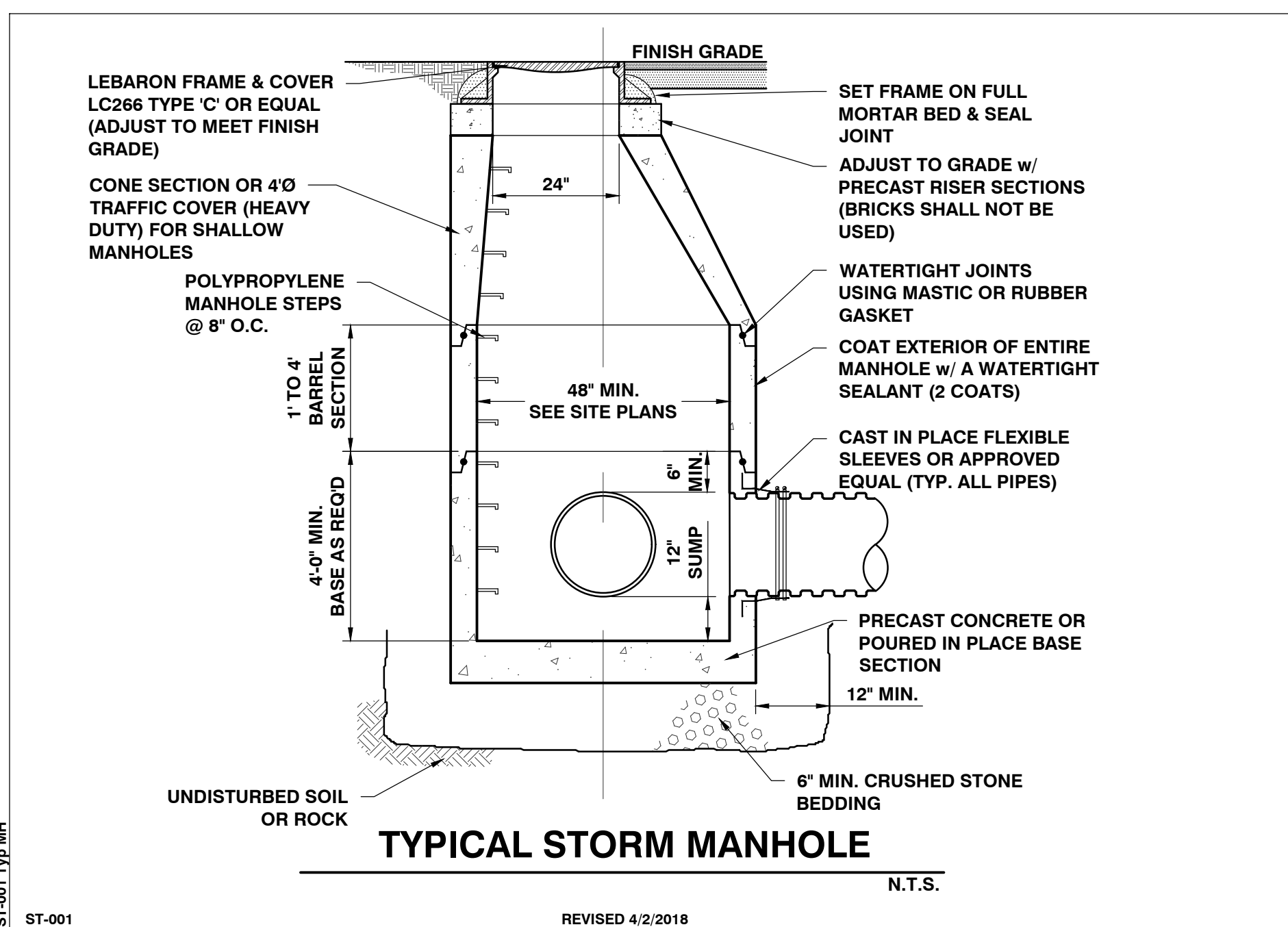
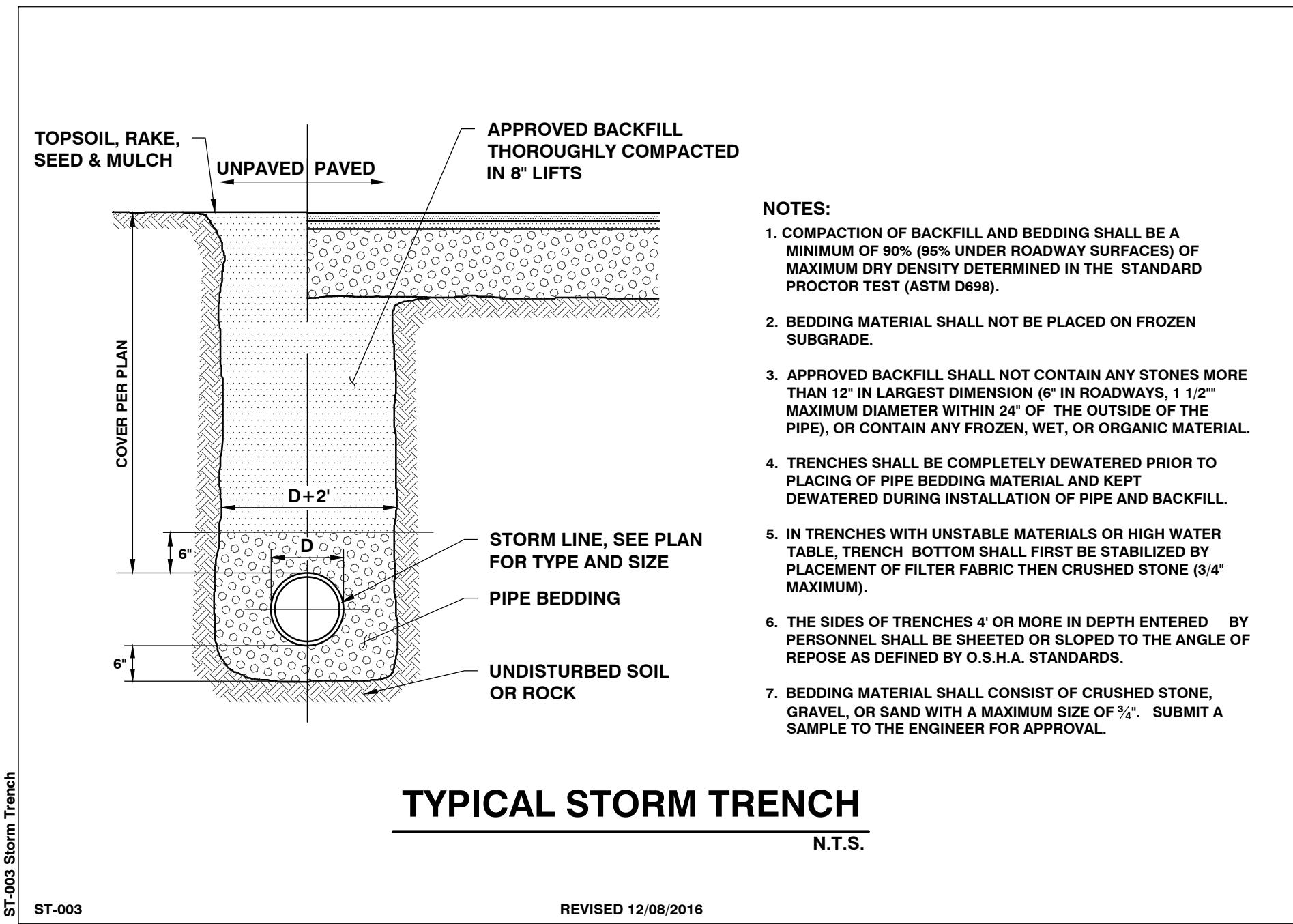
BURLINGTON, VT

111 PROJECT NO:	21255
ORIGINATION DATE:	07/22/2022
SCALE:	AS SHOWN
DRAWN BY:	MAB
CHECKED BY:	DSM
ISSUE LOG:	
2020 PERMIT DRAFT	08/23/22
2020 PERMIT	09/30/22

SHEET CONTENTS:
SITE DETAILS

SHEET NO:
C5.0

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A

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802-684-0950

BURLINGTON HIGH SCHOOL & BURLINGTON TECHNICAL CENTER

BURLINGTON, VT

111 PROJECT NO: 21255

ORIGINATOR DATE: 07/22/2022	SCALE: AS SHOWN
DRAWN BY: MAB	CHECKED BY: DSM
ISSUE LOG: 2000 PERMIT DRAFT 2000 PERMIT	08/23/22 09/30/22

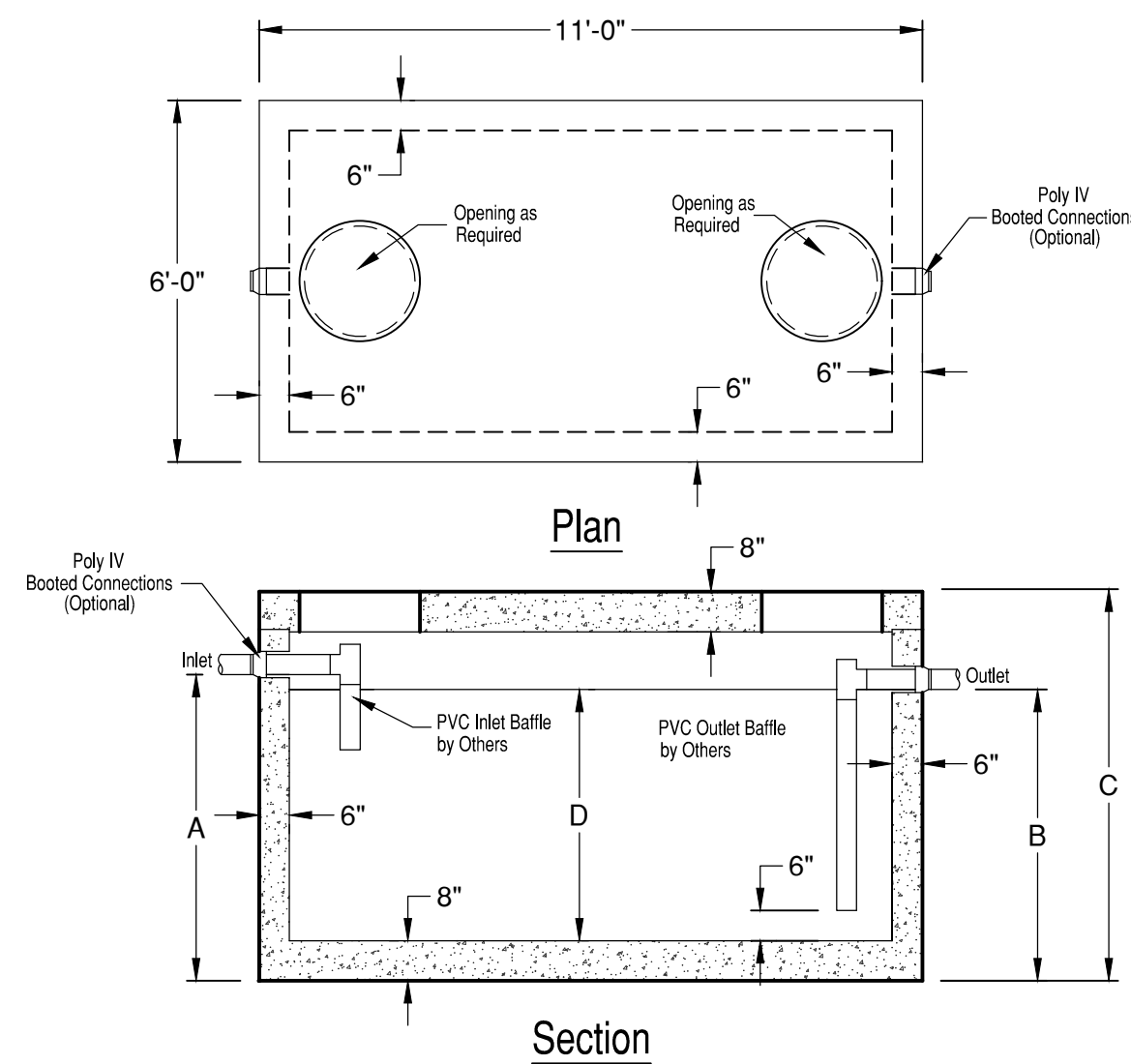
SHEET CONTENTS:

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



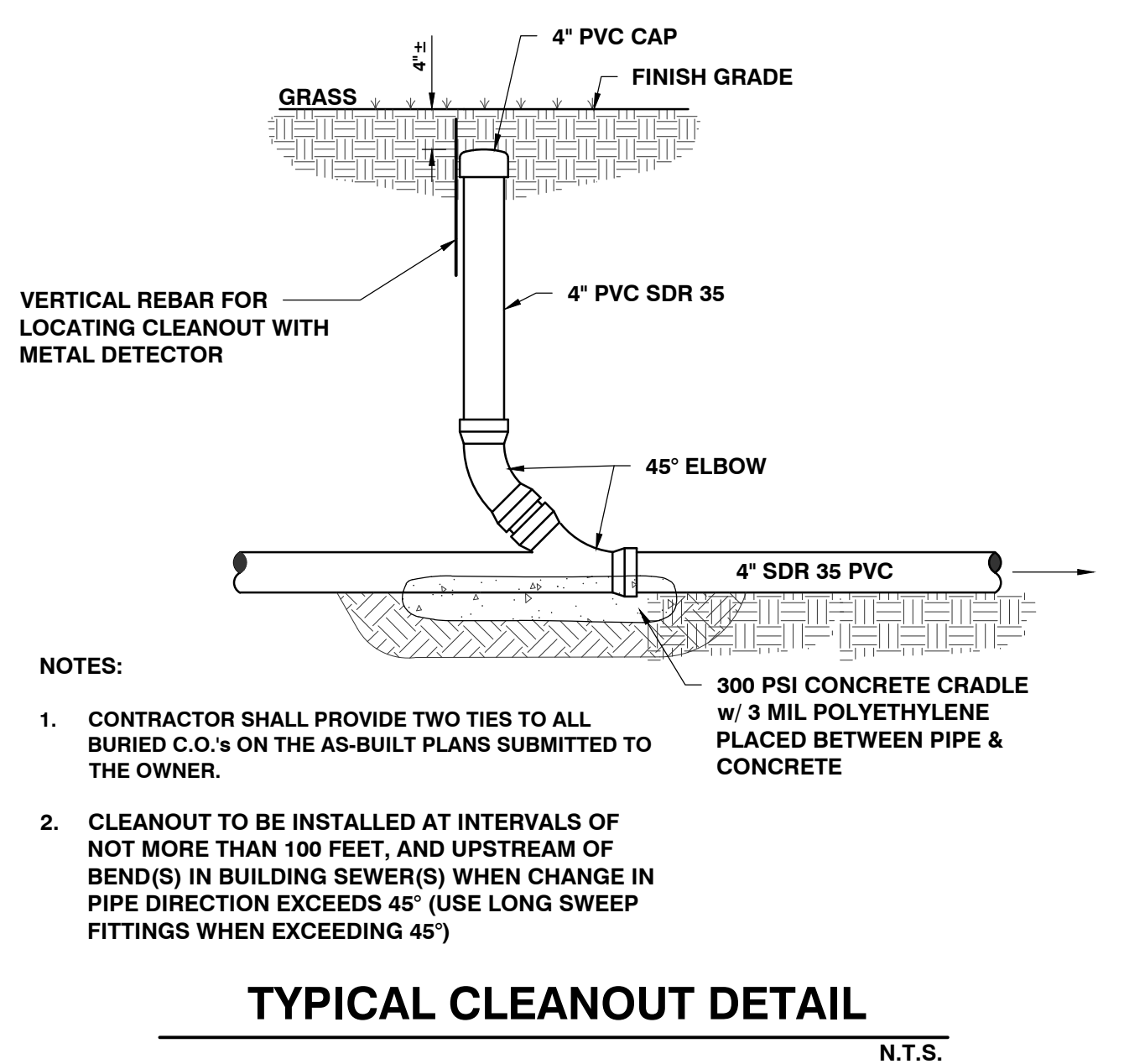
Revision Date : 2/14/2006 Section : 9

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

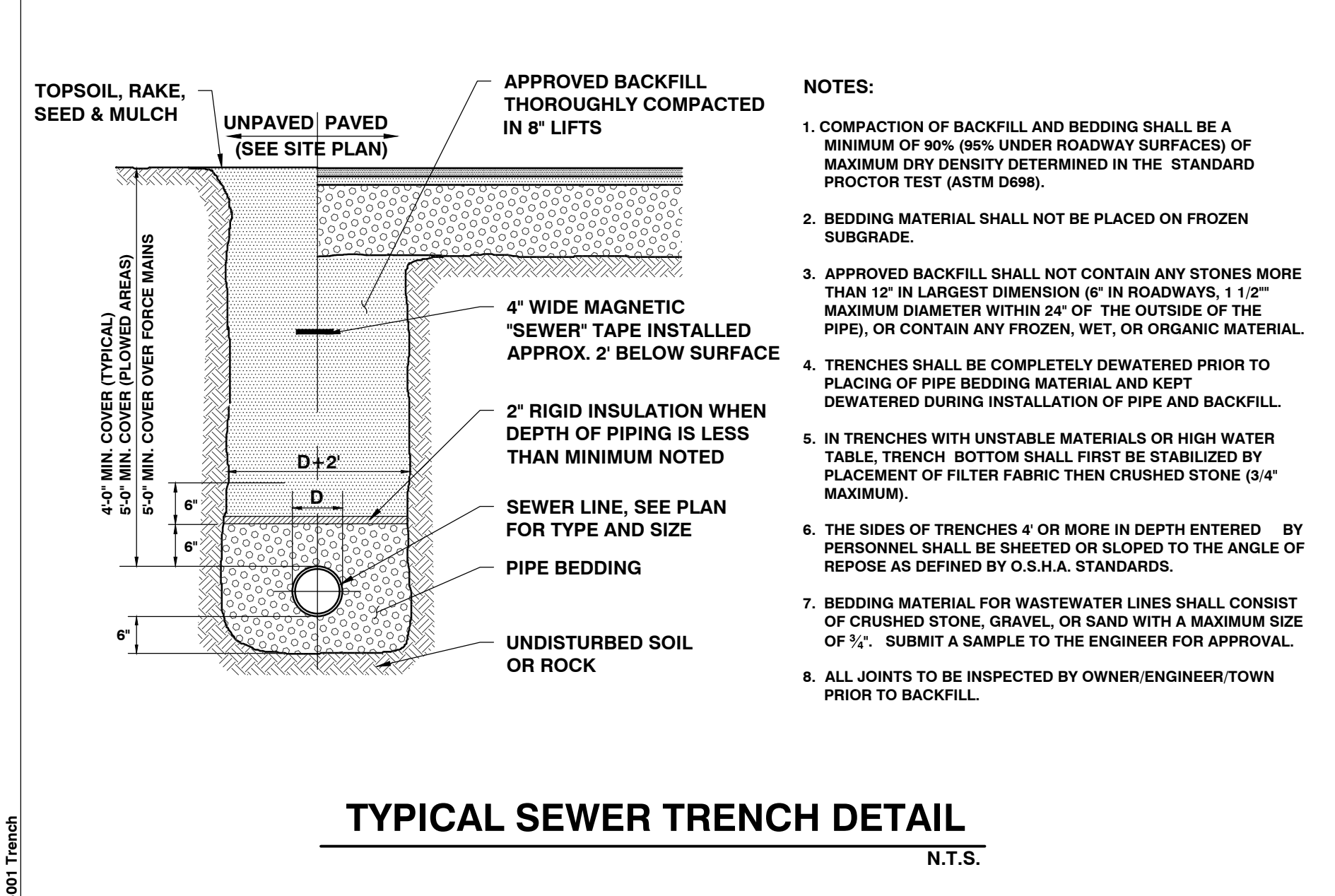
- ¹ Isolation distances for composting sites (commercial or agricultural) shall be measured from the perimeter of the composting area or area used for storage of composted material.
- ² Isolation distances for concentrated livestock holding areas and manure storage systems shall be measured from the 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



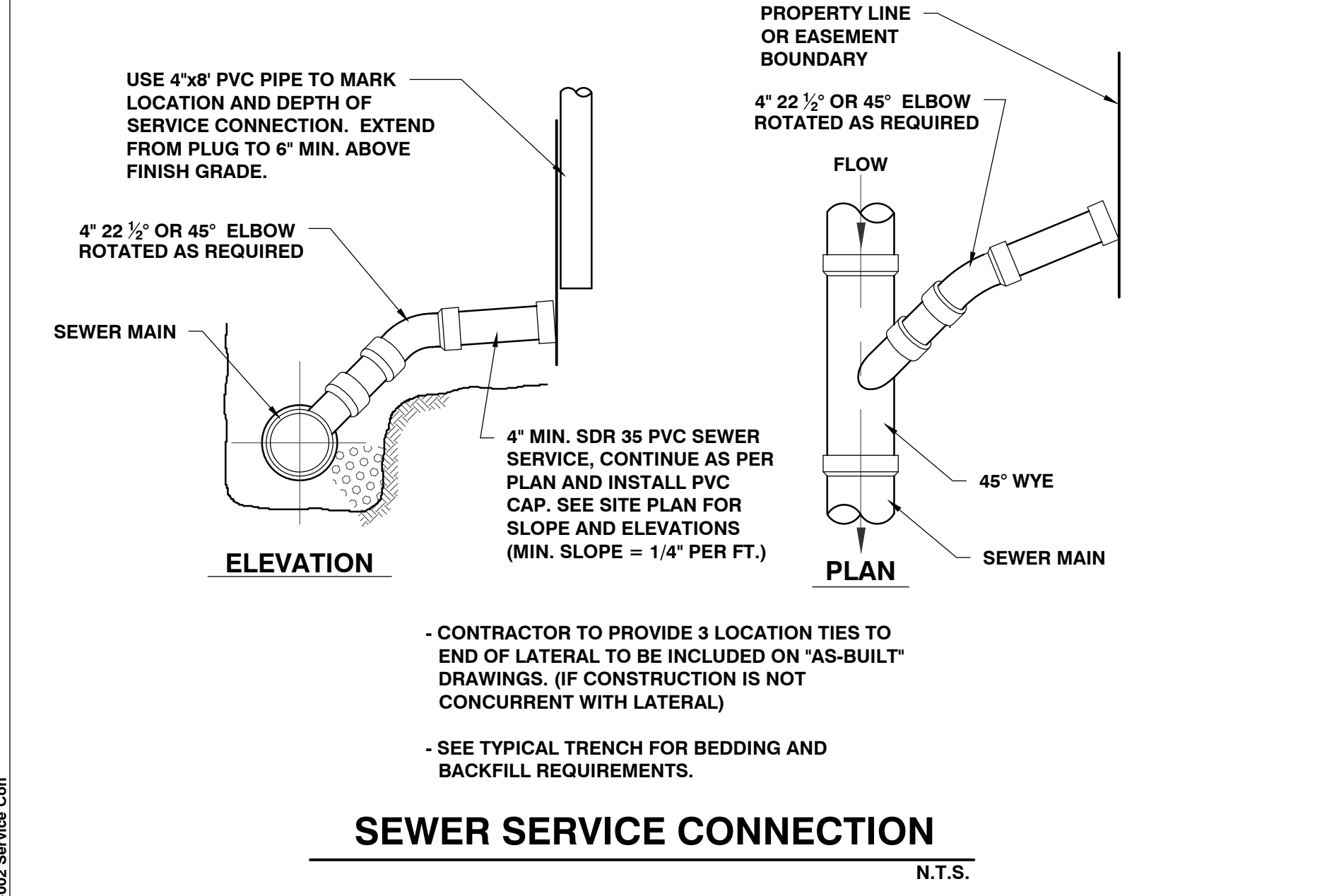
- NOTES:**
- CONTRACTOR SHALL PROVIDE TWO TIES TO ALL BURIED C.O.'s ON THE AS-BUILT PLANS SUBMITTED TO THE OWNER.
 - CLEANOUT TO BE INSTALLED AT INTERVALS OF NOT MORE THAN 100 FEET, AND UPSTREAM OF BEND(S) IN BUILDING SEWER(S) WHEN CHANGE IN PIPE DIRECTION EXCEEDS 45° (USE LONG SWEEP FITTINGS WHEN EXCEEDING 45°)

TYPICAL CLEANOUT DETAIL
N.T.S.



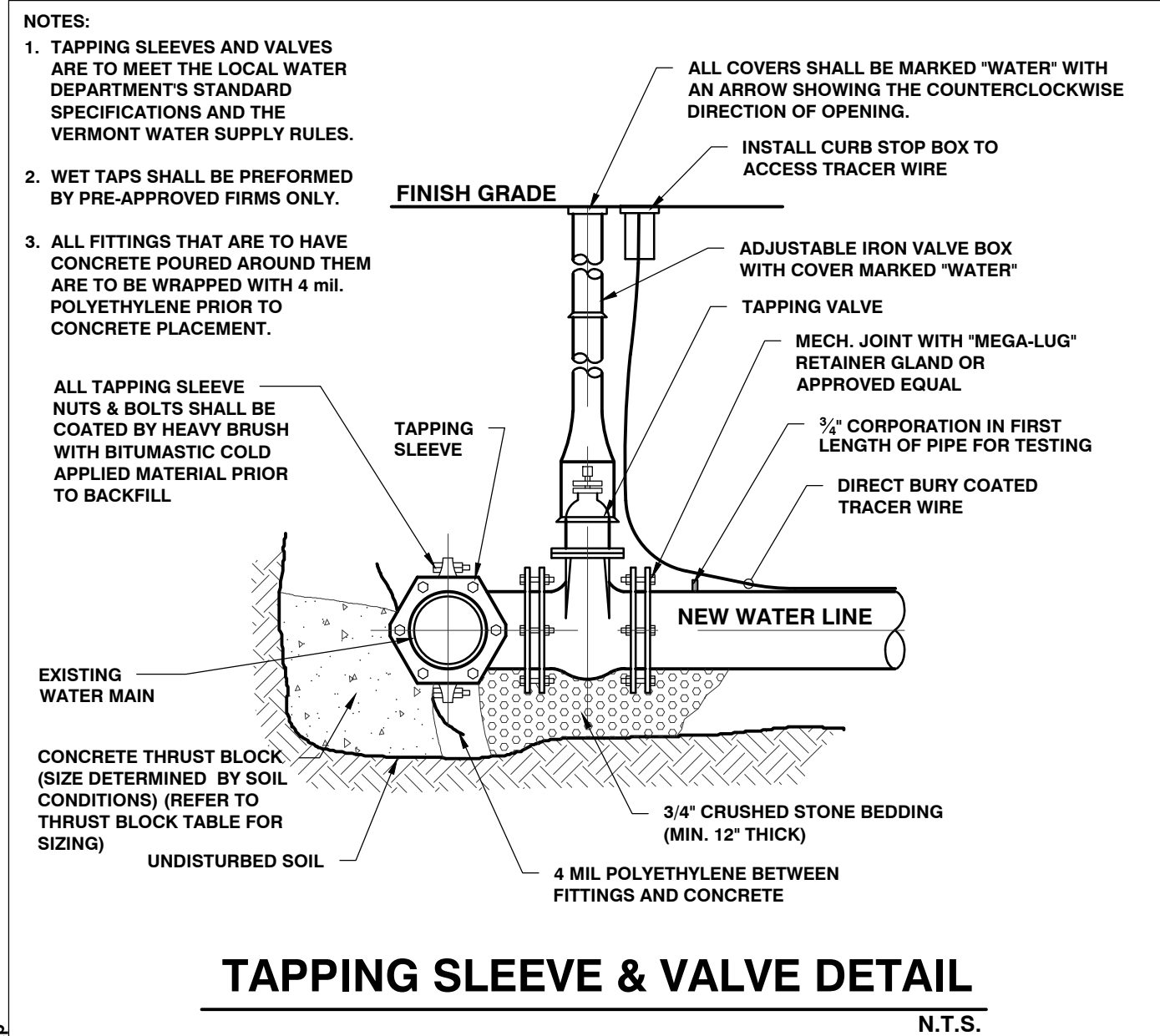
- NOTES:**
- COMPACTION OF BACKFILL AND BEDDING SHALL BE A MINIMUM OF 90% (95% UNDER ROADWAY SURFACES) OF MAXIMUM DRY DENSITY DETERMINED IN THE STANDARD PROCTOR TEST (ASTM D998).
 - BEDDING MATERIAL SHALL NOT BE PLACED ON FROZEN SUBGRADE.
 - APPROVED BACKFILL SHALL NOT CONTAIN ANY STONES MORE THAN 12" IN LARGEST DIMENSION (6" IN ROADWAYS, 1 1/2" MAXIMUM DIAMETER WITHIN 24" OF THE OUTSIDE OF THE PIPE), OR CONTAIN ANY FROZEN, WET, OR ORGANIC MATERIAL.
 - TRENCHES SHALL BE COMPLETELY DEWATERED PRIOR TO PLACING OF PIPE BEDDING MATERIAL AND KEPT DEWATERED DURING INSTALLATION OF PIPE AND BACKFILL.
 - IN TRENCHES WITH UNSTABLE MATERIALS OR HIGH WATER TABLE, TRENCH BOTTOM SHALL FIRST BE STABILIZED BY PLACEMENT OF FILTER FABRIC THEN CRUSHED STONE (3/4" MAXIMUM).
 - THE SIDES OF TRENCHES 4' OR MORE IN DEPTH ENTERED BY PERSONNEL SHALL BE SHEETED OR SLOPED TO THE ANGLE OF REPOSE AS DEFINED BY O.S.H.A. STANDARDS.
 - BEDDING MATERIAL FOR WASTEWATER LINES SHALL CONSIST OF CRUSHED STONE, GRAVEL, OR SAND WITH A MAXIMUM SIZE OF 3/4". SUBMIT A SAMPLE TO THE ENGINEER FOR APPROVAL.
 - ALL JOINTS TO BE INSPECTED BY OWNER/ENGINEER/TOWN PRIOR TO BACKFILL.

TYPICAL SEWER TRENCH DETAIL
N.T.S.



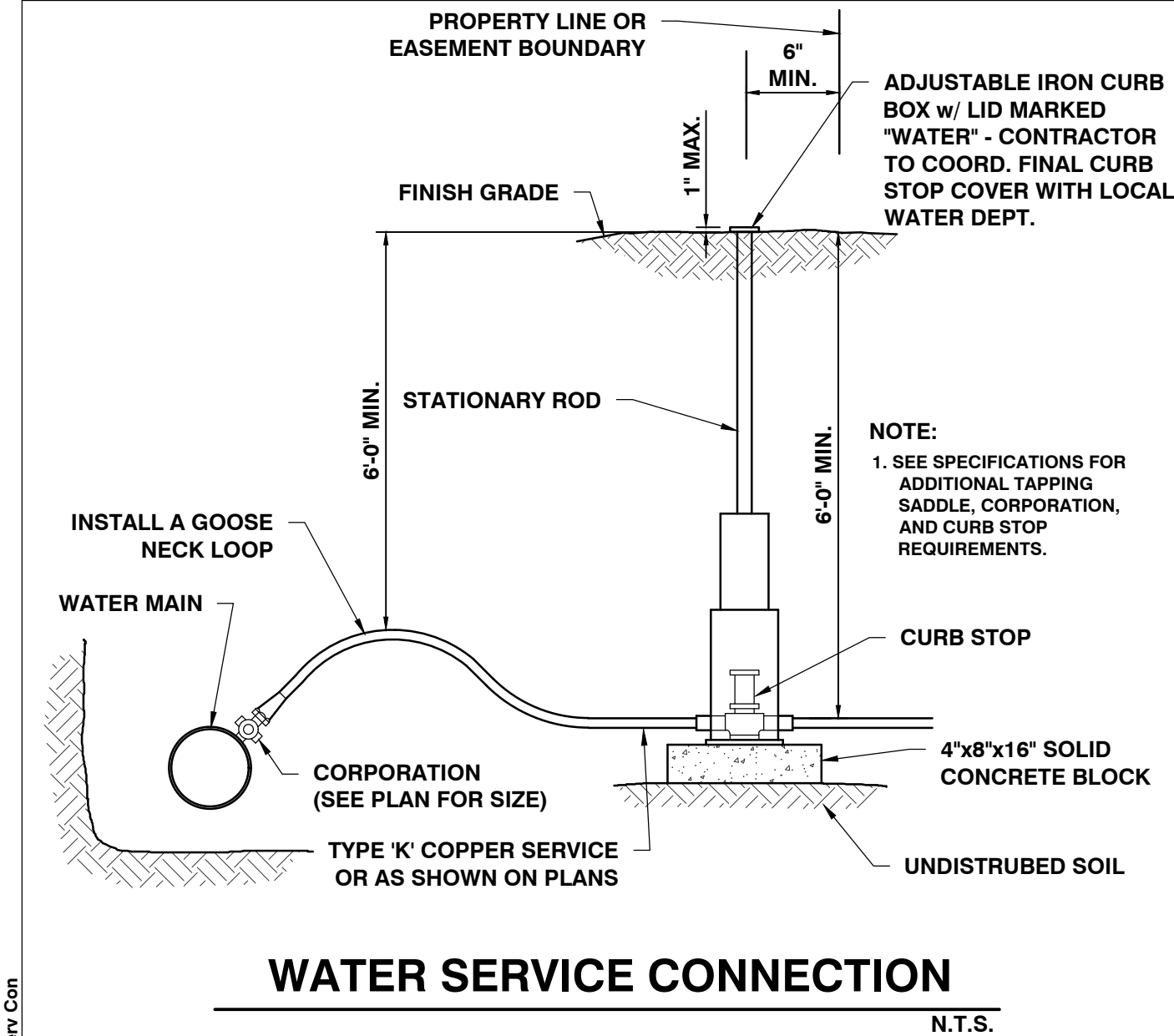
- CONTRACTOR TO PROVIDE 3 LOCATION TIES TO END OF LATERAL TO BE INCLUDED ON "AS-BUILT" DRAWINGS. (IF CONSTRUCTION IS NOT CONCURRENT WITH LATERAL.)**
- SEE TYPICAL TRENCH FOR BEDDING AND BACKFILL REQUIREMENTS.**

SEWER SERVICE CONNECTION
N.T.S.

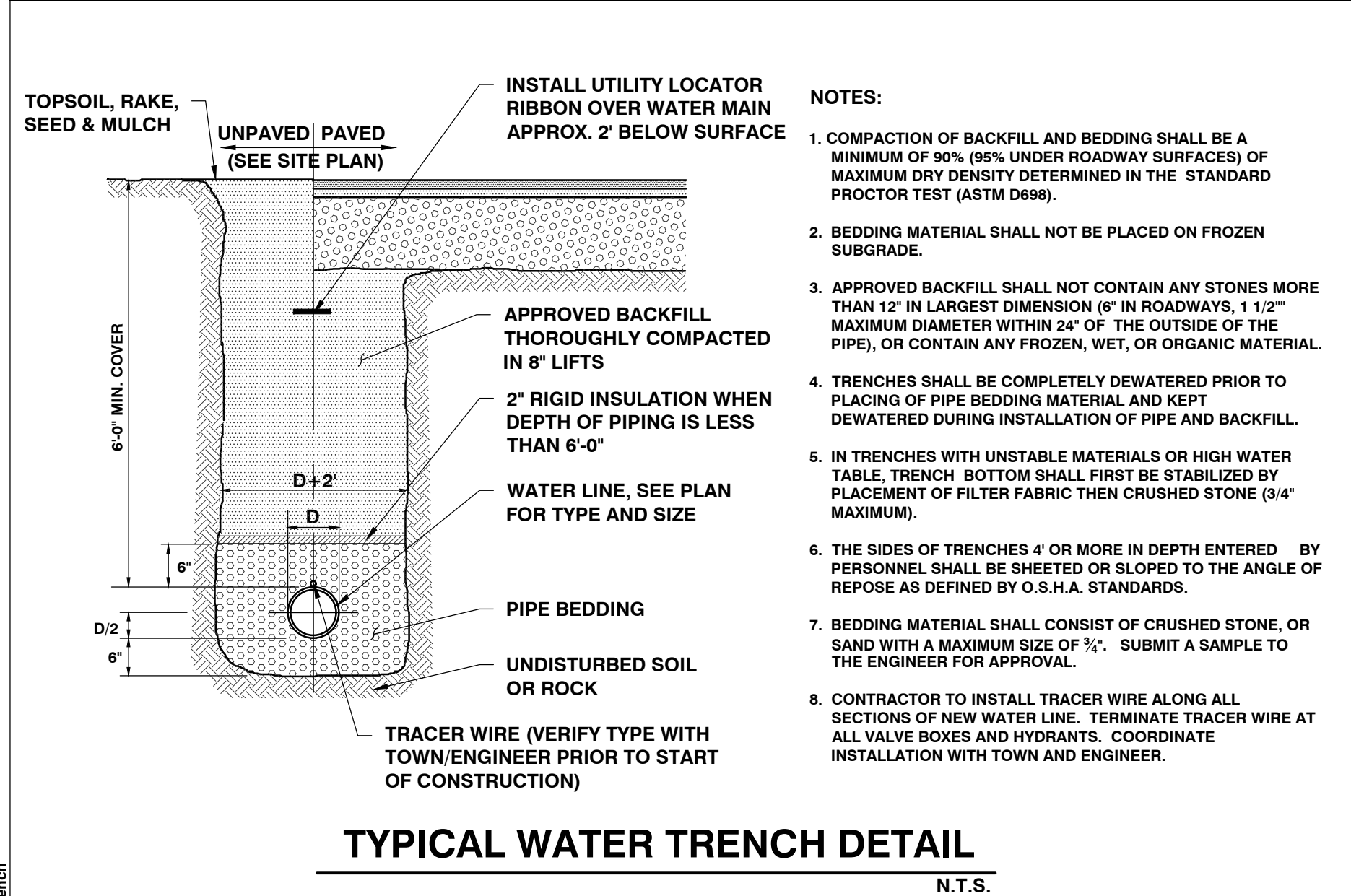


- NOTES:**
- TAPPING SLEEVES AND VALVES ARE TO MEET THE LOCAL WATER DEPARTMENT'S STANDARD SPECIFICATIONS AND THE VERMONT WATER SUPPLY RULES.
 - WET TAPS SHALL BE PERFORMED BY PRE-APPROVED FIRMS ONLY.
 - ALL FITTINGS THAT ARE TO HAVE CONCRETE POURED AROUND THEM ARE TO BE WRAPPED WITH 4 MIL POLYETHYLENE PRIOR TO CONCRETE PLACEMENT.
- ALL TAPPING SLEEVE NUTS & BOLTS SHALL BE COATED BY HEAVY BRUSH WITH BITUMASTIC COLD APPLIED MATERIAL PRIOR TO BACKFILL.

TAPPING SLEEVE & VALVE DETAIL
N.T.S.

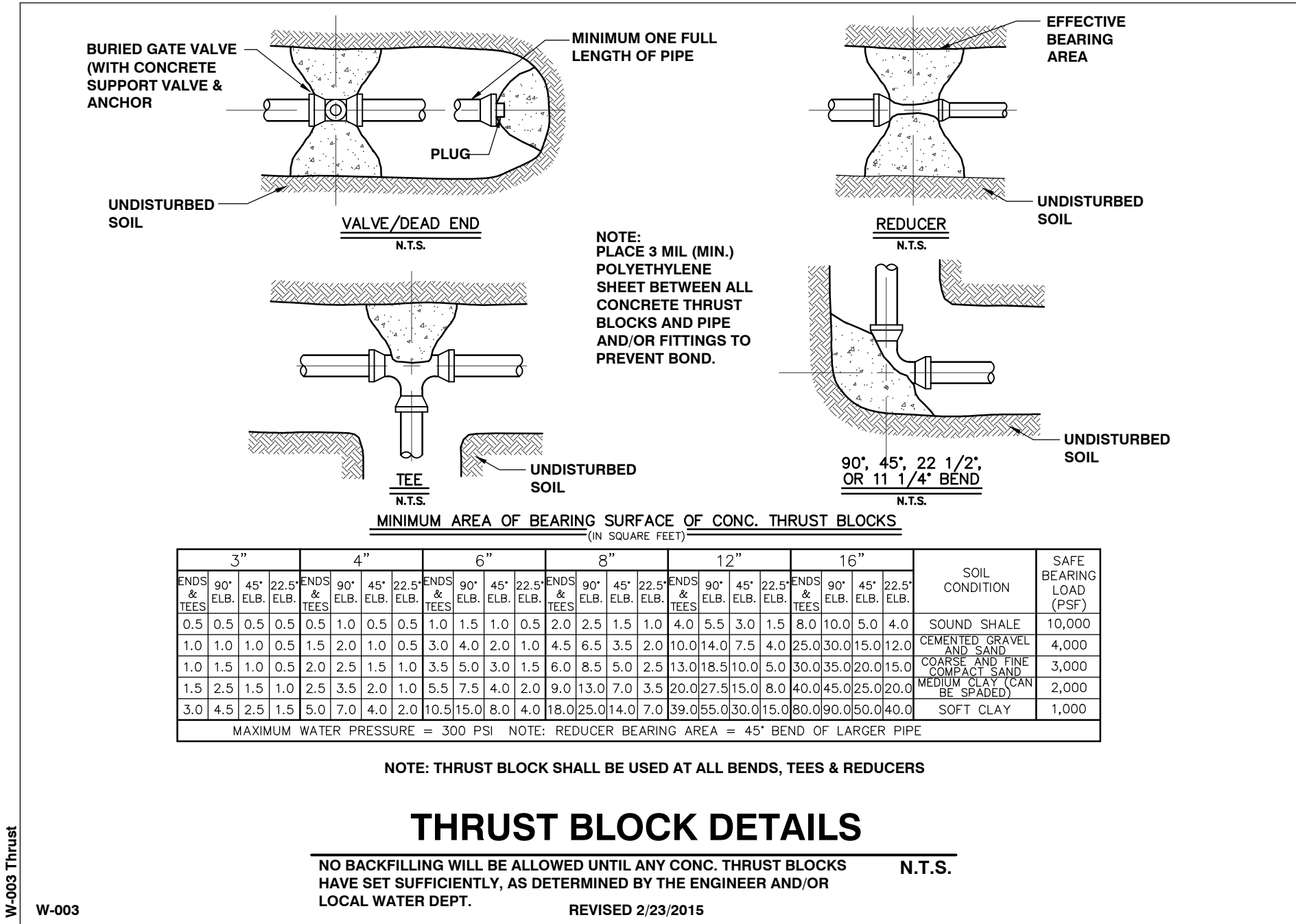


WATER SERVICE CONNECTION
N.T.S.

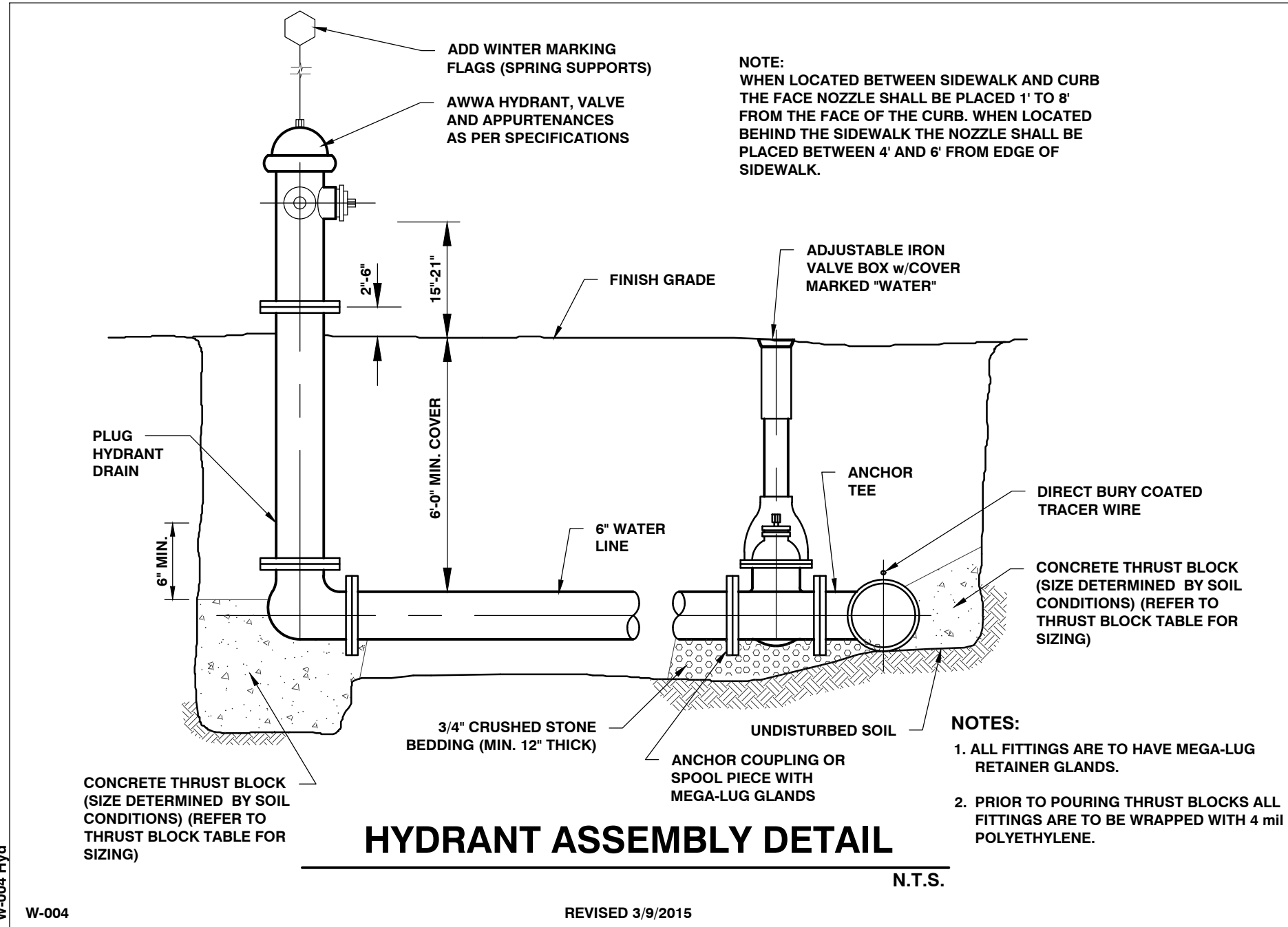


- NOTES:**
- COMPACTION OF BACKFILL AND BEDDING SHALL BE A MINIMUM OF 90% (95% UNDER ROADWAY SURFACES) OF MAXIMUM DRY DENSITY DETERMINED IN THE STANDARD PROCTOR TEST (ASTM D998).
 - BEDDING MATERIAL SHALL NOT BE PLACED ON FROZEN SUBGRADE.
 - APPROVED BACKFILL SHALL NOT CONTAIN ANY STONES MORE THAN 12" IN LARGEST DIMENSION (6" IN ROADWAYS, 1 1/2" MAXIMUM DIAMETER WITHIN 24" OF THE OUTSIDE OF THE PIPE), OR CONTAIN ANY FROZEN, WET, OR ORGANIC MATERIAL.
 - TRENCHES SHALL BE COMPLETELY DEWATERED PRIOR TO PLACING OF PIPE BEDDING MATERIAL AND KEPT DEWATERED DURING INSTALLATION OF PIPE AND BACKFILL.
 - IN TRENCHES WITH UNSTABLE MATERIALS OR HIGH WATER TABLE, TRENCH BOTTOM SHALL FIRST BE STABILIZED BY PLACEMENT OF FILTER FABRIC THEN CRUSHED STONE (3/4" MAXIMUM).
 - THE SIDES OF TRENCHES 4' OR MORE IN DEPTH ENTERED BY PERSONNEL SHALL BE SHEETED OR SLOPED TO THE ANGLE OF REPOSE AS DEFINED BY O.S.H.A. STANDARDS.
 - BEDDING MATERIAL SHALL CONSIST OF CRUSHED STONE, OR SAND WITH A MAXIMUM SIZE OF 3/4". SUBMIT A SAMPLE TO THE ENGINEER FOR APPROVAL.
 - CONTRACTOR TO INSTALL TRACER WIRE ALONG ALL SECTIONS OF NEW WATER LINE. TERMINATE TRACER WIRE AT ALL VALVE BOXES AND HYDRANTS. COORDINATE INSTALLATION WITH TOWN AND ENGINEER.

TYPICAL WATER TRENCH DETAIL
N.T.S.



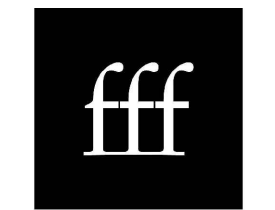
THRUST BLOCK DETAILS
N.T.S.



HYDRANT ASSEMBLY DETAIL
N.T.S.

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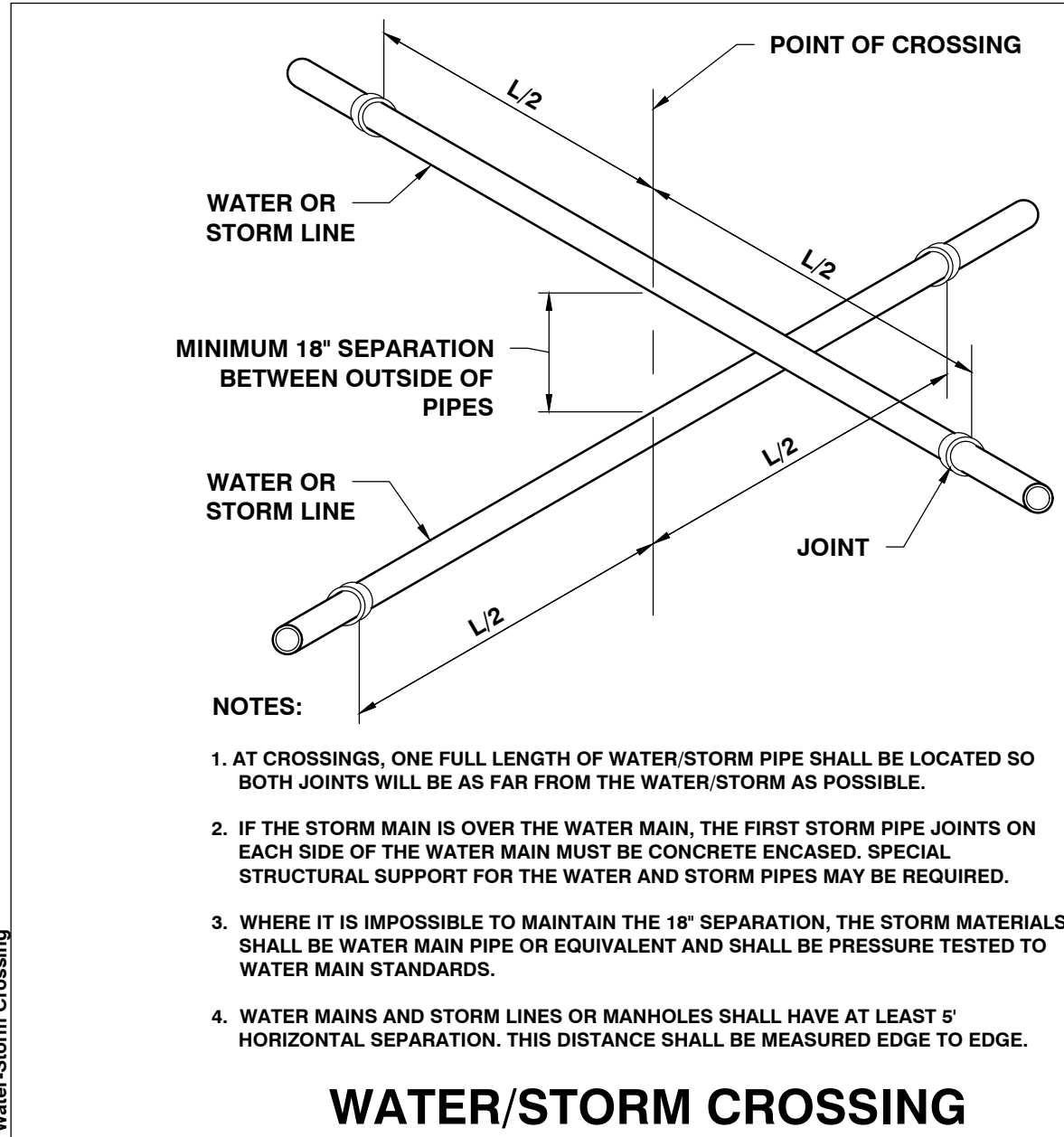
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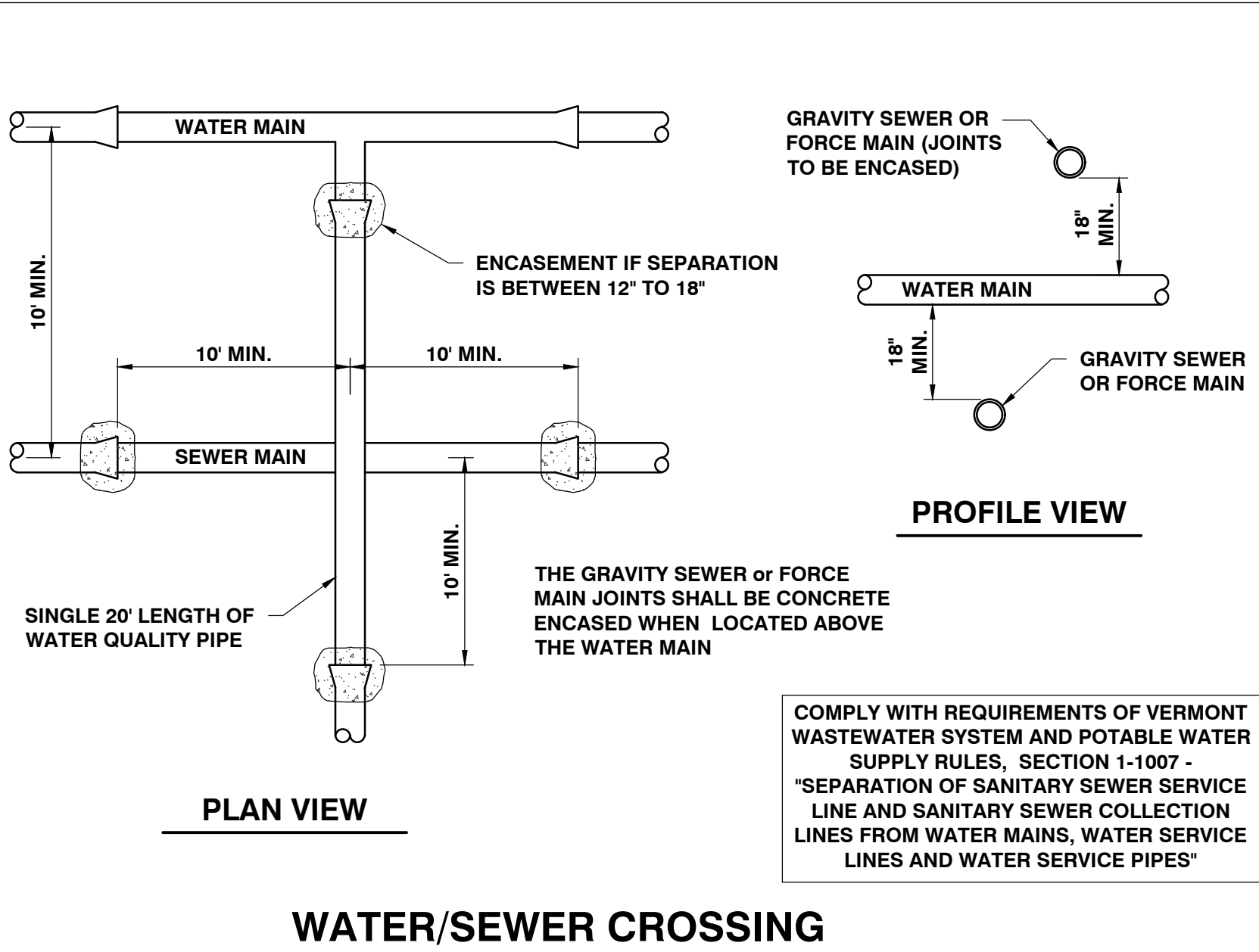
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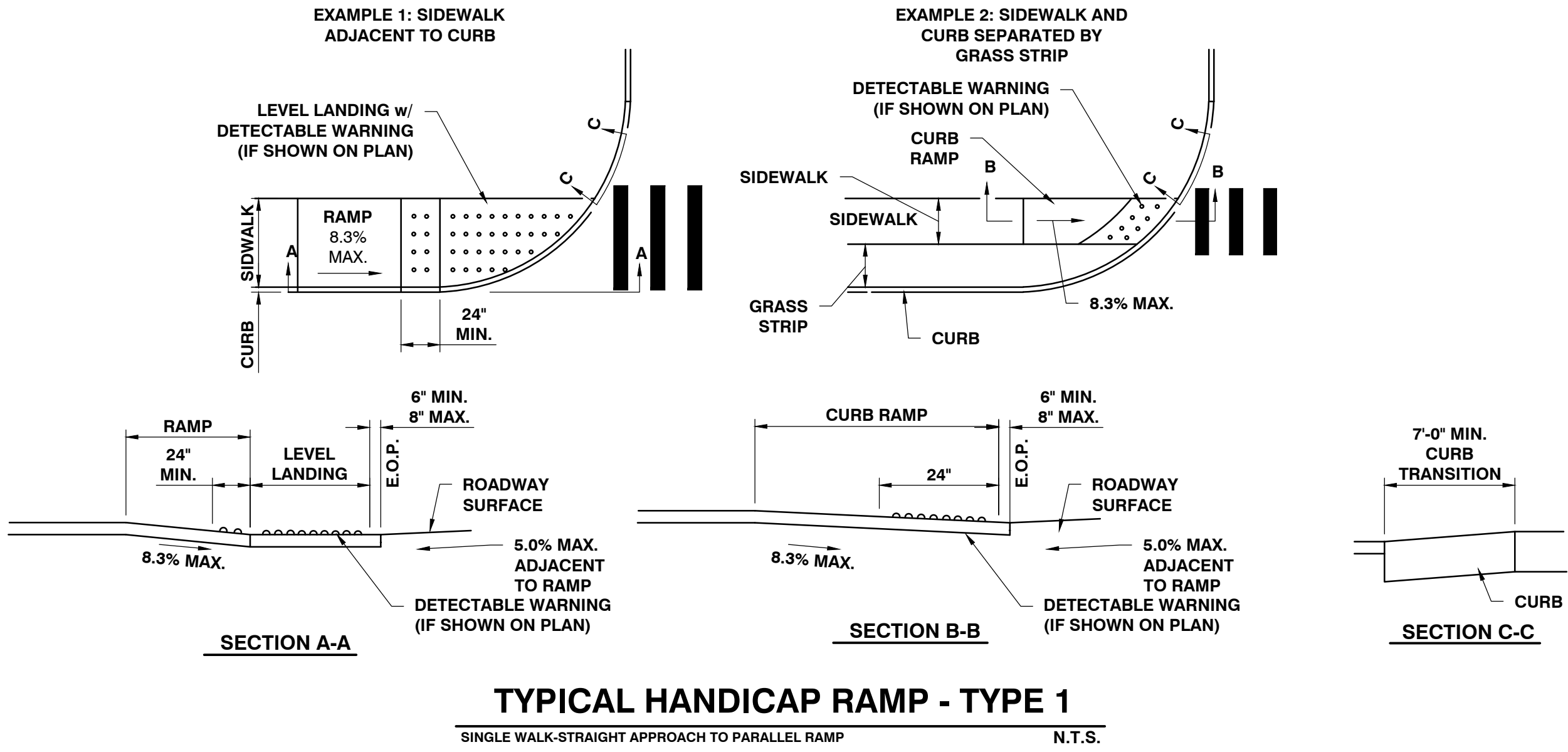
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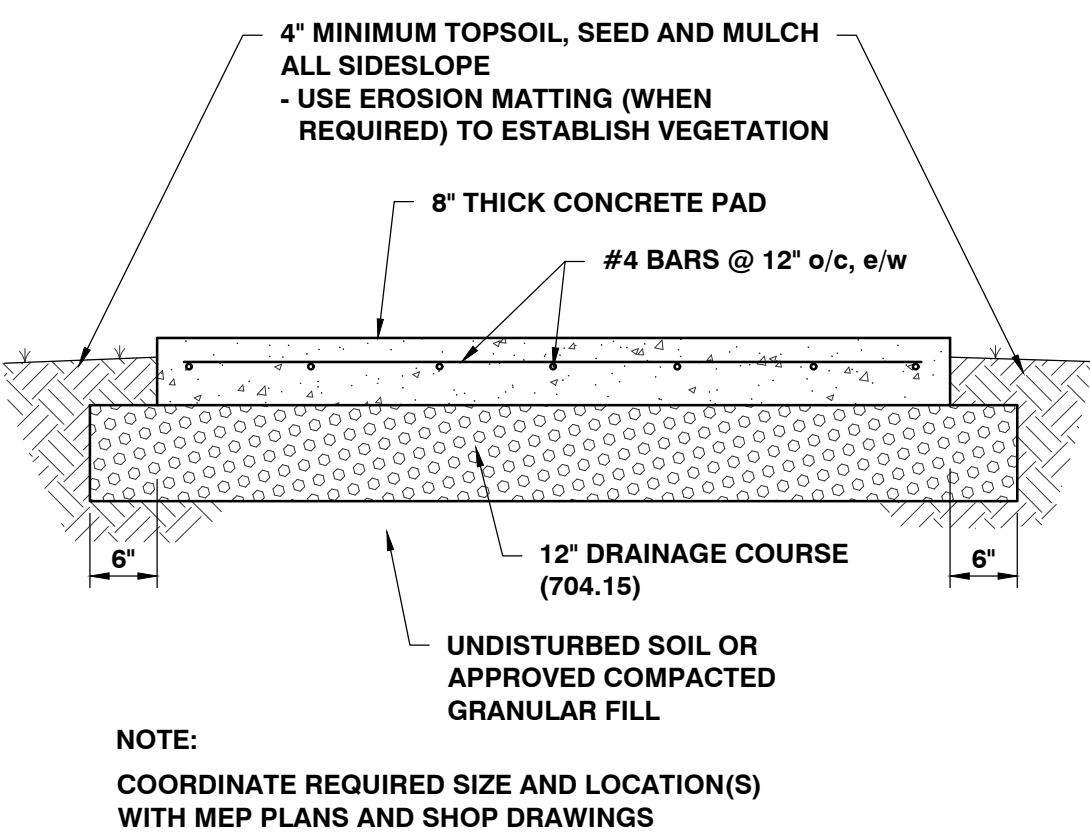
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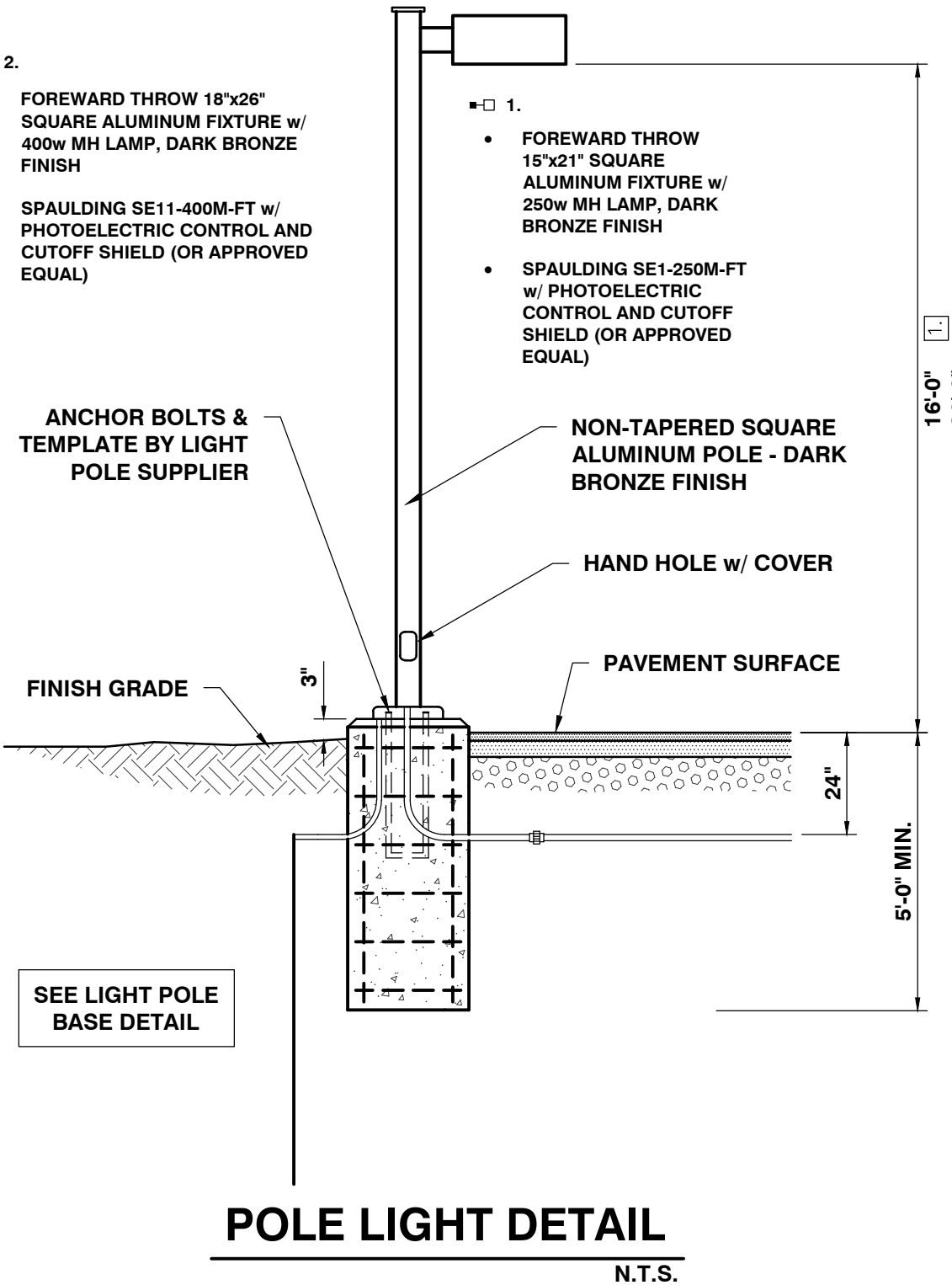
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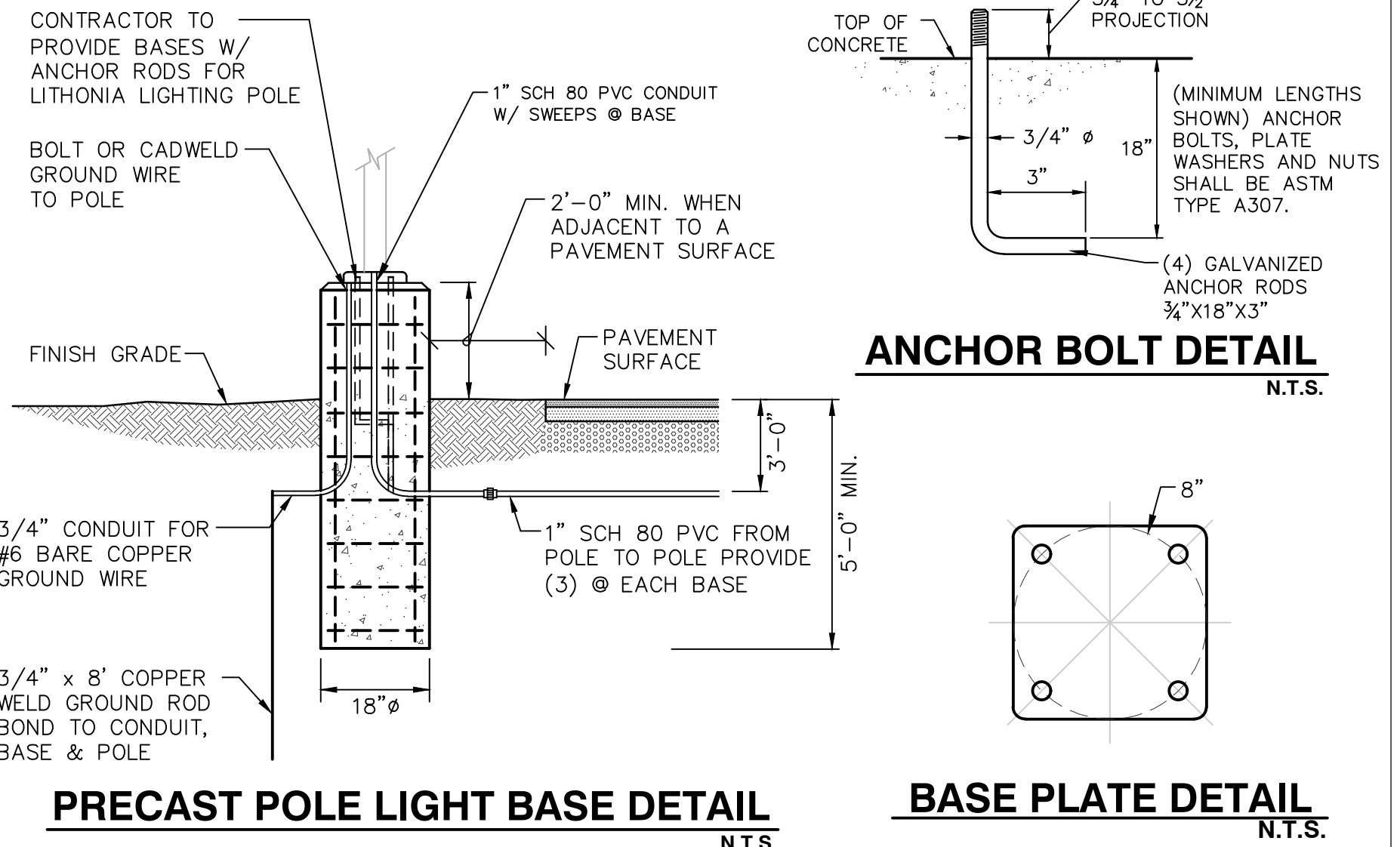
M-002 TYPICAL HANDICAP RAMP - TYPE 1
REVISED 08/01/2014
N.T.S.



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
REVISED 6/16/2015
N.T.S.

ANCHOR BOLT DETAIL
N.T.S.

BASE PLATE DETAIL
N.T.S.

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.

- D. 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.

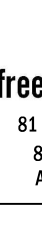
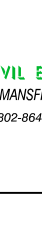
1.02 QUALITY ASSURANCE

- 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.

SCHEMATIC DESIGN - NOT FOR CONSTRUCTION	
 freeman french freeman 81 Maple Street - Burlington VT 05401 802-884-6844 • www.fffinc.com Architecture • Planning • Interiors	
 Colin Lindberg Architects 208 Elm Ave # 2B Burlington, VT 05401 (802) 864-4950	
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BURLINGTON HIGH SCHOOL & BURLINGTON TECHNICAL CENTER	
BURLINGTON, VT	
FFI PROJECT NO: 21255	
ORGANIZATION DATE: 07/22/2022	SCALE: NTS
DRAWN BY: MAB	CHECKED BY: DSM
ISSUE LOG: ZONING PERMIT DRAFT ZONING PERMIT	09/23/22 08/30/22
SHEET CONTENTS: SPECIFICATION:	
SHEET NO: C6.1	
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- 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 or 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 all 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 in 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 sealer 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. Spare 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, imparts 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

- 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.

2.07 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" shop drawing sheets
- E. All bolts and nuts used with all pipe sleeves shall, upon final tightening and testing, be braced and sealed 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 by the contractor. The minimum installation of two inch (2") thick highest available density extruded polystyrene insulating sheets or equivalent. Sheets shall be the lesser 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 Watertous 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

- A. Hydrant assemblies shall consist of an anchor tee, a six inch (6") mechanical joint gate valve conforming to the above specifications, the appropriate length of six inch (6") Ductile Iron Cement Lined, Class 52 pipe, all necessary anchor couplings and approved restraining glands, the fire hydrant and appropriate thrust block.

- B. Care shall be taken to prevent damage to hydrants and appurtenances during handling and installation. All materials shall

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 typicatures 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

and on 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 or 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.
1. 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.
2. All water required for testing shall be potable. All testing shall be conducted in the presence of the Engineer.
3. 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.
4. 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.
5. 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)
6. 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.
7. 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.
- B. The Engineer or Town Water Department will require as minimum:
1. 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.
2. 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.
3. 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.
4. 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.
- C. 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 Raster (.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 douse, 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.

STORM WATER PONDS

PART 1 – GENERAL

1.01 SUMMARY

- A. Section includes:
- 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:

1. 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.

2. 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.
3. 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.
4. 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.
5. 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, phosphorous, 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; 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:

1. 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.

1. Protect adjacent and adjoining areas from hydros seeding and hydromulching overspray.
2. 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 and topsoil to any dimension and sticks, roots, rubbish, and other extraneous matter.

1. 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.

- D. 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, rake, remove ridges, and fill depressions to meet finish grades. Limit finish grading to areas that can be planted in the immediate future.

- E. Moisten prepared areas before planting if soil is dry. Water thoroughly and allow surface to dry before planting. Do not create muddy soil.

- F. 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

NOT FOR CONSTRUCTION



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- A. Maintain and establish seeding by waterings, fertilizing, weeding, mowing, trimming, replanting, and other operations. Roll, regrade, and replant bare or eroded areas and remove to produce a uniformly smooth lawn. Provide materials and installation the same as those used in the original installation.

1. In areas where mulch has been disturbed by wind or maintenance operations, add new mulch and anchor as required to prevent displacement.

2. Begin maintenance immediately after each area is planted and continue until acceptable lawn is established, but for not less than the following periods:

- Seeded Areas: 90 days from date of Substantial Completion.
- When initial maintenance period has not elapsed before end of planting season, or if seeding is not fully established, continue maintenance during next planting season.

3.6 SATISFACTORY CONDITIONS

- A. Installations shall meet the following criteria as determined by Engineer/Owner:

1. Satisfactory Seeded Area: At end of maintenance period, a healthy, uniform, close stand of grass has been established, free of weeds and surface irregularities, with coverage exceeding 90 percent over any 10 sq. ft. and bare spots not exceeding 5 by 5 inches.

- B. Use specified materials to reestablish area that do not comply with requirements and continue maintenance until areas are satisfactory.

3.7 CLEANUP AND PROTECTION

- A. Promptly remove soil and debris, created by work. Clean wheels of vehicles before leaving site to avoid tracking soil onto roads, walks, or other paved areas.
- B. Erect temporary fencing or barricades and warning signs as required to protect newly planted areas from traffic. Maintain fencing and barricades throughout initial maintenance period and remove after lawn is established.

- C. Remove nondegradable erosion-control measures after grass establishment period.

BURLINGTON HIGH SCHOOL & BURLINGTON TECHNICAL CENTER

BURLINGTON, VT



To: Burlington Planning

Date: September 22, 2022

Memorandum

Project #: 58736.00

From: Jenn Conley, PE, PTOE

Re: Transportation Demand Management (TDM)

VHB has reviewed the City of Burlington's ordinance regarding Transportation Demand Management (TDM) for Burlington High School and Technical Center located at 52 Institute Road. According to the City of Burlington's Comprehensive Development Ordinance, the purpose of a TDM program is to reduce parking demand, car ownership, and vehicle miles traveled while increasing transit use and non-motorized travel.

VHB has discussed its recommendations with the client who has committed to the following TDM measures based on City requirements.

(a) Outreach and Education

The ordinance requires assignment of a Transportation Coordinator who will be responsible for providing employees and students with information on TDM strategies during an annual meeting as well as on request. In addition, the Transportation Coordinator is required to prepare and disseminate an annual travel survey of employees and provide record keeping to the City.

The Burlington High School has committed that [redacted] will serve as the Transportation Coordinator. **THIS PERSON/OFFICE** will survey the employees yearly regarding mode choices and submit the findings to the City. **THIS PERSON/OFFICE** will also provide information on alternative modes and the ease of using them to travel to and from the site.

(b) TDM strategies.

The ordinance requires GMT transit passes be provided to all employees and staff for free for the first year of occupancy and at a minimum discount of 50% for each year afterward. BSD will offer free transit passes to all staff at the high school. The Burlington School District works cooperatively with Green Mountain Transit (GMT) to provide bus transportation options for students traveling to and from school. At the Institute Road site, this includes School Tripper routes as well as Route 7. **Burlington High School students ride GMT busses fully subsidized, for free with their student ID.**

Green Mountain Transit offers bus routes referred to as "School Trippers" and the routes that include the current temporary downtown location of Burlington High School are, 334, 336, and 349. These routes have historically traveled from both the North End and South End to the Institute Road site. All three "School Trippers" bus routes connects to the Downtown Transit Center which provides connection the greater Chittenden County area.

Figure 1- Burlington School District GMT Bus Routes



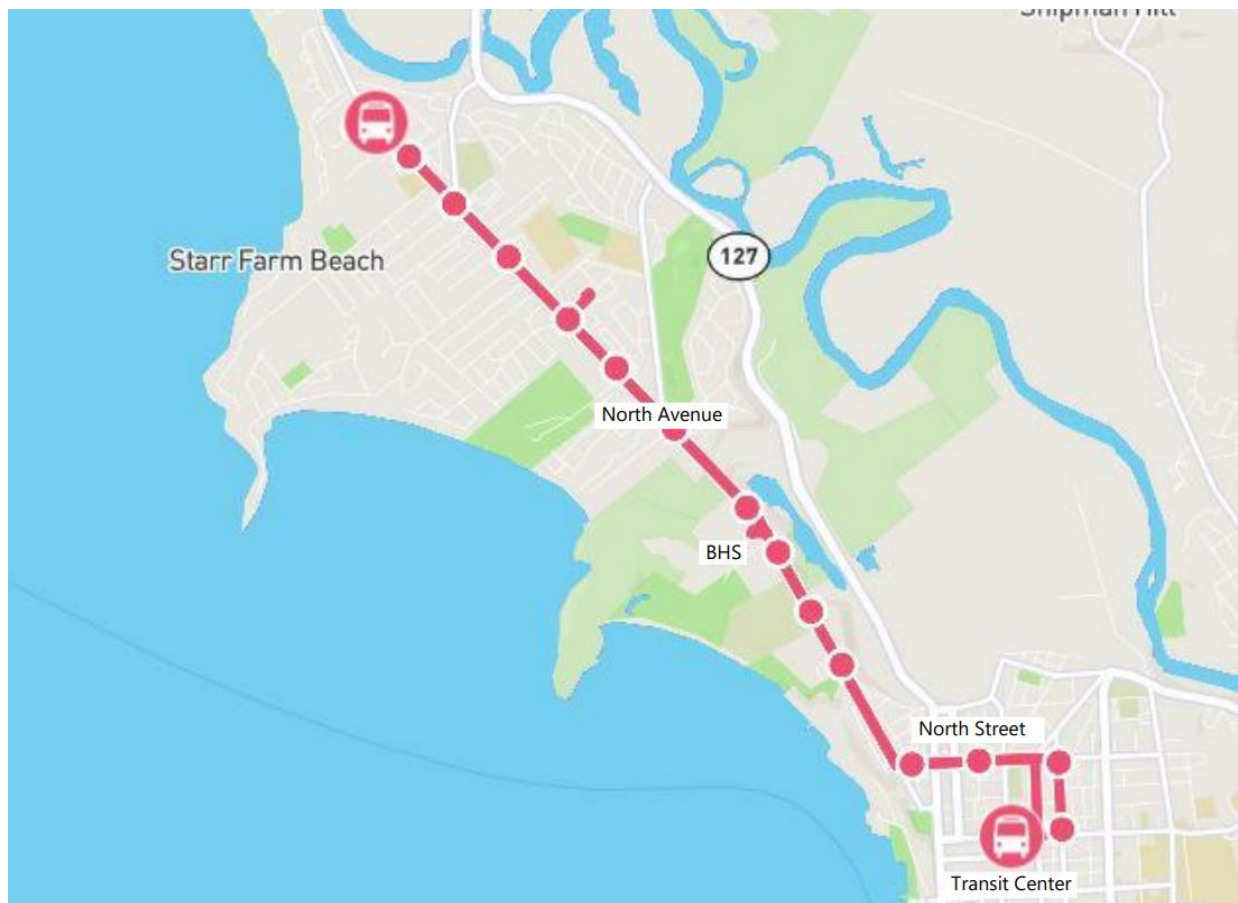
Green Mountain/BSD Transit, Burlington School District Travel Plan

For staff and faculty, Route 7 travels along North Avenue and connects from the Downtown Transit Center up to the North End and includes stops near the High School every 10 to 20 minutes during the peak periods. Figure 3 illustrates the existing southbound bus shelter located to the south of Institute Road. This

stop and shelter will be relocated to the north to minimize the need for users to cross the street when boarding or alighting at this stop. A northbound bus shelter is provided approximately 300 feet to the south of Institute

This provides students, staff, and faculty the opportunity to rely on public transport as their mode of transportation. The Downtown Transit Center can connect faculty and staff to the other areas around the region.

Figure 2- Burlington North Avenue Bus Route



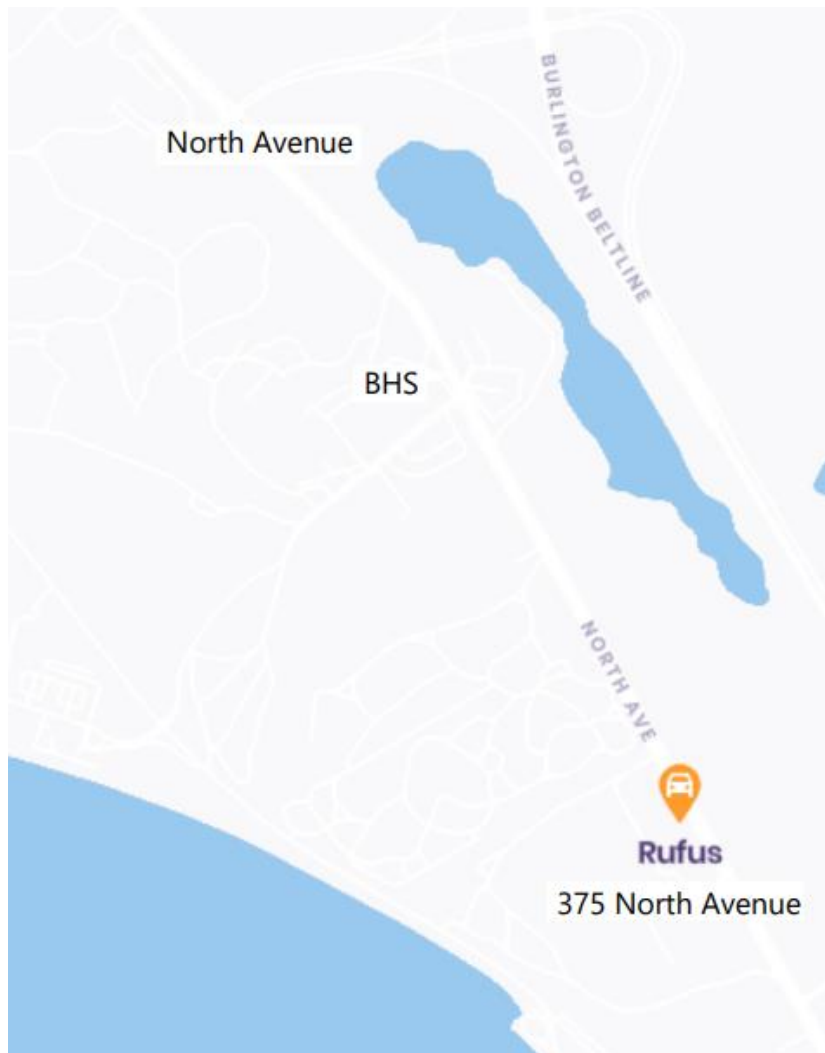
Green Mountain Route 7 Schedule

Figure 3- Bus Stop Located at North Avenue and Institute Road



The ordinance suggests offering a car share membership to all employees and staff. However, because Burlington High School and Technical Center is more aggressive in its subsidy of transit, and, as shown on the graphic below, there is currently one vehicle located 0.6 miles from the Burlington High School and Technical Center, employees that would like to occasional participate in a carshare program, have that option within walking distance.

Figure 4- Car Share Location at 375 North Avenue



Burlington Car Share Locations, CarShare Vermont

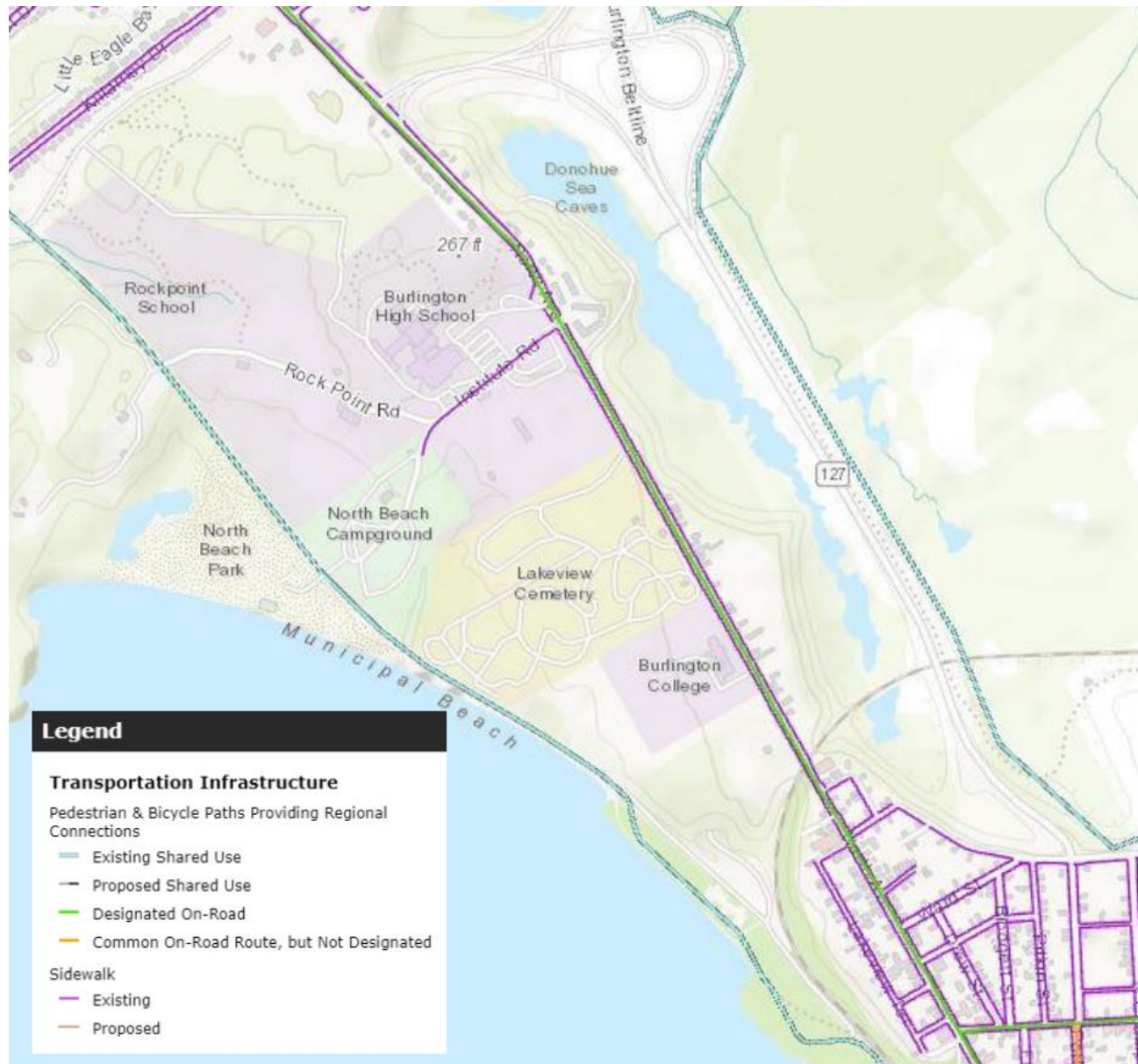
(c) Parking Management

Per the Ordinance, Parking Utilization studies need to be conducted annually. **The Project has committed to collect this data through the Transportation Coordinator and report the information when reporting on employee travel surveys.**

Priority parking spaces closest to the primary building entrance need to be provided for handicapped parking, as well as bicycle, scooter and motorcycle, and carpool spaces. These spaces are each provided, as shown on the site plan.

In addition to reducing auto trips by encouraging transit, the City of Burlington provides students and employees with many opportunities to access safe pedestrian and bike paths. Students and faculty can connect to paved bike routes along North Avenue or can easily connect to the Island-Line Trail. This provides safe routes for students and faculty to be able to travel from the North End to South End.

Figure 4- Bike and Pedestrian Connections



Chittenden County Regional Planning Commission, Transportation and Infrastructure GIS Layer

In order to determine the likely demand for bicycle parking, observations of bicycles parked around the current location of Burlington High School were made on three weekdays during Fall 2022. On these three good weather days (clear and warm), between 8 and 13 bikes were parked on the bike racks and an additional 12 to 17 bikes were attached to nearby objects. Taking the highest count, a

total of 30 bicycles were counted. With enrollment currently at 979 students, demand can be calculated as 0.03 bicycles per student.

Were the new high school to reach its full capacity of 1594 students, we would anticipate demand for 48 bicycle parking spaces. **In order to further encourage cycling to the Institute Road site, in accordance with LEED standards, 136 bike parking spaces will be provided.**

(d) TDM Agreement

The Project is committing to this TDM plan and will provide the written documentation from the School Department committing to the ongoing implementation of the TDM requirements as set forth above; acknowledgement that the project has no claim to on street parking; acknowledgement that failure to maintain TDM as required is a violation of this ordinance and that no certification of occupancy be granted until any such violation has been remedied.

Gilman & Briggs Environmental

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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.



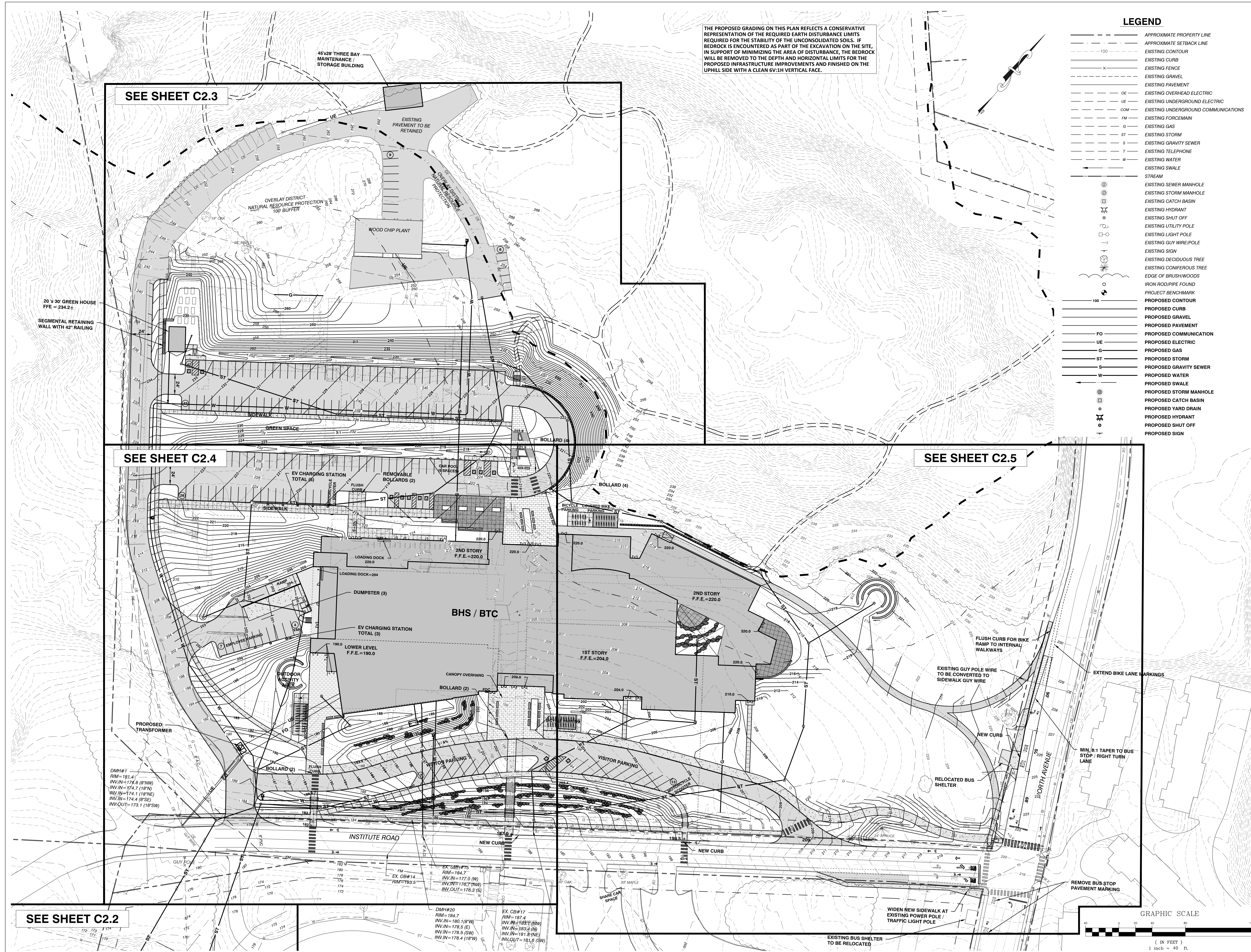
Herb Robert, a calciphile herb, restricted to limestone outcrops.



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

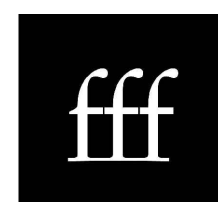


North-facing slope beyond crest; more rugged outcrops and very shaded conditions.



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BURLINGTON
HIGH SCHOOL
&
BURLINGTON
TECHNICAL
CENTER

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 CONTAINS:
PROPOSED
GRADING AND
DRAINAGE
NORTH

SHEET NO: C2.1

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Gilman & Briggs Environmental

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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.

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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.

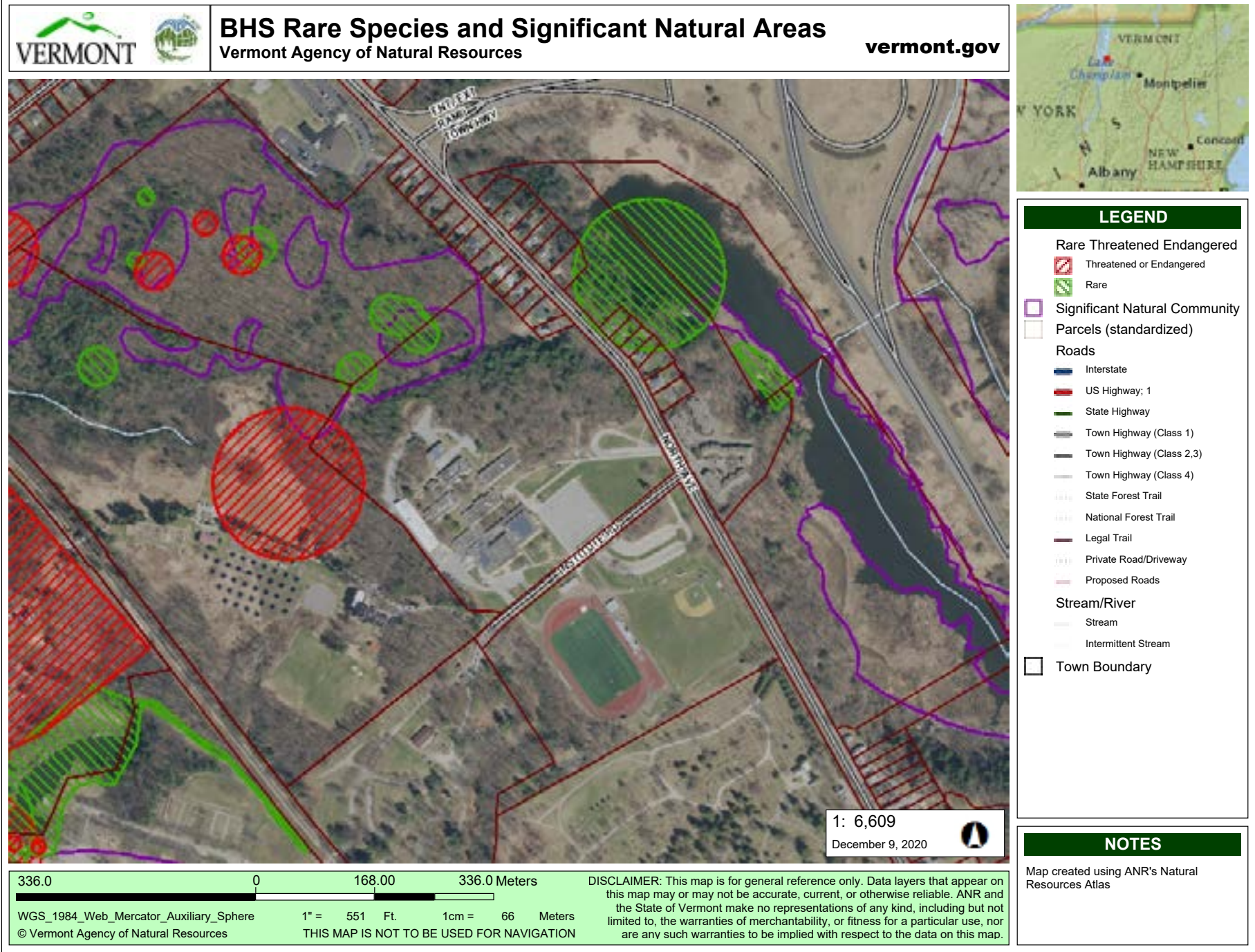
Table 1. Plants observed, north of the existing entrance, the lawns, and the buildings; to the approximate north property line; includes species around the parking lot north of the buildings. Date of observations, 31 Aug 2019.

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 vaginaeflorus</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		

NOTES

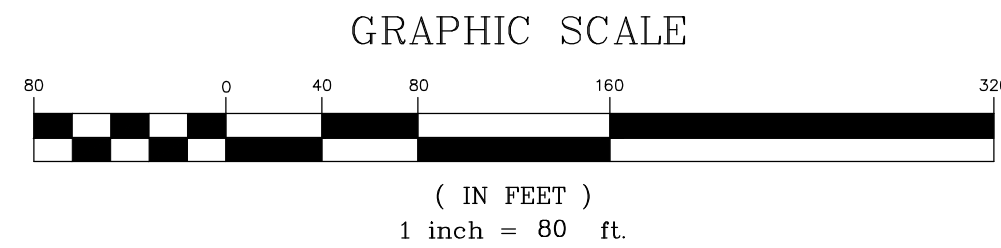
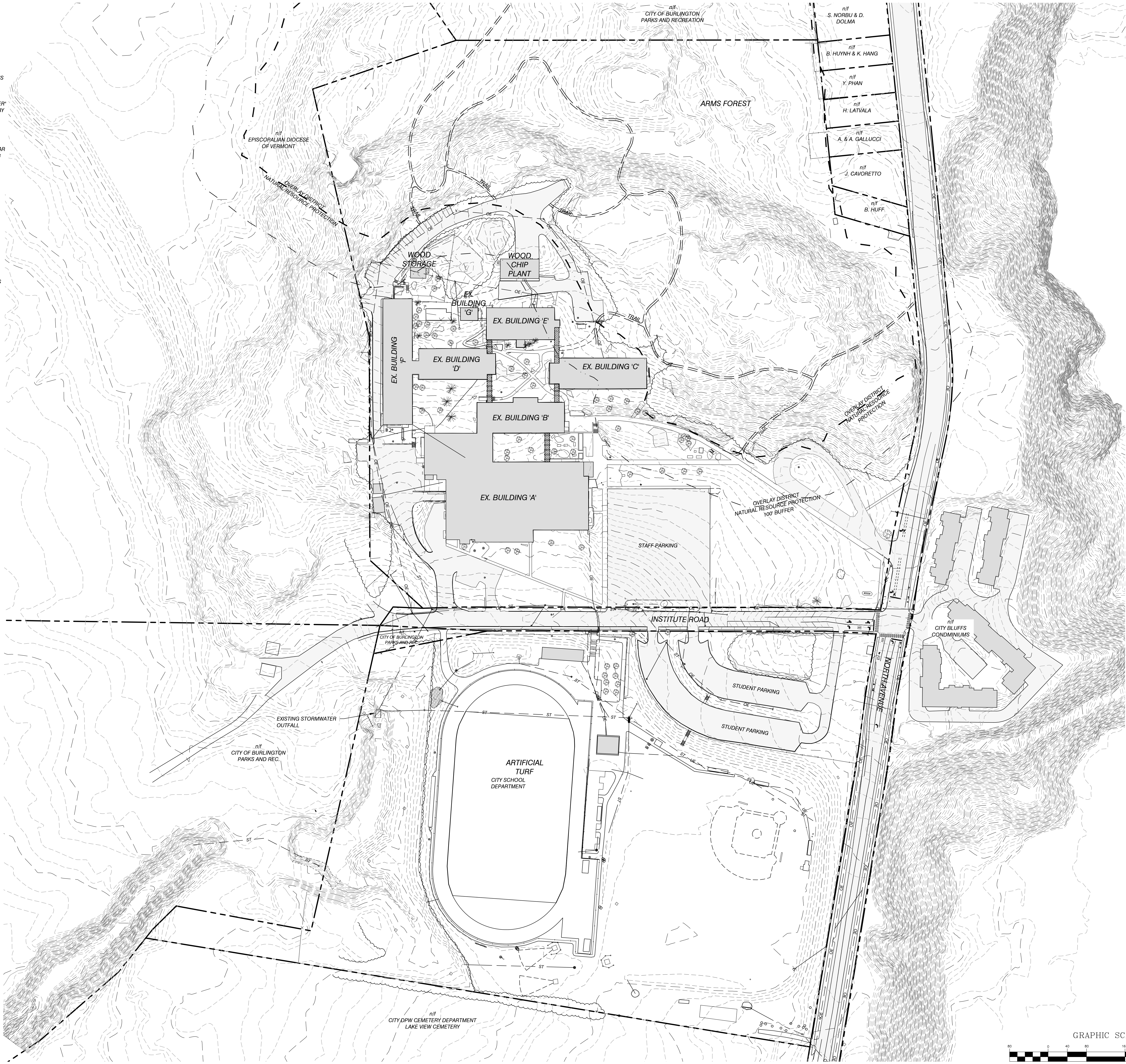
1. UTILITIES SHOWN DO NOT PURPORT TO CONSTITUTE OR REPRESENT ALL UTILITIES LOCATED UPON OR ADJACENT TO THE SURVEYED PREMISES. EXISTING UTILITY LOCATIONS ARE APPROXIMATE ONLY. THE CONTRACTOR SHALL FIELD VERIFY ALL UTILITY CONFLICTS. ALL DISCREPANCIES SHALL BE REPORTED TO THE ENGINEER. THE CONTRACTOR SHALL CONTACT DIG SAFE (888-344-7233) PRIOR TO ANY CONSTRUCTION.
2. PROPERTY LINE INFORMATION IS 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.
3. 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.
5. 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



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BURLINGTON HIGH SCHOOL & BURLINGTON TECHNICAL CENTER

BURLINGTON, VT

fff PROJECT NO: 21255

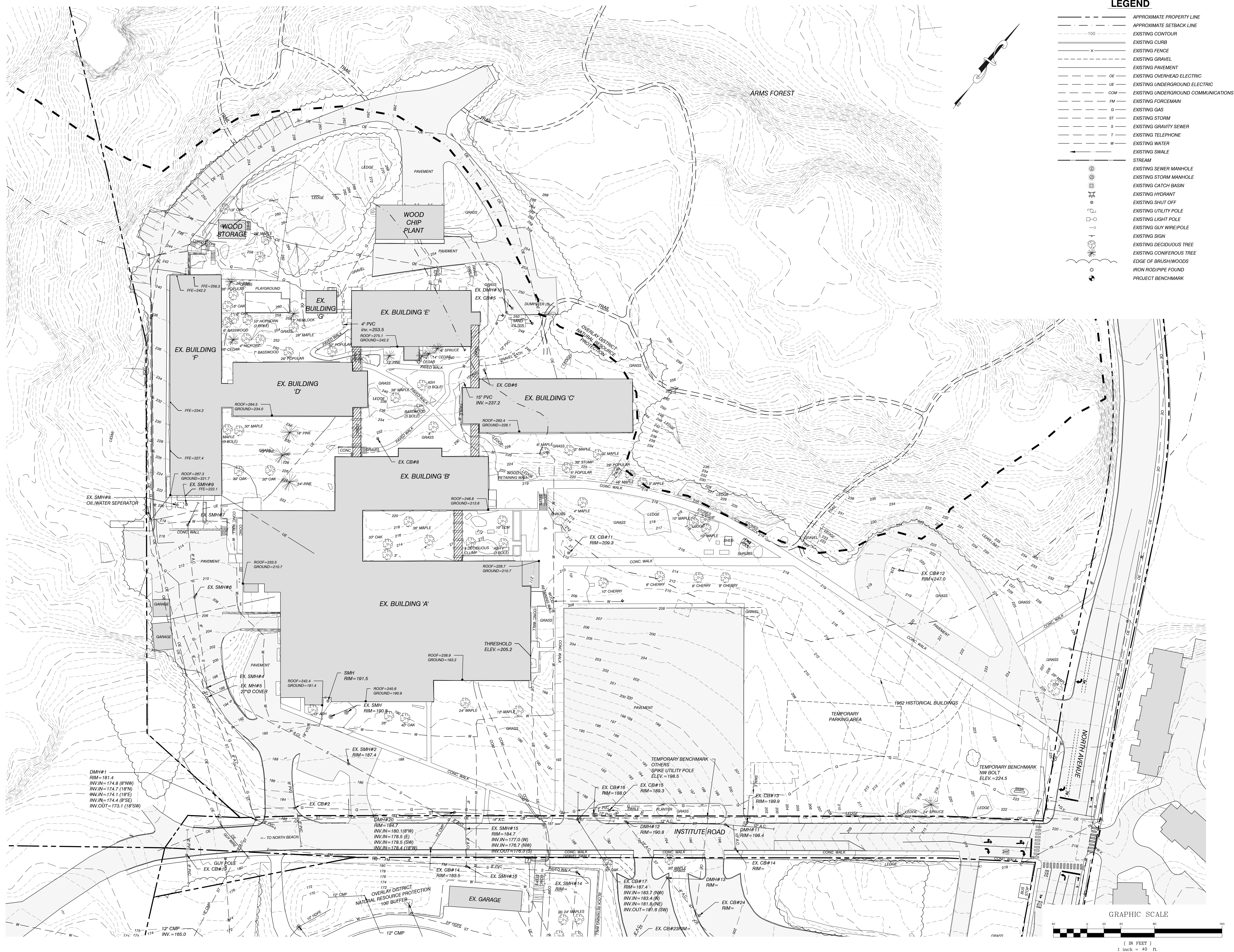
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ZONING PERMIT 09/30/22

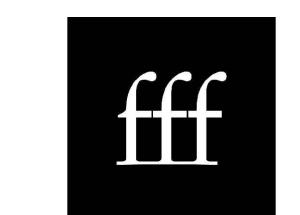
OVERALL EXISTING CONDITIONS SITE PLAN

SHEET NO: C1.0

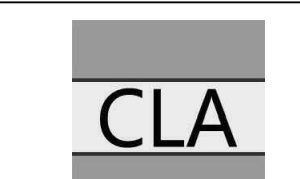


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Waltham, MA 02453
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**BURLINGTON
HIGH SCHOOL
&
BURLINGTON
TECHNICAL
CENTER**

BURLINGTON, VT

FF PROJECT NO:
21255

ORIGINATION DATE:	SCALE:
07/22/2022	1" = 4'

MAB	DSM
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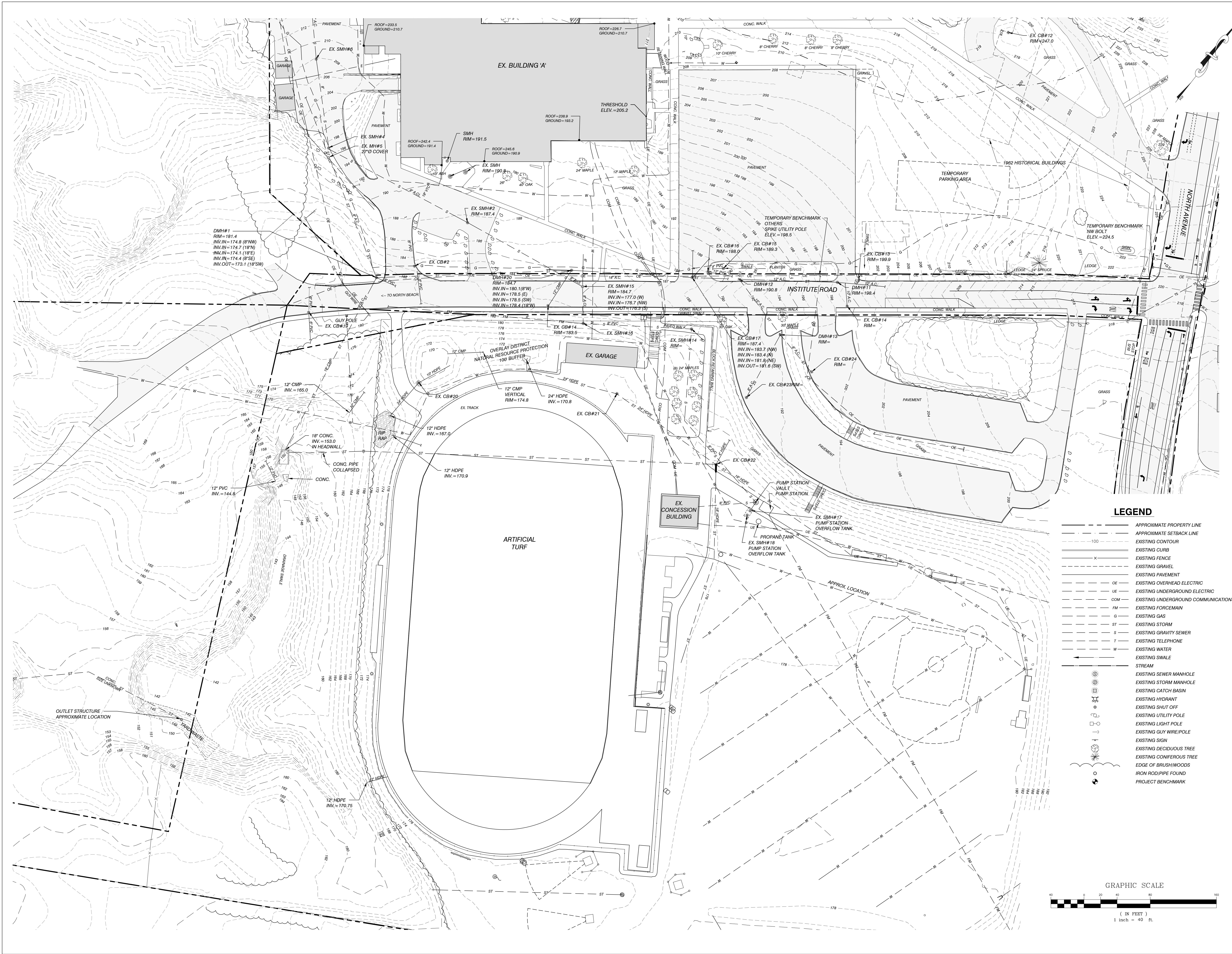
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ONING PERMIT	09/30/

HEET CONTENTS:

**EXISTING
CONDITIONS
NORTH**

C1.1

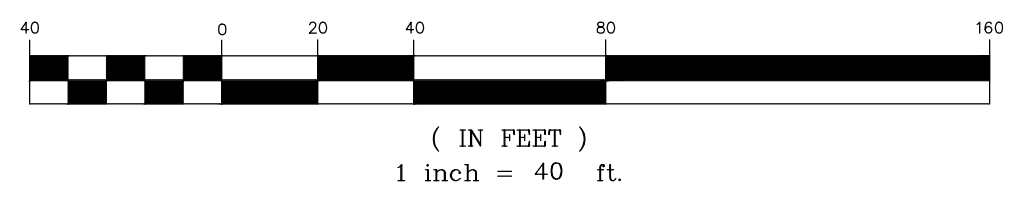
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LEGEND

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- APPROXIMATE SETBACK LINE
- EXISTING CONTOUR
- EXISTING CURB
- EXISTING FENCE
- EXISTING GRAVEL
- EXISTING PAVEMENT
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- EXISTING CONIFEROUS TREE
- EDGE OF BRUSHWOODS
- IRON ROD/PIPE FOUND
- PROJECT BENCHMARK

GRAPHIC SCALE



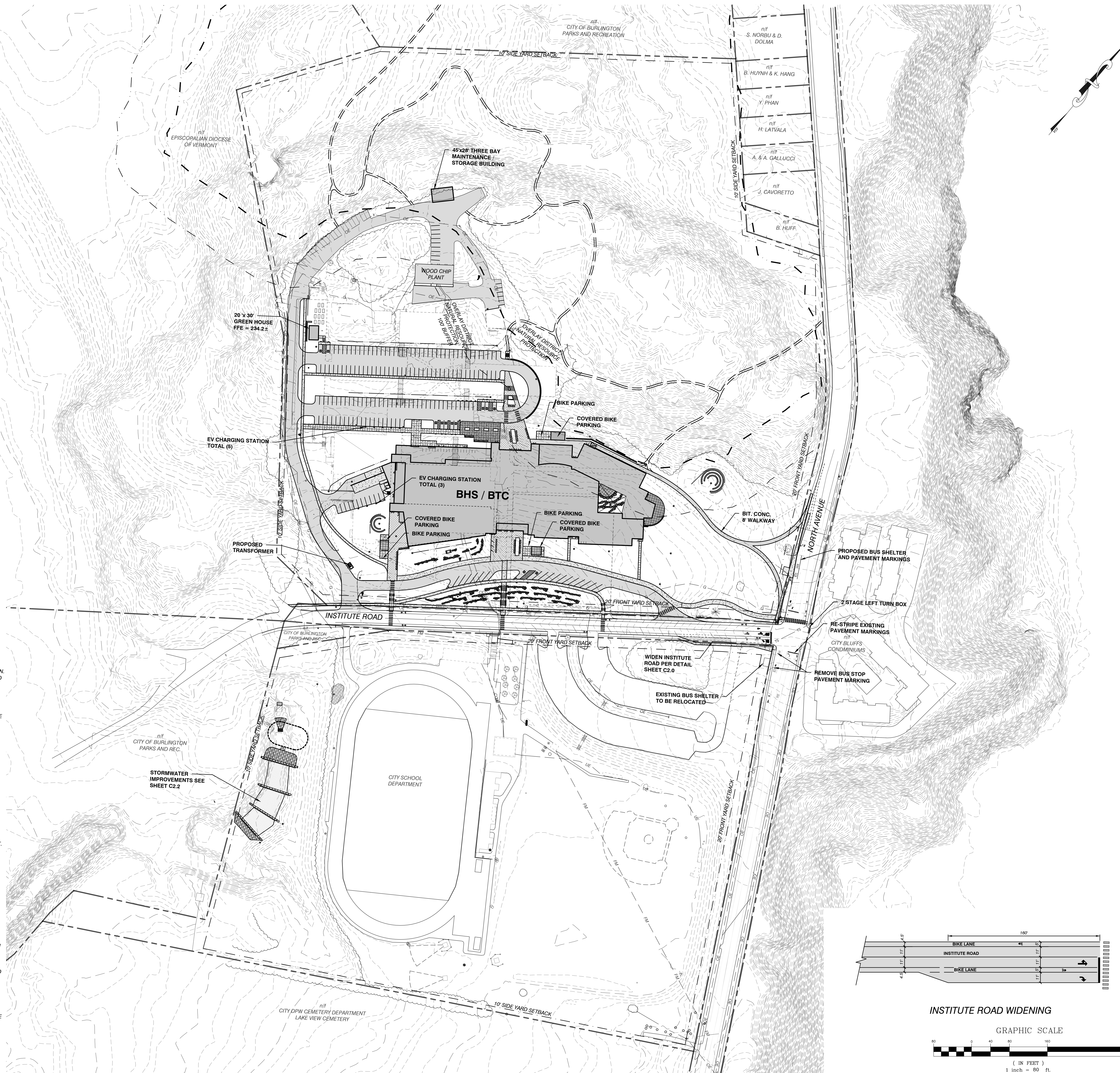
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=====	EXISTING PAVEMENT
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_____UE_____	EXISTING UNDERGROUND ELECTRIC
_____COM_____	EXISTING UNDERGROUND COMMUNICATIONS
_____FM_____	EXISTING FORCEMAIN
_____G_____	EXISTING GAS
_____ST_____	EXISTING STORM
_____S_____	EXISTING GRAVITY SEWER
_____T_____	EXISTING TELEPHONE
_____W_____	EXISTING WATER
◀-----	EXISTING SWALE

- | | |
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| | EXISTING SEWER MANHOLE |
| | EXISTING STORM MANHOLE |
| | EXISTING CATCH BASIN |
| | EXISTING HYDRANT |
| | EXISTING SHUT OFF |
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| | PROJECT BENCHMARK |
| | PROPOSED CONTOUR |
| | PROPOSED CURB |
| | PROPOSED GRAVEL |
| | PROPOSED PAVEMENT |
| | PROPOSED COMMUNICATION |
| | PROPOSED ELECTRIC |
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| | PROPOSED CATCH BASIN |
| | PROPOSED YARD DRAIN |
| | PROPOSED HYDRANT |
| | PROPOSED SHUT OFF |
| | PROPOSED SIGN |

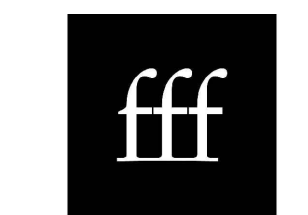
ZONING DISTRICT: INSTITUTIONAL DISTRICT

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

1. UTILITIES SHOWN DO NOT PURPORT TO CONSTITUTE OR REPRESENT ALL UTILITIES LOCATED UPON OR ADJACENT TO THE SURVEYED PREMISES. EXISTING UTILITY LOCATIONS ARE APPROXIMATE ONLY. THE CONTRACTOR SHALL RECONVEY ALL UTILITY CONTACTS. ALL DISCREPANCIES SHALL BE REPORTED TO THE ENGINEER. THE CONTRACTOR SHALL CONTACT DIG SAFE (888-344-7238) 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.
2. ALL EXISTING UTILITIES NOT INCORPORATED INTO THE FINAL DESIGN SHALL BE REMOVED OR ABANDONED AS INDICATED ON THE PLANS OR DIRECTED BY THE ENGINEER.
3. 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.
4. THE CONTRACTOR SHALL REPAIR/RESTORE ALL DISTURBED AREAS (ON OR OFF THE SITE) AS A DIRECT OR INDIRECT RESULT OF THE CONSTRUCTION.
5. ALL GRASSED AREAS SHALL BE MAINTAINED UNTIL FULL VEGETATION IS ESTABLISHED.
6. MAINTAIN ALL TREES OUTSIDE OF CONSTRUCTION LIMITS.
7. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL WORK NECESSARY FOR COMPLETE AND OPERABLE FACILITIES AND UTILITIES.
8. 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.
9. IN ADDITION TO THE REQUIREMENTS SET IN THESE PLANS AND SPECIFICATIONS, THE CONTRACTOR SHALL COMPLETE ALL WORK IN ACCORDANCE WITH ALL PERMIT CONDITIONS AND ANY LOCAL PUBLIC WORKS STANDARDS.
10. 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.
11. ANY DETERIORATION NECESSARY FOR THE COMPLETION OF THE SITEMARK SHALL BE CONSIDERED AS PART OF THE CONTRACT AND SHALL BE THE CONTRACTOR'S RESPONSIBILITY.
12. THE CONTRACTOR SHALL COORDINATE ALL WORK WITHIN TOWN ROAD R.O.W. WITH TOWN AUTHORITIES.
13. THE CONTRACTOR SHALL INSTALL THE ELECTRICAL, CABLE AND TELEPHONE SERVICES IN ACCORDANCE WITH THE UTILITY COMPANIES REQUIREMENTS.
14. EXISTING PAVEMENT AND TRUCK STUMPS TO BE REMOVED SHALL BE DISPOSED OF AT AN APPROVED OFF-SITE LOCATION. ALL PAVEMENT CUTS SHALL BE MADE WITH A PAVEMENT SAW.
15. 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.
16. PROPERTY LINE INFORMATION IS BASED ON A PLAN DATED "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.
17. 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.
18. THE CONTRACTOR IS RESPONSIBLE FOR OBTAINING TESTING AND INSPECTION SERVICES INDICATED IN THE CONTRACT DOCUMENTS, TYPICAL FOR CONCRETE AND SOIL TESTING.
19. 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.
20. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE INSTALLATION OF ANY AND ALL SAFETY FENCES OR RAILS AROUND ALL EXCAVATIONS 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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CIVIL ENGINEERING ASSOCIATES, INC.
10 MANSFIELD NEW LANE, SOUTH BURLINGTON, VT

**BURLINGTON
HIGH SCHOOL
&
BURLINGTON
TECHNICAL
CENTER**

BURLINGTON, VT

FF PROJECT NO:
21255

ORIGINATION DATE:	SCALE:
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RAWN BY:	CHECKED BY:
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MAB	DSM
TRUE LOG:	

ONING PERMIT DRAFT	09/23/2017
ONING PERMIT	09/30/2017

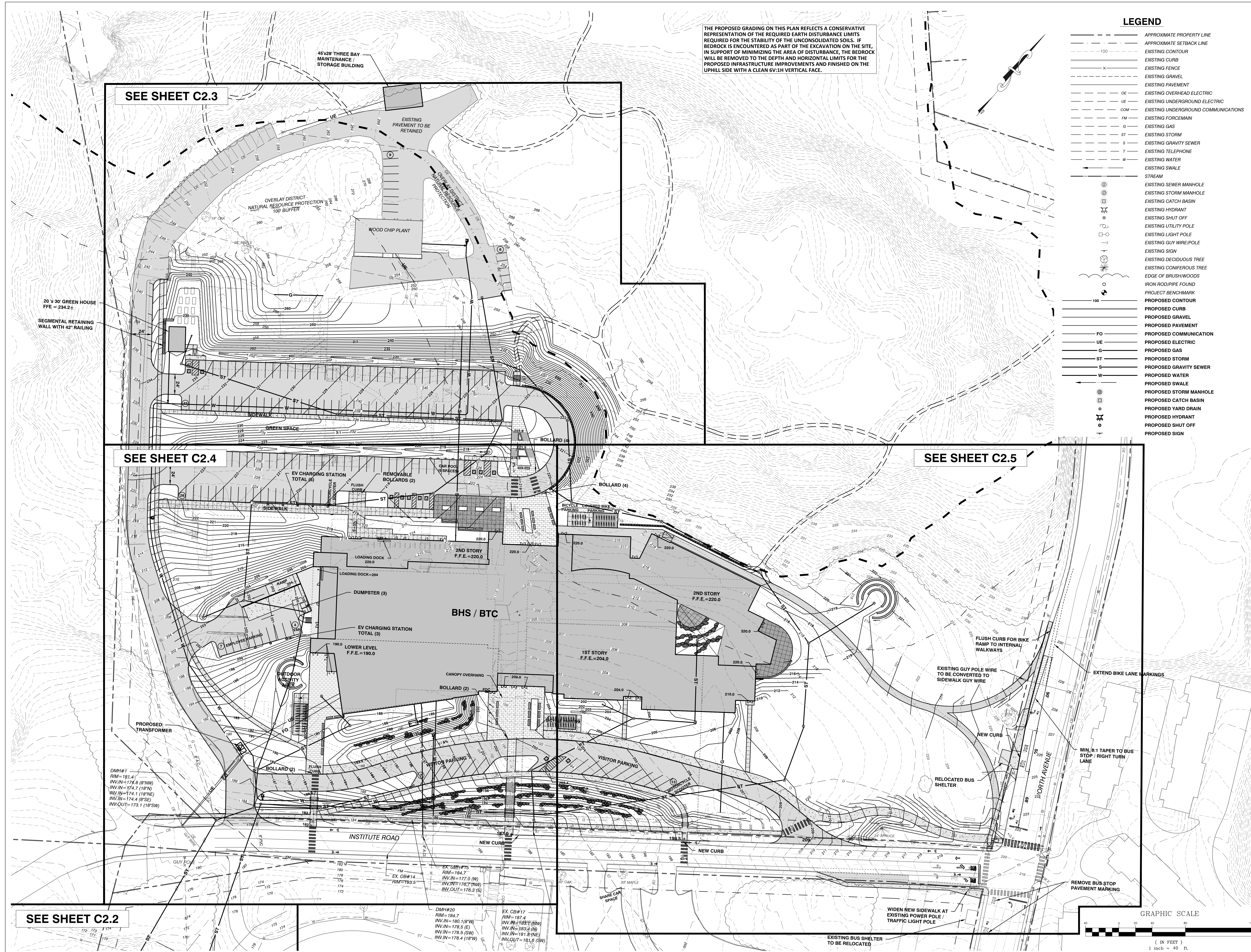
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OVERALL PROPOSED SITE PLAN

SHEET NO: _____

C2.0

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BURLINGTON HIGH SCHOOL & BURLINGTON TECHNICAL CENTER

BURLINGTON, VT

FF PROJECT NO: 21255

ORIGINATION DATE: 07/22/2022

SCALE: 1" = 40'

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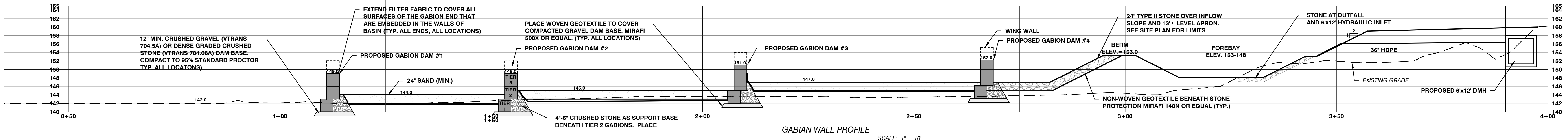
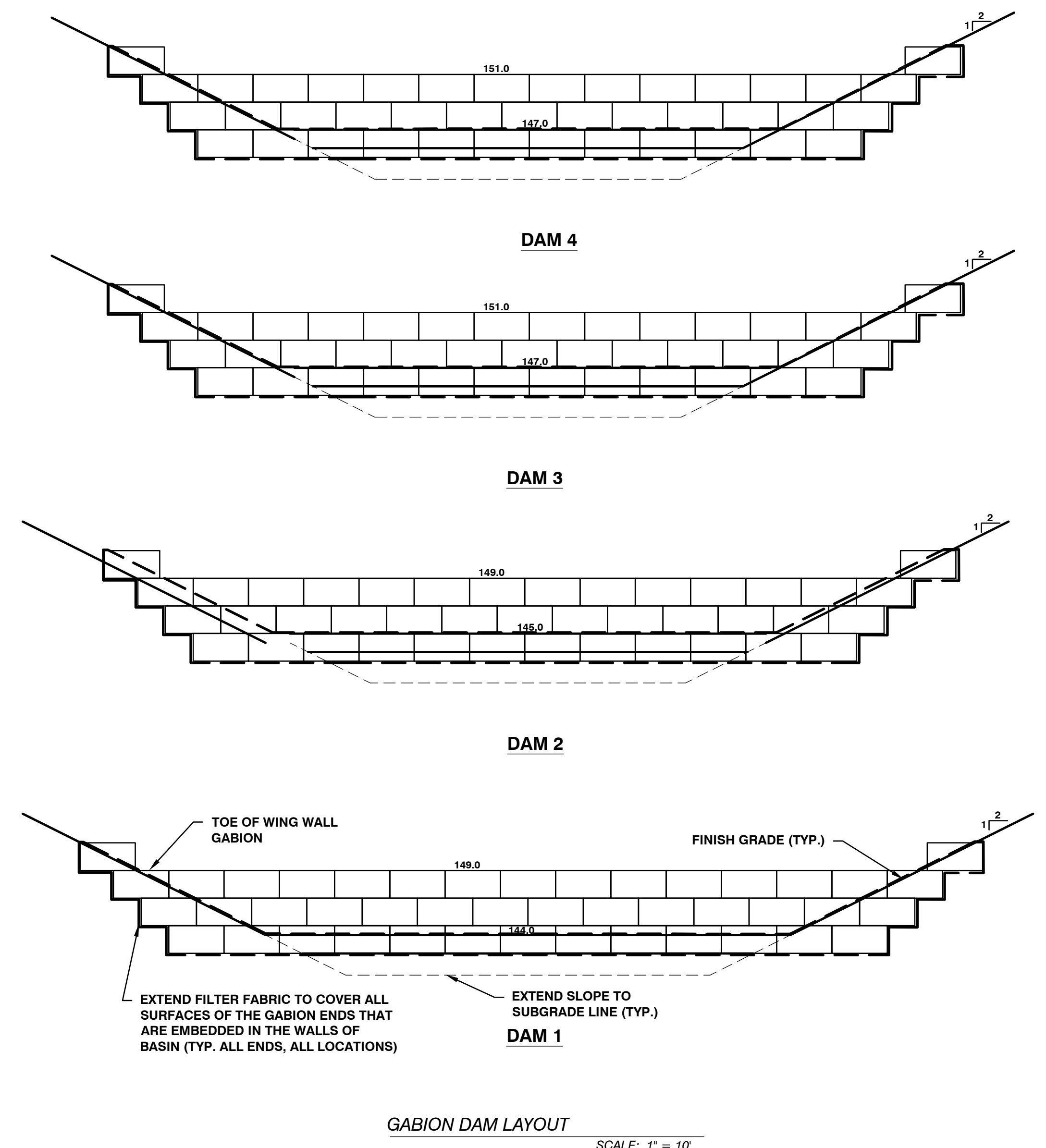
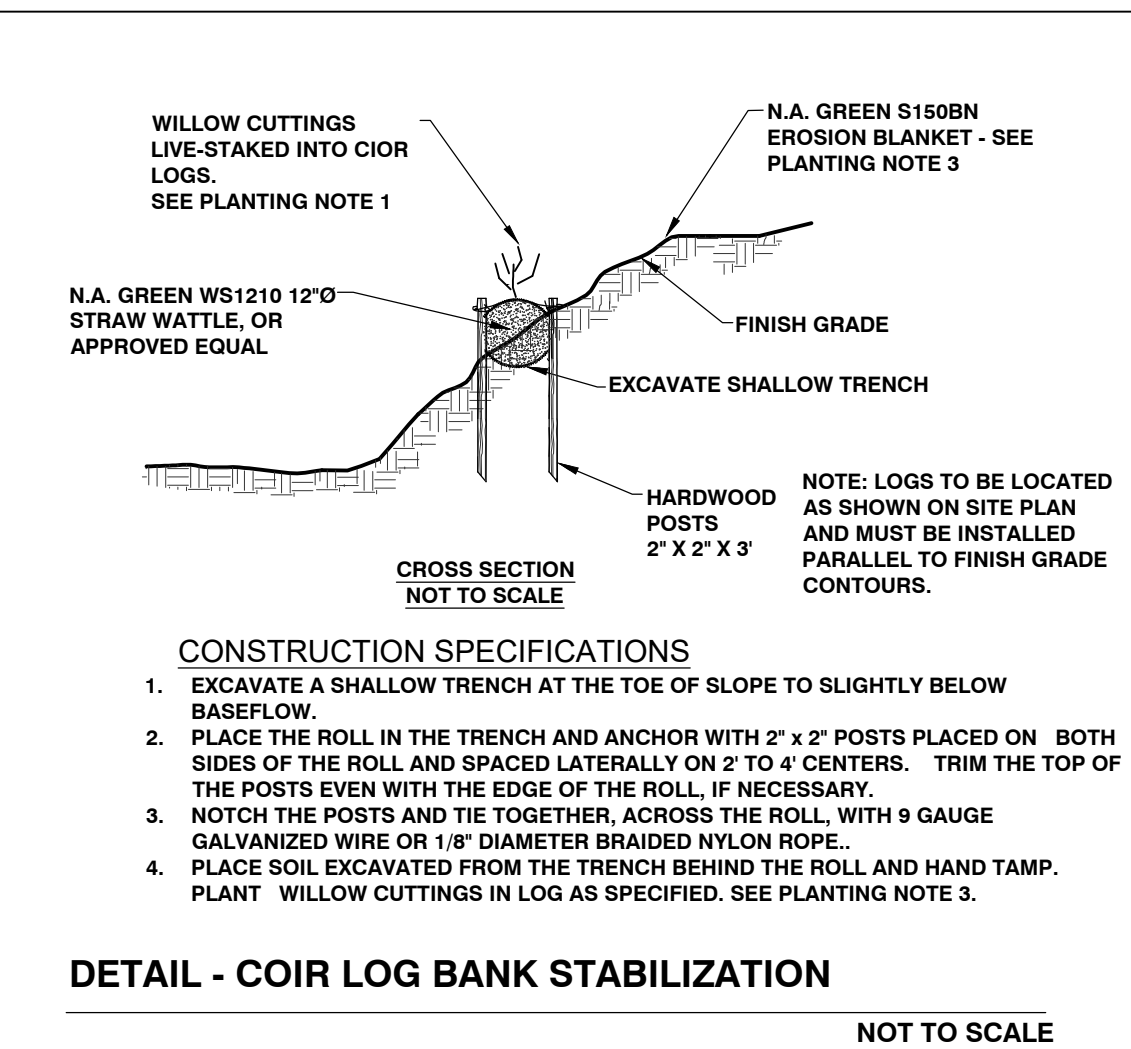
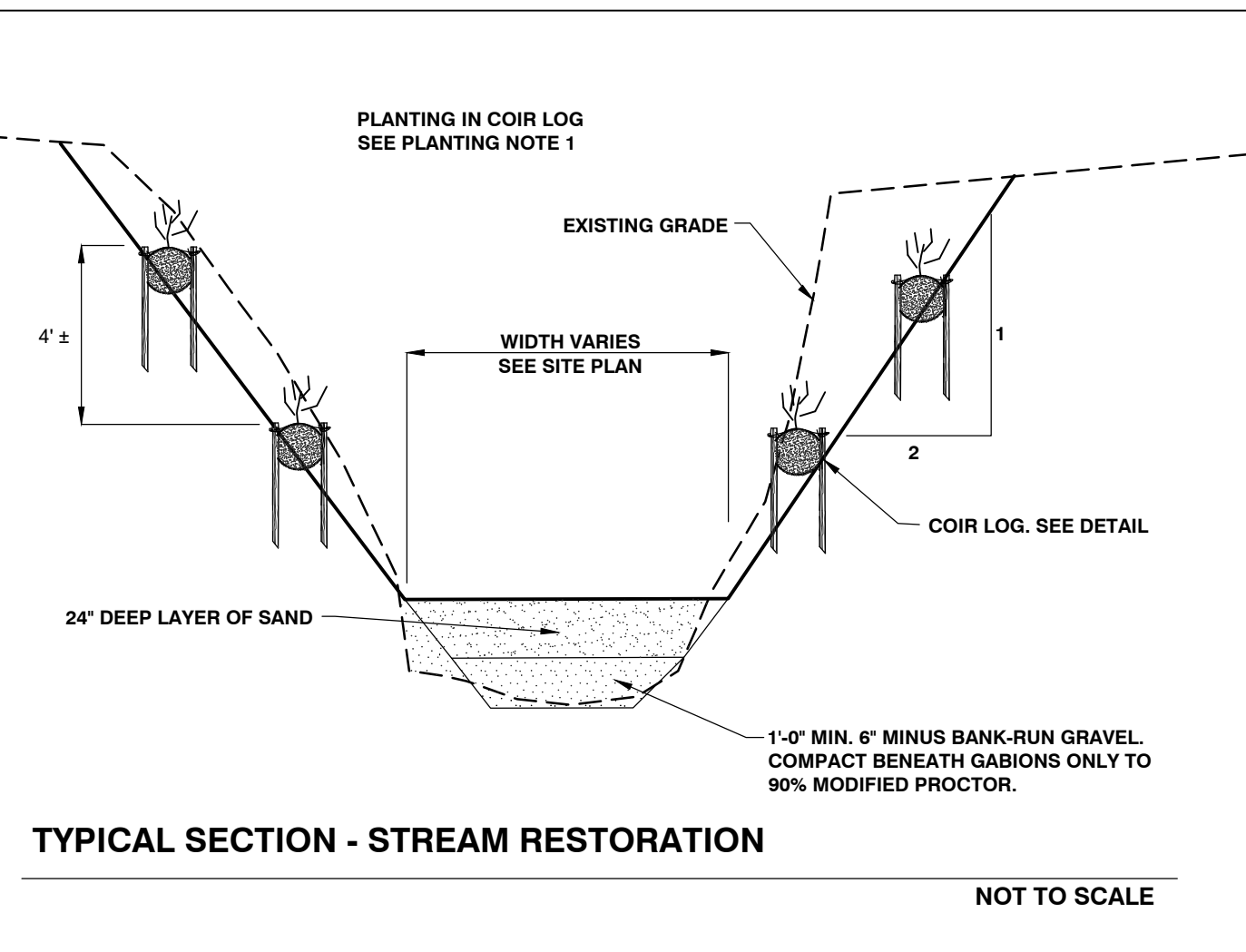
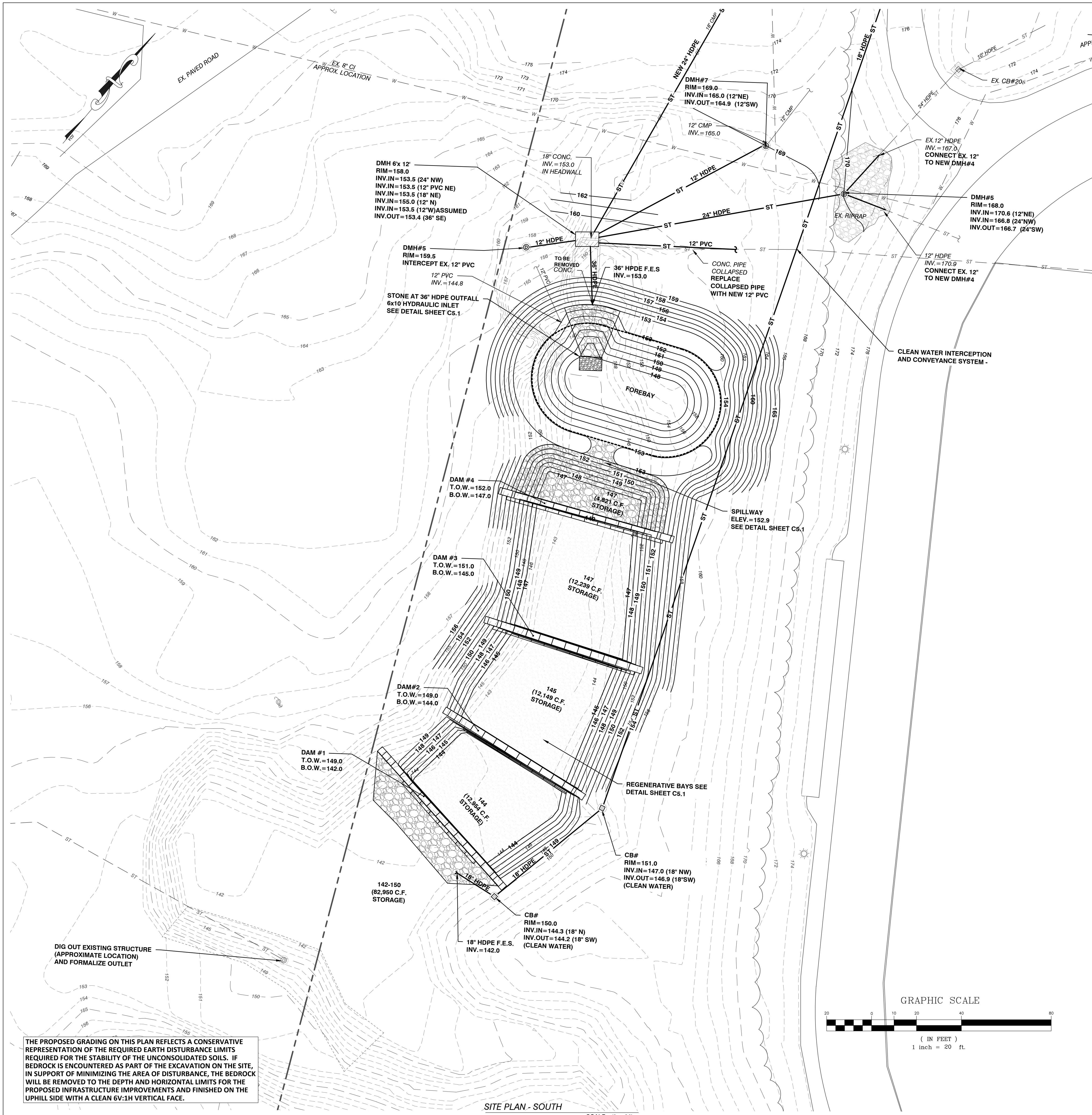
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ZONING PERMIT DRAFT 08/23/22
ZONING PERMIT 09/30/22

SHEET CONTENTS:
PROPOSED GRADING AND DRAINAGE NORTH

SHEET NO: 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

CHECKED BY: DSM

ISSUE LOG:

ZONING PERMIT DRAFT

08/23/22

ZONING PERMIT

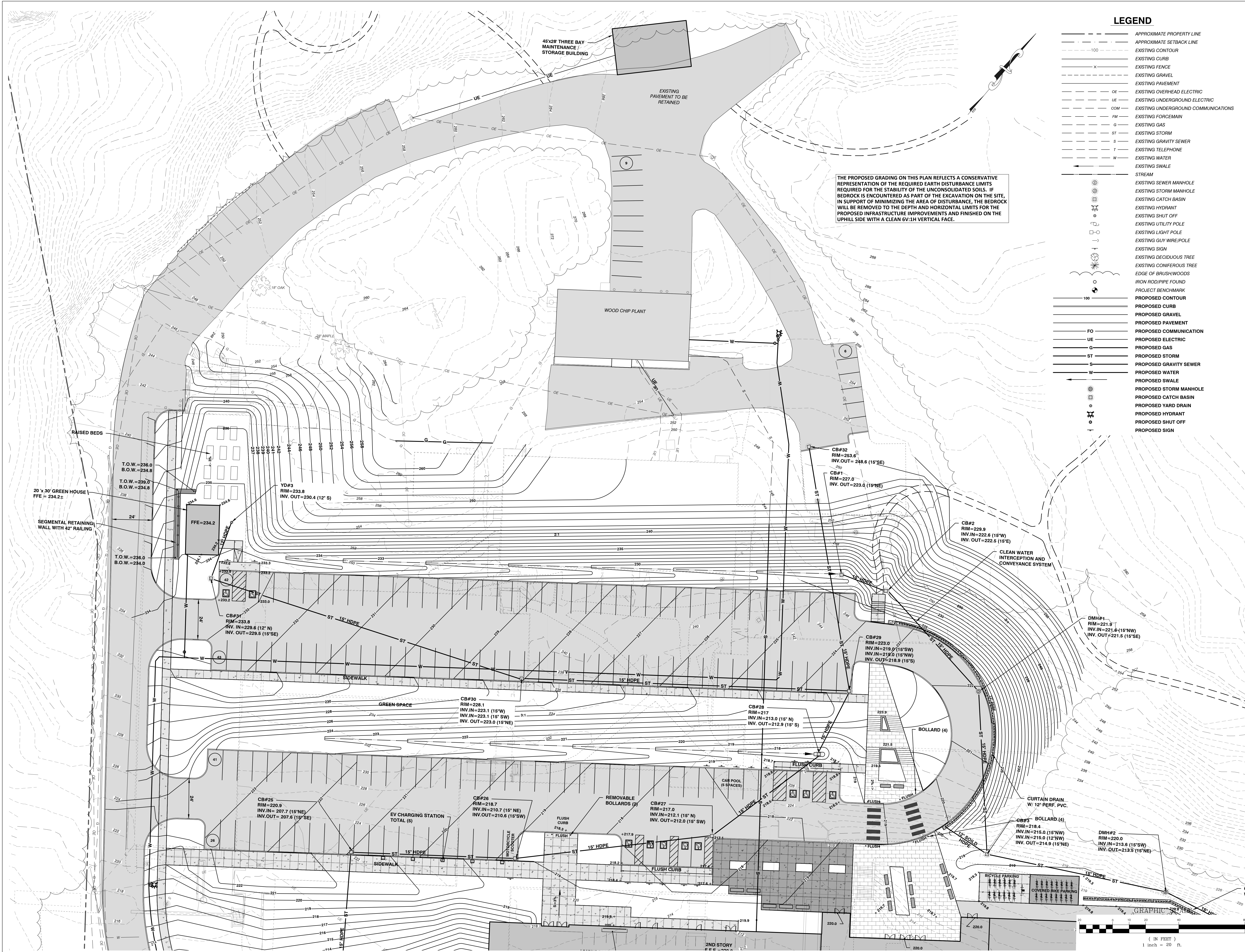
09/30/22

SHEET CONTENTS:

PROPOSED GRADING AND DRAINAGE SOUTH

SHEET NO: C2.2

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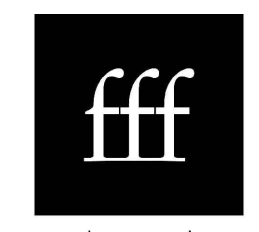
LEGEND

- | | |
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| --- | EXISTING CONTOUR |
| --- | EXISTING CURB |
| --- | EXISTING FENCE |
| --- | EXISTING GRAVEL |
| --- | EXISTING PAVEMENT |
| --- | EXISTING OVERHEAD ELECTRIC |
| --- | EXISTING UNDERGROUND ELECTRIC |
| --- | EXISTING UNDERGROUND COMMUNICATIONS |
| --- | EXISTING FORCEMAIN |
| --- | EXISTING GAS |
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| --- | EXISTING GRAVITY SEWER |
| --- | EXISTING TELEPHONE |
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| --- | EXISTING SEWER MANHOLE |
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| --- | PROPOSED HYDRANT |
| --- | PROPOSED SHUT OFF |
| --- | PROPOSED SIGN |

THE PROPOSED GRADING ON THIS PLAN REFLECTS A CONSERVATIVE REPRESENTATION OF THE REQUIRED EARTH DISTURBANCE LIMITS REQUIRED FOR THE STABILITY OF THE UNCONSOLIDATED SOILS. IF BEDROCK IS ENCOUNTERED AS PART OF THE EXCAVATION ON THE SITE, IN SUPPORT OF MINIMIZING THE AREA OF DISTURBANCE, THE BEDROCK WILL BE REMOVED TO THE DEPTH AND HORIZONTAL LIMITS FOR THE PROPOSED INFRASTRUCTURE IMPROVEMENTS AND FINISHED ON THE UPHILL SIDE WITH A CLEAN 6V:1H VERTICAL FACE.

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BURLINGTON HIGH SCHOOL & BURLINGTON TECHNICAL CENTER

BURLINGTON, VT

PROJECT NO. 21255

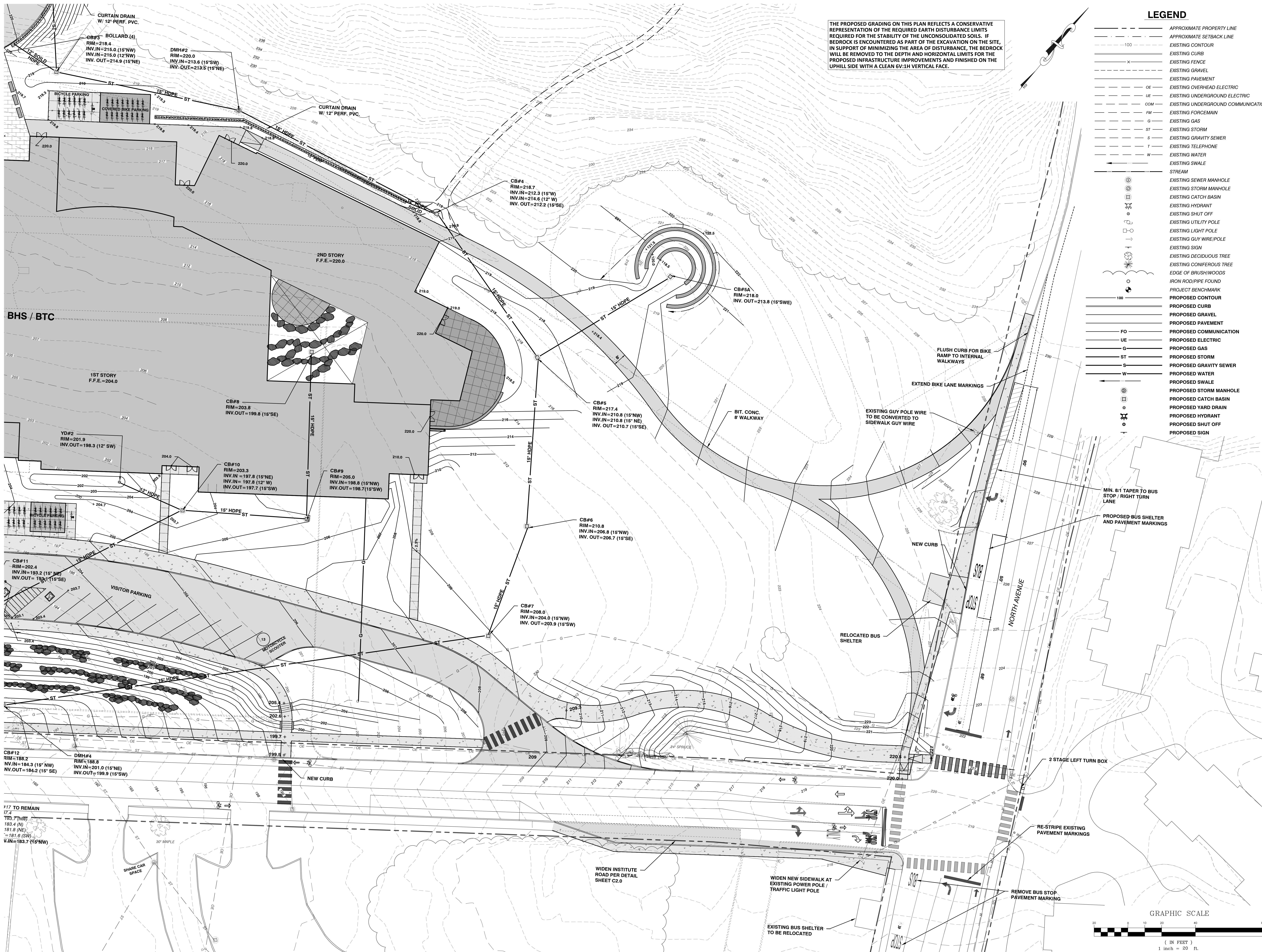
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ISSUE LOG: ZONING PERMIT DRAFT 08/23/22 ZONING PERMIT 09/30/22

PARTIAL GRADING AND DRAINAGE - NORTH

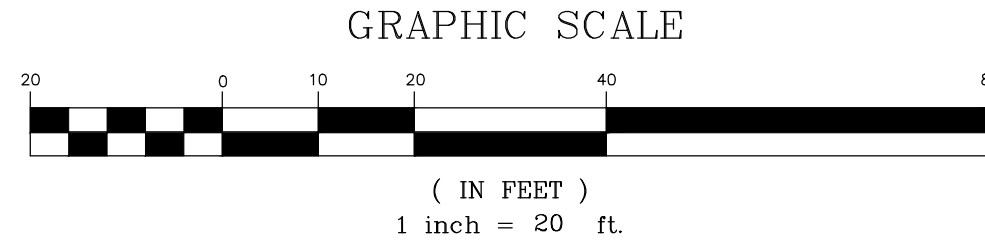
C2.3



THE PROPOSED GRADING ON THIS PLAN REFLECTS A CONSERVATIVE REPRESENTATION OF THE REQUIRED EARTH DISTURBANCE LIMITS REQUIRED FOR THE STABILITY OF THE UNCONSOLIDATED SOILS. IF BEDROCK IS ENCOUNTERED AS PART OF THE EXCAVATION ON THE SITE, IN SUPPORT OF MINIMIZING THE AREA OF DISTURBANCE, THE BEDROCK WILL BE REMOVED TO THE DEPTH AND HORIZONTAL LIMITS FOR THE PROPOSED INFRASTRUCTURE IMPROVEMENTS AND FINISHED ON THE UPHILL SIDE WITH A CLEAN 6V:1H VERTICAL FACE.

LEGEND

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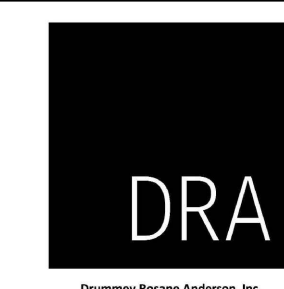
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PROJECT NO: 21255

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

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ISSUE LOG:

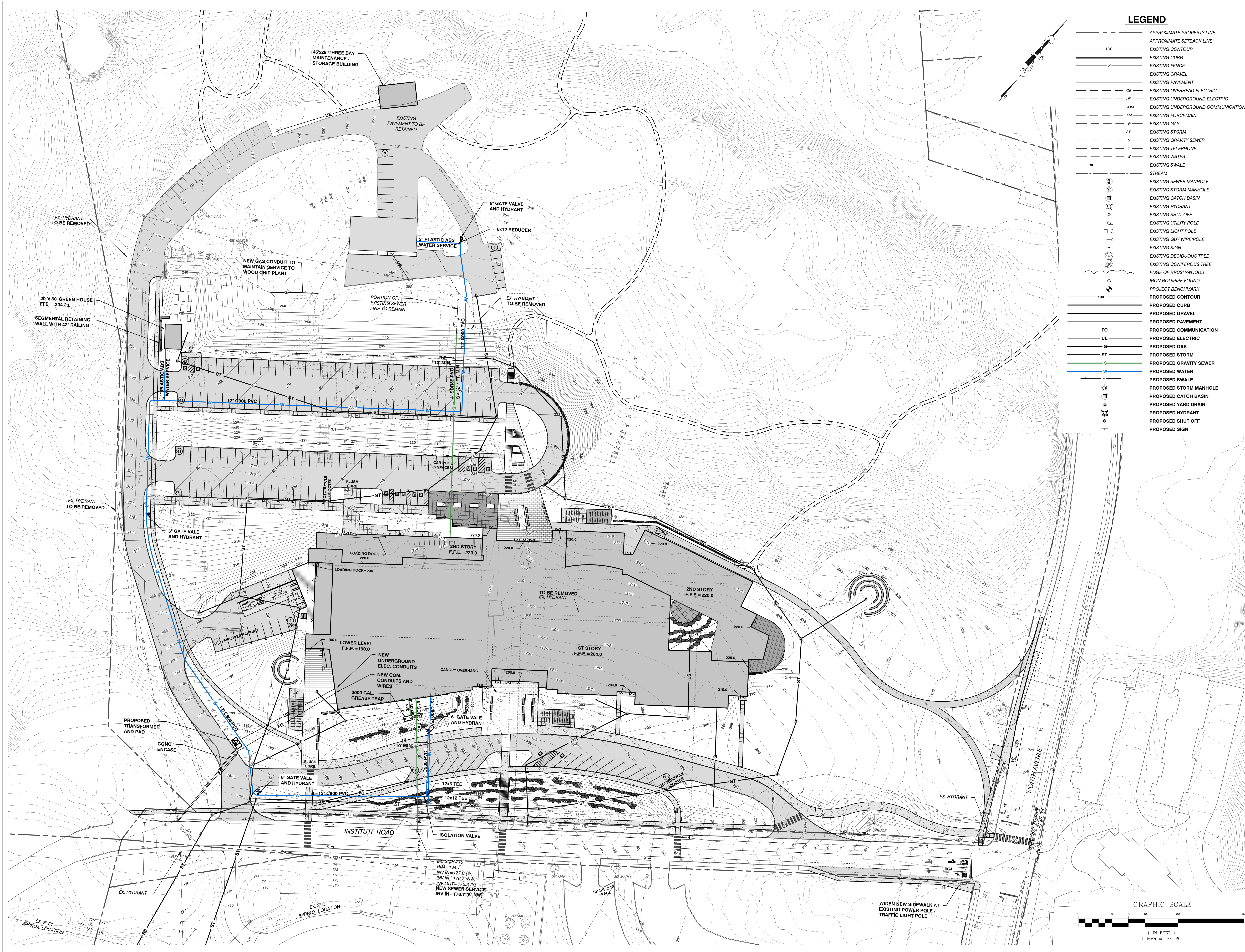
ZONING PERMIT DRAFT 08/23/22

ZONING PERMIT 09/30/22

SHEET CONTENTS:
PARTIAL
GRADING AND
DRAINAGE -
NORTH

SHEET NO: C2.5

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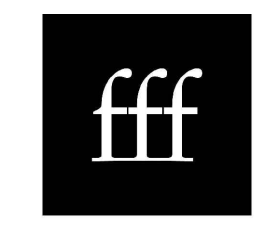


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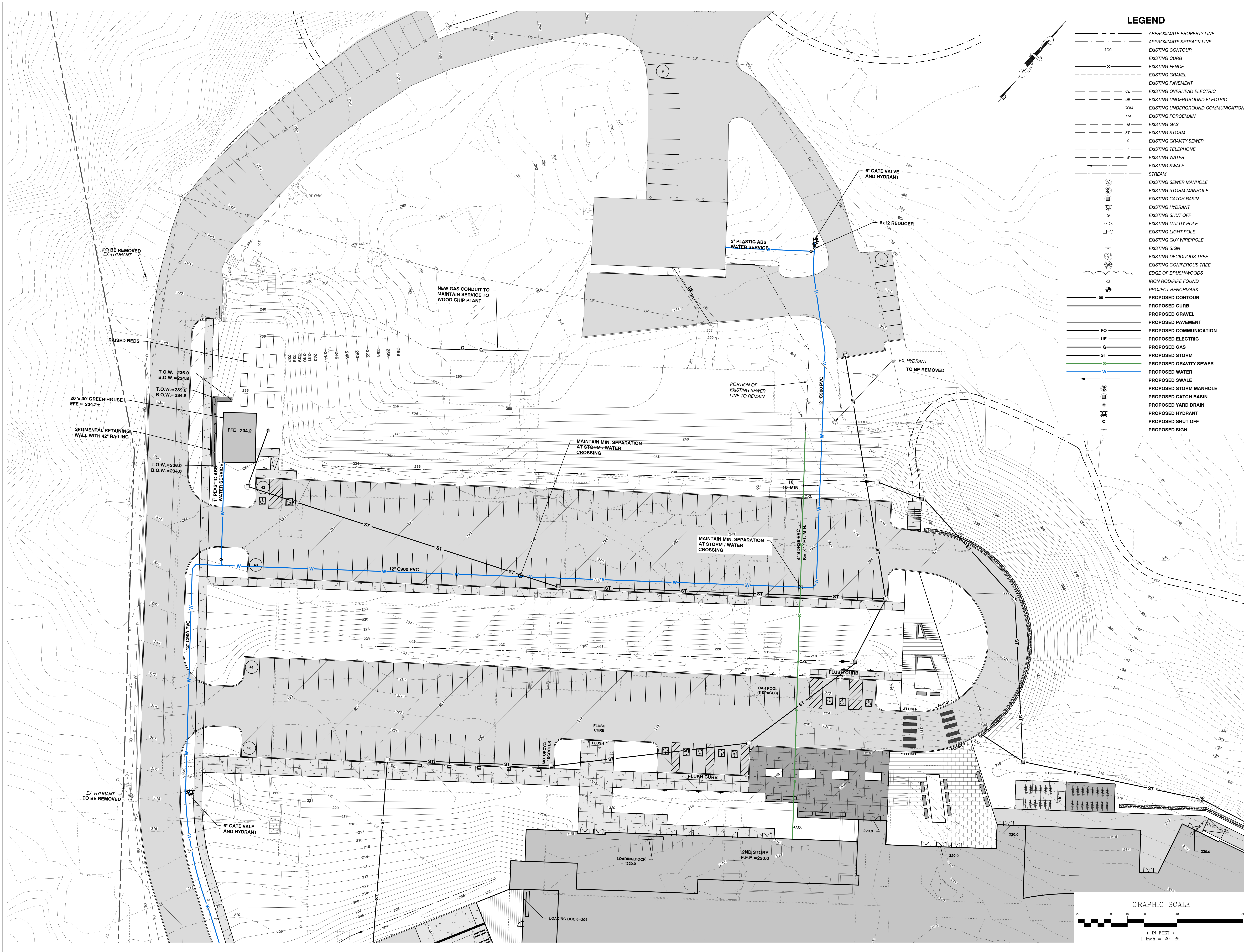
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ISSUE LOG:
ZONING PERMIT DRAFT 08/23/22
ZONING PERMIT 09/30/22

SHEET CONTAINS:
PROPOSED
UTILITY PLAN
NORTH

SHEET NO: C3.0

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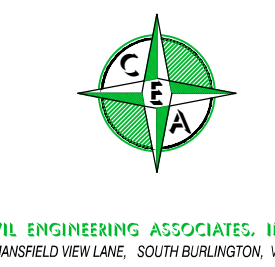
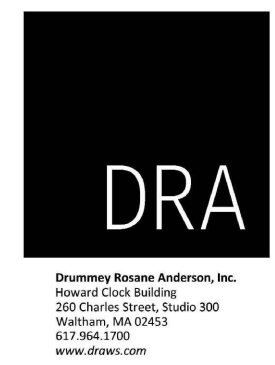


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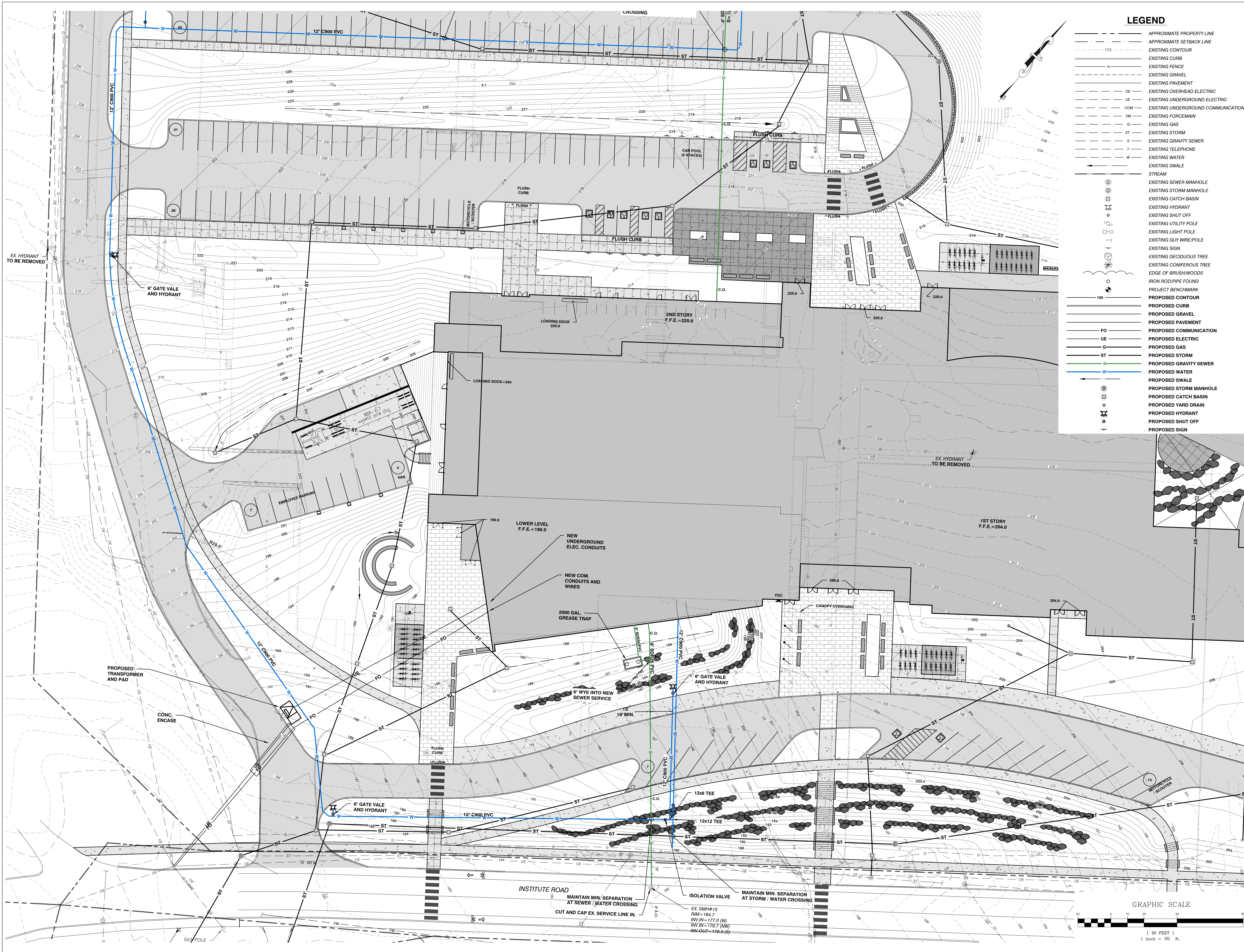
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ISSUE LOG: ZONING PERMIT DRAFT 08/23/22 ZONING PERMIT 09/30/22

SHEET CONTENTS:
PARTIAL
UTILITY PLAN
NORTH

C3.1



LEGEND

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SCALE: 1" = 40'

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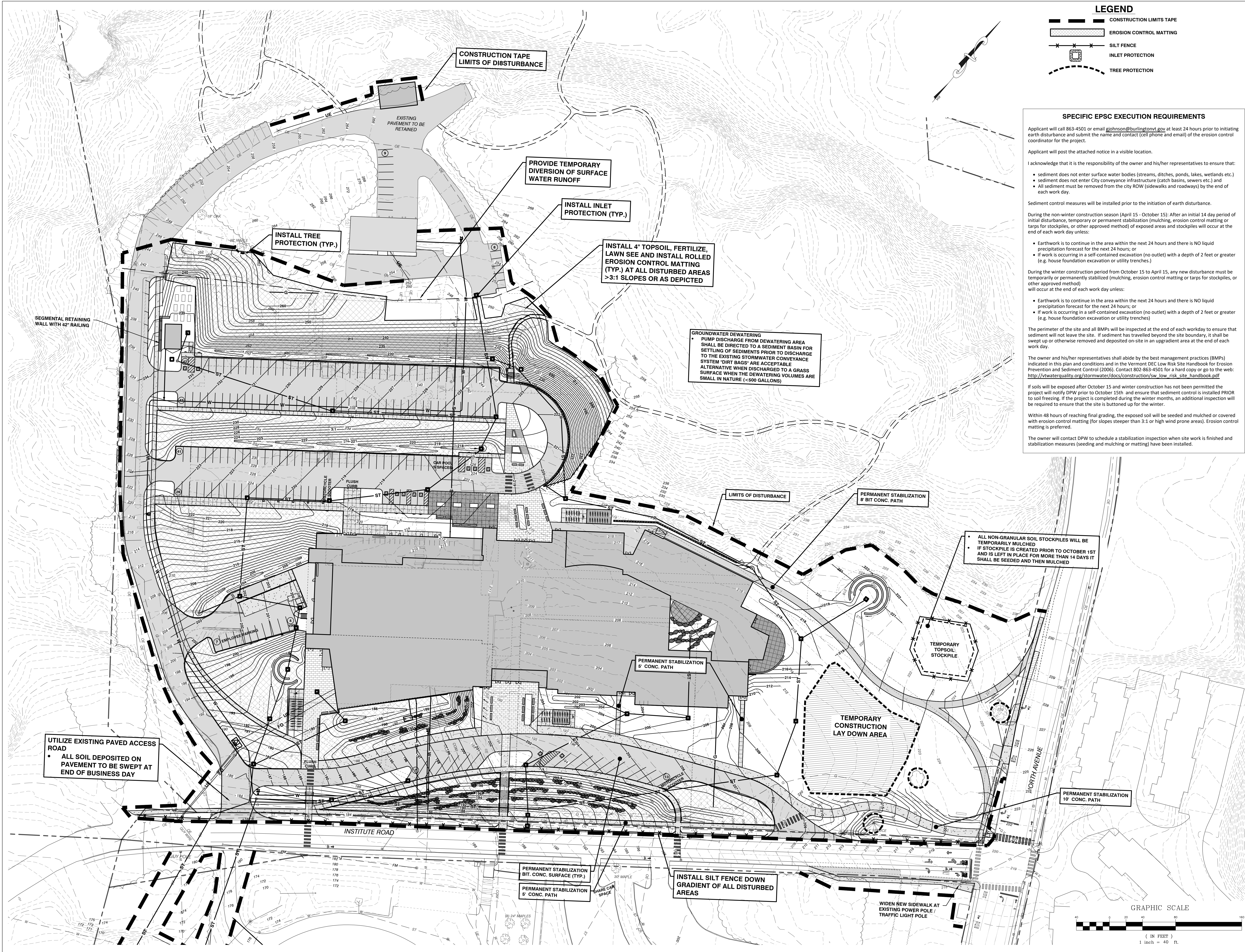
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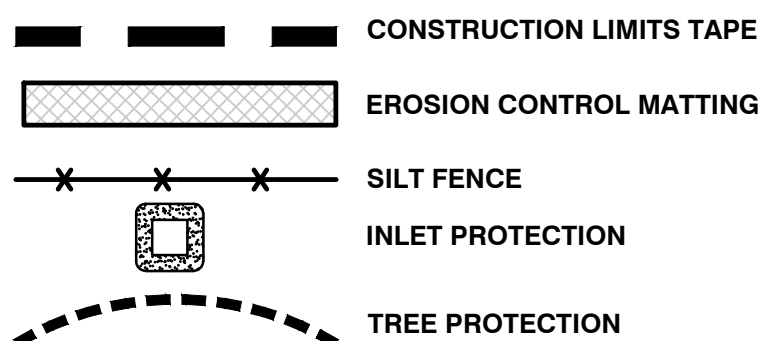
ZONING PERMIT 09/30/22

SHEET CONTAINS:
PARTIAL
UTILITY PLAN
NORTH

C3.2



LEGEND



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

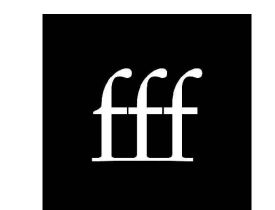
If soils will be exposed after October 15 and winter construction has not been permitted the project will notify DPW prior to October 15th and ensure that sediment control is installed PRIOR to soil freezing. If the project is completed during the winter months, an additional inspection will be required 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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PROJECT NO: 21255

ORIGIN DATE: 07/22/2022

SCALE: 1" = 40'

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ISSUE LOG:

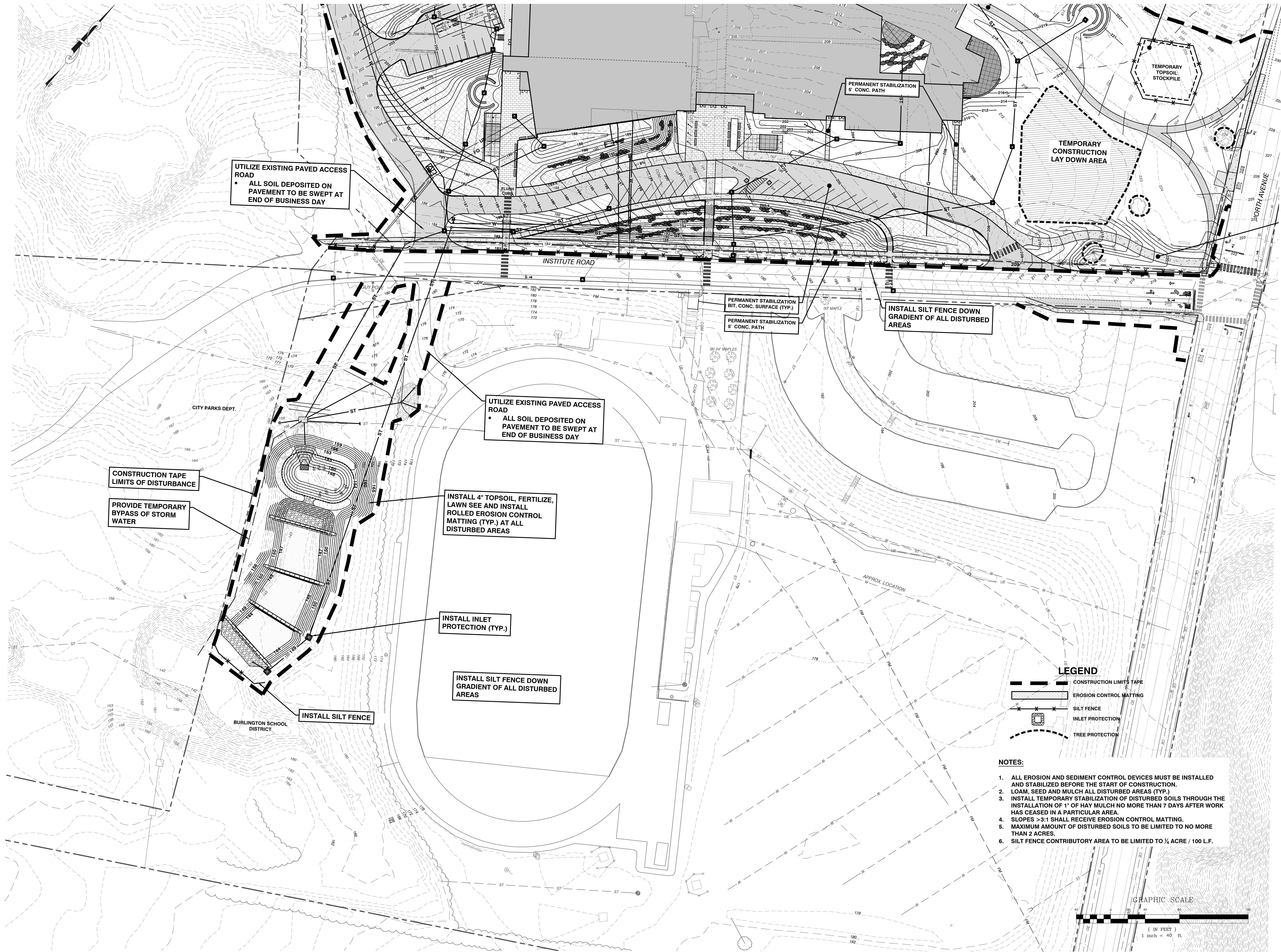
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SHEET CONTAINS:
EPSC SITE
PLAN
NORTH

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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
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SHEET CONTAINS:
EPSC SITE
PLAN
SOUTH

SHEET NO:

C4.1

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Department of Permitting and Inspections

Zoning Division
645 Pine Street
Burlington, VT 05401
<http://www.burlingtonvt.gov/PZ/>
Telephone: (802) 865-7188
(802) 865-7195 (FAX)

William Ward, Director
Theodore Miles, Code Compliance Officer
Charlene Orton, Permitting and Inspections Administrator
Scott Gustin, AICP, CFM, Principal Planner
Mary O'Neil, AICP, Principal Planner
Ryan Morrison, Associate Planner
Joseph Cava, Planning Technician
Celeste Crowley, Permit Administrator



MEMORANDUM

To: Development Review Board
From: Mary O'Neil, AICP, Principal Planner
Date: November 15, 2022
RE: 187 South Champlain Street; ZP 22-466

Note: These are staff comments only. Decisions on projects are made by the Development Review Board, which may approve, deny, table or modify any project. THE APPLICANT OR REPRESENTATIVE MUST ATTEND THE MEETING.

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.)

The **Design Advisory Board** reviewed the application at their October 25, 2022 meeting and voted unanimously to recommend approval of the project.

Recommended motion: Consent approval, per the following Findings and Conditions:

I. Findings

Article 5: Citywide General Regulations

Section 5.2.1 Existing Small Lots.

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).

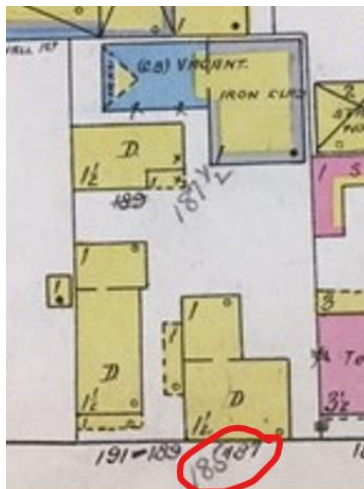
187 South Champlain Street is an existing lot. The 1919 Sanborn Map illustrates a single parcel (included 189-191 South Champlain Street) with three residential dwellings and a large concrete and iron-clad outbuilding. By the 1930s, the single dwelling at 187 South Champlain Street was a duplex, and the rear outbuilding was gone. By 1952, the duplex at 187-189 was gone, and a playground area is noted on the site. **Affirmative finding.**

Section 5.2.2 Required Frontage or Access

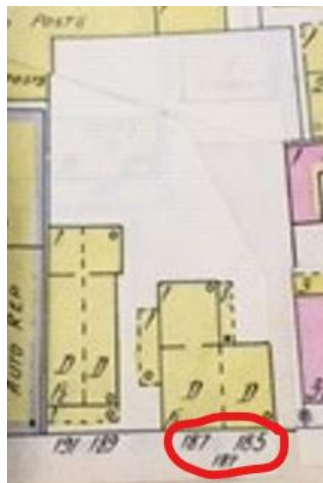
187 South Champlain Street has direct access to the public way and city sidewalks. **Affirmative finding**

Section 5.2.3 Lot Coverage Requirements

See Section 14.3.6. (b), Civic Spaces.



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.

Affirmative finding

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. **Affirmative finding**

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. **Affirmative finding as conditioned.**

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.*

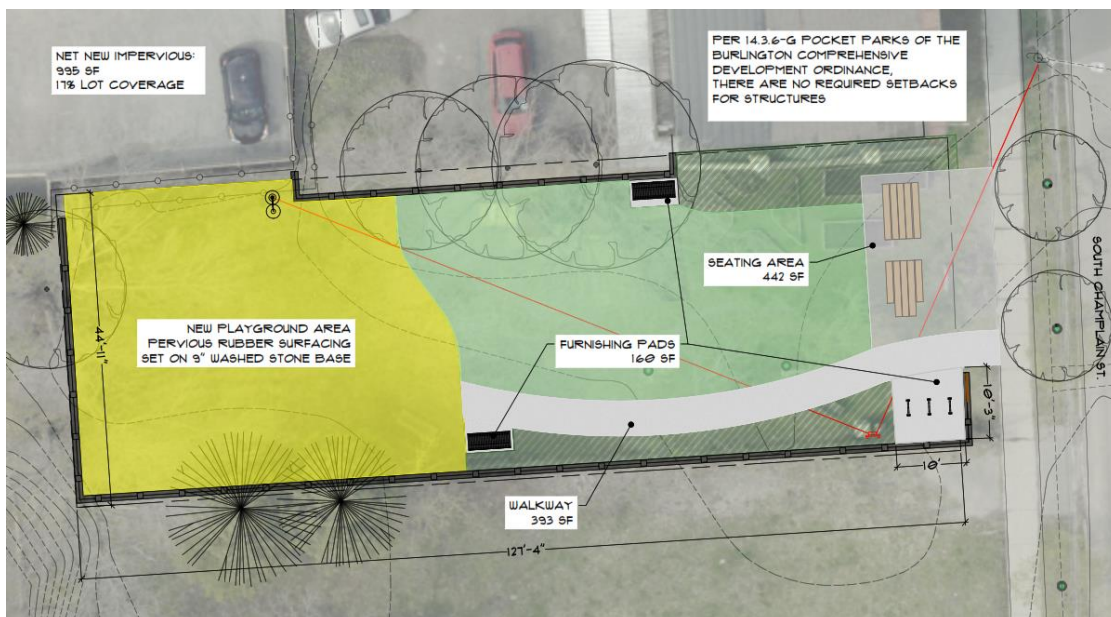
- B. *Independent.* Lots that are attached to or across a Thoroughfare from Civic Space listed as having an “Independent” frontage may have the front, side street, or rear of the Lot facing on to the Civic Space.
- iv. **Form.** The placement and Disposition of objects within the Civic Space.
 - A. *Natural.* 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**
Affirmative finding.

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;*
- *A pre-application Neighborhood Public Meeting pursuant to Section 3.2.1 (d) of the BCDO;*
- *Review and recommendation of the Design Advisory Board; and*
- *Final review and approval by the Development Review Board.*

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.)

The application includes confirmation of NPA attendance as follows:

-NPA Wards 2-3 October 14, 2021 and May 12, 2022

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.

-NPA Ward 5 October 21, 2021 and April 19 or 21, 2022
-NPA Ward 6 October 7, 2021 and May 5, 2022.

Affirmative finding

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:

- i. *Conformance with the adopted land use and development plans for the area as identified in the Municipal Development Plan;*
- ii. *Consistency with:*
 - A. *The purpose of this ordinance;*
 - B. *The intent of the Form District where the project is located;*
 - C. *The purpose of Civic Spaces generally; and*
 - D. *The intent of the Civic Space Type being proposed; and*
- iii. *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.*

Affirmative finding with DRB concurrence.

II. Conditions of Approval

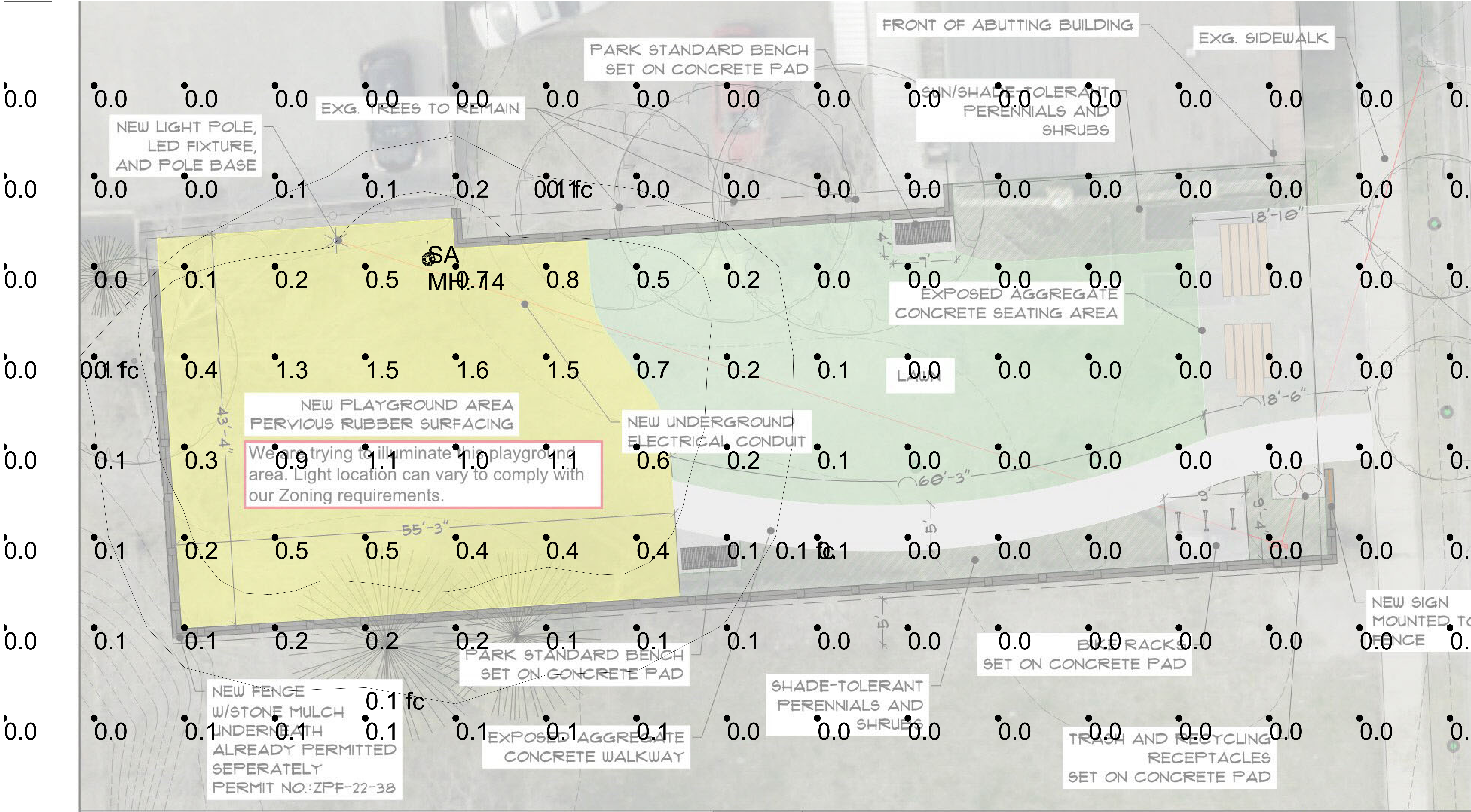
- 1. As more than 400 sq. ft. will be disturbed, an Erosion Prevention and Sediment Control Plan shall be submitted to the Stormwater program for review and approval **prior to release of the zoning permit.**
- 2. Standard Permit Conditions 1-15.

NOTE: These are staff comments only. The Development Review Board, who may approve, table, modify, or deny projects, makes decisions.

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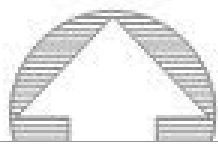
Luminaire Schedule (note fixture catalogue numbers are not complete)					
Type	Qty	Lum. Lumens	LLF	Lum. Watts	Description
SA	1	2493	0.900	40	UCM2-ANG-36L-325-3K7-4W-HS

- 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.

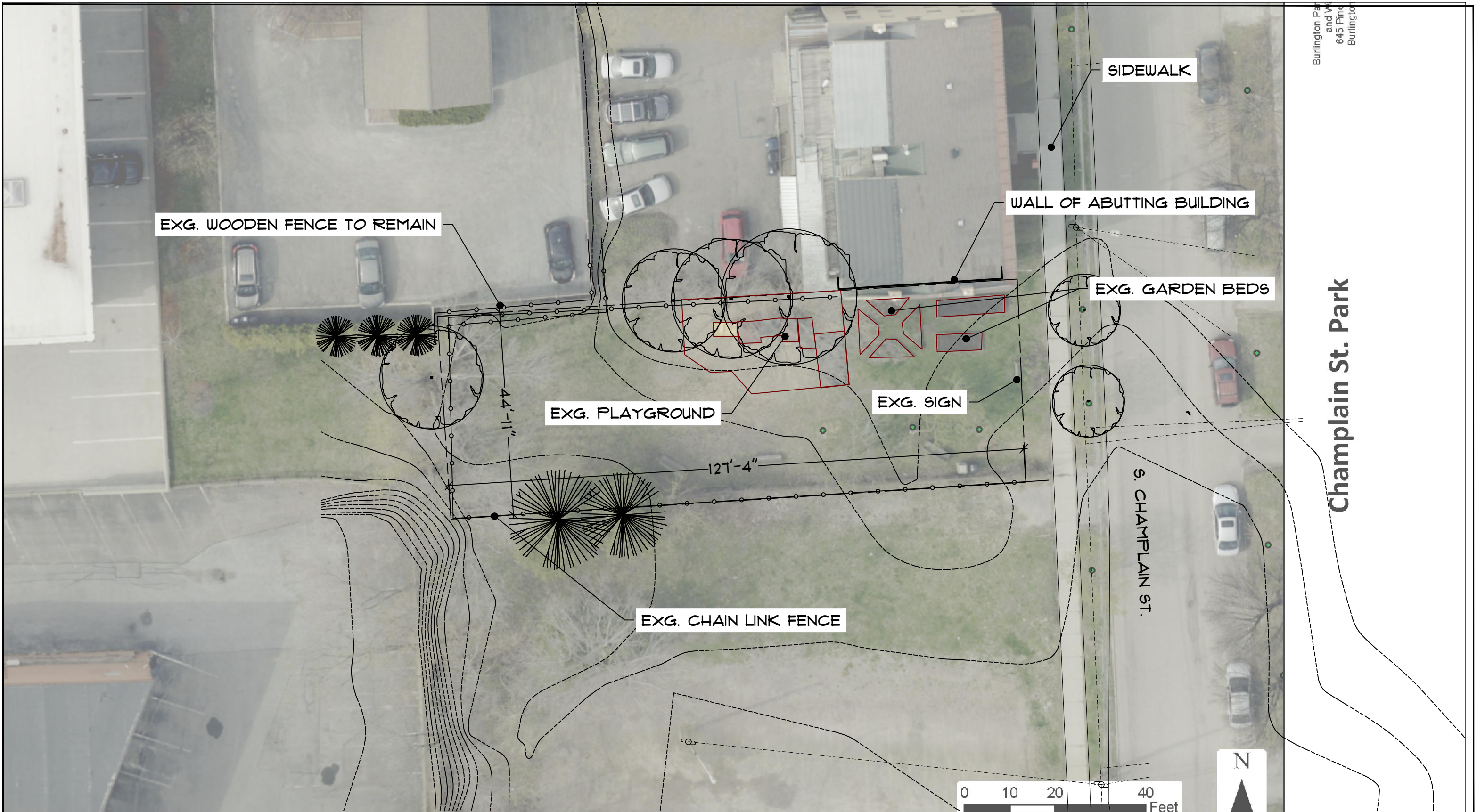
GENERATED FOR:
BURLINGTON PARKS
SCALE: NOT TO SCALE
Page 1 of 1



CHAMPLAIN ST PARK
BURLINGTON, VT
SITE LIGHTING LAYOUT

DATE: 9/22/2022
GENERATED BY: SWANEY LIGHTING, SCARBOROUGH ME - 207-883-7100 - swaneylighting.com

Park site 9-22-22.AGI



Burlington Park
and Waterfront
645 Pine Street
Burlington, VT 05401

Champlain St. Park

20

0

20

40

SCALE: 1" = 20'

EXG. CONDITIONS

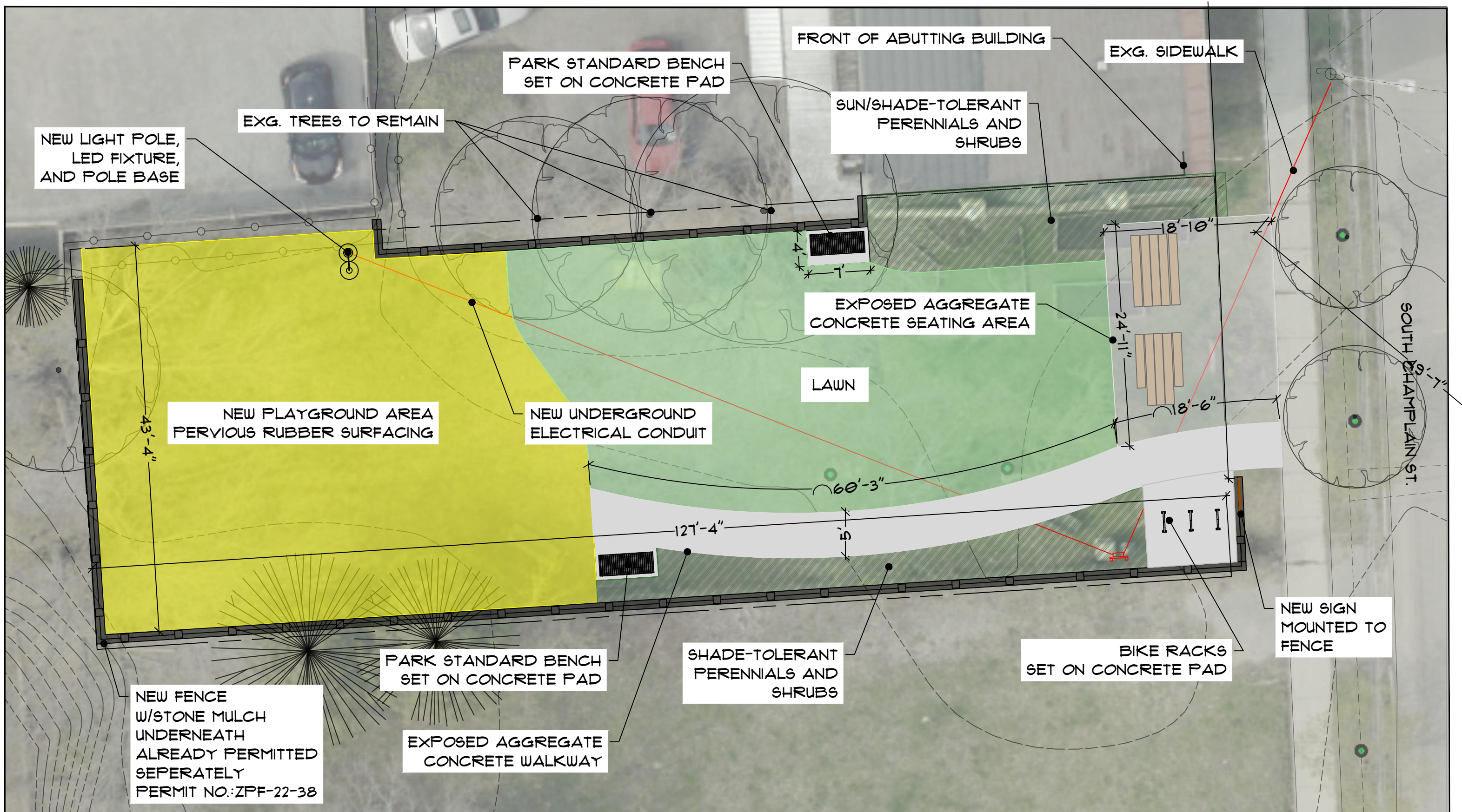
Champlain St. Park Rehab

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

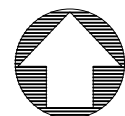
FURNISHING PADS
160 SF

WALKWAY
393 SF

SOUTH CHAMPLAIN ST.



IMPERVIOUS COVERAGE



Champlain St. Park Rehab

187 South Champlain St, Burlington, VT 05401

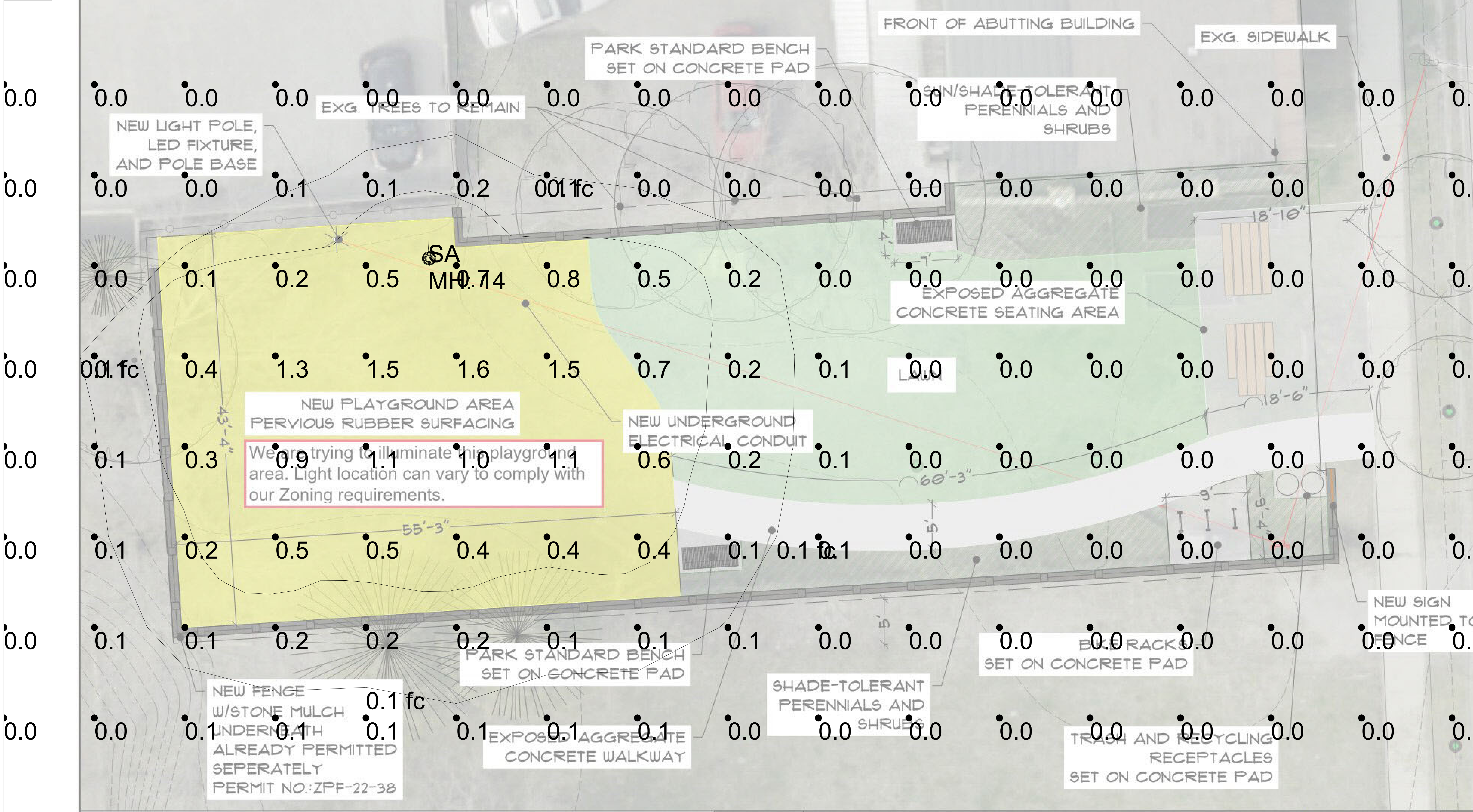
**BURLINGTON
PARKS
RECREATION
WATERFRONT**
645 PINE STREET, SUITE B
BURLINGTON, VT 05401
(802) 864-0123

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

Calculation Summary					
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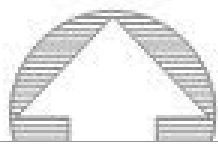
Luminaire Schedule (note fixture catalogue numbers are not complete)					
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PLAN VIEW

OVERALL SITE PLAN



Champlain St. Park Rehab



DESIGN
MAY
DRAW
MAY

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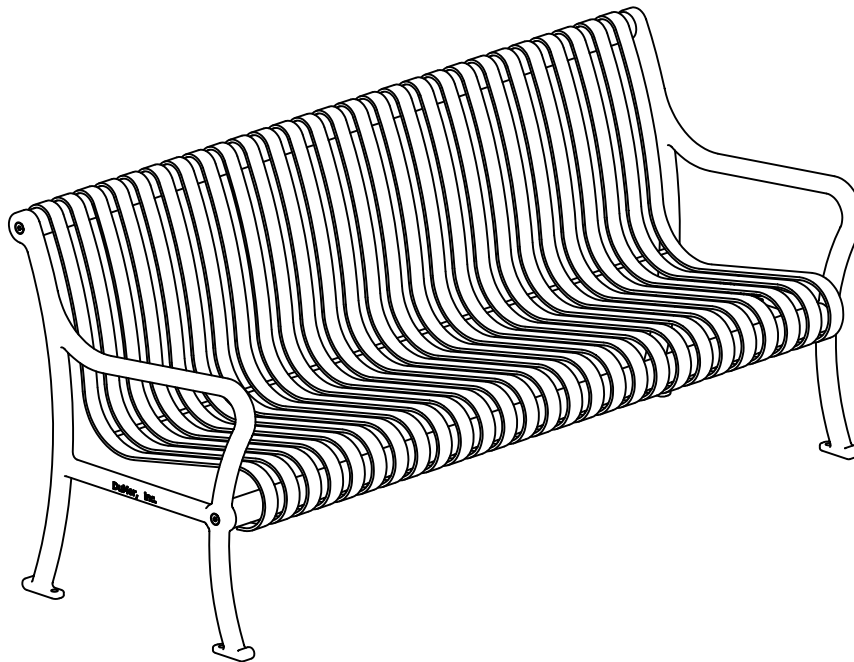
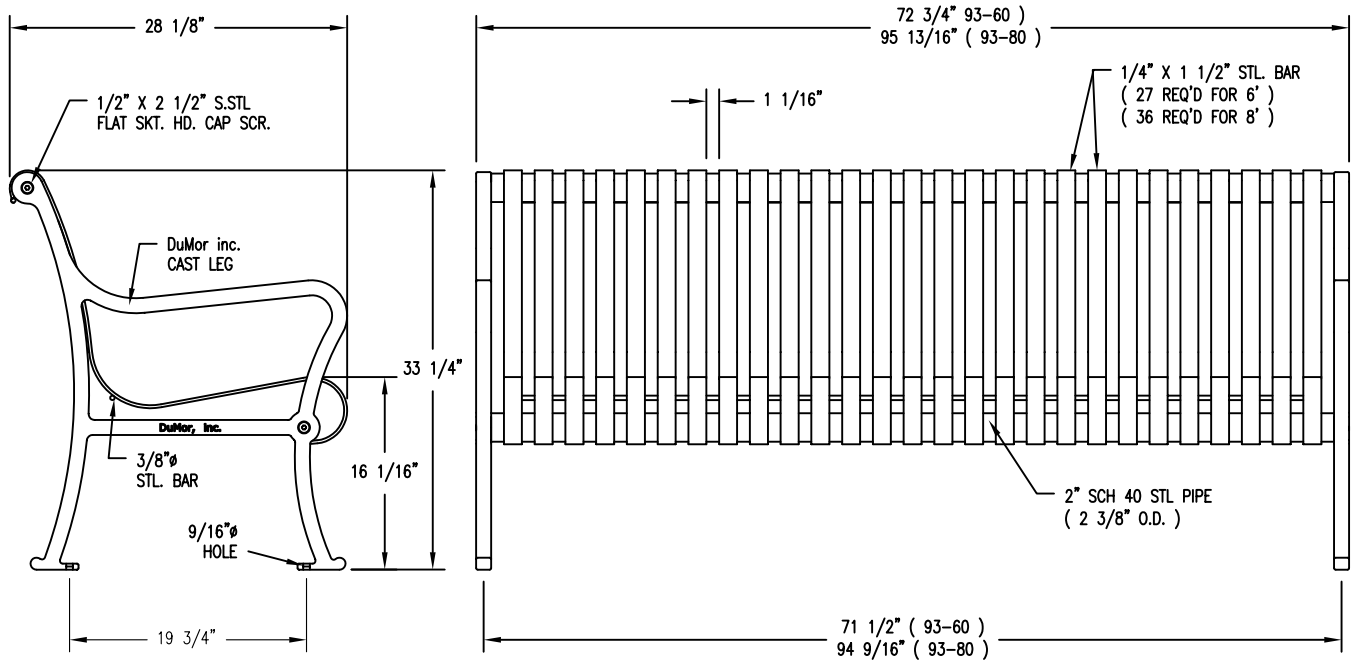
GENERATED FOR:
BURLINGTON PARKS
SCALE: NOT TO SCALE
Page 1 of 1

CHAMPLAIN ST PARK
BURLINGTON, VT
SITE LIGHTING LAYOUT

DATE: 9/22/2022



DATE: 9-22-22.AGI
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.) $\frac{1}{2}" \times 3 \frac{3}{4}"$ 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 :

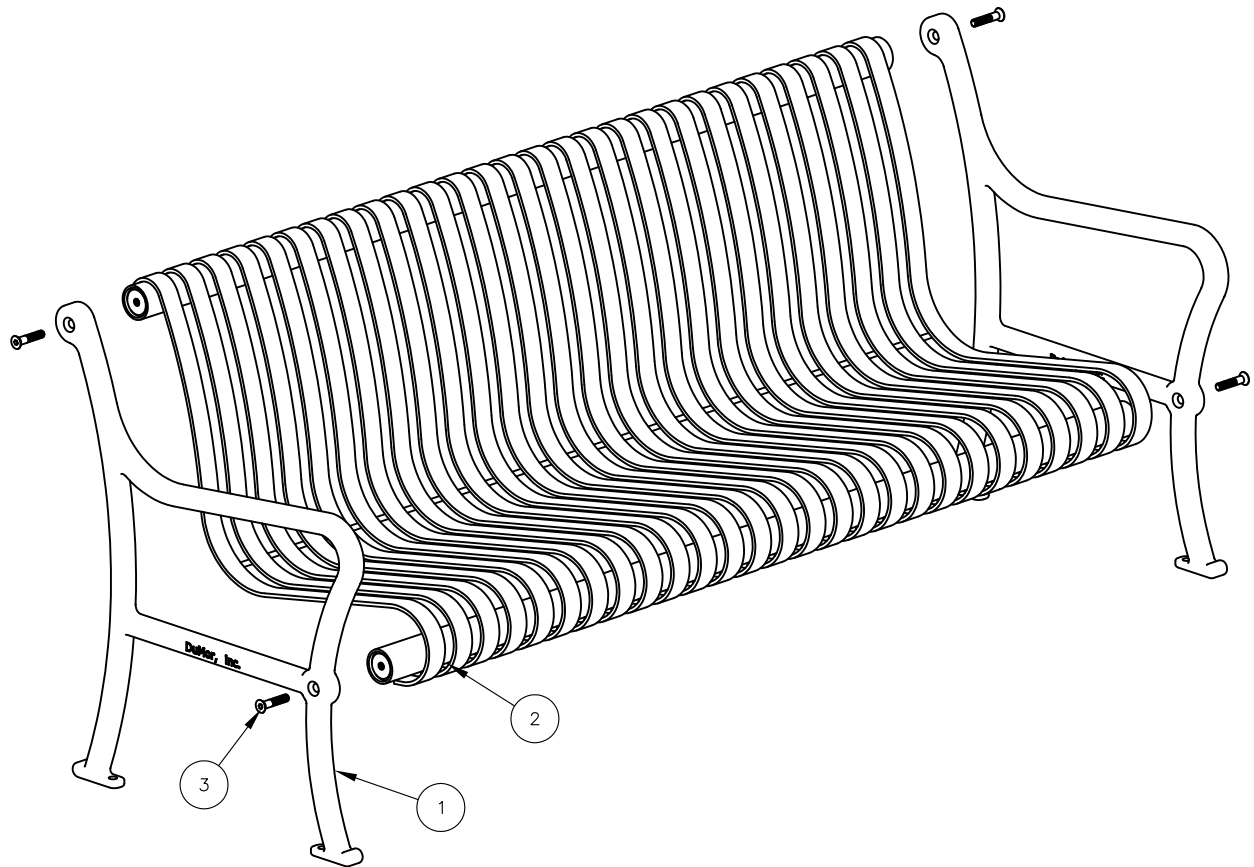
BENCH

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



Legend

- ## Proposed Addition 323 Greencastle

[illegible]

Drawing Title

**Existing Conditions
Plan of Land**

Sv-1

1 of 5

Project Number
7970.00

NOTES:

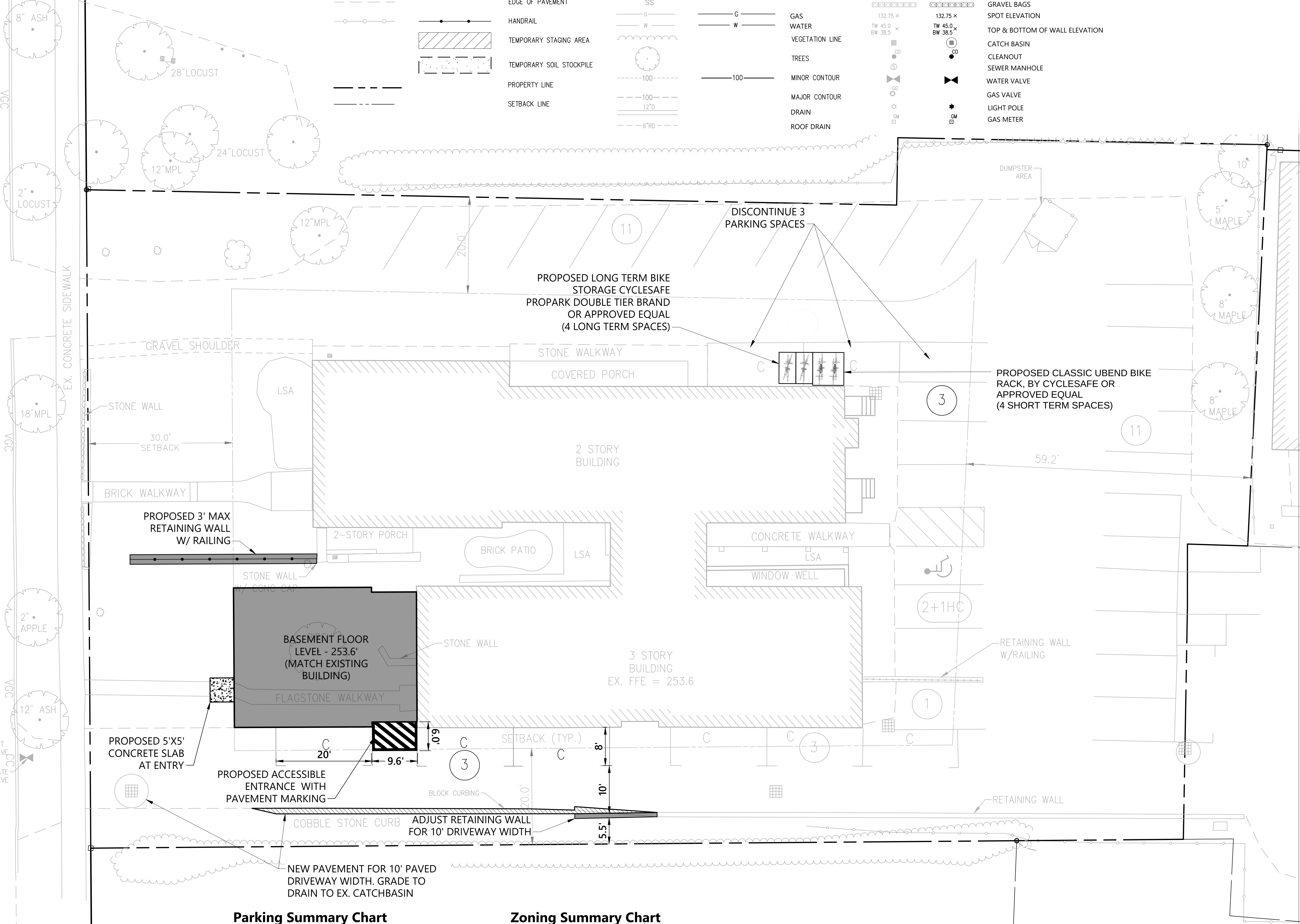
- 1) THE PROPERTY LINES SHOWN ARE BASED UPON A BOUNDARY SURVEY PLAT FOR THE SUBJECT PROPERTIES, ENTITLED "BOUNDARY LINE ADJUSTMENT SURVEY PLAT", PREPARED BY VHB, DATED MAY 30, 2018, REVISED JUNE 29, 2018.
- 2) EXISTING CONDITIONS SHOWN ARE BASED UPON VHB FIELD SURVEY PERFORMED JUNE 2020 AND A COMPILED OF AVAILABLE EXISTING UTILITY RECORDS. UTILITY LOCATIONS ARE APPROXIMATE AND SHALL BE FIELD VERIFIED BY THE CONTRACTOR PRIOR TO PERFORMING ANY EARTHWORK.

Legend

EXISTING	PROPOSED	EXISTING	PROPOSED	EXISTING	PROPOSED	EXISTING	PROPOSED

STREET

COLLEGE

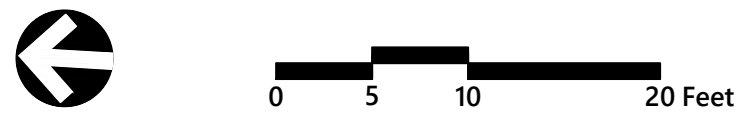


Parking Summary Chart

Description	Existing	Proposed
COMPACT SPACES	5	6
STANDARD SPACES	29	28
STANDARD ACCESSIBLE SPACES	1	1
PARALLEL SPACES	5	6
TOTAL SPACES	35	35

Zoning Summary Chart

Zoning District(S):	Residential - High Density (RH)		
Overlay District(S):	Design Review		
Zoning Regulation Requirements	Existing	Required	Proposed
LOT AREA	32,566 SF	N/A	32,566 SF
LOT COVERAGE	70.0%	80% (Max)	75.9%



Proposed Addition
323 Greencastle, LLC

323 College Street
Burlington, Vermont

No.	Revision	Date	Appr'd.
1	Revisions to Building and Retaining Wall	04/01/2022	PBS
2	Per DRB Comments	10/03/2022	PBS

Designed by	CHS	Checked by	PBS
Issued for	Permit	Date	July 14, 2020

Not Approved for Construction
Layout and
Materials Plan

Drawing Number

C1.01

Sheet 2 of 8

Project Number
57970.00

NOTES:

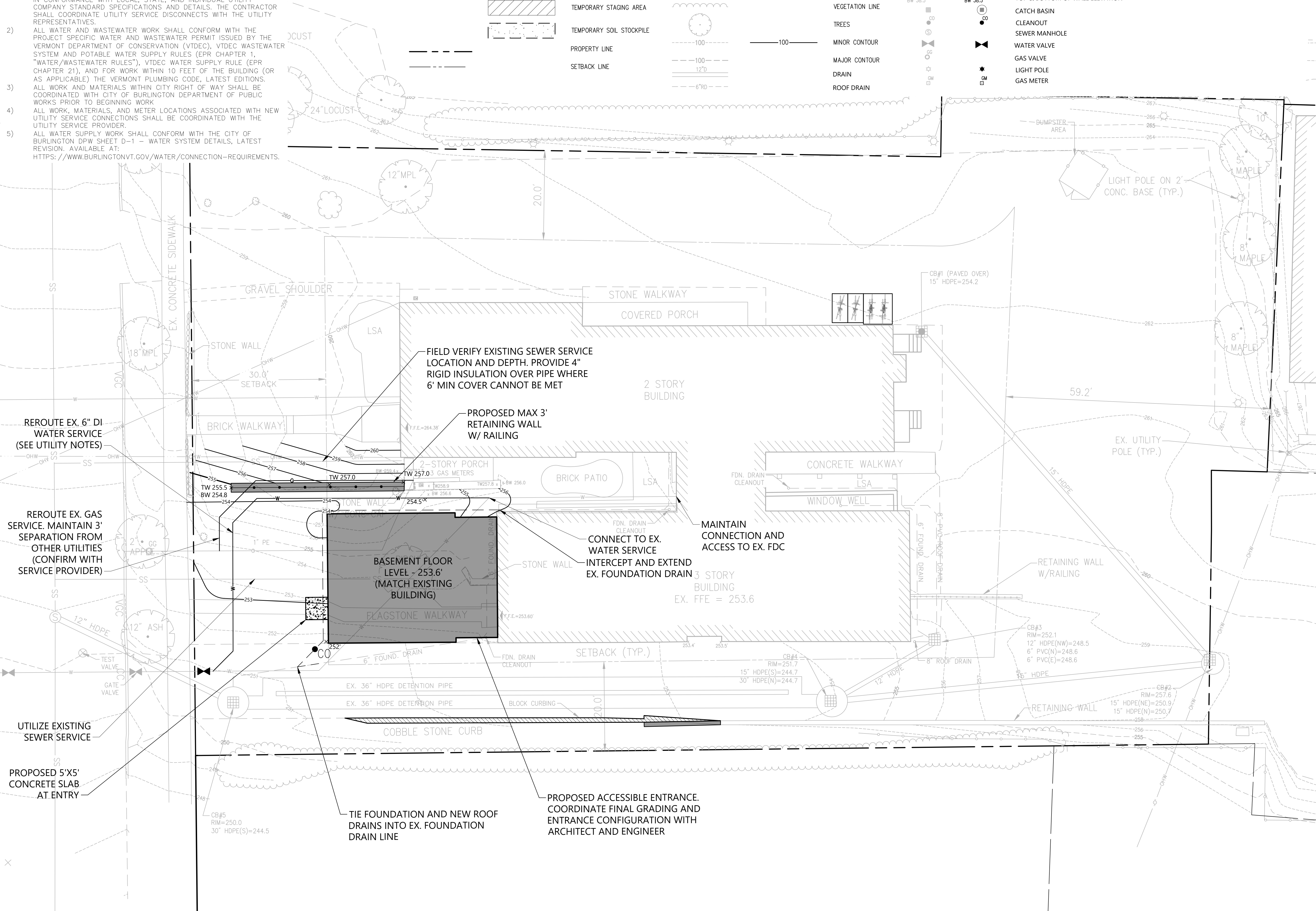
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UTILITY NOTES:

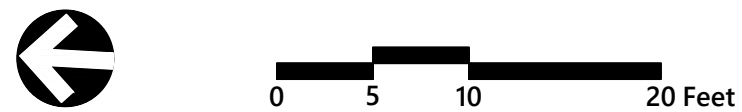
- 1) EXISTING UTILITIES SHALL BE TERMINATED, UNLESS OTHERWISE NOTED, IN CONFORMANCE WITH LOCAL, STATE, AND INDIVIDUAL UTILITY COMPANY STANDARD SPECIFICATIONS AND DETAILS. THE CONTRACTOR SHALL COORDINATE UTILITY SERVICE DISCONNECTS WITH THE UTILITY REPRESENTATIVES.
- 2) ALL WATER AND WASTEWATER WORK SHALL CONFORM WITH THE PROJECT-SPECIFIC WATER AND WASTEWATER PERMIT ISSUED BY THE VERMONT DEPARTMENT OF CONSERVATION (VTDEC). VTDEC WASTEWATER SYSTEM AND POTABLE WATER SUPPLY RULES (EPR CHAPTER 1, "WATER/WASTEWATER RULES"), VTDEC WATER SUPPLY RULE (EPR CHAPTER 21), AND FOR WORK WITHIN 10 FEET OF THE BUILDING (OR AS APPLICABLE) THE VERMONT PLUMBING CODE, LATEST EDITIONS.
- 3) ALL WORK AND MATERIALS WITHIN CITY RIGHT OF WAY SHALL BE COORDINATED WITH CITY OF BURLINGTON DEPARTMENT OF PUBLIC WORKS PRIOR TO BEGINNING WORK.
- 4) ALL WORK, MATERIALS, AND METER LOCATIONS ASSOCIATED WITH NEW UTILITY SERVICE CONNECTIONS SHALL BE COORDINATED WITH THE UTILITY SERVICE PROVIDER.
- 5) ALL WATER SUPPLY WORK SHALL CONFORM WITH THE CITY OF BURLINGTON DPW SHEET D-1 - WATER SYSTEM DETAILS, LATEST REVISION, AVAILABLE AT: [HTTPS://WWW.BURLINGTONVT.GOV/WATER/CONNECTION-REQUIREMENTS](https://www.burlingtonvt.gov/water/connection-requirements).

Legend

EXISTING	PROPOSED	EXISTING	PROPOSED	EXISTING	PROPOSED	EXISTING	PROPOSED



101 Walnut Street
PO Box 9151
Watertown, MA 02471
617.924.1770



Proposed Addition
323 Greencastle, LLC

323 College Street
Burlington, Vermont

No.	Revision	Date	Appr'd.
1	Revisions to Building and Retaining Wall	04/01/2022	PBS
2	Per DRB Comments	10/03/2022	PBS

Designed by CHS
Checked by PBS

Issued for Permit
Date July 14, 2020

Not Approved for Construction

Site Grading
and Utility Plan

Drawing Number

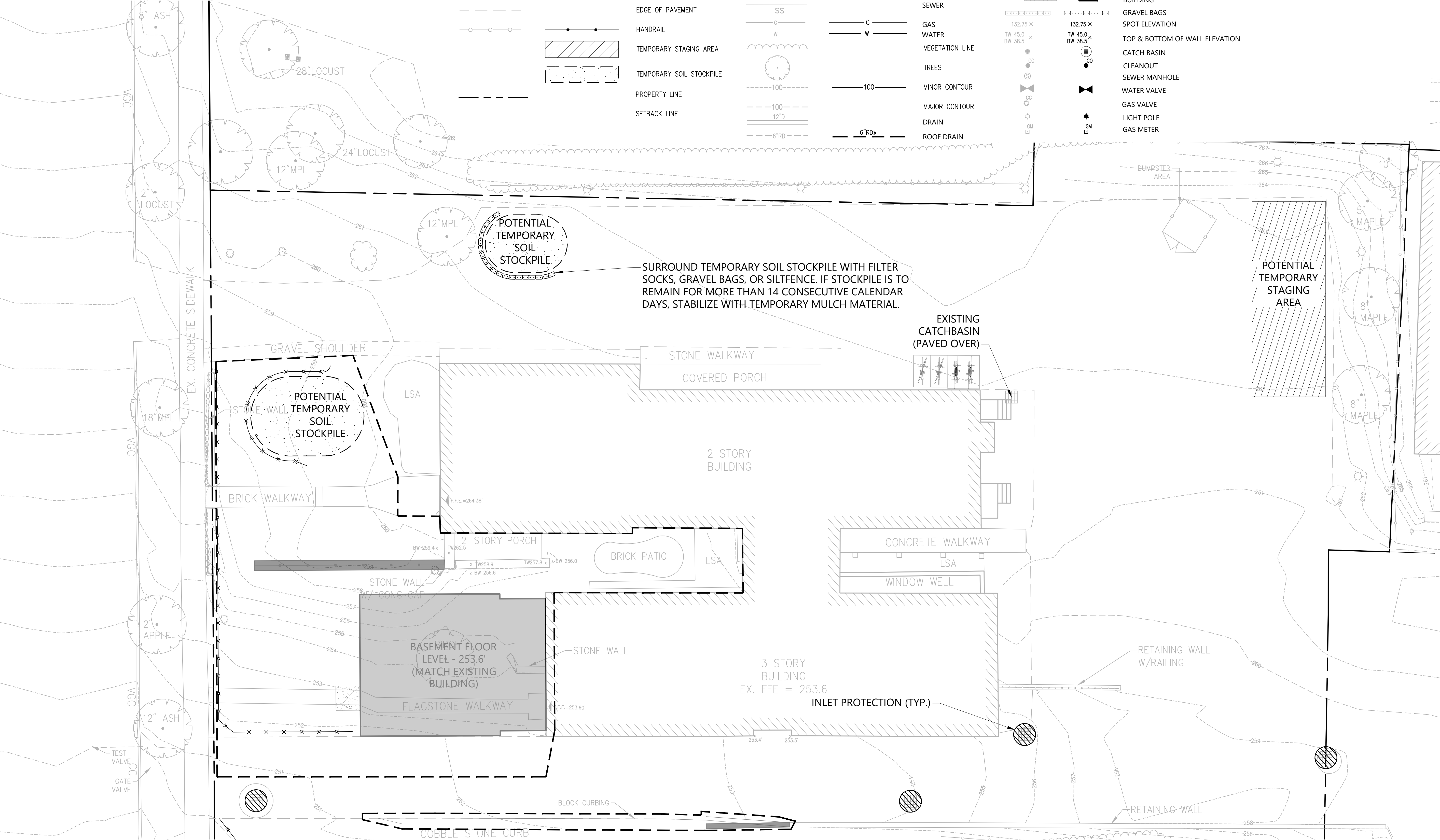
C2.01

Sheet 3 of 8

Project Number
57970.00

NOTES:

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EROSION CONTROL NOTES

1. CONTACT CITY OF BURLINGTON DPW STORMWATER ADMINISTRATOR AT LEAST 24 HOURS PRIOR TO START OF CONSTRUCTION ACTIVITY (802) 863-4501
2. ALL WORK SHALL BE PERFORMED IN ACCORDANCE WITH THE CONDITIONS OF THE EPSC PLAN APPROVAL GRANTED BY THE CITY OF BURLINGTON DEPARTMENT OF PUBLIC WORKS.
3. INSTALL EROSION AND SEDIMENT CONTROL MEASURES PRIOR TO EARTH DISTURBANCE. EROSION CONTROL MEASURES SHALL BE INSPECTED AND REPAIRED DAILY IN ORDER TO MINIMIZE THE DISCHARGE OF SEDIMENT TO THE CITY DRAINAGE SYSTEM. MAINTAIN SEDIMENT CONTROLS UNTIL SITE IS FULLY STABILIZED.
4. THE SITE, ACCESS POINTS TO THE PROJECT, AND NEARBY PORTIONS OF SURROUNDING CITY STREETS SHALL BE INSPECTED DAILY AND PRIOR TO FORECAST PRECIPITATION EVENTS. SEDIMENT DEPOSITED BY VEHICLE TRACKING SHALL BE REMOVED BY SWEEPING AS NEEDED AND PRIOR TO FORECAST PRECIPITATION.
5. NO VEHICLE OR EQUIPMENT PARKING OR MATERIAL STAGING SHALL OCCUR WITHIN THE CITY ROW WITHOUT PERMISSION FROM THE CITY OF BURLINGTON DEPARTMENT OF PUBLIC WORKS.
6. THE NEW AND EXISTING STORMWATER DRAINAGE SYSTEM SHALL BE FREE FROM SEDIMENT AND CONSTRUCTION DEBRIS AT THE COMPLETION OF CONSTRUCTION, AND PRIOR TO TRANSFER OF THE SITE TO THE OWNER.
7. DISTURBED AREAS SHALL BE STABILIZED WITH TOPSOIL, SEED AND MULCH, STONE, CONCRETE, PAVEMENT, OR OTHER APPROVED MEANS WITHIN 14 DAYS OF INITIAL DISTURBANCE.
8. SILT FENCE OR OTHER APPROVED SILT BARRIER SHALL BE INSTALLED AT THE DOWNSLOPE PERIMETER OF ALL SOILS STOCKPILES.
9. THE CONTRACTOR SHALL TAKE ALL REASONABLE MEANS NECESSARY TO KEEP THE NEW STORMWATER SYSTEM FREE OF SEDIMENT AND DEBRIS DURING THE CONSTRUCTION PERIOD. DO NOT ALLOW RUNOFF FROM DISTURBED AREAS TO DRAIN THESE FEATURES UNTIL THEY HAVE RECEIVED FINAL STABILIZATION.
10. DURING THE WINTER CONSTRUCTION PERIOD FROM NOVEMBER 1 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)

**Proposed Addition
323 Greencastle, LLC**

**323 College Street
Burlington, Vermont**

No.	Revision	Date	Appr'd.
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2	Per DRB Comments	10/03/2022	PBS

Designed by	CHS	Checked by	PBS
Issued for	Permit	Date	July 14, 2020

Not Approved for Construction

Erosion and
Sediment Control Plan

Drawing Number

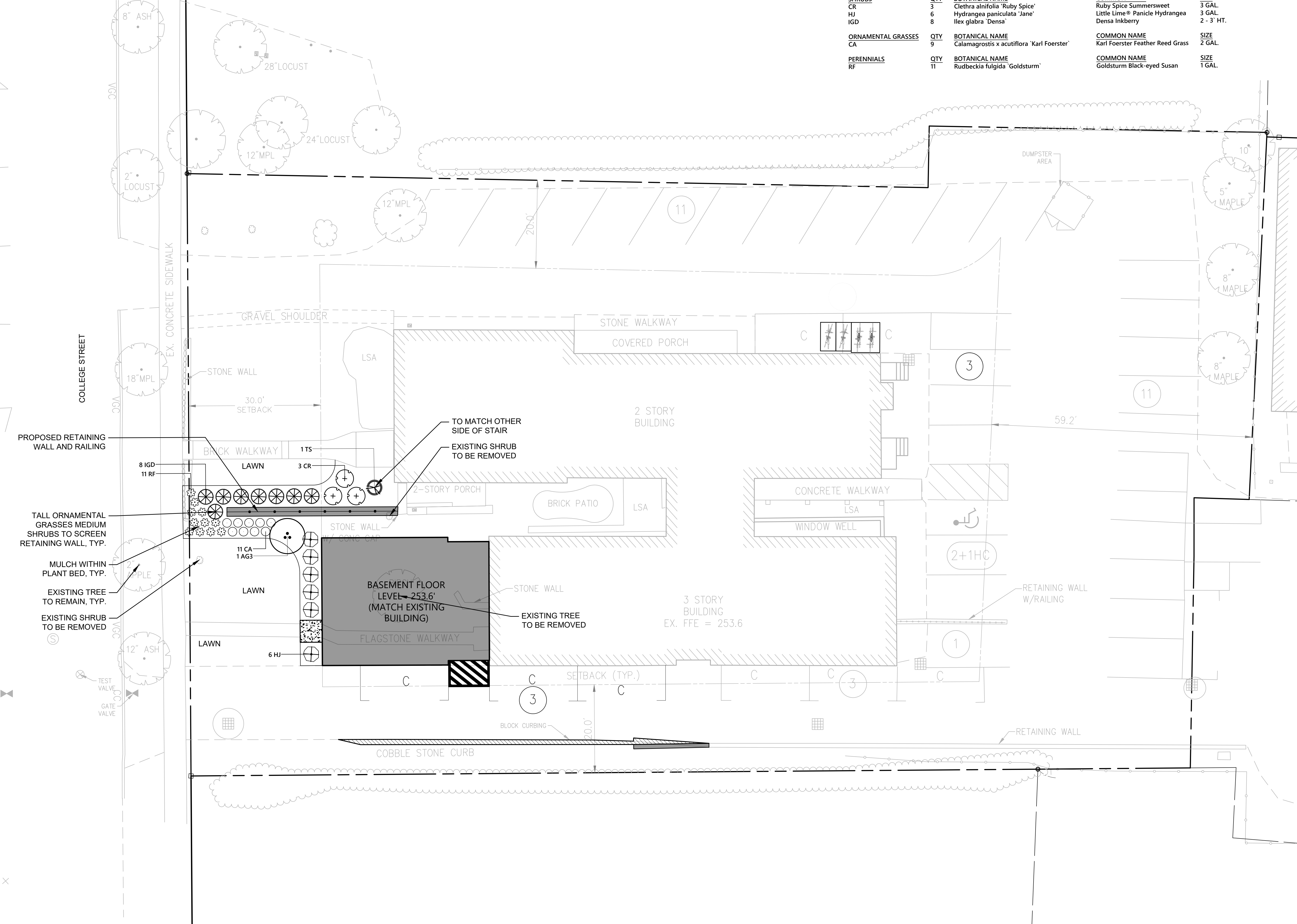
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Sheet 4 of 8

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PLANT SCHEDULE

DECIDUOUS TREES	QTY	BOTANICAL NAME	COMMON NAME	SIZE
AG3	1	Amelanchier x grandiflora 'Autumn Brilliance'	'Autumn Brilliance' Serviceberry	4-5' HT./Multi-stem
EVERGREEN TREES	QTY	BOTANICAL NAME	COMMON NAME	SIZE
TS	1	Thuja occidentalis 'Smaragd'	Emerald Green Arborvitae	5 - 6' HT.
SHRUBS	QTY	BOTANICAL NAME	COMMON NAME	SIZE
CR	3	Clethra alnifolia 'Ruby Spice'	Ruby Spice Summersweet	3 GAL.
HJ	6	Hydrangea paniculata 'Jane'	Little Lime® Panicle Hydrangea	3 GAL.
IGD	8	Ilex glabra 'Densa'	Densa Inkberry	2 - 3' HT.
ORNAMENTAL GRASSES	QTY	BOTANICAL NAME	COMMON NAME	SIZE
CA	9	Calamagrostis x acutiflora 'Karl Foerster'	Karl Foerster Feather Reed Grass	2 GAL.
PERENNIALS	QTY	BOTANICAL NAME	COMMON NAME	SIZE
RF	11	Rudbeckia fulgida 'Goldsturm'	Goldsturm Black-eyed Susan	1 GAL.

vhb.com

vhb

101 Walnut Street
PO Box 9151
Watertown, MA 02471
617.924.1770

0 5 10 20 Feet

**Proposed Addition
323 Greencastle, LLC**

323 College Street
Burlington, Vermont

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Designed by JD Checked by PBS

Issued for Permit Date July 14, 2020

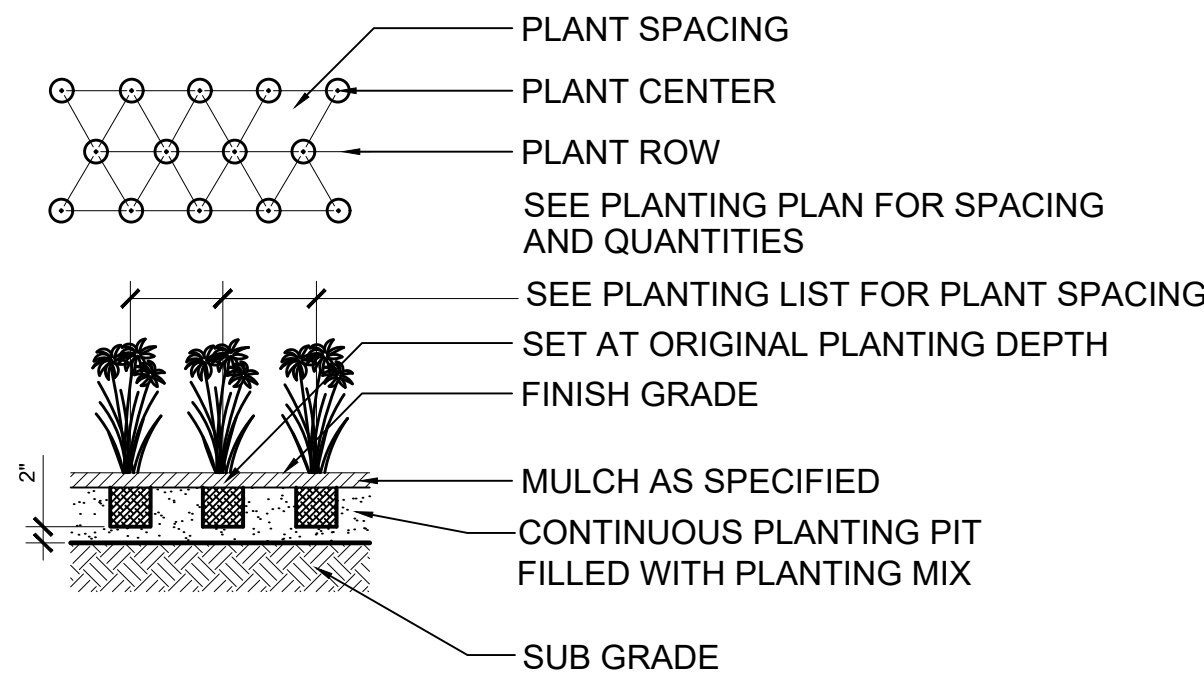
Not Approved for Construction

Drawing Title
Landscaping Plan

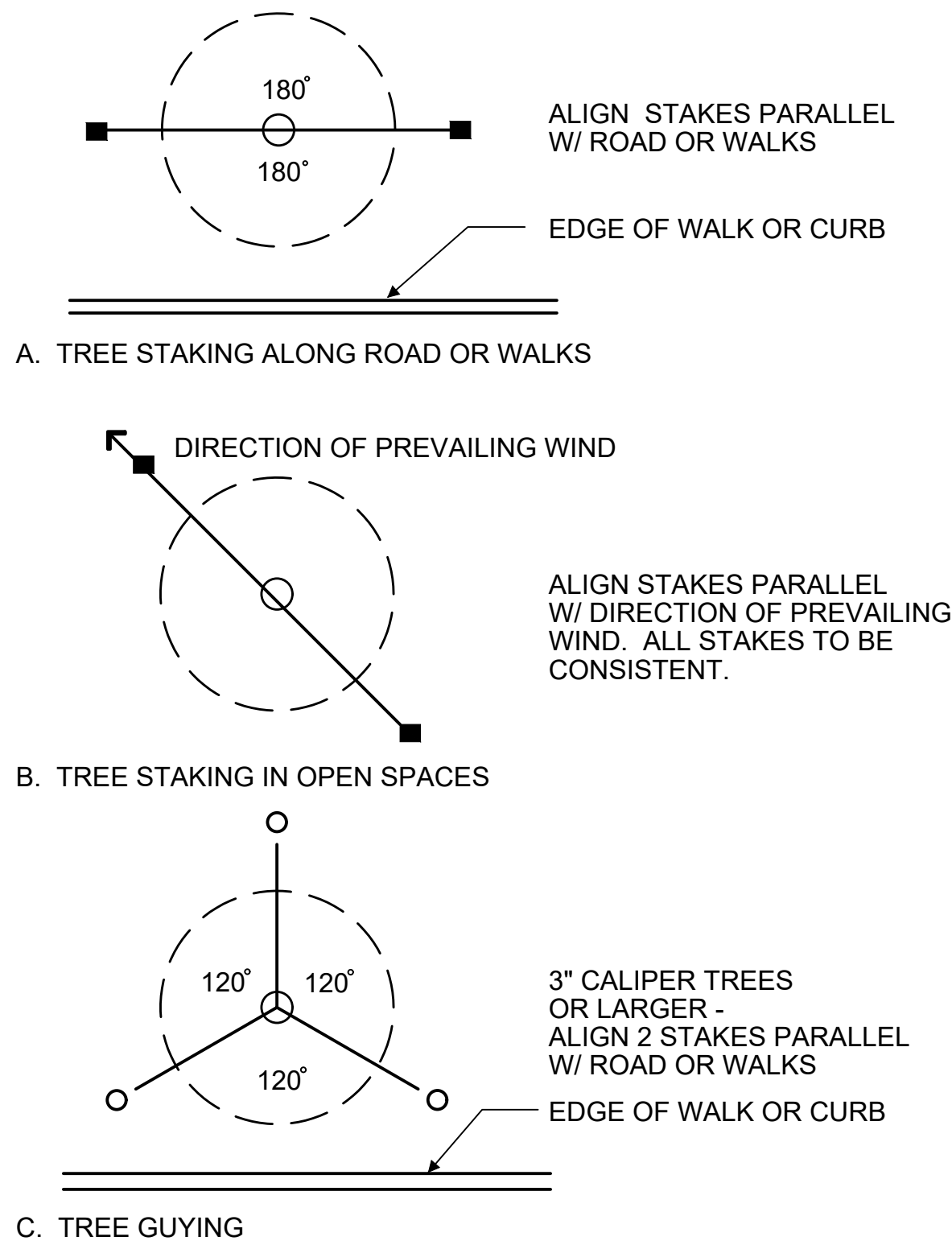
Drawing Number
C4.01

Sheet 5 of 8

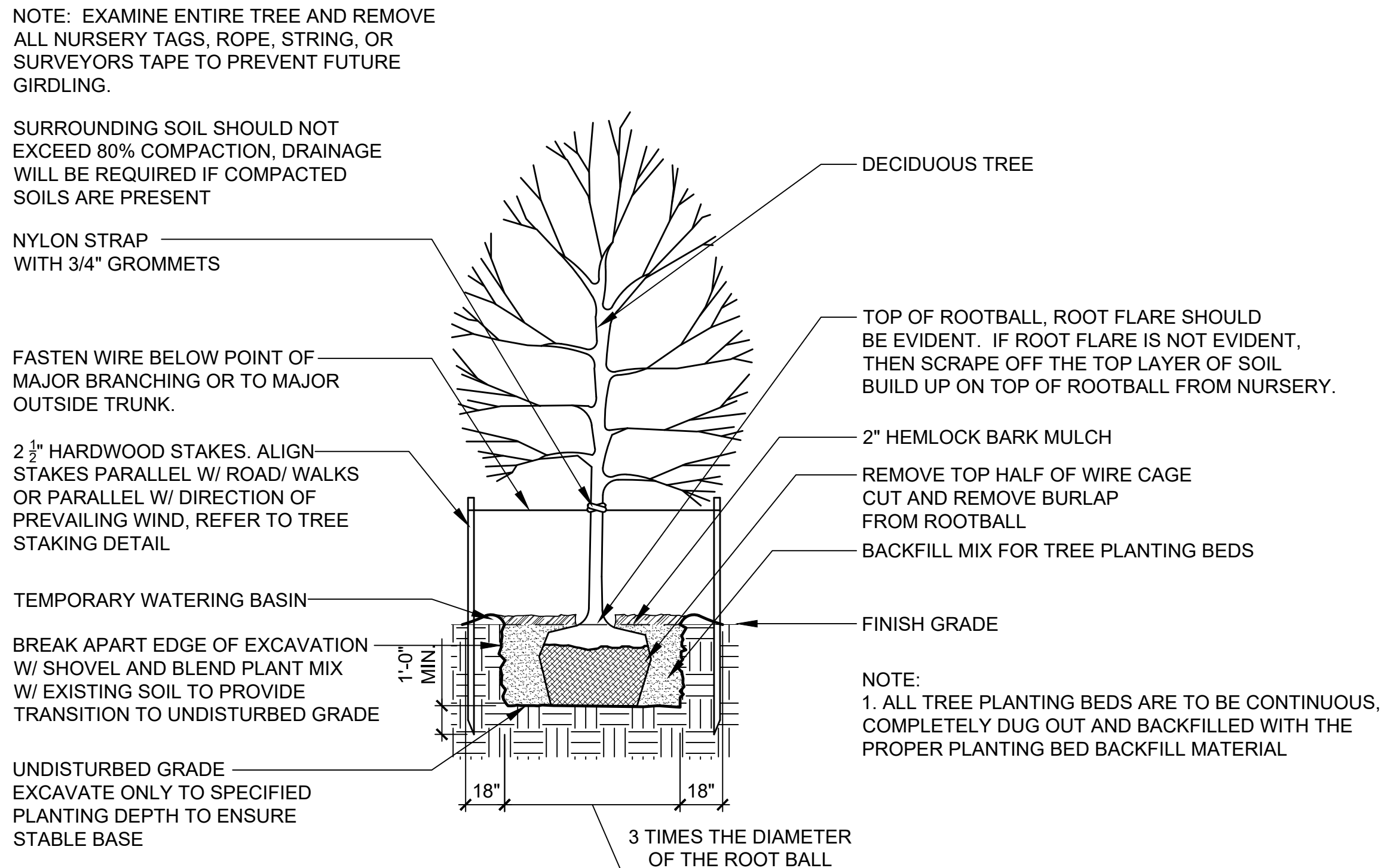
Project Number
57970.00



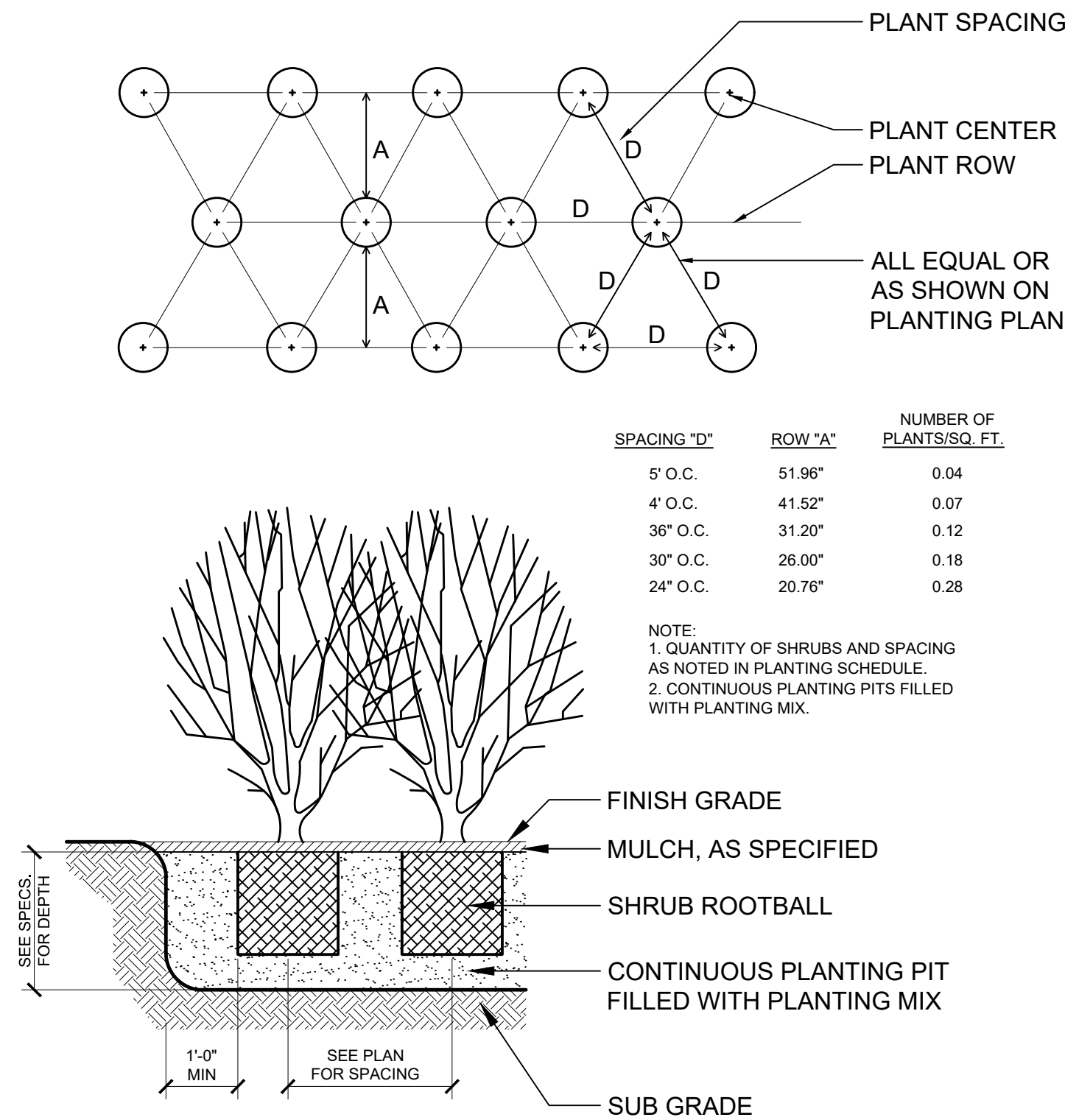
E PERENNIAL PLANTING
SCALE: 1/2" = 1'-0"



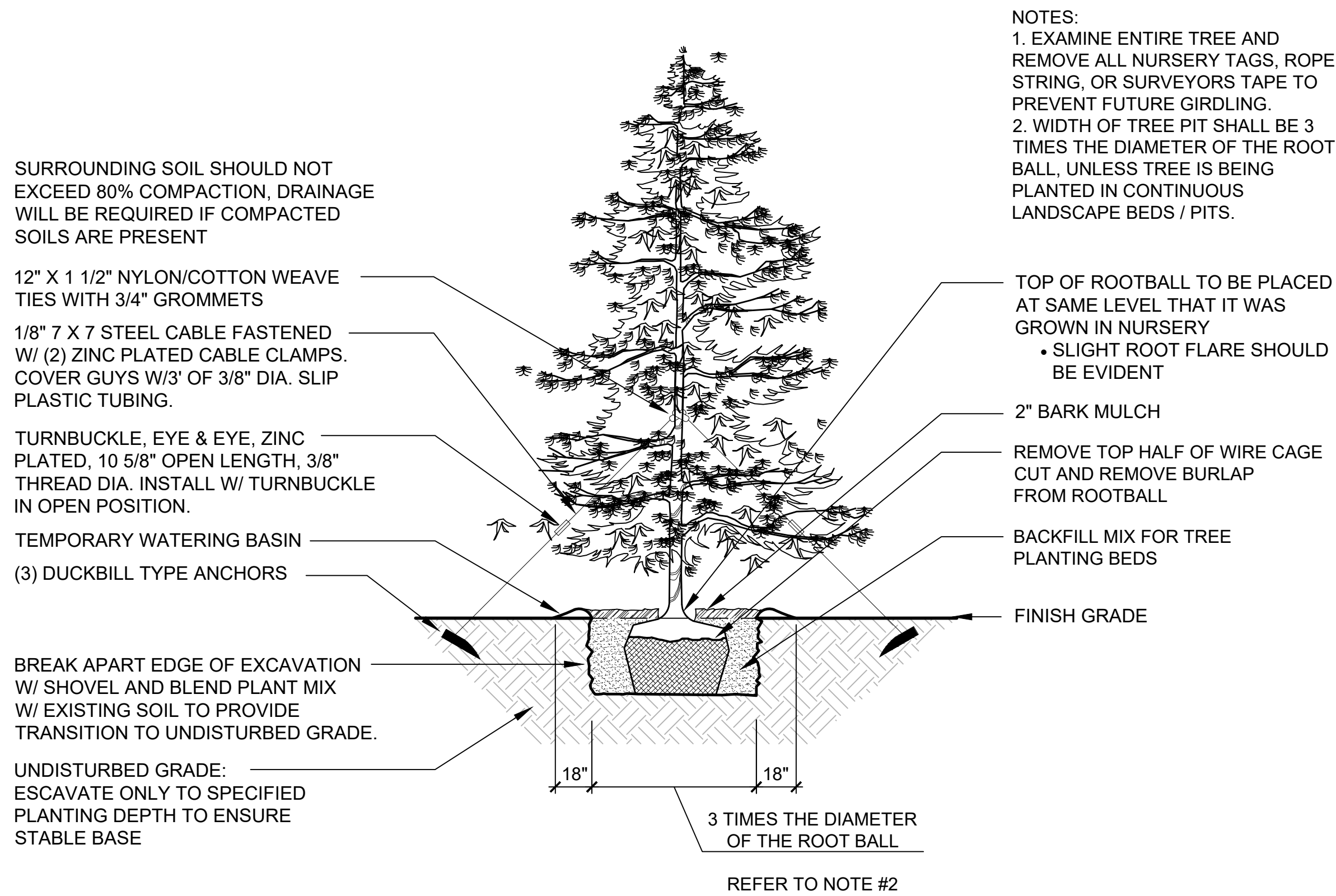
C TREE STAKING LAYOUT
NO SCALE



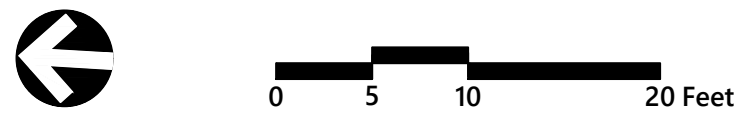
A TREE PLANTING
SCALE 1/4" = 1'-0"



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



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



**Proposed Addition
323 Greencastle, LLC**

323 College Street
Burlington, Vermont

No.	Revision	Date	Appr'd.
1	Revisions to Building and Retaining Wall	04/01/2022	PBS
2	Per DRB Comments	10/03/2022	PBS

Designed by **JD** Checked by **PBS**
Issued for _____ Date _____
Permit July 14, 2020

Not Approved for Construction

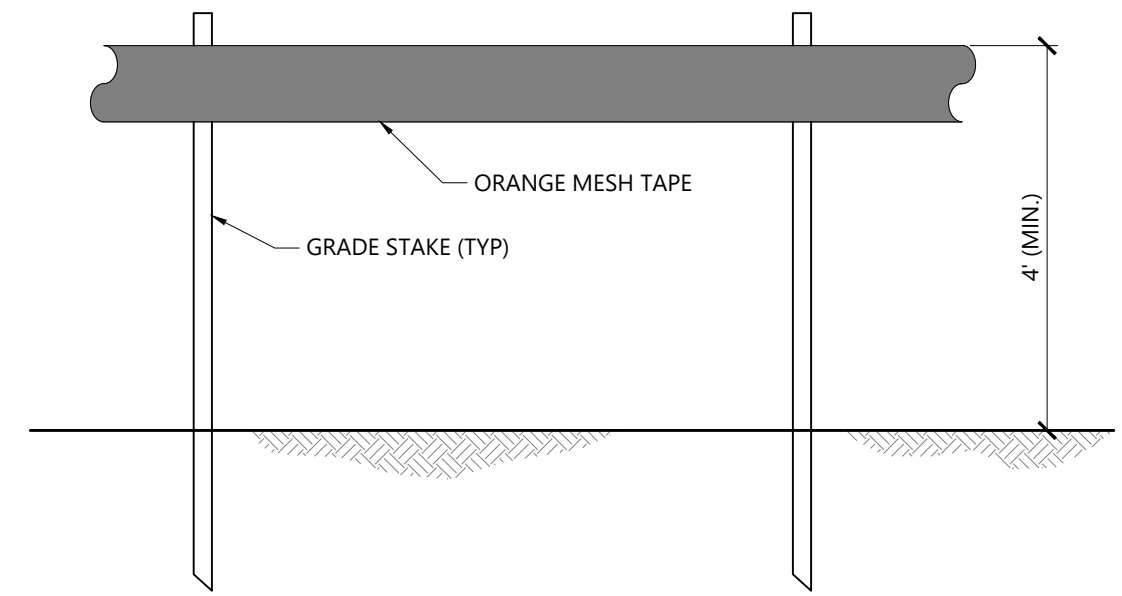
Drawing Title
Landscaping Details

Drawing Number

C4.02

Sheet 6 of 8

Project Number
57970.00

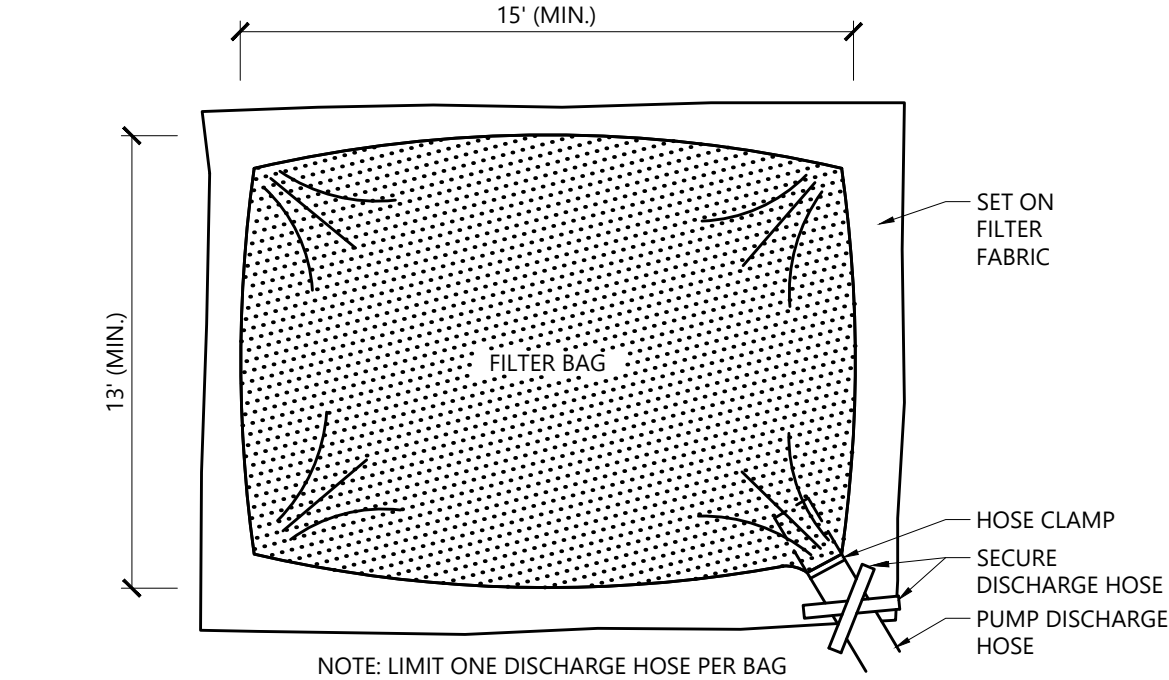


NOTES

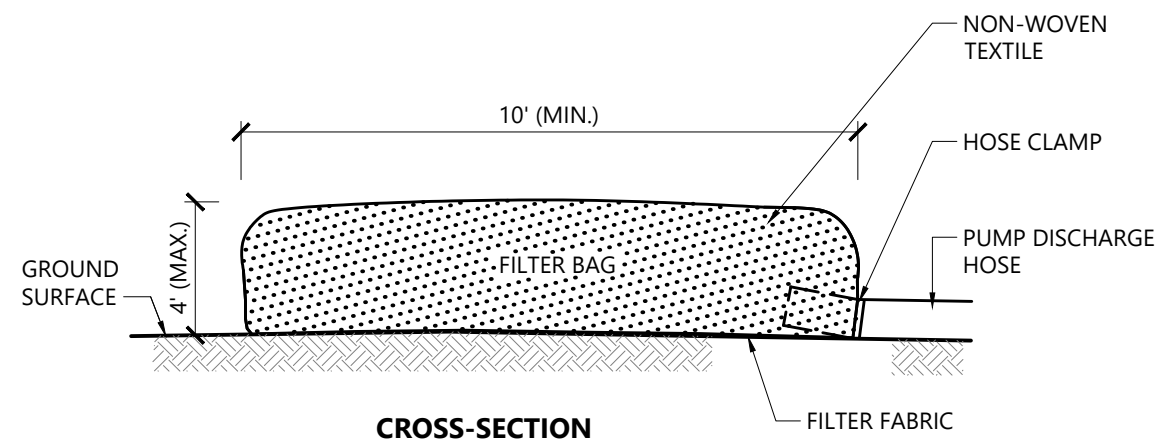
1. BARRIER MESH TAPE SHALL BE INSTALLED ALONG THE PERIMETER OF THE PROJECT AREA TO DEMARCATATE THE LIMIT OF DISTURBANCE. NO EARTHWORK OR STORAGE OF MATERIALS SHALL BE CONDUCTED BEYOND THIS LIMIT WITHOUT PRIOR APPROVAL FROM THE OSPC.
2. USE 3" ORANGE BARRIER MESH TAPE.
3. TAPE OR ROPE MAY BE FASTENED TO STAKES, TREES, OR OTHER APPROPRIATE FIXED OBJECTS.
4. PROJECT DEMARCATATION SHALL NOT CROSS ACTIVE ACCESS ROUTES (E.G. ROADS).
5. PROJECT DEMARCATATION SHALL REMAIN IN PLACE AND BE MAINTAINED/REPLACED AS NEEDED UNTIL FINAL STABILIZATION IN THE AREA HAS BEEN ACHIEVED.

Barrier Mesh Tape or Rope

N.T.S. Source: VHB 08/16 REV LD_VT



PLAN VIEW



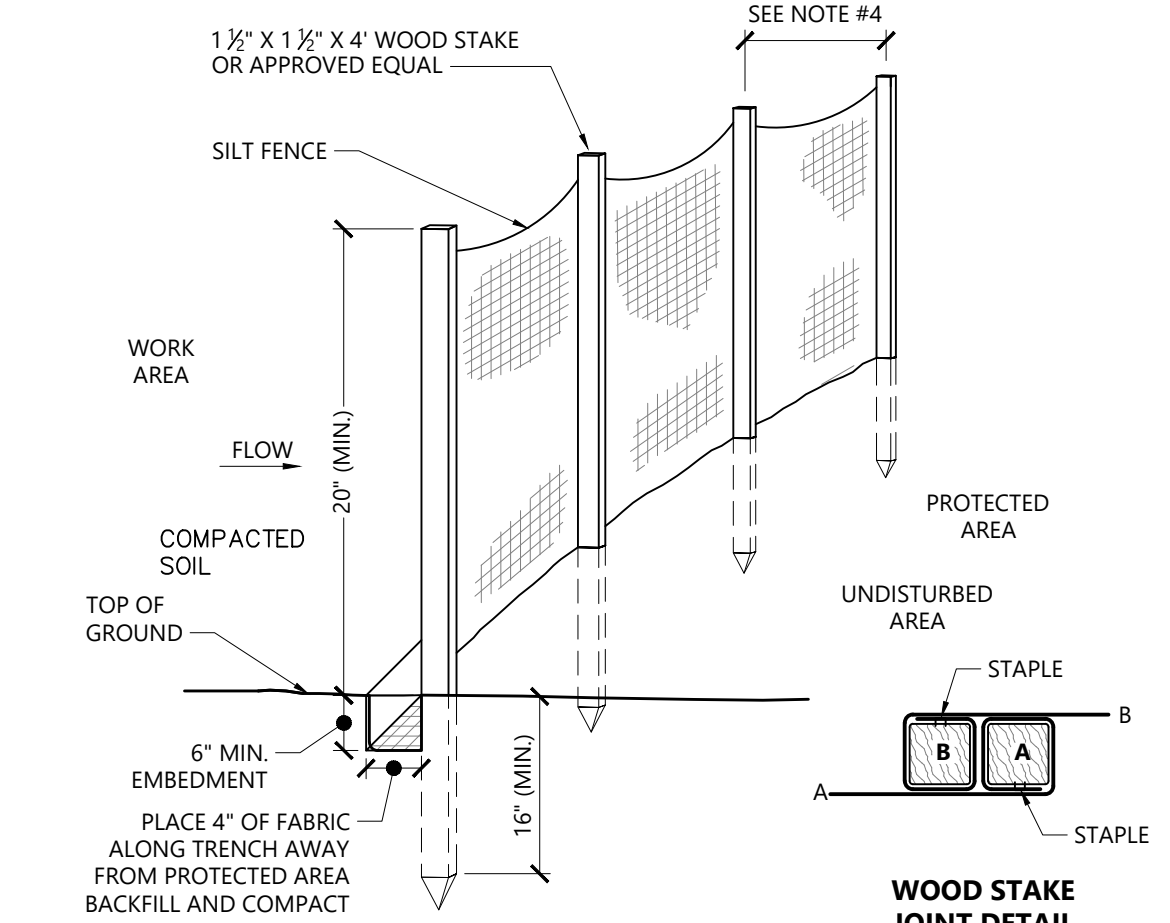
CROSS-SECTION

NOTES

1. BAG TO BE USED IN ACCORDANCE WITH MANUFACTURERS RECOMMENDATIONS.

Dewatering Filter Bag

N.T.S. Source: VHB 1/16 LD_691



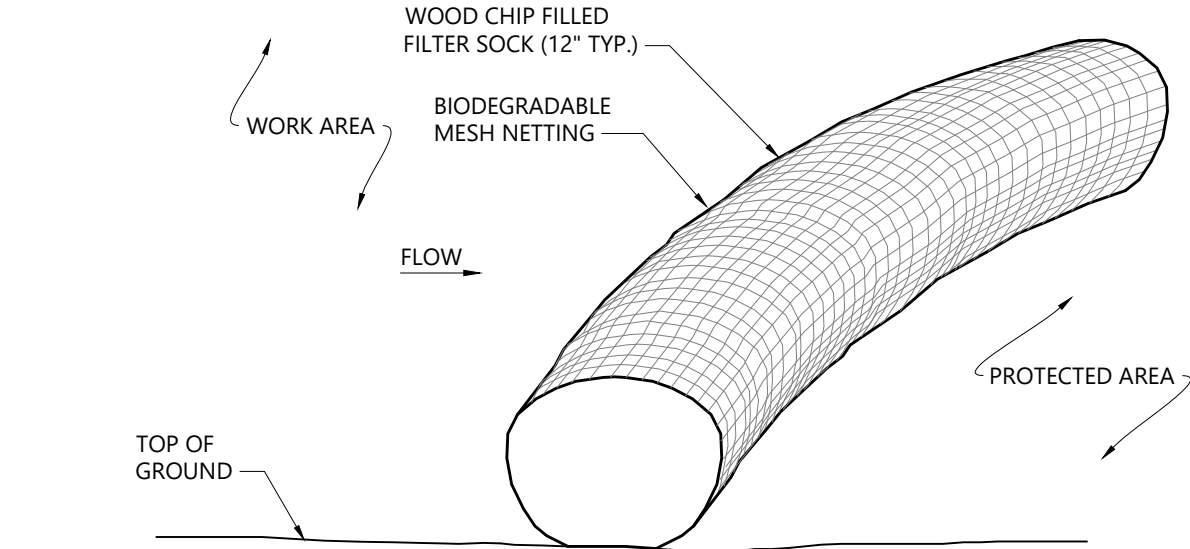
WOOD STAKE
JOINT DETAIL

NOTES

1. WOVEN WIRE FENCE REINFORCEMENT IS REQUIRED WITHIN 50 FT UPSLOPE OF RECEIVING WATERS.
2. WHERE REQUIRED FENCE SHALL BE WOVEN WIRE, MIN. 14 GAUGE WITH A 6" MESH OPENING SHALL BE USED.
3. FILTER CLOTH SHALL BE EITHER FILTER X, MIRAFI 100X, STABILINKA T140N OR APPROVED EQUIVALENT.
4. POST SPACING FOR WIRE BACKED FENCE SHALL BE 10 FT. MAX. FOR FILTER CLOTH FENCE WHEN ELONGATION IS >50%, POST SPACING SHALL NOT EXCEED 4 FT. FOR FILTER CLOTH FENCE WHEN ELONGATION IS <50%, POST SPACING SHALL NOT EXCEED 6 FT.
5. WHEN TWO SECTIONS OF FILTER CLOTH ADJOIN EACH OTHER THEY SHALL BE OVER-LAPPED BY 6 INCHES AND FOLDED.
6. PREFABRICATED UNITS SHALL BE GEOFAB, ENVIROFENCE OR APPROVED EQUIVALENT.
7. MAINTENANCE SHALL BE PERFORMED AS NEEDED AND MATERIAL REMOVED WHEN SEDIMENT REACHES HALF OF FABRIC HEIGHT.
8. SILT FENCE SHALL NOT BE USED TO DEMARCATATE LIMITS OF DISTURBANCE.
9. AREA DRAINING TO SILT FENCE SHALL NOT EXCEED 1/4 ACRE PER 100 LF

Silt Fence/ Reinforced Silt Fence Barrier

N.T.S. Source: VHB 08/16 LD_650-VT



NOTES

1. FILTER SOCK SHALL BE FILTREXX SILTSOXX, OR APPROVED EQUAL.
2. FILTER SOCK SHALL BE ANCHORED WITH GRAVEL BAGS.
3. FILTER SOCK SHALL BE INSPECTED PERIODICALLY AND AFTER ALL STORM EVENTS, AND REPAIR OR REPLACEMENT SHALL BE PERFORMED PROMPTLY AS NEEDED.
4. IF NON BIODEGRADABLE NETTING IS USED THE NETTING SHALL BE COLLECTED AND DISPOSED OF OFFSITE.

Siltsock - Erosion Control Barrier

N.T.S. Source: VHB 1/16 REV LD_658

TEMPORARY SEEDING

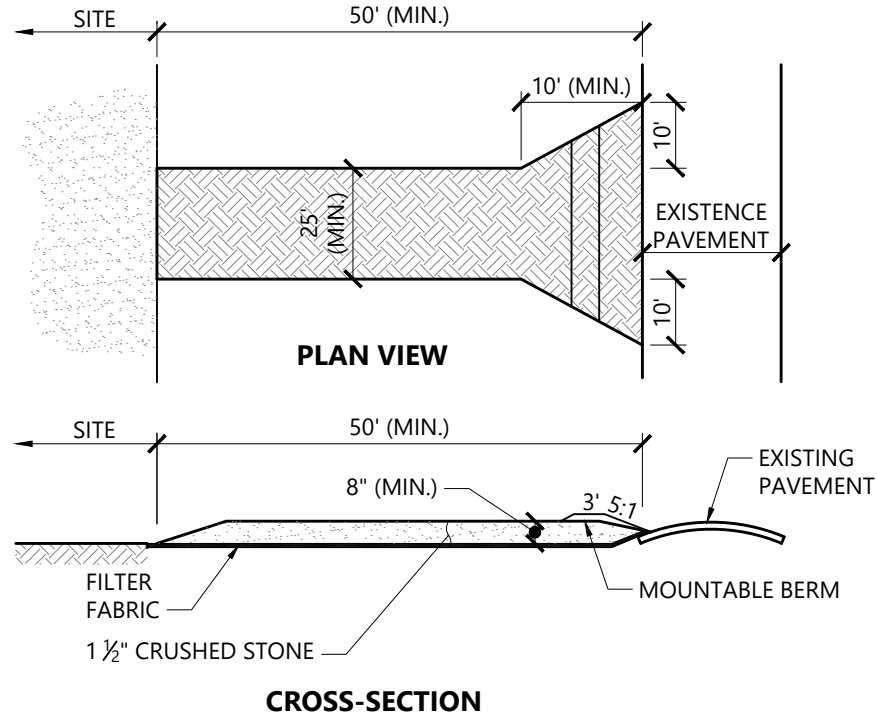
1. AREA TO BE SEEDED MUST BE ROUGH GRADED AND SLOPES PHYSICALLY STABLE.
2. SEEDING METHOD TO RESULT IN GOOD SOIL TO SEED CONTACT.
3. AFTER SEEDING, MULCH THE AREA WITH HAY OR STRAW AT 2 TONS/AC (APPROX 90 LBS/1,000 SF OR 2 BALES/1,000 SF); SEE MULCH DETAIL AND SPECIFICATIONS.
4. MULCH ANCHORING MAY BE NEEDED WHERE WIND OR AREAS OF CONCENTRATED WATER ARE POSSIBLE.
5. WOOD FIBER HYDROMULCH OR OTHER SPRAYABLE PRODUCTS APPROVED FOR EROSION CONTROL MAY BE USED IF APPLIED ACCORDING TO MANUFACTURERS' SPECIFICATIONS.

PERMANENT SEEDING

1. AREA TO BE SEEDED MUST BE ROUGH GRADED AND SLOPES PHYSICALLY STABLE; CHISELING OR DISKING MAY BE NEEDED IF SOIL IS COMPACTED.
2. SEEDING METHOD TO RESULT IN GOOD SOIL TO SEED CONTACT.
3. PERMANENT SEEDING TO OCCUR PRIOR TO SEPTEMBER 15TH UNLESS WEATHER PERMITS SEEDING BEYOND SEPTEMBER 15TH.
4. AFTER SEEDING, MULCH THE AREA WITH HAY OR STRAW AT 2 TONS/AC (APPROX 90 LBS/1,000 SF OR 2 BALES/1,000 SF); SEE MULCH DETAIL AND SPECIFICATIONS.
5. MULCH ANCHORING MAY BE NEEDED WHERE WIND OR AREAS OF CONCENTRATED WATER ARE POSSIBLE.
6. WOOD FIBER HYDROMULCH OR OTHER SPRAYABLE PRODUCTS APPROVED FOR EROSION CONTROL MAY BE USED IF APPLIED ACCORDING TO MANUFACTURERS' SPECIFICATIONS.
7. IRRIGATION MAY BE NEEDED TO FACILITATE GRASS GROWTH AND ESTABLISH ADEQUATE GRASS COVER.

Seeding Notes and Specifications

N.T.S. Source: VHB 08/16 LD_VT



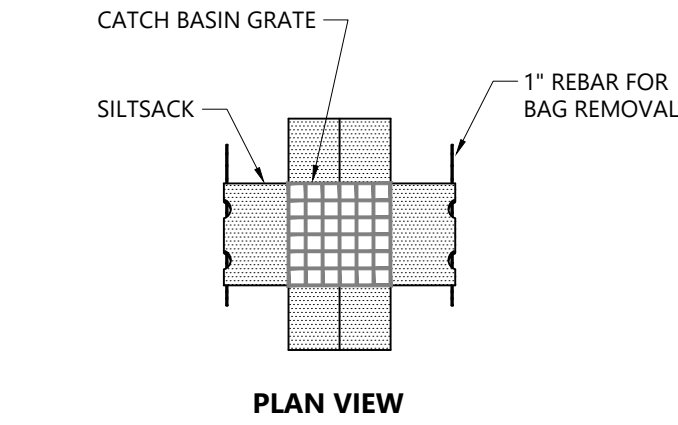
CROSS-SECTION

NOTES

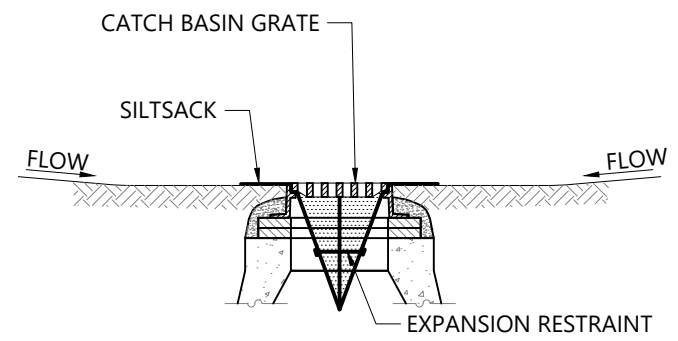
1. AGGREGATE SIZE: USE A MIX OF 1 TO 4 INCH STONE, OR RECLAIMED OR RECYCLED CONCRETE EQUIVALENT.
2. LENGTH: NOT LESS THAN 50 FEET (EXCEPT ON SINGLE RESIDENCE LOT WHERE A 30 FOOT MINIMUM LENGTH APPLIES)
3. THICKNESS: NOT LESS THAN EIGHT (8) INCHES
4. WIDTH: TWELVE (12) FOOT MINIMUM, BUT NOT LESS THAN THE FULL WIDTH AT POINTS WHERE INGRESS OR EGRESS OCCURS. TWENTY-FOUR (24) FOOT MINIMUM IF THERE IS ONLY ONE ACCESS TO THE SITE.
5. GEOTEXTILE MUST BE PLACED OVER THE ENTIRE AREA PRIOR TO PLACING OF STONE
6. ALL SURFACE WATER FLOWING OR DIVERTED TOWARD CONSTRUCTION EXITS SHALL BE PIPED BENEATH THE EXIT. IF PIPING IS IMPRACTICAL, A MOUNTABLE BERM WITH 5:1 SLOPES WILL BE PERMITTED.
7. THE EXIT SHALL BE MAINTAINED IN A CONDITION WHICH WILL PREVENT TRACKING OR FLOWING OF SEDIMENT ONTO PUBLIC RIGHTS-OF-WAY. ALL SEDIMENT SPILLED, DROPPED, WASHED OR TRACKED ONTO PUBLIC RIGHTS-OF-WAY MUST BE REMOVED IMMEDIATELY.
8. WHEN WASHING IS REQUIRED IT SHALL BE DONE ON AN AREA STABILIZED WITH STONE AND WHICH DRAINS INTO AN APPROVED SEDIMENT TRAPPING DEVICE.
9. PERIODIC INSPECTION AND NEEDED MAINTENANCE SHALL BE PROVIDED ACCORDING TO PERMIT REQUIREMENTS.

Stabilized Construction Exit

N.T.S. Source: VHB 1/16 REV LD_682-VT



PLAN VIEW



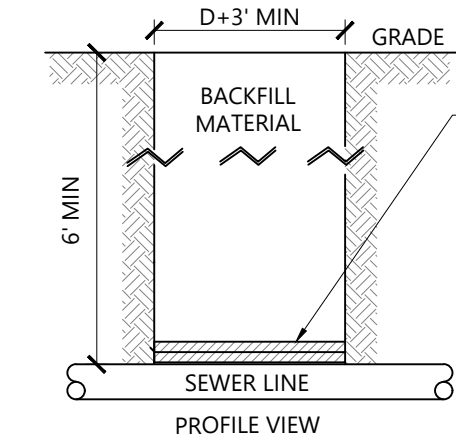
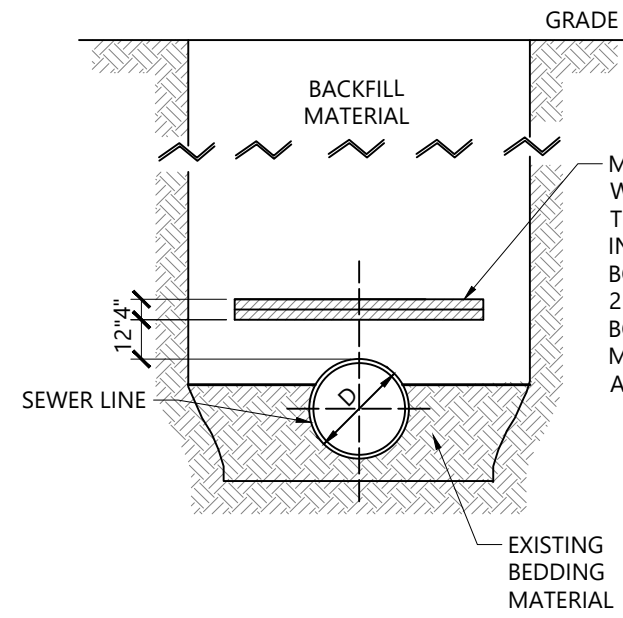
SECTION VIEW

NOTES

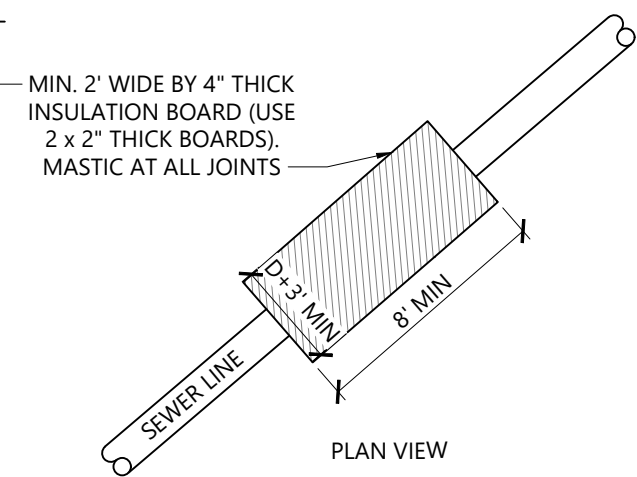
1. INSTALL SILTSACK IN ALL CATCH BASINS WHERE INDICATED ON THE PLAN BEFORE COMMENCING WORK OR IN PAVED AREAS AFTER BINDER COURSE IS PLACED AND STRAW BALES HAVE BEEN REMOVED.
2. GRATE TO BE PLACED OVER SILTSACK.
3. SILTSACK SHALL BE INSPECTED PERIODICALLY AND AFTER ALL STORM EVENTS AND CLEANING OR REPLACEMENT SHALL BE PERFORMED PROMPTLY AS NEEDED. MAINTAIN UNTIL UPSTREAM AREAS HAVE BEEN PERMANENTLY STABILIZED

Siltsack Sediment Trap

N.T.S. Source: VHB 1/16 REV LD_674



PROFILE VIEW



PLAN VIEW

NOTES

1. INSULATION BOARD TO BE CLOSED CELL, EXTRUDED POLYSTYRENE FOAM MEETING ASTM 578, TYPE VI, 40 PSI COMPRESSING STRENGTH (ASTM D1621), 0.1% MAX. WATER ABSORPTION (ASTM C272).
2. BACKFILL MATERIAL AROUND INSULATION MUST BE FREE FROM ROOTS, ORGANIC MATTER, AND OTHER INJURIOUS MATERIALS.
3. OVERLAP ALL INSULATION BOARD JOINTS
4. PROVIDE INSULATION WHEN DEPTH OF COVER IS LESS THAN 6 FEET

Sewer Line Isulation

N.T.S. Source: VHB 03/22 LD_

Proposed Addition
323 Greencastle, LLC

323 College Street
Burlington, Vermont

No.	Revision	Date	Appr'd.
1	Revisions to Building and Retaining Wall	04/01/2022	PBS
2	Per DRB Comments	10/03/2022	PBS

Designed by _____ Checked by _____
Issued for _____ Date _____
Permit _____ July 14, 2020

Not Approved for Construction

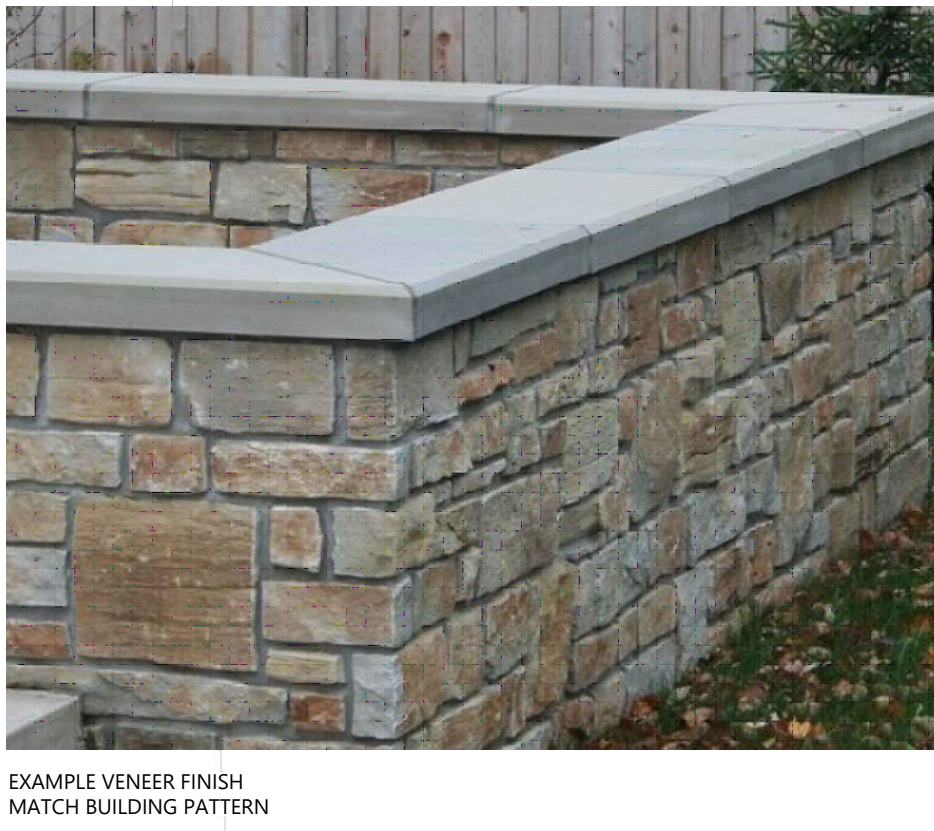
Site Details 1

Drawing Number

C5.01

Sheet 7 of 8

Project Number
57970.00



09/22
LD_



Site Details 2



Daniel Goltzman Design & Development

119 Caroline Street
Burlington, Vermont 05401
646-957-4248

VHB
101 Walnut Street
Watertown, MA 02471
617-924-1770

No.	Description	Date
-----	-------------	------

Greencastle LLC

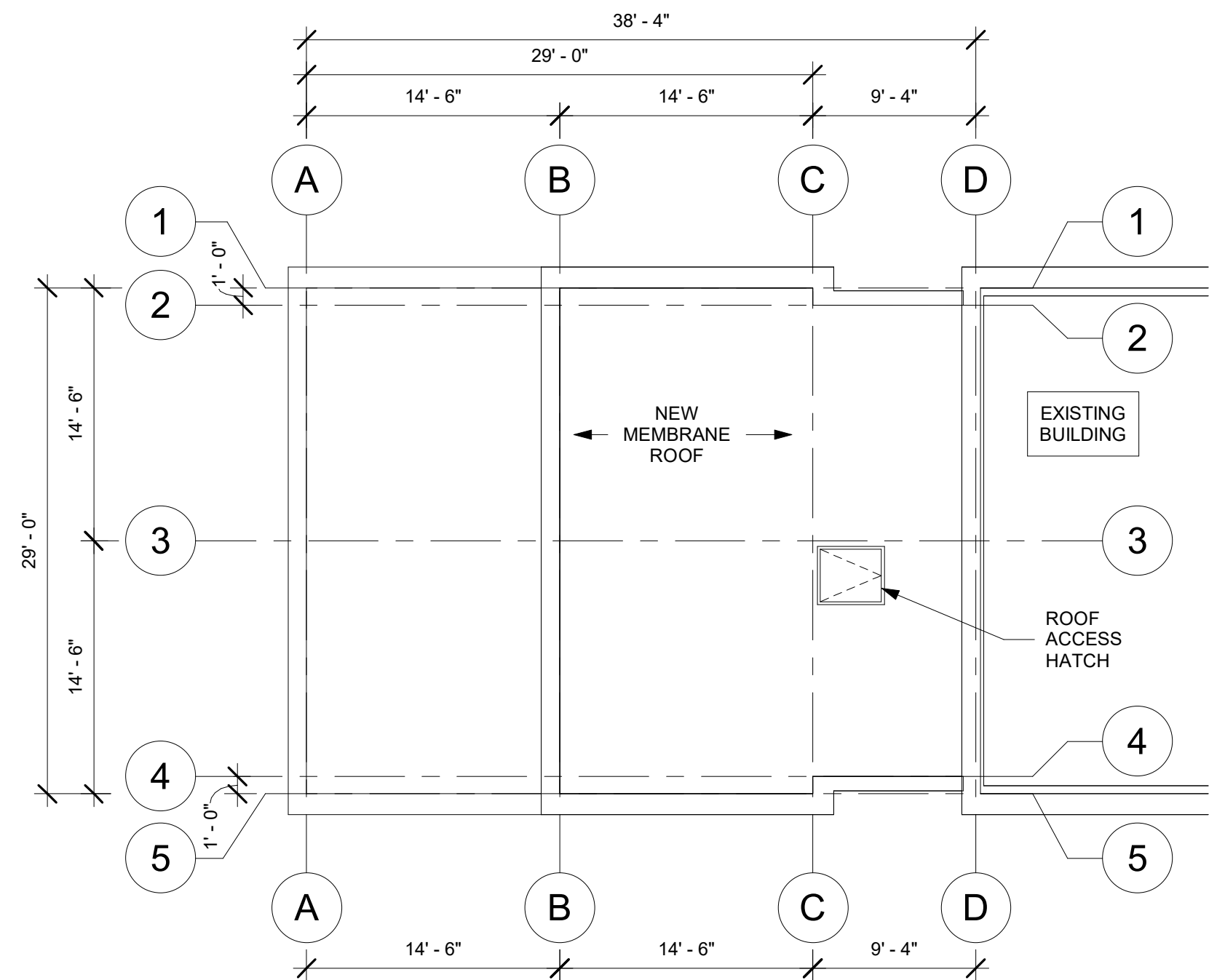
323 College Street

FLOOR PLANS

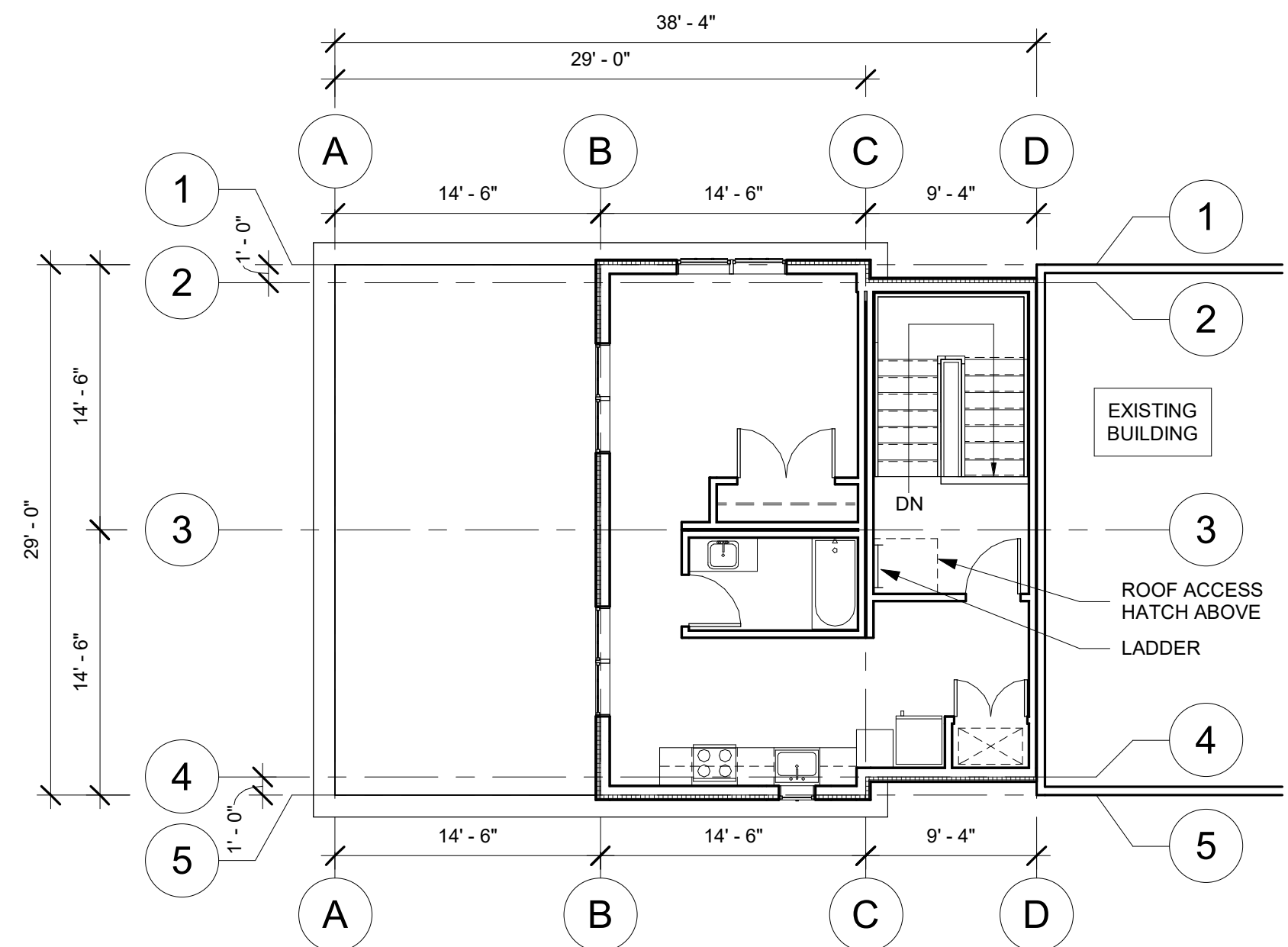
Project number :	202002
Date :	23 August 2022
Drawn by :	DLG
Checked by :	DLG
Project Phase :	Zoning Permit

A1

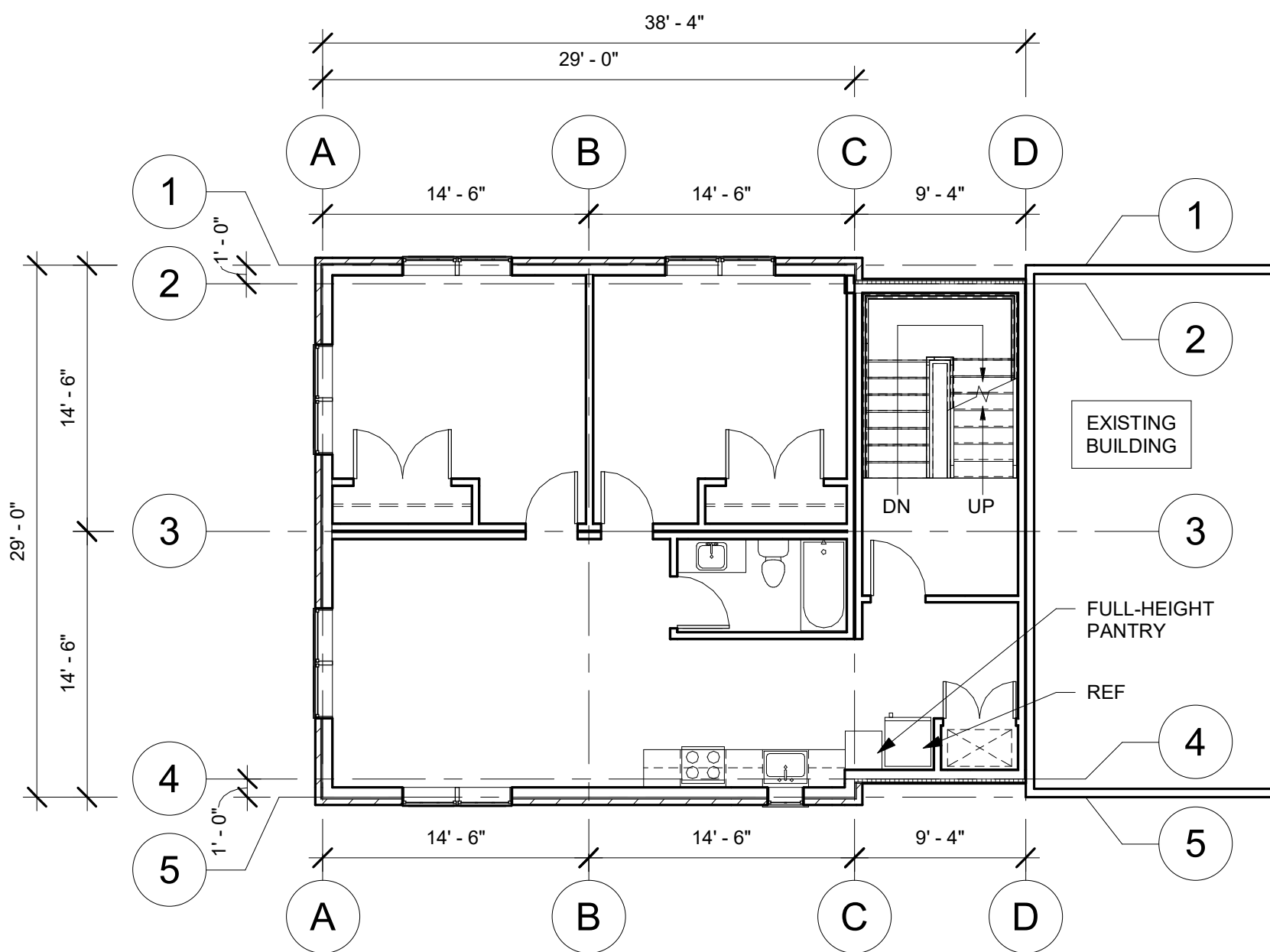
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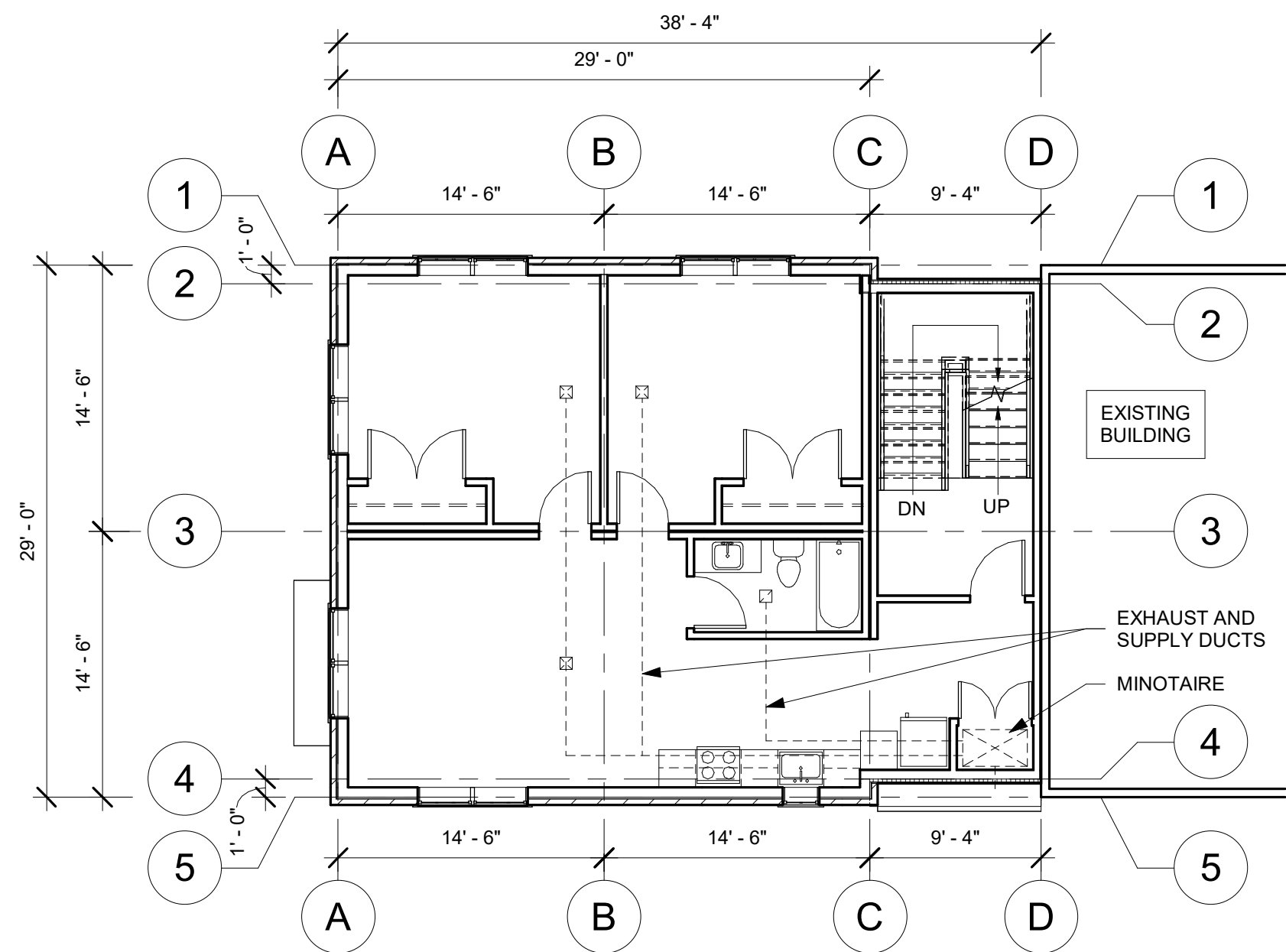
5 Roof Deck
1/8" = 1'-0"



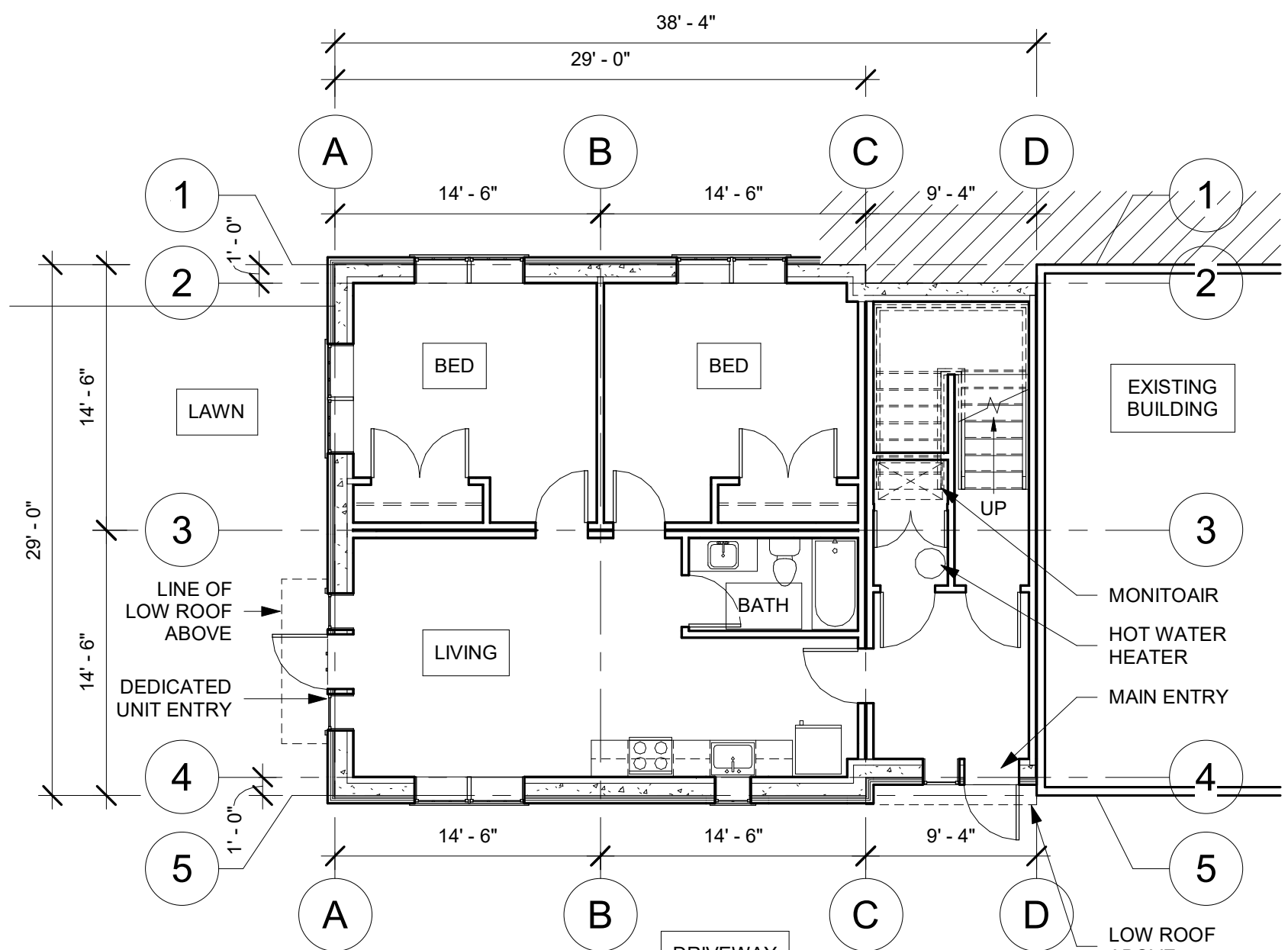
4 Third Floor
1/8" = 1'-0"



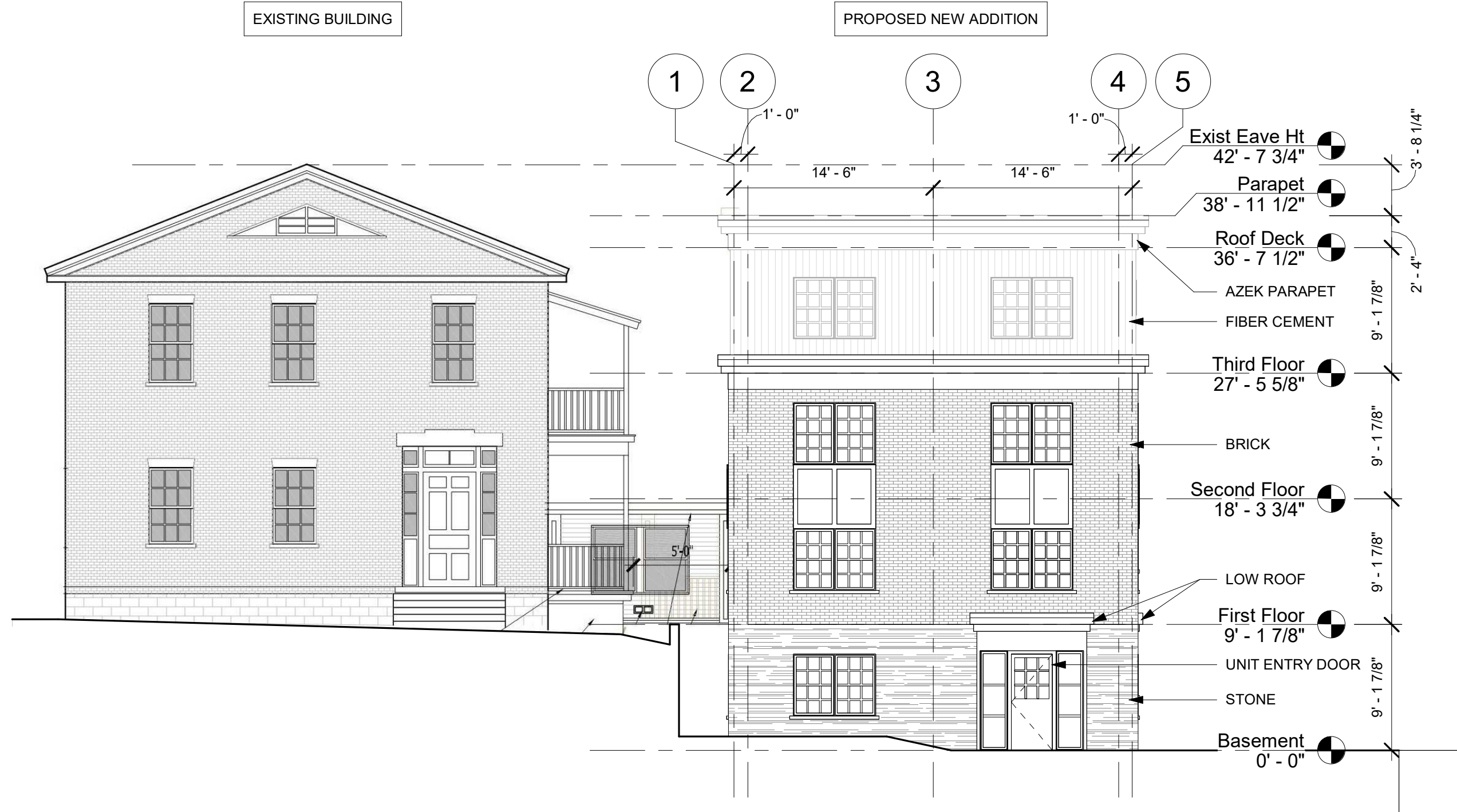
3 Second Floor
1/8" = 1'-0"



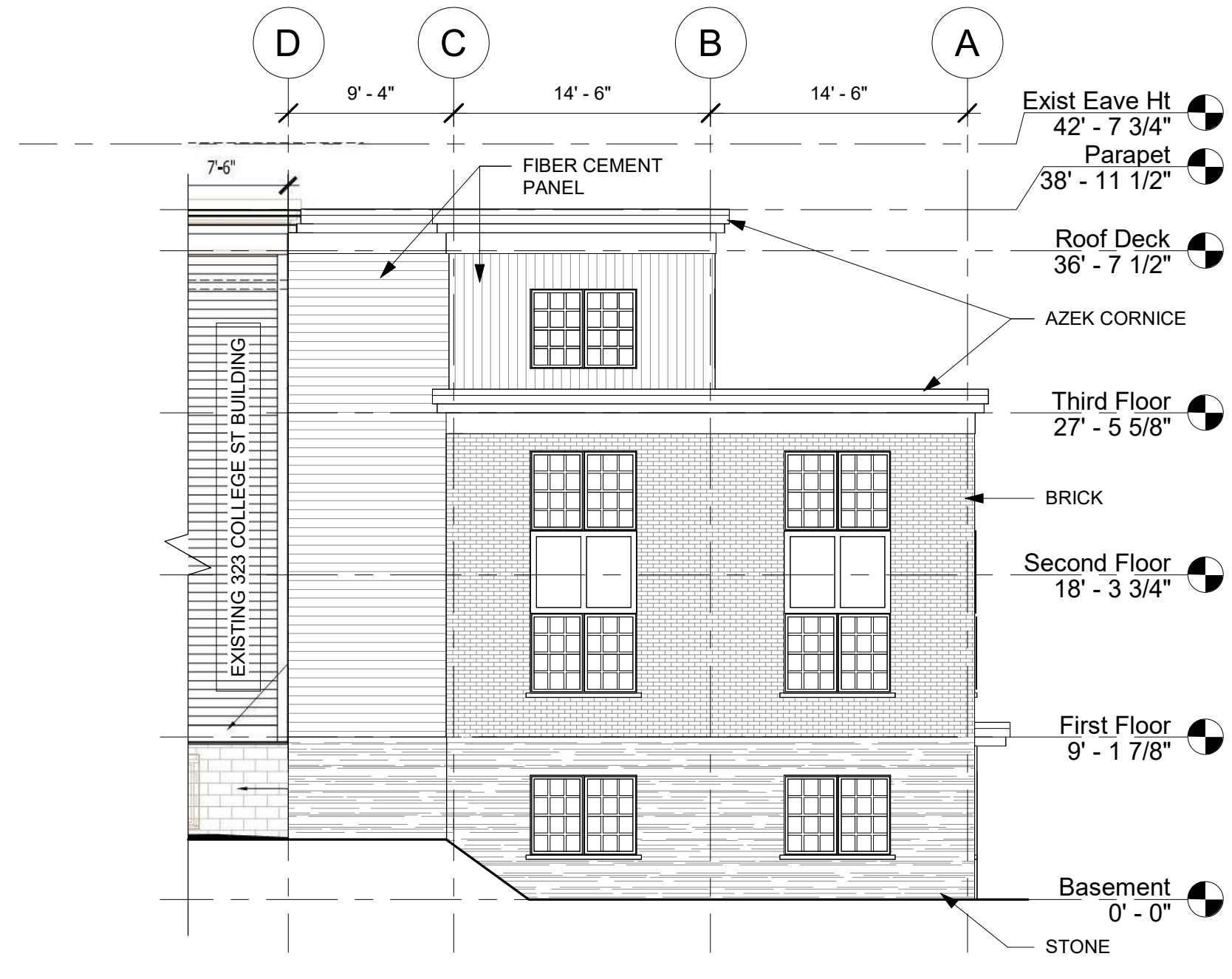
2 First Floor
1/8" = 1'-0"



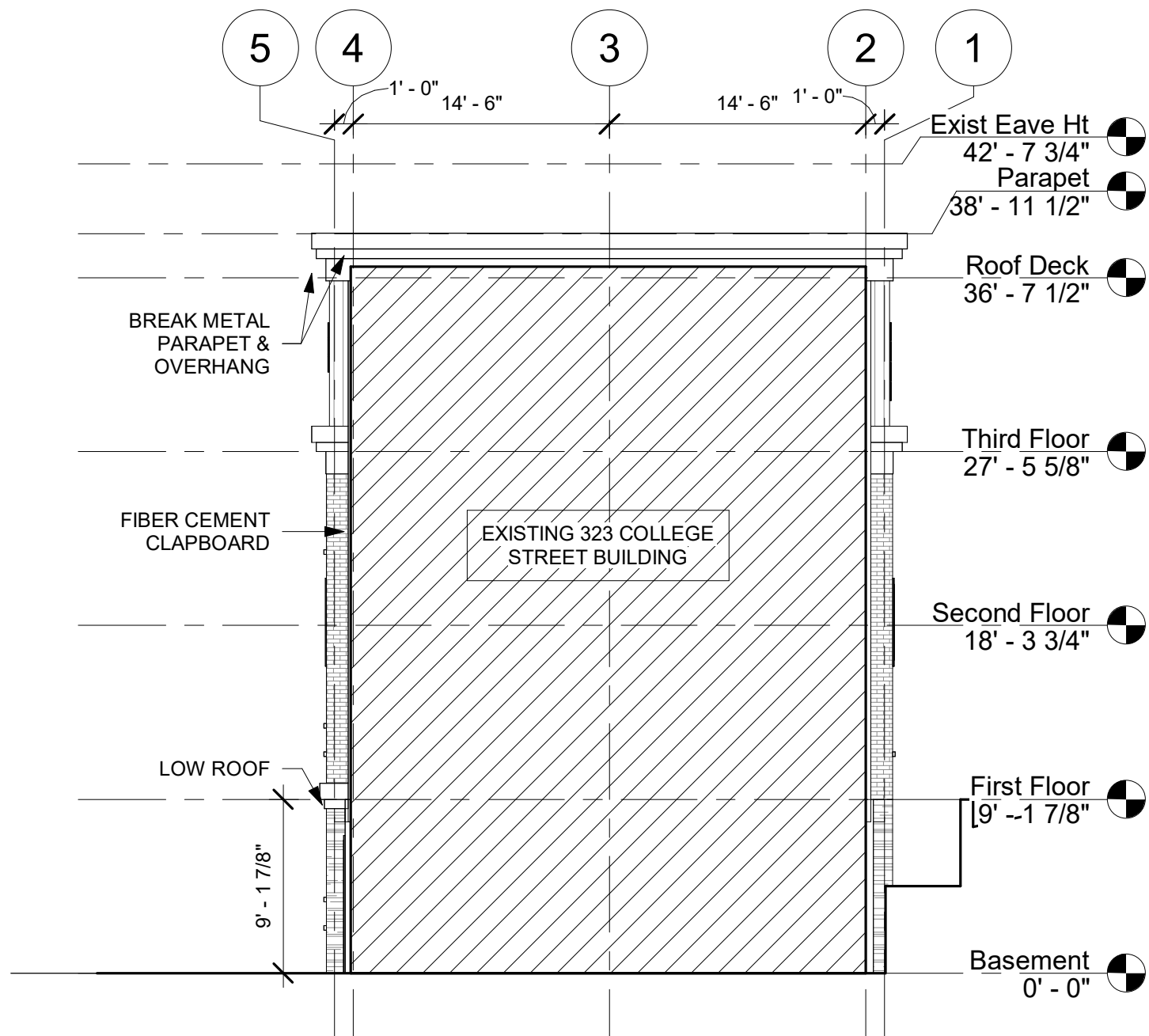
1 Basement
1/8" = 1'-0"



1 North Elevation
1/8" = 1'-0"



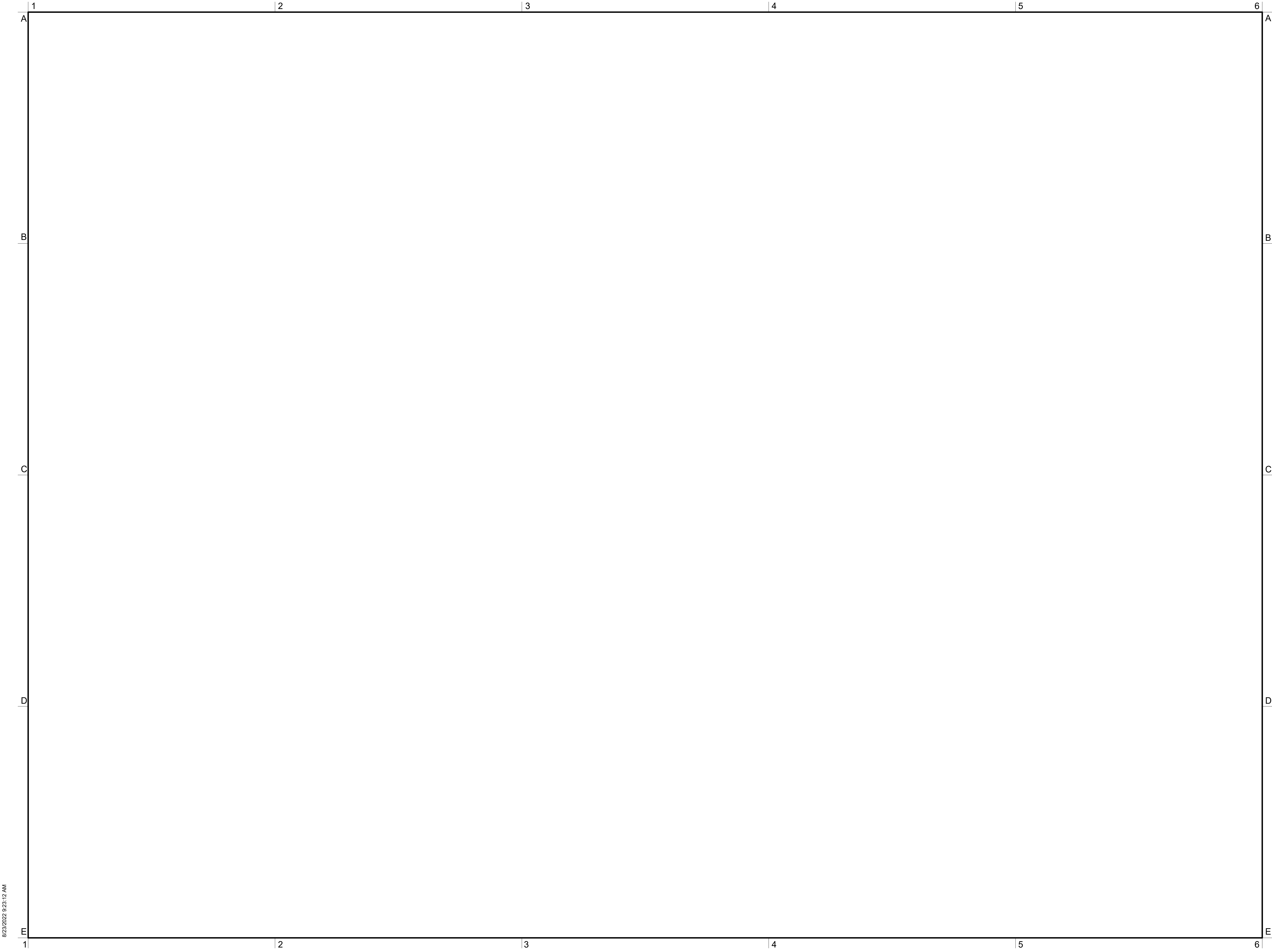
2 East Elevation
1/8" = 1'-0"



3 South Elevation
1/8" = 1'-0"



4 West Elevation
1/8" = 1'-0"



DGD

Daniel Goltzman Design & Development

119 Caroline Street
Burlington, Vermont 05401
646-957-4248

VHB

101 Walnut Street
Watertown, MA 02471
617-924-1770

No.	Description	Date
-----	-------------	------

Greencastle LLC

323 College Street

3D VIEWS

Project number :	202002
Date :	23 August 2022
Drawn by :	DLG
Checked by :	DLG
Project Phase :	Zoning Permit

A3

Scale :

Ryan Morrison

From: Bruce Baker <bbaker@cdbesq.com>
Sent: Tuesday, October 11, 2022 1:43 PM
To: Ryan Morrison
Cc: ben frye
Subject: RE: 323-325 College St DRB meeting
Attachments: 323 College St Site Plans 10-3-2022.pdf; MINOTAIR - PENTACARE-V12 -supporting document.pdf; 323 College St- DRB submission dwgs 2022-08-23.pdf

[WARNING]: This email was sent from someone outside of the City of Burlington.

Hi Ryan

Hi Ryan

It would be best for us to do a November DRB meeting. Thank you for the follow up

Attached are the updated plans and here are the narrative responses to your questions:

1. Landscaping plan, including trees to be removed noted See drawing C4.01 and 4.02 attached
2. The removal of all new parking spaces from the plans – retention of the existing 34 spaces may occur Ryan: We propose deleting 3 existing parking spaces (see drawing C 1.01 at the south east corner of the building) rather than the ones you suggest deleting. The reason for this is it allowed us to make way for secure long term bike storage. We are really trying to hard to amp up our cycling options to make the building even more cycle friendly. To do this we are proposing the following double tier bike storage system and shelter to be located where the prior 3 spaces were as shown on C 1.01

<https://cyclesafe.com/bike-parking/bike-lockers/bike-stations/>

The bike station will include Bluetooth cellular access for the shelter pods, a sheltered u rack and a bike repair stand. Most importantly, it is set back from the road. (We are finding that our tenants do not use bike parking near the road way due to bike theft issues in Burlington.) Bottom line is that this provides a more secure bike parking options that are also in addition to the varied bike parking options already offered inside the building (common room with bike storage and we provide at least one wall mount bike rack per apartment that holds one bike per rack). Note: the 4 new apartment units will also be outfitted with at least one wall mounted bike rack per unit that can hold one bike per rack.

3. Bicycle parking – 1 short term and 4 long term spaces See answer to #2 above showing we are substantially in excess of the requirement. See also drawing C 1.01 and for more detail C 4.01 as well as the web link above.
4. How many dwelling units have been, will be, or are approved for the applicant/responsible party within this month period? Zero dwelling units approved within the past 12 months by these applicants/resp. parties. The applicants are tenants in common joint owners of the property consisting of Peter C. Potts, Sr. IRA; Carol Potts IRA; Mary M. Lee IRA; 323 Green Castle LLC (the sole member is my wife Mary's Trust, the Mary M. Lee revocable trust); Elizabeth M. Demas IRA; and Alpha Properties, LLC (the sole member is Peter C. Potts,

Sr.). None of the owner applicants have any prior zoning approvals for any additional dwelling units within prior 12 month period.

5. Any updates to the property management plan? We have not updated the property management plan and continue to follow it

In addition, the plans confirm that the retaining wall is 3' or less at all points by notation of the engineer at drawing C1.01.

Mechanical units. We have no exterior mechanicals proposed. We are very excited to use the Minotair Pentair System. (See spec sheet attached). The system is cutting edge and ticks off a lot of our goals toward making buildings more efficient 1) all electric to get away from fossil fuels; 2) self contained within the apartment unit (no exterior mechanicals) and 3) direct vented to the outside (this meets a primary safety goal of ours post pandemic in that this system does avoid sharing air between units as with other HVAC systems).

Thank you,

Bruce

Bruce D. Baker, Esq.
Clarke Demas & Baker
346 Shelburne Road, 6th Floor
Burlington, VT 05401

802.652.1400 phone
802.652.1405 fax
802.316.0852 cell

From: Ryan Morrison <rmorrison@burlingtonvt.gov>
Sent: Tuesday, October 11, 2022 8:20 AM
To: ben frye <benjamin.frye12@gmail.com>
Cc: Bruce Baker <bbaker@cdbesq.com>
Subject: RE: 323-325 College St DRB meeting

EXTERNAL EMAIL

Bruce/Ben – if you need more time I'd be happy to have this deferred to the next available meeting – Nov. 15. Let me know.

Ryan Morrison
Associate Planner
City of Burlington
802-865-7190

"Please note that this communication and any response to it will be maintained as a public record and may be subject to disclosure under the Vermont Public Records Act."



323 COLLEGE - GRAY SIDING, BLACK CORNICE AT ROOFS



323 COLLEGE - WHITE SIDING, WHITE CORNICE AT ROOFS

HardiePlank®

Thickness 5/16 in

Length 12 ft planks

SELECT CEDARMILL® & SMOOTH

Width	5.25 in	6.25 in	7.25 in	8.25 in
Exposure	4 in	5 in	6 in	7 in
Prime Pcs/Pallet	360	308	252	230
ColorPlus Pcs/Pallet	324	280	252	210
Pcs/Sq	25.0	20.0	16.7	14.3

SELECT CEDARMILL®



Width	5.25 in	6.25 in	7.25 in	8.25 in
STATEMENT COLLECTION™	✓	✓		
DREAM COLLECTION™	✓	✓	✓	✓
PRIME	✓	✓	✓	✓

SMOOTH



Width	5.25 in	6.25 in	7.25 in	8.25 in
STATEMENT COLLECTION™	✓	✓		
DREAM COLLECTION™	✓	✓	✓	✓
PRIME	✓	✓	✓	✓

BEADED CEDARMILL®



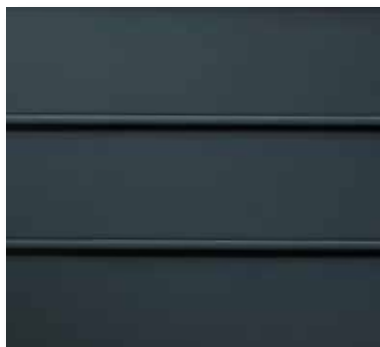
BEADED CEDARMILL® & BEADED SMOOTH

Width	8.25 in
Exposure	7 in
Prime Pcs/Pallet	240
ColorPlus Pcs/Pallet	210
Pcs/Sq	14.3

STATEMENT COLLECTION™	_____
DREAM COLLECTION™	✓
PRIME	✓

FIBER CEMENT
CLAPBOARD SIDING

BEADED SMOOTH



HardiePanel®

Thickness 5/16 in

FIBER CEMENT
PANEL SIDING

SELECT CEDARMILL®



SELECT CEDARMILL®, SMOOTH, STUCCO & SIERRA 8

Size	4 ft x 8 ft	4 ft x 10 ft
Prime Pcs/Pallet	50	50
ColorPlus Pcs/Pallet	50	50
Pcs/Sq	3.2	2.5

Size	4 ft x 8 ft	4 ft x 10 ft
STATEMENT COLLECTION™		✓
DREAM COLLECTION™	✓	✓
PRIME	✓	✓

SMOOTH



Size	4 ft x 8 ft	4 ft x 10 ft
STATEMENT COLLECTION™		✓
DREAM COLLECTION™	✓	✓
PRIME	✓	✓

STUCCO



Size	4 ft x 8 ft	4 ft x 10 ft
STATEMENT COLLECTION™		
DREAM COLLECTION™	✓	✓
PRIME	✓	✓

SIERRA 8

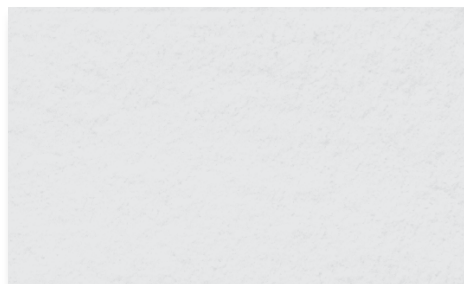


Size	4 ft x 8 ft	4 ft x 10 ft
STATEMENT COLLECTION™		
DREAM COLLECTION™		
PRIME	✓	✓

HardieTrim®

Length 12 ft boards

NT3® BOARDS SMOOTH



FIBER CEMENT
SIDING TRIM

4/4 SMOOTH

Thickness	.75 in				
Width	3.5 in	5.5 in	7.25 in	9.25 in	11.25 in
ColorPlus Pcs/Pallet	312	208	156	104	104

STATEMENT COLLECTION™	✓	✓	✓		✓
DREAM COLLECTION™	✓	✓	✓	✓	✓
PRIME					

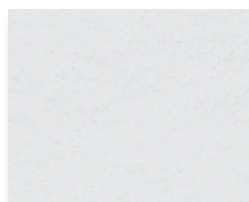
5/4 SMOOTH

Thickness	1 in					
Width	3.5 in	4.5 in	5.5 in	7.25 in	9.25 in	11.25 in
ColorPlus Pcs/Pallet	240	200	160	120	80	80

STATEMENT COLLECTION™	✓	✓	✓	✓		✓
DREAM COLLECTION™	✓	✓	✓	✓	✓	✓
PRIME						

BATTEN BOARDS

SMOOTH



RUSTIC GRAIN®



SMOOTH & RUSTIC GRAIN®

Thickness	.75 in	STATEMENT COLLECTION™	✓
Width	2.5 in	DREAM COLLECTION™	✓
Prime Pcs/Pallet	190	PRIME	✓
ColorPlus Pcs/Pallet	437		

HardieSoffit®

Thickness 1/4 in

VENTED SMOOTH

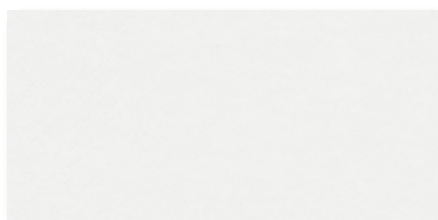


VENTED SELECT CEDARMILL®



ROOF OVERHANG FIBER CEMENT SOFFIT

NON-VENTED SMOOTH



NON-VENTED SELECT CEDARMILL®



BEADED PORCH PANEL



VENTED SMOOTH & SELECT CEDARMILL®

Length	12 ft	12 ft	8 ft
Width	12 in	16 in	24 in
Prime Pcs/Pallet	200	150	100
ColorPlus Pcs/Pallet	216	156	108

Size	12 ft x 12 in	12 ft x 16 in	8 ft x 24 in
STATEMENT COLLECTION™			
DREAM COLLECTION™	✓	✓	✓
PRIME	✓	✓	✓

Size	12 ft x 12 in	12 ft x 16 in	8 ft x 24 in
STATEMENT COLLECTION™			
DREAM COLLECTION™	✓	✓	✓
PRIME			

NON-VENTED SMOOTH & SELECT CEDARMILL®

Length	12 ft	12 ft	8 ft	8 ft
Width	12 in	16 in	24 in	48 in
Prime Pcs/Pallet	200	150	100	50
ColorPlus Pcs/Pallet	216	156	108	—

Size	12 ft x 12 in	12 ft x 16 in	8 ft x 24 in	8 ft x 48 in
STATEMENT COLLECTION™				
DREAM COLLECTION™	✓	✓	✓	
PRIME	✓	✓	✓	✓

Size	12 ft x 12 in	12 ft x 16 in	8 ft x 24 in	8 ft x 48 in
STATEMENT COLLECTION™				
DREAM COLLECTION™	✓	✓	✓	
PRIME				

BEADED PORCH PANEL

Thickness	1/4 in	STATEMENT COLLECTION™	_____
Length	8 ft	DREAM COLLECTION™	✓
Width	48 in	PRIME	_____
ColorPlus Pcs/Pallet	50		

CORRUGATED METAL SIDING

Exposed fastener panels provide ultimate flexibility with panels that can be used as exterior or interior walls, roofs or soffits. Exposed fastener panels can be installed in any weather to enable faster scheduling.

FEATURES & BENEFITS

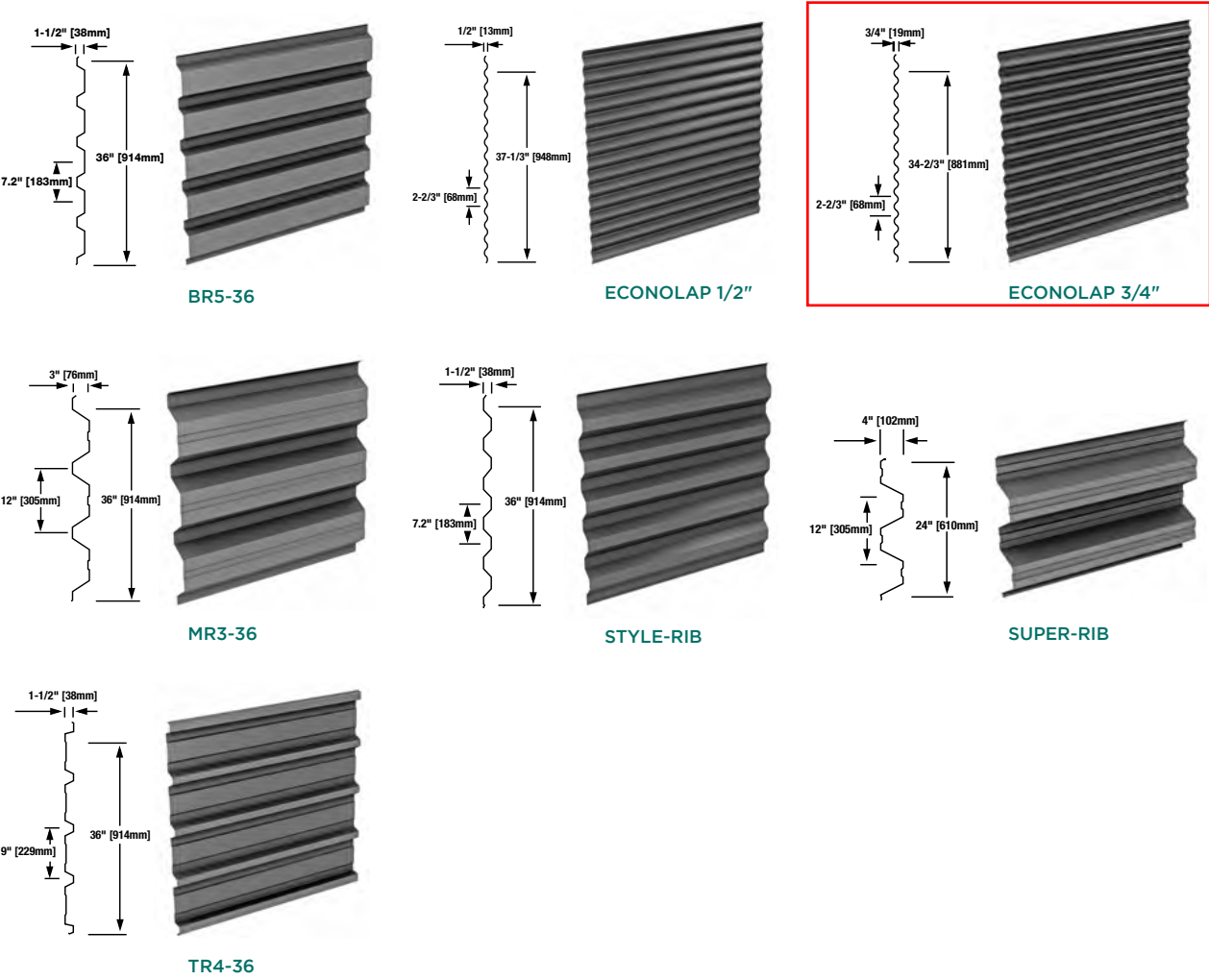
- Extremely versatile panels can be used as exterior or interior walls, roofs and soffits
- Ribs can be run either horizontally or vertically
- May be installed to meet many levels of thermal protection
- Excellent negative wind load properties
- Excellent option for both new construction and retrofit projects
- All-weather installation capability minimizes delays; permits fast-track scheduling
- Panels are available in embossed or smooth finishes

COMPONENT DESCRIPTION

SUBSTRATES	• Standard 24"-18 gauge G-90 galvanized steel • Optional aluminum or stainless steel
SURFACE FINISH	• Smooth or embossed surface texture
PANEL ORIENTATION	• Horizontal or vertical wall installation • Wall and roof installation
PANEL LENGTHS	• Lengths up to 40' [12.2m] for steel panels • Consult CENTRIA for more information.
COATINGS & COLORS	Available in a wide range of coil-coated colors and finishes. See charts on Pages 46-51.

*24-gauge only available in certain profiles. Consult CENTRIA.

EXPOSED FASTENER PANELS

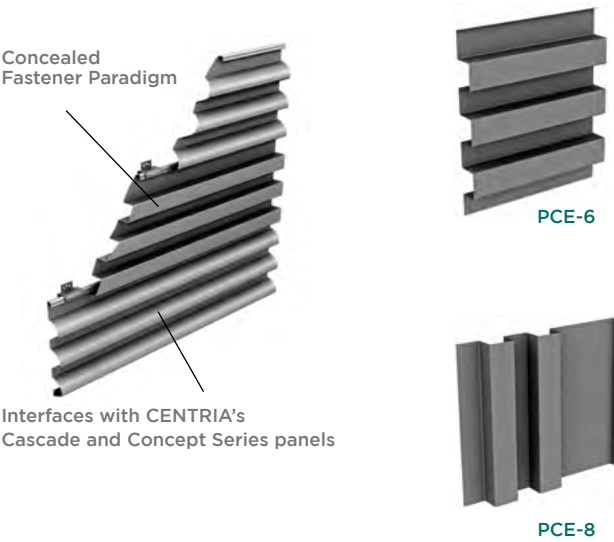


Paradigm makes it possible to create truly unique custom profiles in almost unlimited color and finish options. The result is design flexibility and control, as well as a cost-effective way to add distinctive accents to your next project.

FEATURES & BENEFITS

- Designer-customized panel profile shapes permit variation in design and shadow relief
- Vertical or horizontal installation
- Exposed and concealed fastener options available
- Custom-engineered panels with calculations and Professional Engineer stamps
- State-of-the-art production process ensures crisp and consistent panel fabrication quality
- All-weather installation capability minimizes delays and permits fast-track scheduling
- Unique, project-specific aesthetics and flexibility
- Integrates with CENTRIA Concept Series Concealed fastener panels and horizontal Cascade panels
- More than 85 standard colors and 11 finish options available along with custom color availability
- Our sales team along with a dedicated group of in-house engineers and architects are available to assist in making your product vision a reality

PARADIGM CONCEALED AND EXPOSED FASTENER PANELS



WE MADE IT EASIER AND FASTER TO GET THE METAL FLASHINGS, DRIP EDGES AND TRIM THAT SMART BUILDERS, ROOFERS AND SIDING CONTRACTORS RELY ON MOST.

Flashing, Soffit and Edge Metal

We made it easier and faster to get the metal flashings, drip edges and trim that smart builders, roofers and siding contractors rely on most. No more waiting for an order to arrive from out of state, no more labor-intensive hand-brake work.

Architectural Metal Supply offers standard window and door flashing in thicker-gauge metal than you would find in a hardware or box store, and we offer it in an array of colors. We also offer custom flashing products that accommodate the exterior insulation and rainscreen often required with today's energy-code standards.

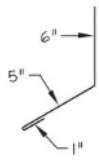


METAL CLADDING
FOR ROOF
PARAPET AND
OVERHANG

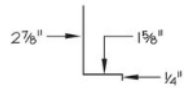
[REQUEST QUOTE](#)[LEARN MORE ABOUT OUR SISTER COMPANY REAP CONSTRUCTION](#)

ARCHITECTURAL METAL SUPPLY, 102 WILLIS FARM ROAD, RICHMOND, VT 05477,
USA (802) 434-3435 INFO@ARCHMETSUPPLY.COM

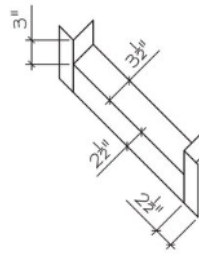




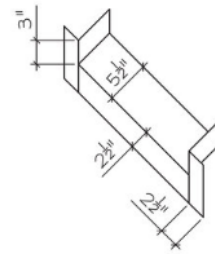
Apron Flashing



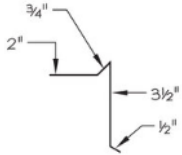
Deck Ledger



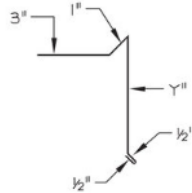
Door Pan - 2x4 Wall



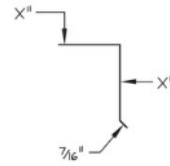
Door Pan - 2x6 Wall



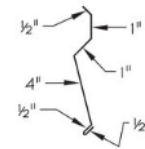
Gravel Stop



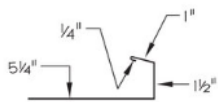
Gravel Stop 2



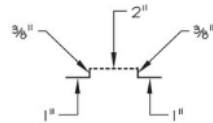
Hook Strip or Cleat



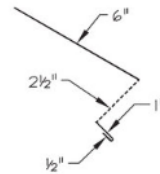
Mount Reglet



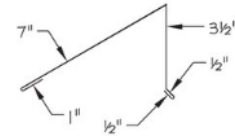
Rain Diverter



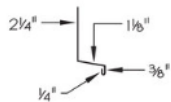
Soffit Vent



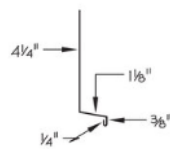
Vented Drip Edge



Vertical Ridge



4" Window Flashing



6" Window Flashing

ESSENTIAL DOUBLE HUNG

Previously known as Integrity All Ultrex Double Hung



Features of the Essential Double Hung Window

- Available in heights up to 6.5 feet or widths up to 4 feet
- Durable and low-maintenance material to the interior and exterior
- Low-profile, easy to operate locking mechanism
- Insert replacement option is available to fit seamlessly into existing window openings
- Top and bottom sash tilt and remove easily for maintenance/cleaning

ENERGY DATA	U-FACTOR	SHGC	VT	ENERGY STAR
Insulated Glass - Low E3 - Argon	0.29	0.22	0.51	NC, SC, S
Insulated Glass - Low E3 - Argon - GBG	0.29	0.20	0.46	NC, SC, S
Insulated Glass - Low E3 - Air	0.33	0.23	0.51	S
Insulated Glass - Low E3 - Air - GBG	0.33	0.20	0.46	S
Insulated Glass - Low E2 - Air - GBG	0.34	0.30	0.51	
Insulated Glass - Low E2 - Argon	0.30	0.33	0.57	NC
Insulated Glass - Low E3 / Low ERS - Argon	0.25	0.22	0.50	N, NC, SC, S
Insulated Glass - Low E3 / Low ERS - Argon - GBG	0.25	0.20	0.45	N, NC, SC, S
Insulated Glass - Low E1 - Argon	0.31	0.55	0.63	
Insulated Glass - Low E1 - Argon - GBG	0.31	0.49	0.56	
Insulated Glass - Low E1 - Air	0.34	0.54	0.63	
Insulated Glass - Low E1 - Air - GBG	0.34	0.49	0.56	
Insulated Glass - Low E3 / Low ERS - Air	0.28	0.22	0.50	NC, SC, S
Insulated Glass - Low E3 / Low ERS - Air - GBG	0.28	0.20	0.45	NC, SC, S
Insulated Glass - Low E2 - Argon - GBG	0.30	0.30	0.51	NC
Insulated Glass - None - Air	0.48	0.62	0.65	

Unit Features

Essential Double Hung: ESDH

For applicable certification and code information, refer to the Introduction and Product Performance chapter.

Frame and Sash:

- The frame and sash exteriors are made of Ultrex®, an advanced fiber reinforced material that is resistant to thermal conductance.
- Exterior colors: Stone White, Pebble Gray, Bronze, Evergreen, Cashmere, or Ebony.
- Interior coating meets all the requirements in Stone White, Bronze, Ebony.
- Split finishes are not available on Dark Interior option. Only Bronze interior/Bronze exterior and Ebony interior/Ebony exterior combinations are available for dark interior options.

Frame:

- Composite frame thickness is 1 3/8", (35). Frame width is 3 3/32", (79). Flat bottom sill with 11 degree bevel. Ultrex is .065"-070" (2) thick.

Sash:

- Composite sash thickness is 15/16" (24). Ultrex is .065" - .070" (2) thick. Sash can be replaced by cannot be re-glazed.
- Cottage style unit: Sash divided 2/5 over 3/5.
- Oriel style unit: Sash divided 3/5 over 2/5.

Jamb Extension:

- 2" (51) is standard
- 4 9/16" (116) and 6 9/16" (167) maintenance free jamb extension available
- Available in Stone White, Bronze, or Ebony. Default color will match the unit interior selection. Stone White jamb extension is available for all unit interior color selections.

Hardware:

- Balance system is a coil spring block and tackle system
 - Nylon cord and steel locking shoe
- High pressure zinc die cast check rail lock and keeper.
 - Lock employs a cam-lock mechanism
 - Two locks on rough openings over 30" (762) wide
- Cam Lock, Keeper and Fastener Default Color: Stone White for Stone White Interior, Oil Rubbed Bronze for Bronze Interior, Matte Black for Ebony Interior.
 - Optional Stone White, Almond Frost, Brass, Satin Nickel, Matte Black, and Oil Rubbed Bronze hardware finishes available
- Tilt Latches, Top Sash Pull and Sash Lift will match the unit interior color (Stone White, Bronze or Ebony).
- Bottom Sash employs tilt latches to allow for easy tilting of sash
- Optional factory applied Window Opening Control Device is available in Black or White color finish.
(min size: 17 27/32" (453) x 24" (610) - max size: 36" (914) x 71 1/8" (1807))
- ABS sash travel limiter is available for field application in Beige color finish with Stone White or Matte Black screws.
- Non-operable lock is available for field application. Available colors: Stone White, Almond Frost, Brass, Oil Rubbed Bronze, Satin Nickel, Matte Black.

Installation:

- Factory applied folding nailing fin
- Optional through jamb installation method with brackets
- Factory supplied mulling kits are available for standard assemblies

Glazing:

- Dual-pane units are manufactured with an 11/16" (17) IG with Low E2, E3, E1, E3/ERS, or no coating including argon gas or air fill.
- Tempered glass and/or obscure glass, and California Fire glass (annealed exterior and tempered interior glazing configuration) are available as an option.
- The glazing seal is a silicone bedding on the exterior surface, and vinyl glazing seal on the interior surface.
- The perimeter spacer default color is mill finish (stainless). An optional black perimeter spacer color is available for all unit interior color selections.
- STC/OITC values are available for 3.1 mm thickness glass.
 - Optional 3.1/4.7 STC/OITC Upgrade glass is available. See the Product Performance chapter for STC and OITC ratings.
- Decorative glass options include frost, glue chip, rain, reed, narrow reed and tinted (bronze, gray or green).
 - Decorative glass is not available with Low E3/ERS or STC/OITC.

Unit Features Continued**Weather Strip:**

- Sill is foam filled vinyl bulb. Color: Beige for Stone White interior, Black for Bronze and Ebony interiors.
- Bottom sash is sealed to the jambs using foam filled vinyl bulb. Color: beige for Stone White interior, black for Bronze and Ebony interiors.
- Top sash is sealed to the jambs using a hollow vinyl bulb. Color: stone white rigid/bulb for Stone White interior, black rigid/bulb for Ebony interior and Bronze rigid/black bulb for Bronze interior.
- Check rails are sealed using rigid vinyl with flexible seal. Top sash check rail cover is beige for Stone White interior and black for Bronze and Ebony interiors. Bottom sash check rail cover will match the unit interior color (Stone White, Bronze or Ebony).

Screen:

- Roll formed aluminum frame with corner key construction
- Available in finish to match the exterior Ultrex frame color
- Charcoal color fiberglass (non-corrosive) screen cloth.
- Spring loaded pins for installation.
- Available in standard full screen or optional half screen

NOTE: Screen bar added when frame OM (height) is equal to or greater than 47 1/2" (1207)

Grilles-Between-The-Glass (GBG):

- 11/16" (17) contoured aluminum bar placed between two panes of glass
- Pattern: Standard rectangular pattern, optional 6 or 9 lite Prairie cut, or Cottage style cut on Double Hung
- Exterior Colors: Stone White, Pebble Gray, Bronze, Evergreen, Cashmere, or Ebony
- Interior Colors: Stone White, Bronze or Ebony (matches unit interior color).
- Not available with tinted glass.

Accessories:

- Field Applied: J-Channel, a 1" (25) or 3" (76) frame expander, Flush Fin installation kit
- Factory Applied: Sheet rock return for 1/2" (13) or 5/8" (16) drywall, a 3/4" (19) receiver, a frame filler or a flush fin.
- Sheet rock return and 3/4" receiver color options: Stone White, Bronze or Ebony. Default color will match unit interior selection. Stone White sheet rock return and 3/4" receiver are available for all unit interior color selections.
- General Mull kits are available for field assembly

Exterior Casing:

- Non-integral to the unit
- Fastened to the exterior wall with barb and kerf: 2" brick mould as a full surround or with sill nosing
- 3 1/2" flat casing available as full surround or with sill nosing
- Available with 1" ranch style and header overhang

NOTE: NFRC Values are now located on www.marvin.com

ENERGY STAR® Program - United States

www.energystar.gov

About ENERGY STAR®

ENERGY STAR® is a joint program of the U.S. Environmental Protection Agency and the U.S. Department of Energy helping us all save money and protect the environment through energy efficient products and practices.

Residential Windows, Doors and Skylights

Thanks to advances in technology, today's ENERGY STAR® qualified windows, doors, and skylights offer greater savings than ever before. Just look for the ENERGY STAR® label.

Save energy and money.

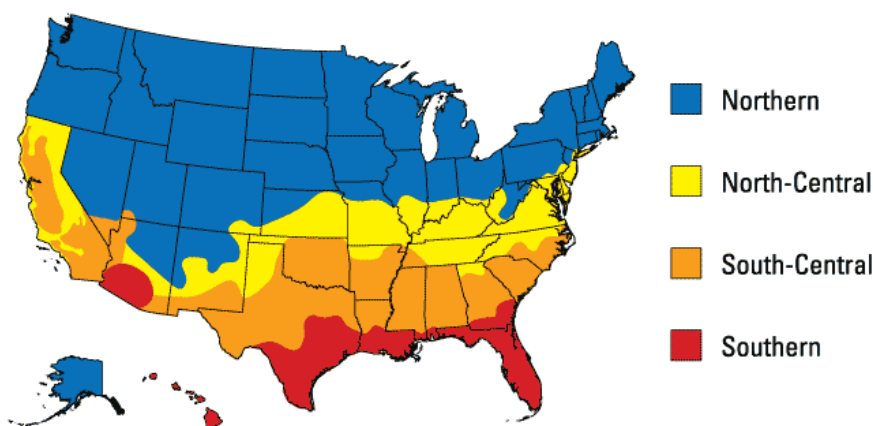
Replacing old windows with ENERGY STAR® qualified windows lowers household energy bills. Lower energy consumption also reduces greenhouse gas emissions from power plants and shrinks a house's carbon footprint.

Current Specification Effective Date: January 1, 2016

As of January 1, 2016, ENERGY STAR® qualified windows, doors, and skylights meet new performance levels, see below.

Windows and skylights must meet NFRC U-Factor and, where applicable, Solar Heat Gain Coefficient (SHGC) requirements based on climate zone. Doors must meet U-Factor and, where applicable, SHGC requirements based on glazing level (amount of glass).

At this time, most Marvin product lines qualify for the ENERGY STAR® program. For more specific information, please refer to the individual product sections in your Marvin catalog.



WINDOWS			
CLIMATE ZONE	U-FACTOR ¹	SHGC ²	
Northern	≤ 0.27	Any	Prescriptive
	= 0.28	≥ 0.32	Equivalent Energy Performance
	= 0.29	≥ 0.37	
	= 0.30	≥ 0.42	
North Central	≤ 0.30	≤ 0.40	
South Central	≤ 0.30	≤ 0.25	
Southern	≤ 0.40	≤ 0.25	

DOORS			
GLAZING LEVEL	U-FACTOR ¹	SHGC ²	
Opaque	≤ 0.17	No Rating	
≤ ½-Lite	≤ 0.25	≤ 0.25	
> ½-Lite	≤ 0.30	Northern North-Central	≤ 0.40
		Southern South-Central	≤ 0.25

ENERGY STAR® Most Efficient - United States

The ENERGY STAR® Most Efficient mark is an extension of the ENERGY STAR® brand and is designed to recognize and advance the most efficient products among those that qualify for ENERGY STAR®. This recognition is for specific categories and awarded for a specific year.

Marvin has long been a leader in providing our customers with energy efficient options. We are pleased to announce that Marvin meets the US ENERGY STAR® Most Efficient criteria with over 50 product types and 13,000+ glazing options.

MOST EFFICIENT CRITERIA

Energy Star Zone	U-factor	SHGC
Northern	≤ 0.20	≥ 0.20
North-Central	≤ 0.20	≤ 0.40
South-Central	≤ 0.20	≤ 0.25
Southern	≤ 0.20	≤ 0.25

As more product and glazing options are certified throughout the year, additional qualifying options will become available. The EPA has set up a page on its website where consumers can go to find all of the Marvin options that meet the Most efficient criteria.

To view the latest listing for [casement windows](#)

To view the latest listing for [horizontal sliding windows](#)

To view the latest listing for [vertical sliding windows](#)

To view the latest listing for [fixed windows](#)



IO (mm)	1' - 6" (457)	2' - 0" (610)	2' - 6" (762)	2' - 8" (813)	3' - 0" (914)	3' - 6" (1067)	4' - 0" (1219)
RO (mm)	1' - 6" (457)	2' - 0" (610)	2' - 6" (762)	2' - 8" (813)	3' - 0" (914)	3' - 6" (1067)	4' - 0" (1219)
FS (mm)	1' - 5 1/2" (445)	1' - 11 1/2" (597)	2' - 5 1/2" (749)	2' - 7 1/2" (800)	2' - 11 1/2" (902)	3' - 5 1/2" (1054)	3' - 11 1/2" (1207)
DLO (mm)	12 9/16" (319)	18 9/16" (471)	24 9/16" (624)	26 9/16" (675)	30 9/16" (776)	36 9/16" (929)	42 9/16" (1081)
2' - 11 3/4" (908)							
2' - 5 3/4" (756)							
3' - 0" (914)							
3' - 6" (1067)							
2' - 11 1/2" (902)							
3' - 5 1/2" (1054)							
20 5/16" (516)							
4' - 5 3/4" (1365)							
5' - 0" (1524)							
35 5/16" (897)							

MARVIN ESSENTIAL™ COLLECTION

DOUBLE HUNG - Transoms and Multiple Assemblies

Transom Muller Over Double Hung

MO (mm)	2' - 6" (762)
RO (mm)	2' - 6" (762)
FS (mm)	2' - 5 1/2" (749)

5' - 11 3/4" (1822)
6' - 0" (1829)
5' - 11 1/2" (1816)

ESDHTR2616

ESDH2646

Transom Muller Over Double Hung 2 Wide

MO (mm)	5' - 0" (1524)
RO (mm)	5' - 0" (1524)
FS (mm)	4' - 11 1/2" (1511)

5' - 11 3/4" (1822)
6' - 0" (1829)
5' - 11 1/2" (1816)

ESDHTR5016

ESDH2646 / ESDH2646

Double Hung Flankers with Center Picture*

MO (mm)	10' - 0" (3048)
RO (mm)	10' - 0" (3048)
FS (mm)	9' - 11 1/2" (3035)

4' - 5 3/4" (1365)
4' - 6" (1372)
4' - 5 1/2" (1359)

ESDH2646 / ESDHP5046 / ESDH2646

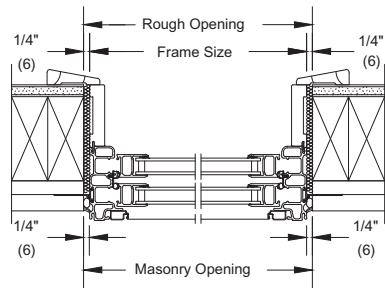
Double Hung Flankers with Center Operator

MO (mm)	7' - 6" (2286)
RO (mm)	7' - 6" (2286)
FS (mm)	7' - 5 1/2" (2273)

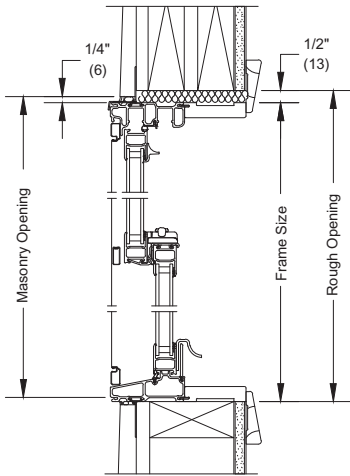
4' - 5 3/4" (1365)
4' - 6" (1372)
4' - 5 1/2" (1359)

ESDH2646 / ESDH2646 / ESDH2646

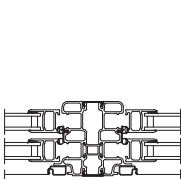
Construction Details



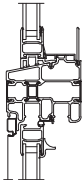
Jambs



Head Jamb
& Sill



Vertical Mullion



Horizontal Mullion
Transom/Operator

* This product is only available field muller.

Details and Elevations not to scale.

Available in equal, cottage, and reverse cottage sash configurations. Cottage and reverse cottage sash configurations are not available on 20, 60, and 66 call number heights.

Obscure Glass option available on all units.

Special sized units available within product size matrix. See your Marvin retailer.

Units may optionally include a window opening control device tested to ASTM F2090-10, which can be released from the inside without the use of a key, tool, special knowledge, or force greater than that required for normal unit operation.

See page 52 for specific PG Ratings.

For further details and drawings visit the 'Tools and Documents' section at Marvin.com.

MULTIPLE ASSEMBLIES

Multiple assemblies can be factory muller.

MAXIMUM ROUGH OPENING not to exceed 114" x 78". Maximum up to 6 units wide by 1 unit high.

MAXIMUM ROUGH OPENING not to exceed 96" x 96". Maximum up to 5 units wide by 5 units high.

Field mull kits are available. Structural mullion reinforcement is required for some assemblies.

Please consult your local Marvin representative for more information.



LED 10W & 13 Wallpacks. Patent Pending thermal management system. 100,000 hour L70 lifespan. 5 Year Warranty.

Color: Bronze

Weight: 3.3 lbs

Project:
Pine and Flynn

Type:
C

Prepared By:
A. Murphy

Date:
06/28/16

Driver Info

Type: Constant Current
120V: 0.13A
208V: 0.08A
240V: 0.07A
277V: 0.06A
Input Watts: 15W
Efficiency: 87%

LED Info

Watts: 13W
Color Temp: 4000K
Color Accuracy: 83 CRI
L70 Lifespan: 100000
Lumens: 673
Efficacy: 45 LPW

Technical Specifications

Listings

UL Listing:

Suitable for Wet Locations as a Downlight. Suitable for Damp Locations as an Uplight. Wall Mount only. Suitable for Mounting within 4ft. of ground.

Dark Sky Approved:

The International Dark Sky Association has approved this product as a full cutoff, fully shielded luminaire.

IESNA LM-79 & IESNA LM-80 Testing:

RAB LED luminaires have been tested by an independent laboratory in accordance with IESNA LM-79 and 80, and have received the Department of Energy "Lighting Facts" label.

Optical

Lumen Maintenance:

100,000-hour LED lifespan based on IES LM-80 results and TM-21 calculations.

Fixture Efficacy:

44.6 Lumens per Watt

Lumen Maintenance:

The LED will deliver 70% of its initial lumens at 100,000 hours of operation.

BUG Rating:

B1 U0 G0

Construction

Cold Weather Starting:

The minimum starting temperature is -40°F/-40°C.

Ambient Temperature:

Suitable for use in 50°C (122°F) ambient temperatures.

Finish:

Our environmentally friendly polyester powder coatings are formulated for high-durability and long-lasting color, and contains no VOC or toxic heavy metals.

Green Technology:

RAB LEDs are Mercury and UV free.

For use on LEED Buildings:

IDA Dark Sky Approval means that this fixture can be used to achieve LEED Credits for Light Pollution Reduction.

Gaskets:

High Temperature Silicone.

Electrical

Driver:

Multi-chip 13W high output long life LED Driver Constant Current, Class 2 100V - 277V, 50/60 Hz.

Surge Protection:

4KV

LED Characteristics

Color Temperature (Nominal CCT):

4000K

Color Accuracy:

86 CRI

Color Consistency:

3-step MacAdam Ellipse binning to achieve consistent fixture-to-fixture color.

Color Stability:

LED color temperature is warrantied to shift no more than 200K in CCT over a 5 year period.

Color Uniformity:

RAB's range of CCT (Correlated color temperature) follows the guidelines of the American National Standard for Specifications for the Chromaticity of Solid State Lighting (SSL) Products, ANSI C78.377-2015.

Other

Patents:

The design of the LPACK is protected by U.S. Pat. D604,004 and patents pending in Canada, China and Taiwan.

California Title 24:

See WPLED13/PC for a 2013 California Title 24 compliant model.

Warranty:

RAB warrants that our LED products will be free from defects in materials and workmanship for a period of five (5) years from the date of delivery to the end user, including coverage of light output, color stability, driver performance and fixture finish.

Equivalency:

The WPLED13 is Equivalent in delivered lumens to a 100W Metal Halide Wallpack.

HID Replacement Range:

The WPLED13 can be used to replace 70-150W Metal Halide Wallpacks based on delivered lumens.

Country of Origin:

Designed by RAB in New Jersey and assembled in the USA by RAB's IBEW Local 3 workers.

Technical Specifications (continued)

Other

Buy American Act Compliant:

This product is a COTS item manufactured in the United States, and is compliant with the Buy American Act.

Recovery Act (ARRA) Compliant:

This product complies with the 52.225-21 "Required Use of American Iron, Steel, and Manufactured Goods-- Buy American Act-- Construction Materials (October 2010).

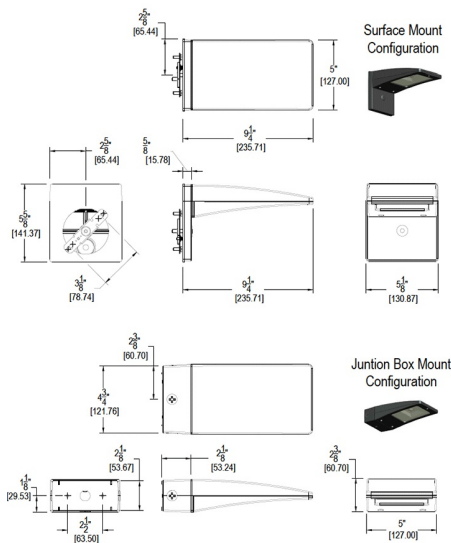
Trade Agreements Act Compliant:

This product is a COTS item manufactured in the United States, and is compliant with the Trade Agreements Act.

GSA Schedule:

Suitable in accordance with FAR Subpart 25.4.

Dimensions



Features

- High performance LED light engine
- Maintains 70% of initial lumens at 100,000 hours
- Weatherproof high temperature silicone gaskets
- Superior heat sinking with die cast aluminum housing and external fins
- 5-year warranty

Ordering Matrix

Family	Watts	Color Temp	Sensor	Surface Plate	Surface Place	Finish	Photocell
WPLED	10 = 10W 13 = 13W	= 5000K (Cool) Y = 3000K (Warm) N = 4000K (Neutral)	= No Sensor MS = Mini Sensor	= No Surface Plate	S = Surface Plate	= Bronze W = White	= No Photocell /PC = 120V Button /PCS = 120V Swivel /PC2 = 277V Button



ROUGH CUT®



Autumn Leaf RoughCut



Casa Blanca RoughCut



Moonlight RoughCut



Vineyard Trail® RoughCut



Wheatfield RoughCut



ELDORADO PROFILE SIZES

*Sizes are nominal ranges. Actual sizes may vary slightly.

STONE	HEIGHT	LENGTH	THICKNESS	PAGES
Ashlar	4" – 12"	11" – 26"	.625" – 3"	30
Bluffstone	1" – 5.5"	4" – 22"	1.375" – 3.5"	40, 46
Cliffstone	1.25" – 6"	4" – 22"	1" – 2"	1, 38
Coarsed Stone	11.75"	12", 18", 24", 30"	1.5"	52
Coastal Ledge	1" – 4"	4" – 24"	1" – 2.75"	52
Coastal Reef	4" – 12"	4" – 16"	1" – 1.25"	14, 31
Cobblestone	2.5" – 12"	4" – 21"	1.875" – 2.75"	50, 53
Country Rubble	2" – 18"	4" – 18"	1" – 2.5"	42, 47
Cut Coarse Stone	3", 6", 9"	12", 18", 24"	.75" – 2.5"	8, 20, 31
Cypress Ridge	1.25" – 18"	4" – 24"	1" – 3.5"	6, 42
European Ledge Single Stone	1.5"	11"	.75" – 2.125"	8, 33
European Ledge Panel	4.5"	24"	.75" – 2.25"	33
Fieldledge	1.5" – 15"	5" – 18"	1.25" – 1.5"	43, 53
Hillstone	1" – 12"	3" – 18"	1" – 3.25"	43, 54
LedgeCut33	3"	12", 18", 24"	.75" – 2"	8, 32
Limestone	2.25" – 8"	3.5" – 17"	1" – 2.5"	39, 48, 53
Longitude24	12"	24"	1"	28
Marquee24	12"	24"	1"	8, 30
Mountain Ledge	1" – 4"	4" – 18"	1" – 3.5"	10, 36, 47, 51, 53
Mountain Ledge Panels	5"	8", 12", 20"	1" – 2.5"	37, 51
Ridgetop18	9"	18"	1" – 1.625"	27
River Rock	1.5" – 15"	3" – 18"	2" – 3.5"	44
RoughCut	2" – 11"	2" – 18.375"	1.5" – 2.5"	41, 48, 51
Rustic Ledge	1" – 5"	6.5" – 20"	1" – 2.5"	12, 22, 35, 54
Shadow Rock	2" – 10"	5" – 24"	2" – 3.5"	44, 49
SierraCut24	12"	24"	1" – 2.5"	30
Stacked Stone	4"	8", 12", 20"	.625" – 2"	16, 34, 48, 51, 54
Vantage30	6"	30"	1" – 1.625"	27
Vintage Ranch	6"	36"	1.125" – 1.375"	4, 25
Weather Edge	1.25" – 8"	5" – 25"	1" – 3.5"	48
Zen24	12"	24"	1"	28

ADOBE

CaminoAdobe	5"	15.5"	1.375" – 1.5"	55
CapistranoAdobe	3.5"	15"	1.25"	55

BRICK

ModenaBrick	2.5"	8"	.75" – .875"	6, 58
RomaBrick	1.5" – 2"	9" – 10.25"	1.125" – 1.25"	58
TundraBrick	2.5"	7.875"	.875"	18, 56, 59
ViaBrick	1.25" – 1.75"	7" – 7.25"	.875"	58



ASHLAR ACCENTS

Ashlar Accents have been sculpted to create uniform edge details. The consistent shape simplifies the installation process, while providing the characteristics and texture of natural stone. Available in Taupe, Earth, Smoke & Buckskin.



Taupe



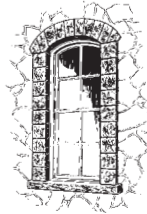
Earth



Smoke

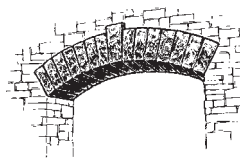


Buckskin



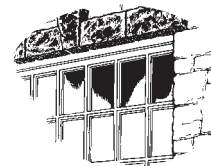
Trim Stones

Approx. 2" thick.



Keystone & Archstone

Approx. 1.5" to 2" thick.



Cut Heads

Approx. 1.5" to 2.5" thick.



Rustic Wall Caps

Approx. 5.75" to 7" thick.

Available in 3 Sizes:

30" x 24"

24" x 24"

18" x 24"



Wall Caps

Approx. 5.75" to 6.5" thick.

Available in 2 Sizes:

20" x 12"

16" x 12"

CRAFTSHIELD™

Preserving the Art of Masonry. CraftShield is a protective treatment that preserves the intended artistry and beauty of architectural stone veneer while safeguarding the surface from nature's elements.

Designed for use on concrete and most masonry surfaces including Eldorado Stone and Eldorado Brick veneer, CraftShield goes on wet and dries invisible to the eye.

It's low odor and alkaline-stable formula is ideal for both exterior and interior applications and offers 10-Year Protection to help resist staining, spalling, cracking and other damage related to water intrusion.

Gallon covers 150-200 sq. ft. of surface area.



CHISELED EDGE™ ACCENTS

Historically, masons have worked with natural stone to create unique accent pieces to finalize their projects. Chiseled Edge Accents feature a hand-dressed appearance with a uniform yet rustic detail. Available in Taupe, Earth, Smoke & Buckskin.



Taupe



Earth



Smoke



Buckskin



Wainscot Sill 90°

8" L (both exterior sides) × 3"D × 2"H (face)
to 2.5"H (back)



Wainscot Sill 135°

7.5" L (both exterior sides) × 3"D × 2"H (face)
to 2.5"H (back)



Wainscot Sill Straight

19.75" L × 3"D × 2"H (face)
to 2.5"H (back)



Hearthstone

20" L × 20"D × 2"H



Peaked Wall Caps

Available in 2 sizes:
20" × 16" (2"H sides with a 3.5"H peak)
20" × 12" (2.375"H sides with a 3.5"H peak)



Textured Column Caps

Cap peak approx. 5.5"H.
Available in 3 sizes with or without hole:
26" × 26" (2.5"H sides)
22" × 22" (2.5"H sides)
18" × 18" (2.5"H sides)



Column & Wall Caps

Column Caps approx. 2.5" thick.
Available in 2 sizes:
30" × 24"
24" × 24"

Wall Caps approx. 2.25" thick.
Available in 3 sizes:
37" × 12"
37" × 9"
37" × 6"

UTILITY ACCENTS

Utility Accents create a simple yet decorative way of transitioning from the utility to the stone or brick veneer. Available in Taupe, Earth, Smoke & Buckskin (see colors above).



(a)



(b)



(c)



(d)



(e)



(f)

Lightboxes

Approx. 1.75" thick.
(a) 8" × 10"
(b) 9.5" × 11"

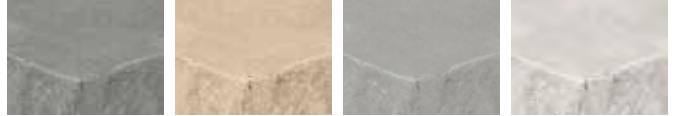
Electrical Boxes

(c) 6" × 8" (approx. 2" thick)
(d) 8" × 8" (approx. 2" thick)
(e) 8" × 8" (approx. 1.75" thick)
(f) 8" × 12" (approx. 1.75" thick)



SPLIT EDGE™ ACCENTS

Split Edge Accents feature a 2" guillotined edge to complement our line of modern stones and contemporary color palettes.

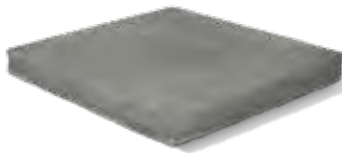


Blue Steel

Coastal Sand

Grey Sky

White Cloud



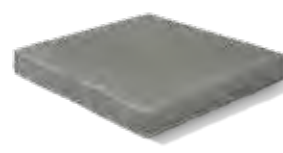
Column Caps

Available in 4 sizes:
26"L × 26"D × 2"H
24"L × 24"D × 2"H
22"L × 22"D × 2"H
18"L × 18"D × 2"H



Wall Caps

Available in 2 sizes:
12"L × 30"D × 2"H
9"L × 30"D × 2"H



Hearthstone

20"L × 20"D × 2"H

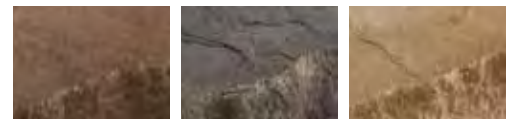


Wainscot Sill

20"L × 3"D × 2"H (face)
to 2.5"H (back)

SNAPPED EDGE™ ACCENTS

Snapped-Edge Accents feature irregular edge details and random undulations that look as if they had been hand chiseled on location. Additionally, each accent features subtle yet contrasting color highlights on the surface and edge details for the ultimate natural appearance. Wainscot Sills have a recessed drip edge on the underside to prevent water from returning behind the stone or dripping onto the face of the stone wall. Available in Walnut, Pewter & Sand.



Walnut

Pewter

Sand



Column Caps

Available in 3 sizes:
24"L × 24"D × 1.5"H
22"L × 22"D × 1.5"H
18"L × 18"D × 1.5"H



Wall Caps

Available in 2 sizes:
24"L × 14"D × 1.5"H
18"L × 14"D × 1.5"H



Hearthstone

20"L × 20"D × 1.5"H



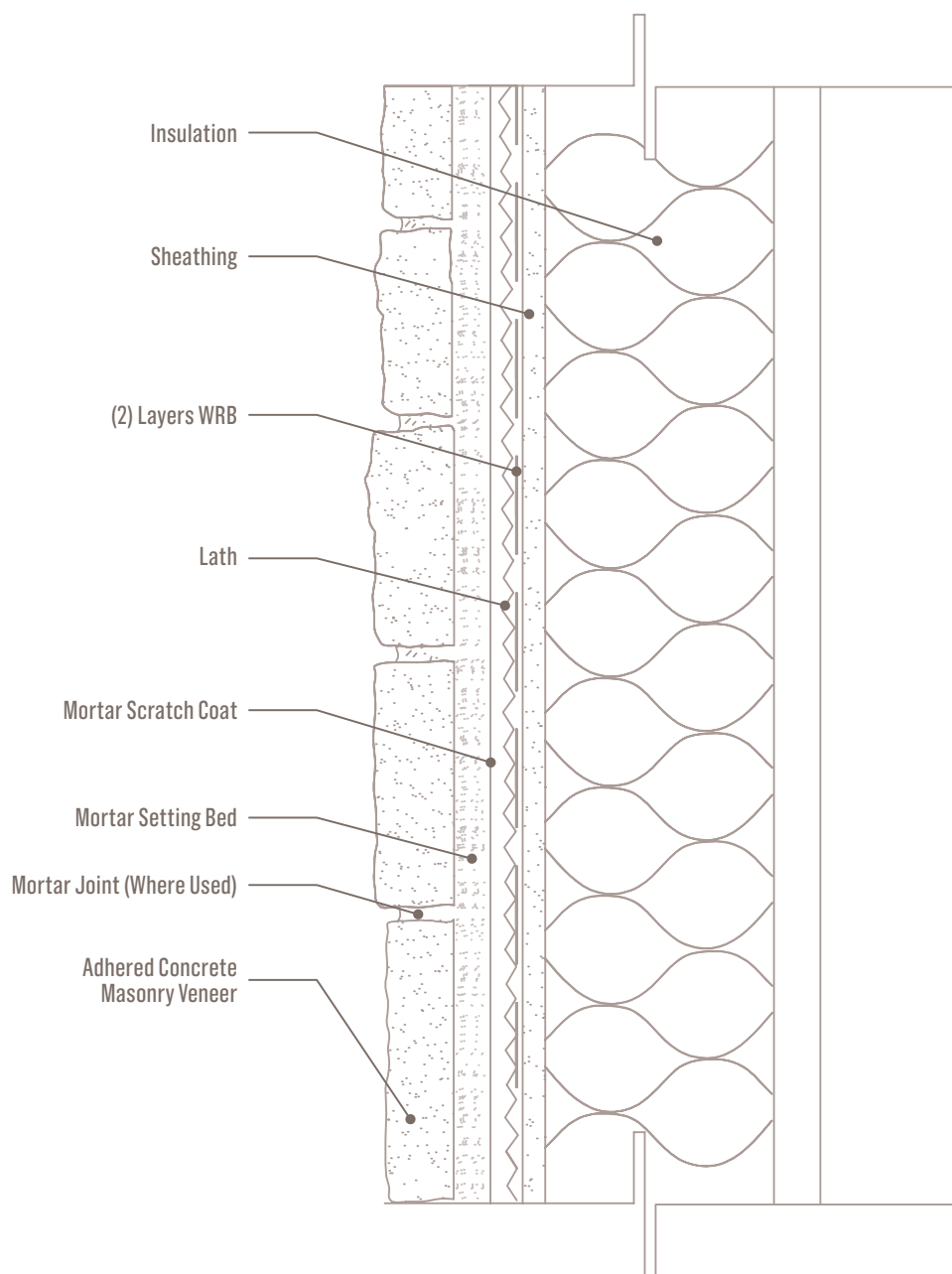
Wainscot Sill

19.75"L × 3"D × 1.5"H (face)
to 2.5"H (back)



INSTALLATION GUIDELINES

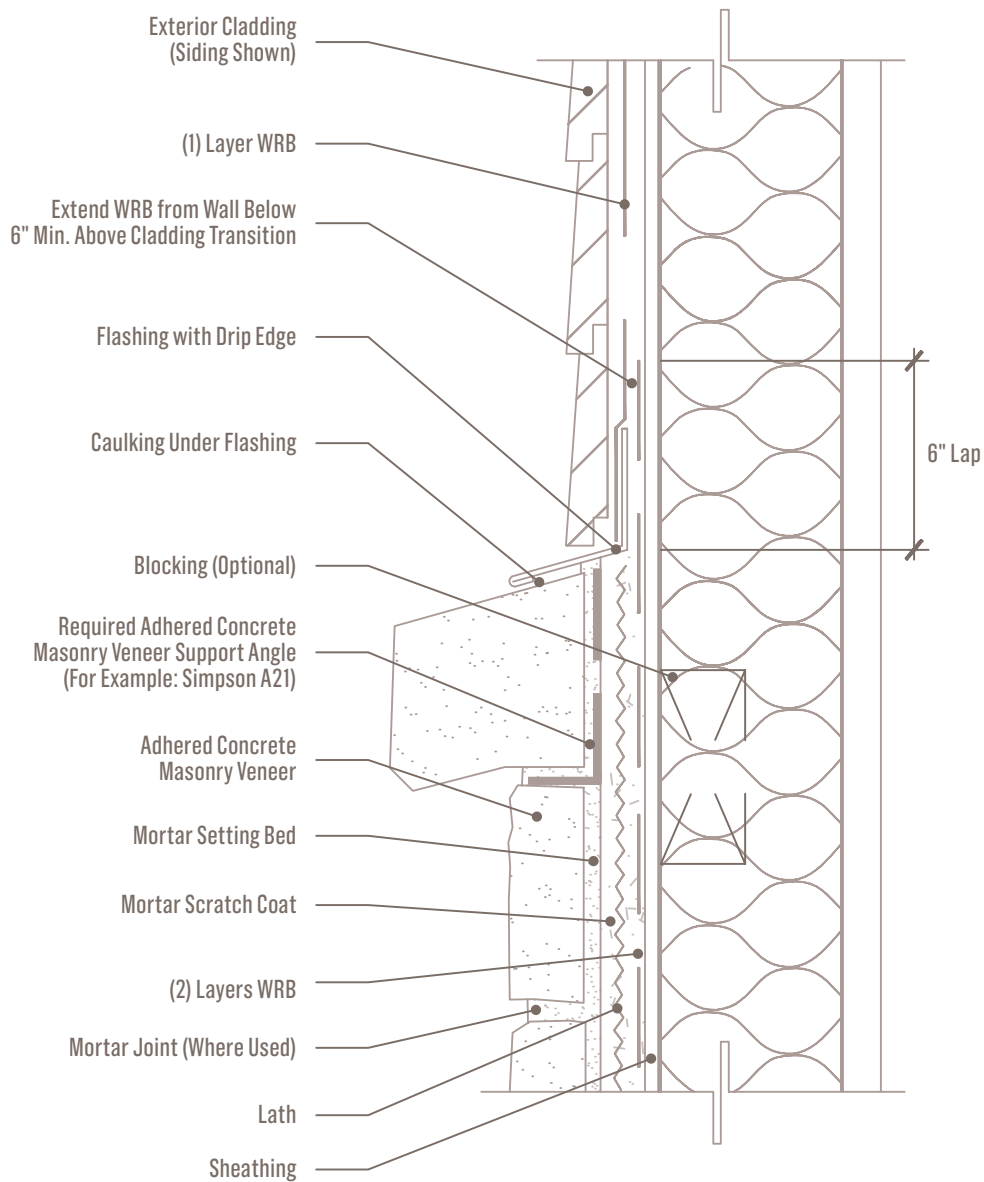
TYPICAL WALL SECTION



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INSTALLATION GUIDELINES

CLADDING TRANSITION



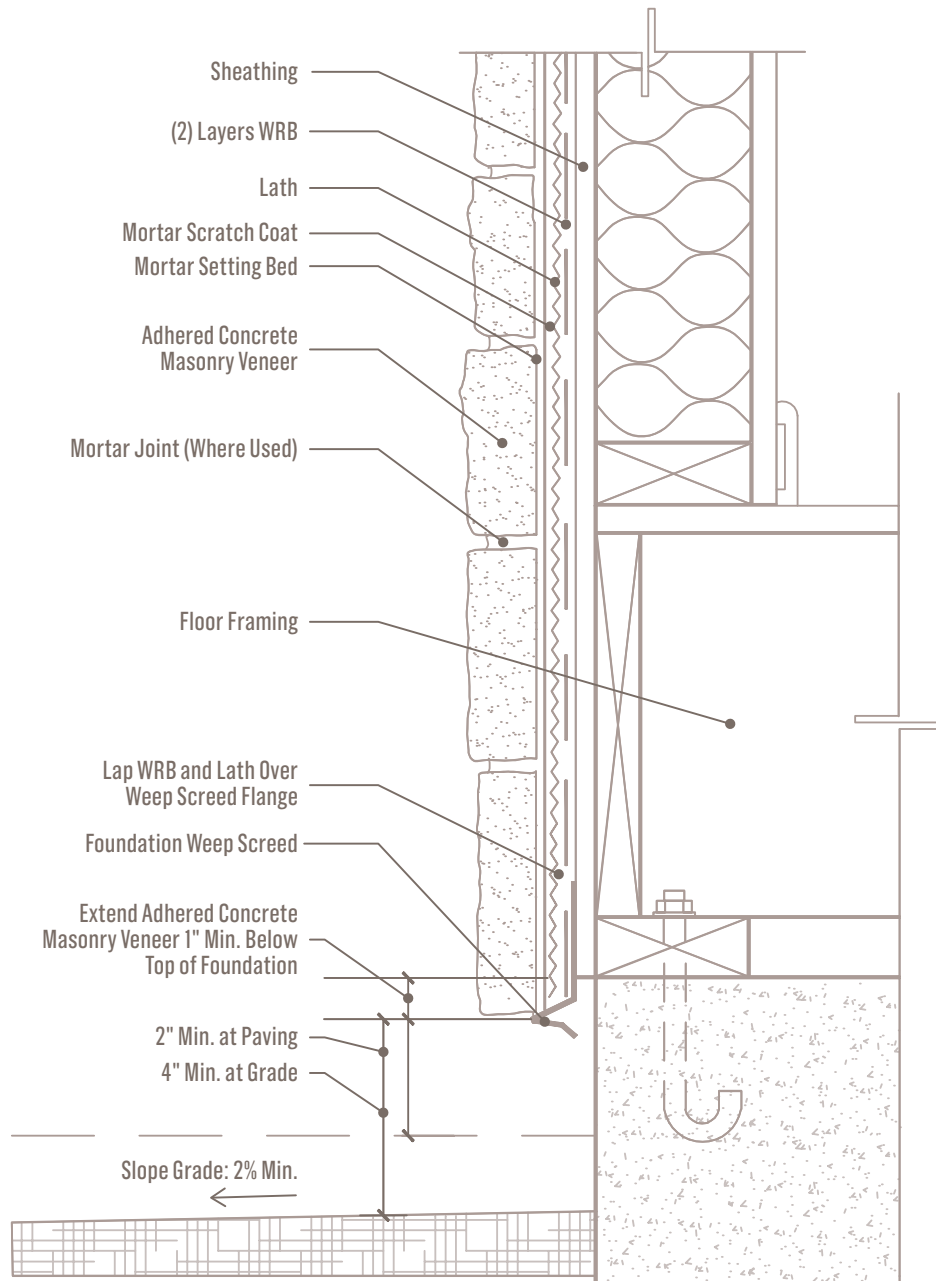
NOTE: Other Finishes May Be Used



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INSTALLATION GUIDELINES

FOUNDATION WALL BASE



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Because Eldorado Stone replicates natural stone, variations should, and can be expected. Even though colors in this brochure are as close to the actual stone as possible, photographic and printing techniques — and actual viewing conditions — can alter perception of color. It is recommended to obtain a sample of Eldorado Stone before placing an order.

If you would like more information on prices, availability of stone, the name of your local distributor, or answers to any questions not covered in this brochure, please contact us. We would be happy to assist you with your stone building plans. Detailed installation instructions, specifications, technical information and test data is available upon request.

800.925.1491 eldoradostone.com

Please join us on:













Serial Number:

Purchase date:

Reseller:

Reseller's Tel:



COMPACT AIR TREATMENT UNIT

PENTACARE-V12 SERIES

USER GUIDE AND INSTALLATION MANUAL

(Sixth Edition)

(For use with Firmware Version 7)



**PLEASE READ THIS MANUAL CAREFULLY
AND KEEP IT FOR FUTURE REFERENCE**

Dear Customer,

Congratulations for purchasing this MINOTAIR product. Your MINOTAIR is a compact air treatment unit used to control the ventilation, temperature and humidity of your home. It does all this by filtering, dehumidifying, heating, cooling and renewing the indoor air – thus providing a healthy and comfortable environment all year round.

Our engineers have successfully integrated and optimized various techniques associated with ventilation and thermodynamics to build a high performance, energy-efficient device. As a result, the MINOTAIR offers superior recovery efficiency when compared to traditional Heat or Energy Recovery Ventilators. Not to mention that, unlike the MINOTAIR, none of these products can heat, cool or dehumidify by themselves. Only the MINOTAIR can claim to be truly multifunctional.

The MINOTAIR is easy to operate with its digital control, designed to focus on the factors directly affecting comfort and air quality. Whether it is about the ventilation rate, temperature or humidity level – the information is always available at a quick glance.

Furthermore, you can rest assured knowing that you will no longer be left behind when new features become available, thanks to the MINOTAIR's USB Port. This makes it possible to update the microcontroller when upgrades are released for download on our website. Gone are the days when you would find out that your brand-new device was quickly becoming obsolete as subsequent features were coming to market. Your MINOTAIR will keep evolving and benefiting you for many years. By the way, new features are offered free of charge!

Finally, please take the time to read this guide thoroughly. It was written for you and contains both practical and important information. It will help you get the most out of your device. Store it for future reference, preferably close to the device.

The whole team thanks you for choosing MINOTAIR.

A handwritten signature in dark ink, appearing to read 'Karl Audet', with a stylized, sweeping flourish at the end.

Karl Audet
President and Lead Engineer
MINOTAIR Ventilation Inc.

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SAFETY DEFINITIONS



WARNING: Indicates a dangerous situation that, if not prevented, could cause serious injury or death.



CAUTION: Indicates a situation that may cause damages to the device or lead to material damage or physical injury.

SAFETY INSTRUCTIONS

Please read these instructions carefully. Failure to follow these instructions could result in damages to the device or other safety hazards. It is very important to understand how this air treatment unit operates and how to perform maintenance procedures safely.



WARNING: *Electrical hazard.*

This device operates at 120 VAC, which is enough to cause serious injury or death. Always cut power to the device before performing maintenance or repairs.



WARNING: *Heavy equipment.*

Improper handling or installation of this device may cause serious injury or death. At least two people are required to hang or take down the device. The device must be suspended using all four installation hooks included for this purpose.



WARNING: *Combustion products.*

Never proceed with the installation of an extraction grille in an enclosed space containing fuel-burning equipment that may be prone to back drafting of combustion products such as an oil furnace, hot water gas heater, stove, fireplace, gas dryer, etc. Combustion products can cause serious poisoning or death.

CAUTION: *Risk of head injury.*



Use caution when opening the main access panel while the device is hanging above ground. Always support the panel until completely opened.

CAUTION: *Risk of water damage.*



This device can condense tens of liters of water every day, depending on humidity levels in the air. The condensate drainpipe must be connected to a floor drain or a dedicated pump. Moreover, in certain situations, there could be condensation forming on the outside walls of the unit and the distribution ducts. In this case, isolating the distribution ducts and adding a drain pan under the device could be required for added protection.



CAUTION: *Cutting hazard.*

Although care has been taken to prevent sharp edges on various parts, always be careful when handling the device from its edges.



CAUTION: *Construction and renovations.*

Before undertaking major painting or sanding projects, shut off ventilation to avoid clogging the air ducts and filters.

SETTING EXPECTATIONS

The following list is meant to clarify expectations following commissioning of the MINOTAIR in accordance with the instructions set forth in this manual. Keep in mind that the MINOTAIR should be installed and maintained in accordance with this manual to ensure optimal performance for many years.

- **Ideal humidity levels.** During winter, a 35% humidity level is ideal. It is, however, possible to adjust this setting depending on personal preference or until condensation appears on the windows. If condensation starts forming, lower your humidity setpoint. Please note that if temperature is lowered for the night, condensation is likely to appear on the windows in the morning. Morning condensation is normal, as long as it goes away once temperature is brought back up to the daytime setpoint. In summer, a 45% humidity level is very comfortable. At all time, the indoor humidity setpoint may be hard to reach and maintain if your house is not airtight.
- **Humidity setpoint.** It can take up to a week from the device's initial start-up to reach the humidity setpoint. This is normal and depends on various factors such as climate, occupant habits, furniture, house size, insulation and airtightness. Regarding the airtightness of the house, if the humidity setpoint cannot be reached, it is likely that the supply of air naturally entering the home through cracks and openings exceeds the MINOTAIR handling capacity. In this case, a point of equilibrium will form which will tend to be more humid in summer and drier in winter.
- **Ventilation rate.** Too much ventilation will bring in an excessive amount of dry air in winter and humid air in summer. This could make it difficult to maintain humidity levels at the desired setpoint. On the other hand, insufficient ventilation will fail to renew the air in the house adequately and could lead to excess humidity. Make sure to follow the guidelines of this manual to plan and set the proper ventilation rate for your situation.
- **Auxiliary heating and cooling systems.** While the MINOTAIR is able to heat and cool a house for parts of the year, it is unlikely to do so completely without the help of an auxiliary system, especially during the cold winter months. Furthermore, several factors can influence your heating and cooling needs. These factors include climate, house size, insulation, airtightness, window quality and area, windows' orientation in relation to the sun, and, of course, occupant habits.
- **Device maintenance.** The MINOTAIR is a sophisticated and safe air treatment system. Its proper operation can only be ensured if the device is adequately maintained. Filters must be changed regularly – every 3 months – and replacement filters must be designed specifically for the MINOTAIR. Furthermore, the condensate drainpipe and the outside air intake/outlet hoods must be inspected at least every month. Clean them as necessary.

You are now ready to enjoy your MINOTAIR!

DEVICE OVERVIEW

The MINOTAIR is a multifunction device:

- Advanced control system.
 - Review the elements that affect comfort and air quality such as ventilation, temperature and humidity easily and at a quick glance!
 - Integrates the control of auxiliary units, including heating, cooling, and humidification for harmonized operations and maximum efficiency.
- High performance air exchanger.
 - Filters air while removing pollutants from the house, and oxygenates indoor air with fresh air from outside.
 - Dehumidifies and cools air in summer, and dehumidifies and recovers heat in winter.
- Self-contained heat pump.
 - Requires no installation of outside equipment other than the fresh air intake and stale air exhaust hoods.
 - Dehumidifies and cools air in summer; heats air in winter.
- Air Purifier with HEPA filtration.
 - Standard antimicrobial filters remove air dust, which could otherwise damage the device. These filters are MERV 8 (G4) rated and stop more than 90% of dust particles as small as 3.0 µm.
 - Standard MERV 15 (F9) High Efficiency filter removes up to 95% of particles as small as 0.3 µm.
- Powerful HumiWatch365® System.
 - Removes up to 56 liters/day (118 pints/day) of moisture from the indoor air depending on the level of humidity contained in the air, and without overheating air unlike conventional dehumidifiers.
 - Recovers the heat and moisture of showers to humidify indoor air when it is too dry, as required. Can also be connected to and control an auxiliary humidifier.



Figure 1 – MINOTAIR – Acts on temperature, humidity level and air renewal.

MAIN COMPONENTS

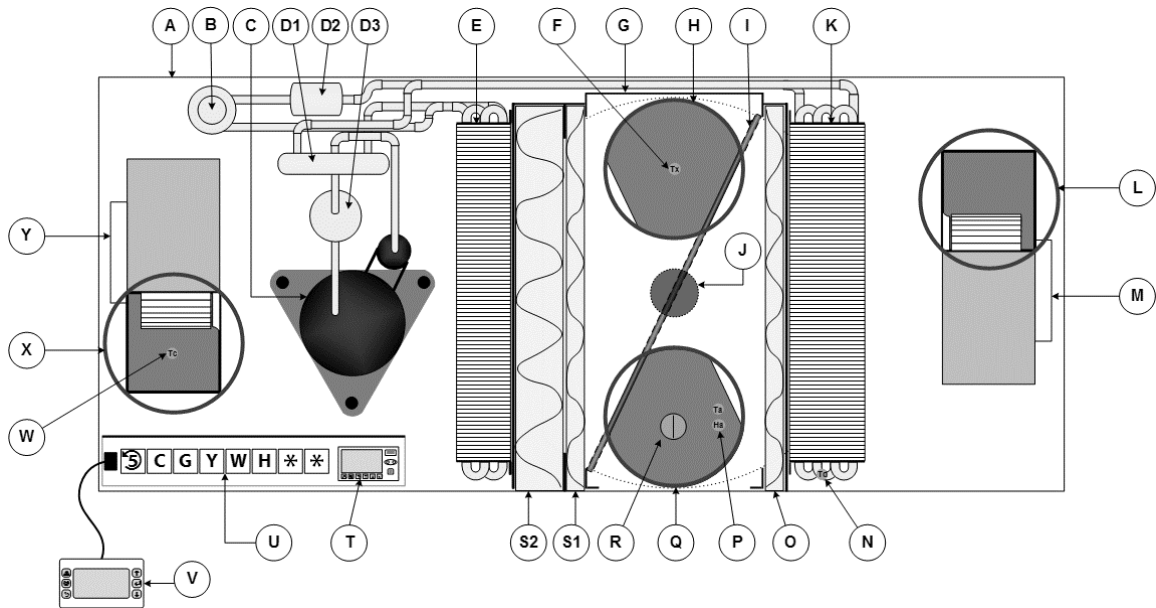


Figure 2 – MINOTAIR assembly and components.

- | | |
|--|--|
| <p>A Insulated finished aluminum housing with resistant powder paint.</p> <p>B Bidirectional expansion valve.</p> <p>X High efficiency compressor</p> <p>Δ 1) Reversible valve.
2) Filter-dryer.
3) Muffler.</p> <p>E Energy recovery coil – Distribution side.</p> <p>Φ Sensor – Outdoor temperature.</p> <p>Γ Motorized damper housing.</p> <p>H Fresh air intake.</p> <p>I Motorized damper.</p> <p>Ⓕ Motorized damper actuator.</p> <p>K Energy recovery coil – Extraction side.</p> <p>Λ Stale air outlet.</p> <p>M Constant airflow exhaust fan.</p> | <p>N Sensor – Defrost temperature</p> <p>O MERV 8 (G4) prefilter – Exhaust side.</p> <p>Π Sensor – Indoor humidity and temperature</p> <p>⊖ Stale air intake.</p> <p>P Condensate pan cap.</p> <p>Σ 1) MERV 8 (G4) prefilter – Supply side.
2) High efficiency MERV 15 (F9) filter.</p> <p>T Microcontroller with integrated control.</p> <p>Y Terminal board for auxiliary units such as a furnace, air conditioning and humidifier.</p> <p>ς Wall mount digital control.</p> <p>Ω Sensor – Conditioned temperature.</p> <p>Ξ Fresh air outlet.</p> <p>Ψ Constant airflow supply fan.</p> |
|--|--|

EXTERNAL OVERVIEW

The MINOTAIR's housing is 100 % aluminum, which makes it lighter and easier to handle. Furthermore, aluminum is a long-term guarantee against corrosion which, otherwise, would end up weakening the housing structure since it is always in contact with humidity and condensates.

The air outlets are located on top of the device for easy installation. This eliminates the need to add elbows to redirect the airflow upward to reach the main ducts, which are often installed in the ceiling joists.

The four installation hooks designed to suspend the device are each secured with a bolt, which allows the hooks to be positioned at an angle. This in turn enables more flexibility when aligning the hooks with their anchor points.

The installation hooks and their polypropylene straps are designed so as to attenuate the propagation of vibrations from the device to the structure of the house.

The transportation feet are designed to protect the condensate drains from collapsing when the device rests on the floor. Furthermore, these feet create a space under the device, which makes lifting it much easier for installers.

Access to components requiring maintenance – filters for example – is possible from the front of the device by opening the main access panel.

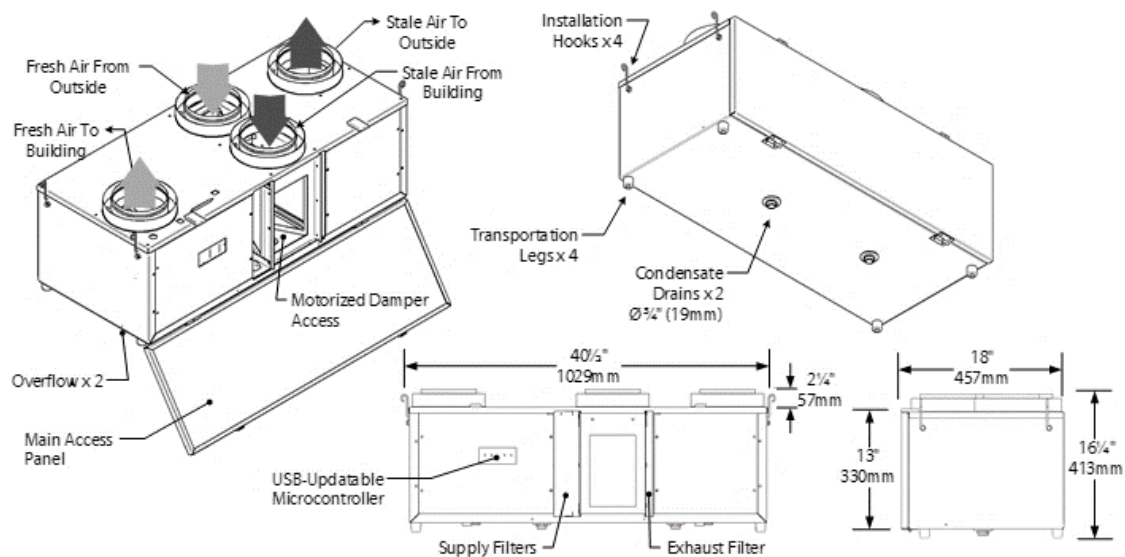


Figure 3 – External overview of the device.

OPERATING MODES

The MINOTAIR is the only system of its kind to combine a motorized damper with two constant airflow fans. The motorized damper can switch between two positions, which allow the MINOTAIR to function as either an air exchanger (ventilation) or a heat pump (recirculation). As a result, this allows for the development of various operating modes to optimize energy efficiency and occupant comfort.

1. AIR EXCHANGER MODE (VENTILATION)

- This mode controls two flows, one being fresh air and the other stale air. To operate in this mode, the motorized damper makes a full clockwise rotation until it is in contact with the angled walls. In this mode, the microcontroller sets the same airflow for each fan.
- Air Exchanger Mode features include:
 - Filters air while removing pollutants from the house, and oxygenates indoor air with fresh air from outside.
 - Dehumidifies and cools air in the summer.
 - Dehumidifies and recovers heat in the winter.
 - Can also humidify when connected to an inline humidifier.
- When to use:
 - When it is imperative to have a continuous supply of fresh air. Note that at certain times of the year, this mode could make humidity management difficult; air too dry in winter and too humid in summer. Moreover, this mode could tend to ventilate beyond the ASHRAE Standard 62.2 resulting in increased energy usage. Running in this mode continuously could result in discomfort during certain periods of the year such as hot summer and cold winter days.

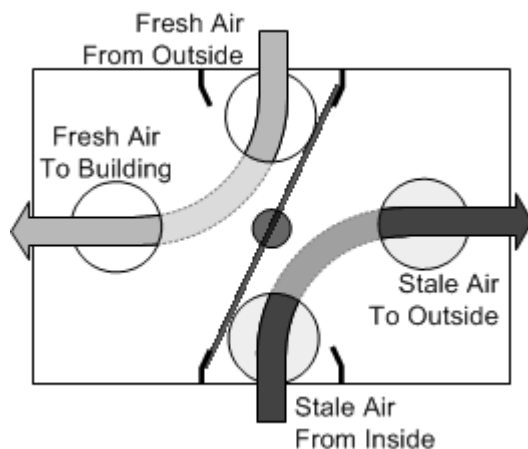


Figure 4 – Air Exchanger Mode (Ventilation).

2. HEAT PUMP MODE (RECIRCULATION)

- This mode controls two flows, one being indoor air recirculation and the other, outside air intake. To operate in this mode, the motorized damper makes a full counterclockwise rotation until it is in contact with the angled walls. In this mode, the airflows set by the microcontroller are not necessarily identical for the two fans, because the goal is to optimize the current operation (heating, cooling, and dehumidification). Thus, the left fan will usually have a lower airflow than the right fan, which should be close to the maximum possible airflow.
- Heat Pump Mode features include:
 - Dehumidifies and cools air in summer and heats air in winter.
 - Filters air while providing uniform humidity and temperature conditions.
 - Can also humidify when connected to an inline humidifier.
- When to use:
 - When comfort prevails over indoor air quality. Note that this mode does not allow any intake of fresh air, so it should not be used continuously.

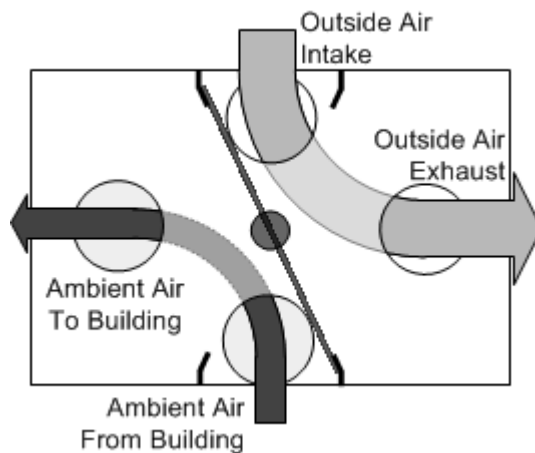


Figure 5 – Heat Pump Mode (Recirculation).

3. RECIRCULATION MODE WITHOUT COMPRESSOR

- This mode controls a single flow, which is indoor air recirculation. To operate in this mode, the motorized damper makes a full counterclockwise rotation until it is in contact with the angled walls. In this mode, the left fan operates at the airflow set by the microcontroller while the right fan is practically stopped except when measuring the outside air temperature.
- Recirculation Mode features include:
 - Filters indoor air while providing uniform humidity and temperature conditions.
 - Ultra-low energy consumption.
- When to use:
 - When it is not possible or desired to have a supply of fresh air and there is no reason to heat, cool or dehumidify. Note that this mode does not allow any intake of fresh air, so it should not be used continuously.

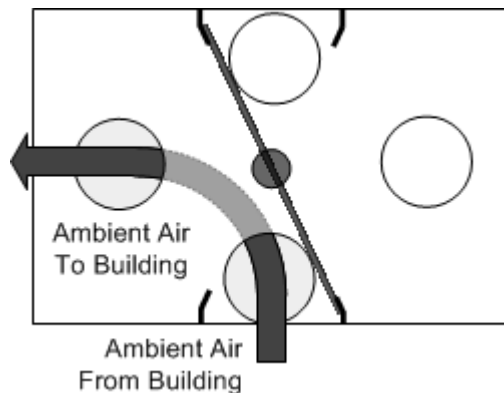


Figure 6 – Recirculation Mode without Compressor.

4. INTERMITTENT MODE

- This is a mixed mode that alternates between Air Exchanger and Recirculation modes. Four settings are possible:
 - **Intermittent-10.** Activates Air Exchanger Mode for 10 minutes before switching to Heat Pump Mode for 50 minutes, and so on.
 - **Intermittent-20.** Activates Air Exchanger Mode for 20 minutes before switching to Heat Pump Mode for 40 minutes, and so on.
 - **Intermittent-30.** Activates Air Exchanger Mode for 30 minutes before switching to Heat Pump Mode for 30 minutes, and so on.
 - **Intermittent-40.** Activates Air Exchanger Mode for 40 minutes before switching to Heat Pump Mode for 20 minutes, and so on.
- Intermittent Mode features include:
 - Lower energy consumption.
 - All the benefits of Air Exchanger and Heat Pump Modes, depending on the type of intermittency selected.
- When to use:
 - When it is necessary to have a guaranteed time-based supply of fresh air.
 - Ideal during prolonged absences to ensure a minimum supply of fresh air.
 - If air becomes too dry in winter, lower the intermittency as needed.
 - Could tend to over-ventilate if intermittency is set too high.

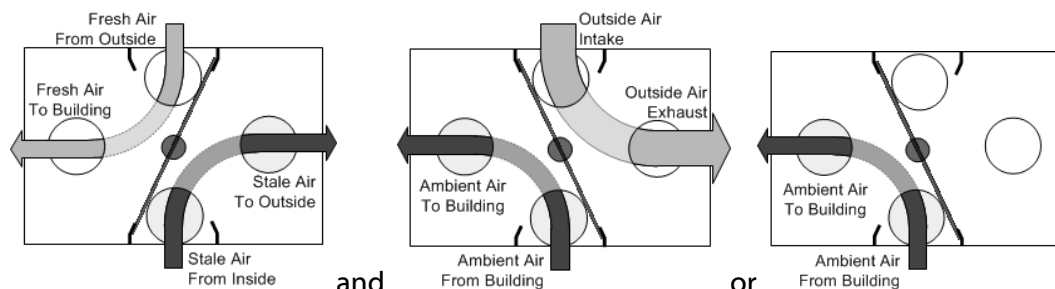


Figure 7 – Intermittent Mode 10, 20, 30 or 40 – with heat pump recirculation.

5. SMART MODE

- This is a mixed mode in which priority is given to humidity management and fresh air supply according to ASHRAE Standard 62.2. When the fresh air requirement is satisfied, the unit can switch to Heat Pump or Recirculation Mode as needed.
- Smart Mode features include:
 - Greatly optimizes humidity management.
 - Ensures strict compliance to ASHRAE Standard 62.2 over a twenty-minute time window, three times an hour.
 - Switches to heat pump mode upon calls for heat or cooling.
 - Switches to Free Cooling (no compressor) or to Turbo Cooling (free cooling with compressor) when outside temperature permits.
 - Goes into recirculation mode when the fresh air requirement is met and there is no need to heat, cool or dehumidify.
- When to use:
 - Always! Unless you have a specific reason to use a different mode, the Smart mode is the ideal and recommended option.
 - Combine the Smart mode with the operation of heating and cooling in *automatic* mode and you will get an integrated indoor air management system that is fully automated. In other words, once the unit is set to your preferences, you will forget it's there.
 - This is the only mode that fully abide to ASHRAE Standard 62.2.

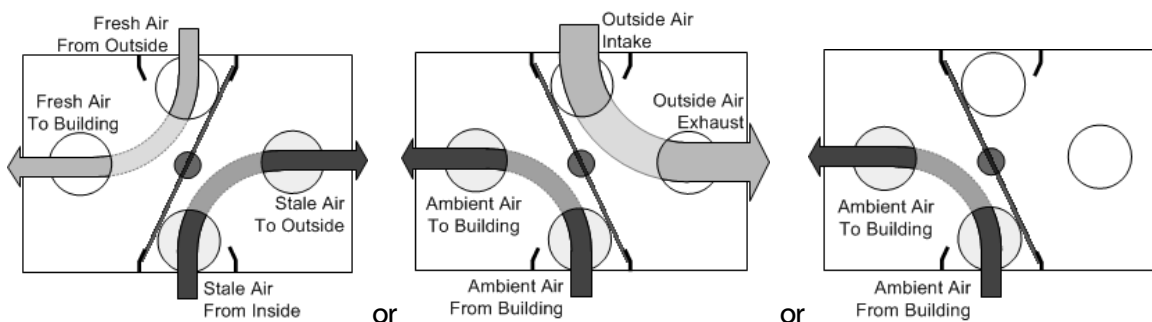


Figure 8 – Smart Mode.

INSTALLATION PROCEDURES

IMPORTANT INSTALLATION REQUIREMENTS

PERSONAL SAFETY

- Wear safety glasses when installing the MINOTAIR.
- Follow professional safety standards and all local regulations.

REGULATIONS

- **WARNING!** The MINOTAIR should be installed in accordance with the local building codes that are in effect. In absence of such requirements, it is advisable to check with local authorities having jurisdiction in your area.

DEVICE INSPECTION

- **WARNING!** Do not power on the device at this point.
- Inspect the exterior of the device to make sure it is not damaged.
- Make sure the panel, the hinges, the damper, the vents, the fan blades, the housing and the installation hooks are in good condition.
- Any damage sustained during transport must be reported within 24 hours of delivery.

CHOOSING WHERE TO INSTALL THE MINOTAIR

- Choose an accessible location that will allow and facilitate maintenance and repairs.
- Avoid lounging areas, offices and bedrooms. It is recommended to soundproof the selected location if it is too close to rooms where quietness is desired. In this case, use a solid core door and affix a rubber door sweep (weather strip) at its bottom to seal the space between the bottom of the door and floor. Do not use louvred or accordion doors as they have no soundproofing property.
- The device must be installed indoor, never outside, and the location must maintain an indoor temperature between 16°C and 27°C (60°F and 80°F).
- The device must be located near a 120 VAC electrical source, which must be dedicated to the device. **No other device can use this same circuit.**
- The location must be close to a floor drain. If that is impossible or if there is no floor drain in the house, you must install a condensate pump (not supplied) in order to eliminate condensation in a water return pipe. For example, a washing machine return pipe could be used. Condensate pumps can be found in most hardware stores.
- If the air ducts are not already installed, it is preferable to plan their course before deciding on the unit's final location.

CHOOSING AN INSTALLATION METHOD

- The MINOTAIR must be installed using one of the three following methods:
 - Connection to a forced air ventilation system – Simplified method.
 - Connection to a forced air ventilation system – Extraction at the source.
 - Connection to an independent system of ventilation ducts.

CONNECTION TO A FORCED AIR VENTILATION SYSTEM – SIMPLIFIED METHOD

- This is the easiest installation method, though not necessarily the preferred one. It will provide fresh air to all rooms supplied by the ventilation system. Stale air and humidity extraction is done through the return plenum which could make humidity management more difficult than if the extraction were done at the source.
- This method is only possible if the MINOTAIR can be installed in the same room where the forced-air system ventilator is located. It is required that the forced air ventilator runs continuously or ventilator operations is interlocked with the “G” terminal of the MINOTAIR. A minimum distance of 6 ft. (2 m) between the return and supply connections is required.
- **IMPORTANT:** Only use acoustic flexible ducts capable of withstanding a negative static pressure of 1.5 in H₂O to prevent the ducts liner from imploding.

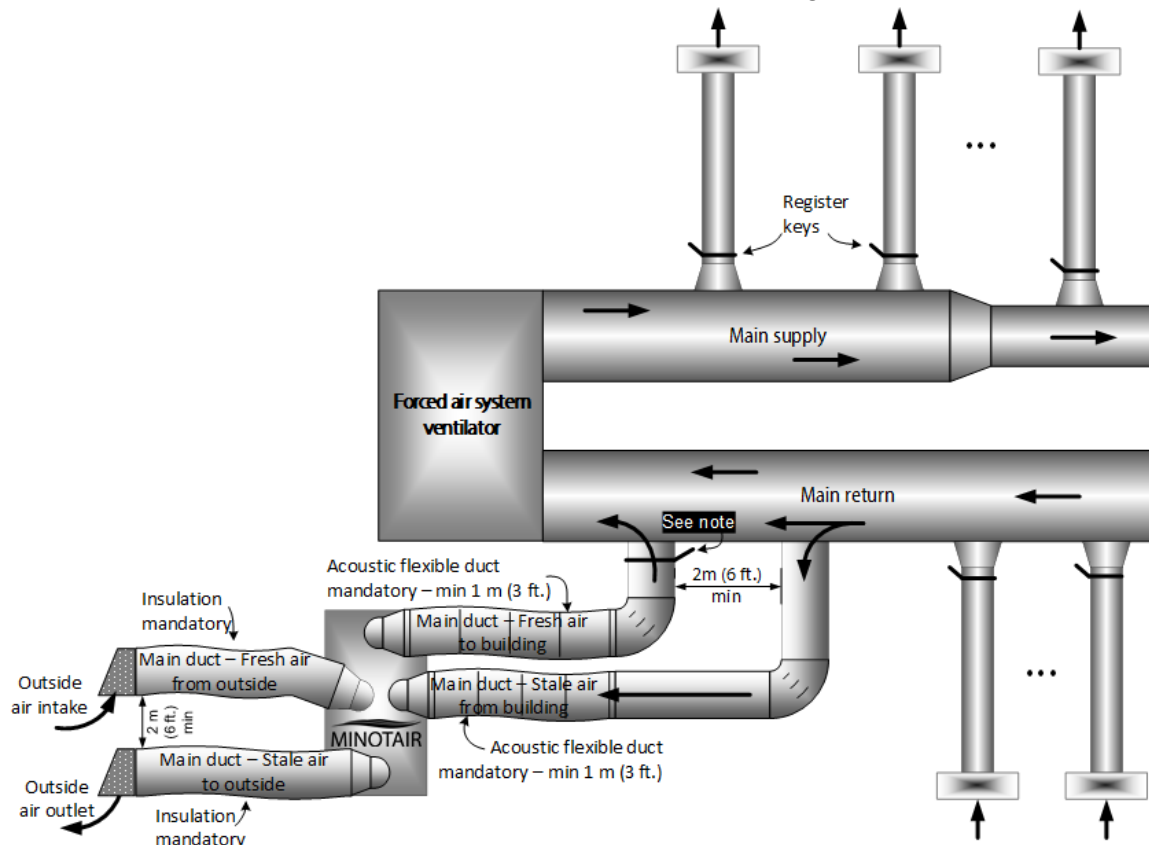


Figure 9 – Connection to a forced air ventilation system – Simplified method.
(The two MINOTAIR center ports are swapped for more clarity in the drawing)

NOTE: Refer to the section about “Balancing the MINOTAIR” to assess the need to add a register key at this location.

CONNECTION TO A FORCED AIR VENTILATION SYSTEM – EXTRACTION AT THE SOURCE

- This installation method is preferred over the “Simplified Method” described previously. If you must choose between the two, it is better to choose “Extraction at the Source” to fully benefit from the HumiWatch365© system.
- This method will provide fresh air to all rooms supplied by the ventilation system. However, stale air and moisture will be extracted directly at the source through dedicated ducts to ensure better humidity management.
- This option is only possible if the MINOTAIR can be installed in the same room where the forced-air system ventilator is located. It is required that the forced air ventilator runs continuously or ventilator operations is interlocked with the “G” terminal of the MINOTAIR.
- **IMPORTANT:** Only use acoustic flexible ducts capable of withstanding a negative static pressure of 1.5 in H₂O to prevent the ducts liner from imploding.

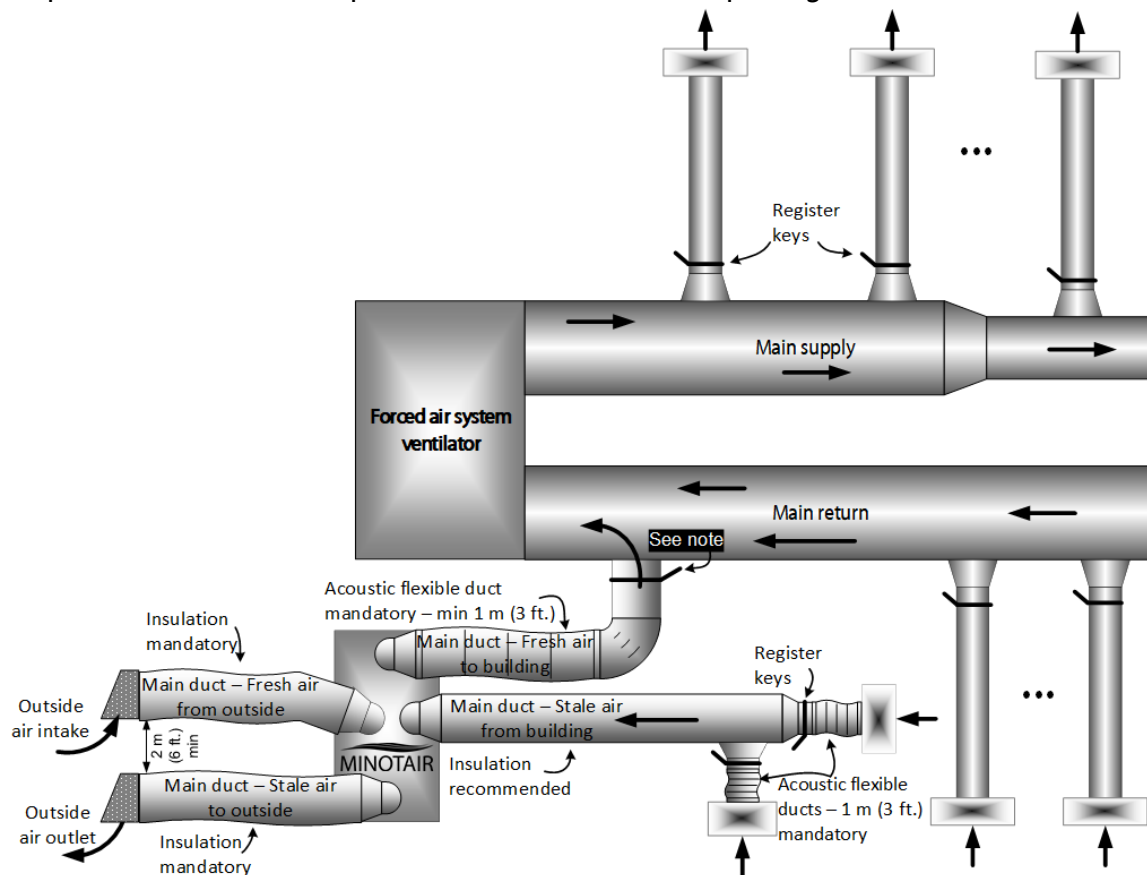


Figure 10 – Connection to a forced air ventilation system – Extraction at the source.
(The two MINOTAIR center ports are swapped for more clarity in the drawing)

NOTE: Refer to the section about “Balancing the MINOTAIR” to assess the need to add a register key at this location.

CONNECTION TO AN INDEPENDENT SYSTEM OF VENTILATION DUCTS

- This type of installation is required when the house is heated through electric baseboards or a radiant system. Since these systems do not include forced air ventilation ductwork, it is necessary to install a dedicated system of ventilation ducts.
- Like the previous method, stale air and moisture will be extracted directly at the source through dedicated ducts to ensure better humidity management. Therefore, one will be able to fully benefit from the HumiWatch365® system.
- For this type of installation, it is **mandatory** to include a section of acoustic flexible duct measuring 1 m (3 ft) at the end of each supply branch. This will soundproof the air supply. The same must be done for the ducts serving the rooms where silence is sought. **IMPORTANT:** Only use acoustic flexible ducts capable of withstanding a negative static pressure of 1.5 in H₂O to prevent the extraction ducts liner from imploding. Moreover, if the flexible duct must move moist air (humidifier, bathrooms), the insulation must be protected by a vapor barrier located between the liner and the insulation. The Minotair AcoustiCare® series of flexible ducts and prefabricated mufflers are products that meet all these requirements for peace of mind installations.

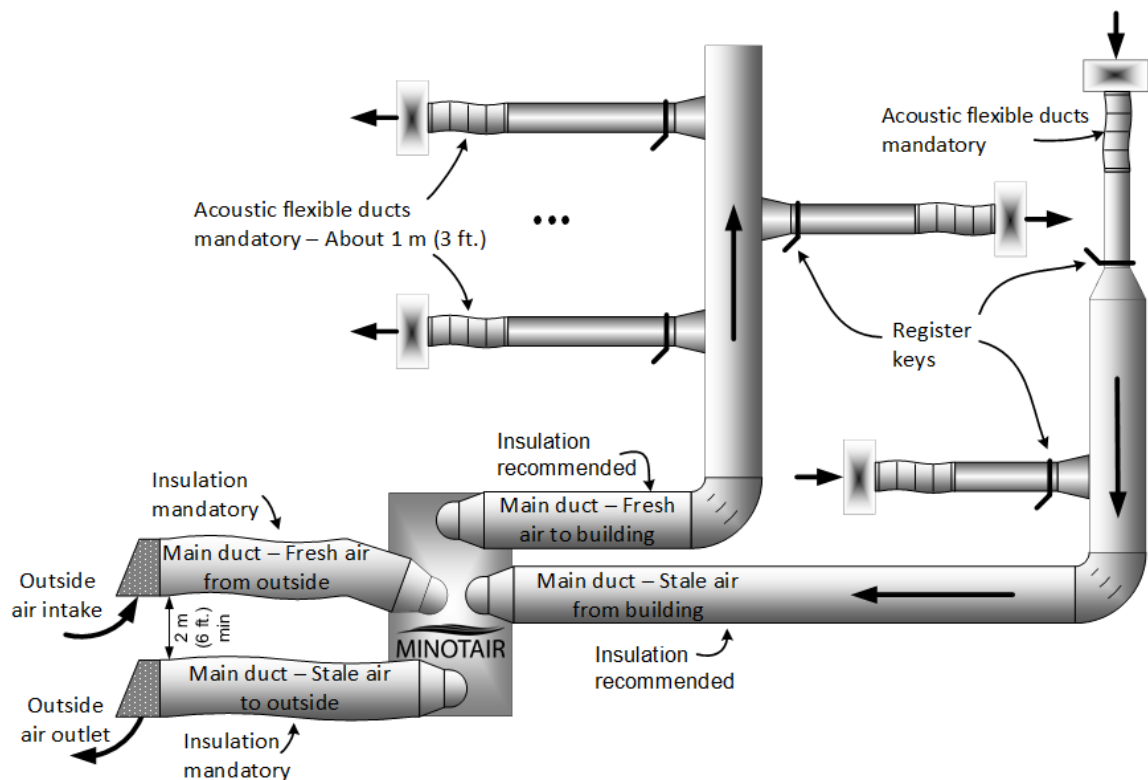


Figure 11 – Connection to an independent system of ventilation ducts.
(The two MINOTAIR center ports are swapped for more clarity in the drawing)

CALCULATING VENTILATION AIRFLOW

- The airflow rate of fresh air and stale air required throughout the house must be calculated by adding together the airflow required for each room, as indicated in the shaded columns below, unless calculated by a qualified professional. Airflows are denoted in cubic feet per minute (cfm) or liters per second (l/s).
- The smaller a room is in comparison to the other rooms, the closer the airflow rate must be to the "Min" value. Bigger rooms will require airflow rates closer to the "Max" value.

For each dwelling		Recommended airflow for each room				Air ducts diameter for each room			
		cfm		l/s		in		mm	
		Min	Max	Min	Max	Min	Max	Min	Max
SUPPLY	Rooms requiring a fresh air supply*								
	Each bedroom (one person)	10	20	5	10	5	5	125	125
	Each bedroom (two persons)	20	30	10	15	5	6	125	150
	Home office	10	20	5	10	5	5	125	125
	Main lounging room (living room)	10	20	5	10	5	6	125	150
	Each floor not already serviced by air supply	10	20	5	10	5	6	125	150
	Basement if not already serviced by air supply	10	20	5	10	5	6	125	150
	Optional rooms to be supplied with fresh air*								
	Dining room	10	20	5	10	5	6	125	150
	Family room	10	20	5	10	5	6	125	150
	Play room	10	20	5	10	5	6	125	150
	Kitchen (This will help the range hood work better).	10	20	5	10	5	6	125	150
	Any other furnished room	10	20	5	10	5	5	125	125
EXTRACTION	Recommended rooms for stale air extraction*								
	Bathroom or shower	60	80	30	40	5	6	125	150
	Restroom	10	20	5	10	5	5	125	125
	Kitchen (Not recommended. Use a range hood instead.) (Minimum distance between the return grille and any cooking surface must be 3 m (10 ft.)).	10	20	5	10	5	6	125	150
	Laundry room	10	20	5	10	5	5	125	125
	Basement	10	20	5	10	5	6	125	150

* Treat each room comprised in an open space as an individual room

	Required fresh air supply <i>Write result</i>		Main ducts minimum diameter			
			cfm		l/s	
	cfm	l/s	cfm	l/s	in	mm
Total fresh air supply ^{1,2} 1. Input this value into the microcontroller. 2. The total exhaust airflow must be identical	<i>Your answer</i>	<i>Your answer</i>	≤ 90	≤ 40	6	150
			> 90	> 40	8	200

Table 1 – Airflow planning.

SIZING AIR DUCTS

- To minimize turbulence and ventilation noise, the ducts must be sized based on the numbers in the shaded columns below, unless they have been otherwise sized by a qualified professional. The conduit diameters are denoted in inches (in) or in millimeters (mm).
- The duct diameter must be proportional to the airflow established for the room. Thus, if the airflow has been established based on the "Min" column, then the duct diameter should also be sized according to the "Min" column. If the "Max" column or another value in-between was used then the duct must be sized according to the "Max" column, or the adequate value in-between "Min" and "Max". If there is no in-between value, use the "Max" value.
- If in doubt, use the "Max" value.

For each dwelling		Recommended airflow for each room				Air ducts diameter for each room			
		cfm		l/s		in		mm	
SUPPLY	Rooms requiring a fresh air supply*	Min	Max	Min	Max	Min	Max	Min	Max
	Each bedroom (one person)	10	20	5	10	5	5	125	125
	Each bedroom (two persons)	20	30	10	15	5	6	125	150
	Home office	10	20	5	10	5	5	125	125
	Main lounging room (living room)	10	20	5	10	5	6	125	150
	Each floor not already serviced by air supply	10	20	5	10	5	6	125	150
	Basement if not already serviced by air supply	10	20	5	10	5	6	125	150
	Optional rooms to be supplied with fresh air*								
	Dining room	10	20	5	10	5	6	125	150
	Family room	10	20	5	10	5	6	125	150
	Play room	10	20	5	10	5	6	125	150
	Kitchen (This will help the range hood work better).	10	20	5	10	5	6	125	150
	Any other furnished room	10	20	5	10	5	5	125	125
EXTRACTION	Recommended rooms for stale air extraction*								
	Bathroom or shower	60	80	30	40	5	6	125	150
	Restroom	10	20	5	10	5	5	125	125
	Kitchen (Not recommended. Use a range hood instead.) (Minimum distance between the return grille and any cooking surface must be 3 m (10 ft.)).	10	20	5	10	5	6	125	150
	Laundry room	10	20	5	10	5	5	125	125
	Basement	10	20	5	10	5	6	125	150

* Treat each room comprised in an open space as an individual room

	Required fresh air supply <i>Write result</i>		Main ducts minimum diameter			
	cfm	l/s	cfm	l/s	in	mm
Total fresh air supply^{1,2}	<i>Your answer</i>	<i>Your answer</i>	≤ 90	≤ 40	6	150
1. Input this value into the microcontroller. 2. The total exhaust airflow must be identical			> 90	> 40	8	200

Table 2 – Air ducts planning.

- The main ducts' diameter depends on the airflow that was calculated at the previous step. If the calculated airflow is 90 cfm (40 l/s) or less, it is possible to use main ducts of 6" (150 mm). The maximum airflow of the main ducts will then be required to be adjusted between 180 cfm and 215 cfm (85 l/s and 100 l/s) in the microcontroller's ventilation menu. Note, however, that this setting will decrease heating and cooling capacity in heat pump mode by up to approximately 25% depending on current temperatures and humidity level.
- If enough space is available, it is always preferable to choose main ducts of 8" (200 mm) to use the MINOTAIR to its full. The maximum airflow of the main ducts will then be required to be adjusted between 220 cfm and 250 cfm (105 l/s and 120 l/s) in the microcontroller's ventilation menu. If space does not allow the use of 8" (200 mm) ducts for all main ducts, you must favor the main distribution duct (fresh air to building) to minimize the ventilation noise at the supply grilles.
- **IMPORTANT!** In high speed or heat pump mode, airflow increases significantly. To minimize the noise of the air in motion, it is required to have a minimum number of supply and return ducts based on whether the main ducts are 6" (150 mm) or 8" (200 mm) in diameter:

- **Main ducts – 6" (150 mm) for an airflow ranging between 180 cfm and 215 cfm (85 l/s and 100 l/s):**

Minimum recommendations for **supply** ducts:

- Minimum 2 x 6" (150 mm) duct, or
- Minimum 1 x 6" (150 mm) duct and 2 x 5" (125 mm), or
- Minimum 4 x 5" (125 mm) ducts.

Minimum recommendations for **return** ducts:

- Minimum 1 x 6" (150 mm) duct and 1 x 5" (125 mm), or
- Minimum 3 x 5" (125 mm) ducts.

- **Main ducts – 8" (200 mm) for an airflow ranging between 220 cfm and 250 cfm (105 l/s and 120 l/s):**

Minimum recommendations for **supply** ducts:

- Minimum 3 x 6" (150 mm) ducts, or
- Minimum 2 x 6" (150 mm) duct and 2 x 5" (125 mm), or
- Minimum 1 x 6" (150 mm) duct and 3 x 5" (125 mm), or
- Minimum 5 x 5" (125 mm) ducts.

Minimum recommendations for **return** ducts:

- Minimum 2 x 6" (150 mm) ducts, or
- Minimum 1 x 6" (150 mm) duct and 2 x 5" (125 mm), or
- Minimum 4 x 5" (125 mm) ducts.

GUIDELINES FOR AIR DUCTS

- All ventilation ducts must be made of rigid materials, in galvanized sheet metal or an equivalent material, and be cleanable when needed. However, if rigid ducts are not a possibility, flexible materials can be used (see “Installing flexible ducts”).
- Air ducts must always be installed on the warm side of the building envelope, such as the interior walls, the floors or the ceilings. Avoid installing ducts in the attic or in unheated spaces, but where this cannot be avoided, use ducts with an R-Value of at least **R- 24 (RSI 4.2)**. Attics can reach extremely high temperatures in summer and very cold temperatures in winter.
- All air ducts located on the cold side, namely the fresh air intake from outside and the stale air exhaust to outside, must have an R-value of at least R-4 (RSI 0.7), **ideally R-8 (RSI 1.4)** especially if your location is subject to harsh winters where it's not uncommon to reach -20°C (-4°F) and below.
- It is advisable to fully insulate the supply ductwork with an R-Value of **R-4 (RSI 0.7)** to minimize energy losses when distributing heated or cooled air. If this is not possible, it is nonetheless advisable that at least the first 6 feet (2 m) of the supply ductwork starting from the Minotair be insulated.

CAUTION! During cooling and dehumidification operations, condensation could form on the outside walls of the unit and the supply ducts, which could cause water damage. In this case, isolating the supply ducts and adding a drain pan under the Minotair could be required for added protection.

- It is not necessary to insulate return ducts unless there is a risk of condensation or if the ductwork passes through hot or cold areas that could alter the return temperature read by the Minotair.
- All insulating sleeves must be equipped with a vapor barrier film made of aluminum for its robustness. All joints must be airtight and sealed with aluminum tape.
- All ducts that go through an air or vapor barrier must be sealed hermetically at the point of entry.
- All ventilation ducts must be airtight. To achieve this, all joints, cracks and holes on the ducts, as well as all fittings, must be sealed with mastic or aluminum tape.
- Straight tees and elbows (without bends) should be avoided. Choose wye fittings and curved elbows for better flow and soundproofing.

- **IMPORTANT!** To minimize the static pressure (air restriction) in the ventilation ductwork, departures on the four vents must be vertical and **WITHOUT** any bend radius exceeding 30°. The length of each vertical departure must measure a minimum of 6" (15 cm). Use 6" to 8" taper increasers to allow for efficient airflow and ease-up the installation of insulation sleeves. Tuck the insulation between the 6" and 8" port walls, and tape the vapor barrier to the outside wall of the 8" port with aluminum tape.

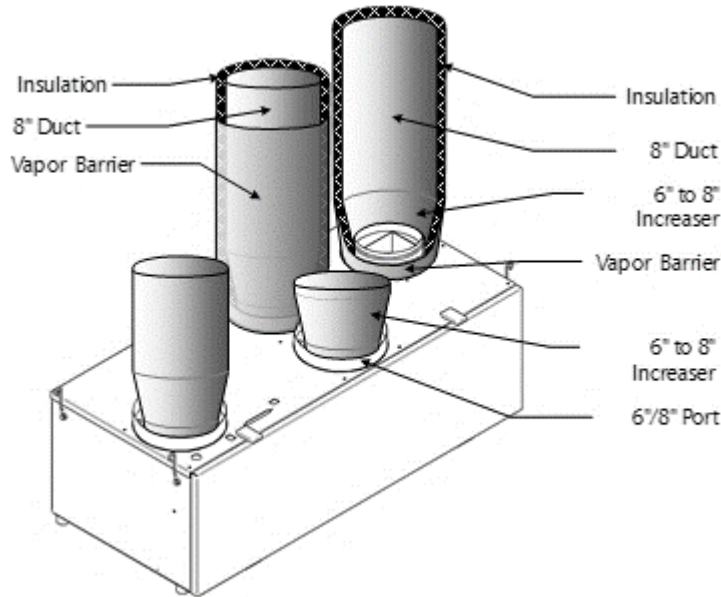


Figure 12 – Efficient airflow and easy installation of insulation sleeve using 6" to 8" increasers.

- **Acoustic ducts.** It is mandatory to install a section of acoustic flexible duct measuring about 3 ft. (1 m) at the end of each supply run to reduce ventilation noise and ensure optimal soundproofing of the distribution network (see next figure). The same must also be done for the return ducts for optimum sound comfort. Acoustic flexible duct is nothing more than insulated flexible duct for which the liner was perforated with thousands of tiny holes and which, like a muffler, will absorb the majority of sound waves caused by the air in motion and mechanical components. Use the *Minotair AcoustiCare®* series of flexible ducts and prefabricated mufflers for peace of mind installations.

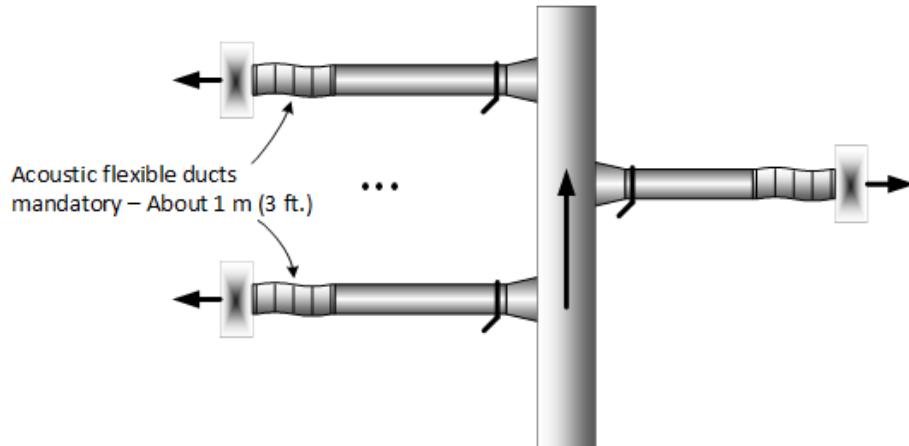


Figure 13 – Install acoustic flexible duct at the end of each supply run.

INSTALLING FLEXIBLE DUCTS

- Generally, flexible ducts should be avoided because they produce a lot of restriction which leads to a higher static pressure (air restriction) inside the ductwork. The higher the static pressure, the more the fans will have to rotate to compensate, which in turn increases ventilation noise and energy consumption.
- If and when you install flexible ducts they must:
 - Be of the highest quality and capable of sustaining a negative static pressure of 1.5" of water column for the return ducts and the fresh air intake,
 - Be as short as possible,
 - Be stretched enough to reduce the internal roughness caused by the duct's natural folds,
 - Not be crushed, and
 - Not have a bend radius inferior to the rigid elbows' bend radius when changing direction. If this is not possible, replace the curved portion by its rigid equivalent and isolate it as required.
- **IMPORTANT:** Only use acoustic flexible ducts capable of withstanding a negative static pressure of 1.5 in H₂O to prevent the extraction ducts liner from imploding. Moreover, if the flexible duct must move moist air (humidifier, bathrooms), the insulation must be protected by a vapor barrier located between the liner and the insulation. The Minotair *AcoustiCare*® series of flexible ducts and prefabricated mufflers are products that meet all these requirements for peace of mind installations.

VALIDATING THE DUCTS INSTALLATION

- **IMPORTANT!** To avoid problems caused by too much air restriction in ductwork, make sure that the static pressure does not exceed 1.5 inches of water column (375 Pa) when operating in Air Exchanger and Recirculation modes with the unit running at full capacity, depending on the previously selected maximum airflow setting. Use the last screen of the "Ventilation" menu to get the static pressure reading.
- If you get a static pressure greater than 1.5 inches of water column (375 Pa), you must identify the causes of this excessive pressure and apply remedial actions. Possible causes mostly comprise the improper installation of ductwork. For example, the use of undersized conduits, crushed flexible conduits and their non-compliance with the minimum bend radius.

LOCATION OF INDOOR GRILLES

SUPPLY GRILLES

- The air supply grilles must be located and installed in a manner that optimizes air circulation in the rooms.
- Generally, air distribution must be performed through wall grilles. The air supply grilles must be located on the upper part of the wall, at least 1 ft. (30 cm) from the finished ceiling and at least 6 ft. 6 in (2 m) from the floor.
- It is also possible to distribute air through floor registers. However, floor registers do not provide as good air circulation as wall grilles, and can be a source of discomfort for some persons.

RETURN GRILLES

- Generally, air extraction must be performed through wall grilles. The air return grilles must be installed on the upper part of the wall, at least 1 ft. (30 cm) from the finished ceiling and at least 6 ft. 6 in (2 m) from the floor.
- **WARNING!** The return grilles cannot be installed less than 10 ft. (3 m) from a cooking surface. Air extraction from cooking surfaces must be performed by a range hood.
- It is also possible to perform air extraction through floor registers. However, floor registers are prone to capturing debris that could clog the inside of the air return ducts.

LOCATION OF OUTSIDE HOODS

- Outside hoods must be wall type.
- All outside hoods which go through the building envelope must:
 - Be hermetically sealed, on their perimeter, to the sealing system they penetrate.
 - Be equipped with a grid to stop small rodents from entering. This grid must not be too fine, because it could restrict air from passing through and become easily clogged with dust.
- The fresh air intake hood must be located at least 1 ft. 6 in (45 cm) from surfaces where snow may accumulate and at least 6 ft. (1.80 m) from any exhaust air outlet, driveways or any other source of contamination.
- The stale air exhaust hood must be located at least 1 ft. 6 in (45 cm) from surfaces where snow may accumulate and be equipped with an airtight back draft damper.
- Whenever possible, the slope of the conduits connecting to the outside hoods should have a slight slope either towards the outside or the Minotair to drain out condensates that may form if the airflow passing through the conduits is very humid.

BALANCING THE SYSTEM

BALANCING REGISTERS

- All ductwork leading to an air supply or return grille should be equipped with register keys. The keys must be locked and secured mechanically after final balancing (see Figure 9, Figure 10, and Figure 11).
- Where possible, register keys must be installed at least 5 ft. (1.50 m) away from the grilles in order to minimize ventilation noise.
- The last 3 ft. (1 m) of ducts leading to a supply grille would benefit of being made of acoustic flexible ducts in order to further minimize ventilation noise, especially if this is a bedroom.
- It is recommended to keep the register keys accessible through an access panel or a suspended ceiling.
- Grilles with integrated registers should be avoided, because they can be noisy when air passes through them.

BALANCING THE MINOTAIR

- In normal circumstances, the MINOTAIR does not require balancing because its constant airflow fans ensure continuous balancing with a tolerance of $\pm 9\%$ at up to 1.5" water column (375 Pa) of static pressure within the ductwork. This margin of error is within standards.
- For added accuracy or if the building regulations for your area so require, it is possible to further balance the intake and exhaust airflow. This is accomplished by using a differential pressure gauge capable of measuring 0 to ± 0.5 inches of water column (0 to ± 125 Pa) and two flexible plastic tubes.
- **Procedure:**
 - Close all windows and doors, and turn off all exhaust devices such as range hood, dryer and bathroom fans.
 - Set the controller to the maximum airflow allowed, and set the MINOTAIR to "air exchanger" mode.
 - Connect each plastic tube to the fresh air from outside and stale air to outside respectively. To do this, you will need to drill two holes (the size of the tubes) in the ductwork, each at the same distance from the Minotair fan outlets as much as possible.
 - Adjust the airflow of the extraction to make it up to 10% less than or greater than the fresh air intake until the pressure differential reads as close to zero as possible. This setting is accessible in the "Ventilation" menu of the microcontroller.
 - Wait 30 seconds between changes to give the system time to stabilize.
 - Make sure you plug the two holes at the end of the procedure.

SECURING THE MINOTAIR

- The mounting location must be solid enough to support the weight of the device filled with water, in case the drain clogs up, which is a total weight of 120 lb. (55 kg).
- The MINOTAIR must be suspended using the four specially designed hooks. Use the polypropylene webbing straps (supplied) to tie the device.
- Each strap must have its upper part secured by the equivalent of a #10 screw (M5), at least 1 ¼ in (3 cm) deep. The lower part of the strap is attached to its corresponding hook on one of the MINOTAIR's four corners.
- Ensure there is a space of at least 16" (40 cm) in front of and under the device to open the access panel. If that is impossible, the panel can be removed completely by sliding it to the right. In that case, ensure there is a space to the right of the device of at least 2 in (5 cm).
- Allow for a minimum space of ½ in (1 cm) between the device and the walls. Do not install the device directly against a wall, because the vibrations it makes while functioning will transfer to the building structure and may disturb the occupants. However, if space allows, leave a clearance of 12" to 16" (30-40 cm) at the back of the unit for easy troubleshooting.
- The device must be level after installation in order to allow the condensates to drain properly and to avoid compressor damage.

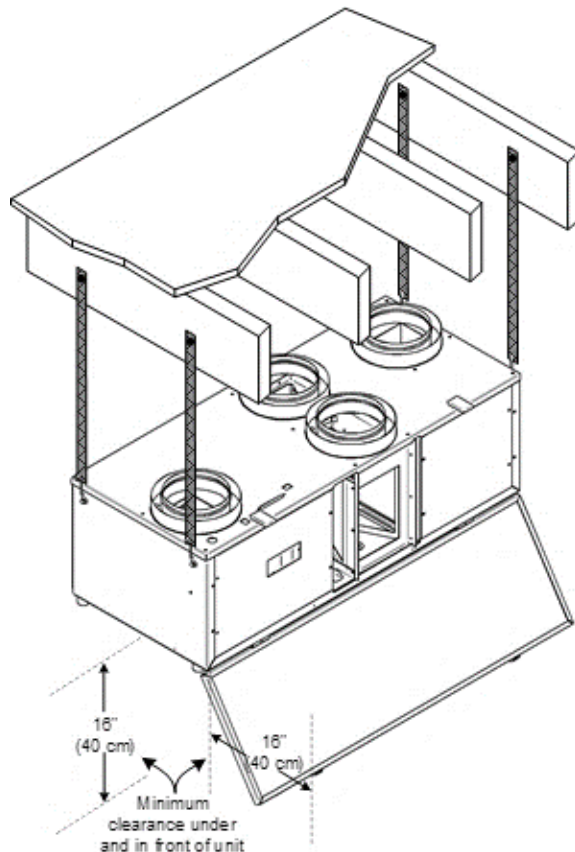


Figure 14 –Mounting the MINOTAIR using the floor joists.

CONNECTING THE CONDENSATE DRAIN

- Connect the female end of the fittings (supplied) to the condensate drains located under the device.
- Connect the male end of the fittings to a $\frac{3}{4}$ in (19 mm) internal diameter flexible tubing (supplied). Then connect the tubing ends to the supplied Tee fitting.
- The Tee fitting must be positioned in an upward angle to form a water trap. An angle between 30 and 45° is required. The water trap must not be located closer than 6" (15 cm) from the bottom of the device or the drain could clog over time.
- **IMPORTANT:** Failure to form a water trap as just described will also create a passageway where stale air will contaminate the fresh air. It is thus recommended to fill the trap with water before starting the device for the first time in order to avoid contamination as well as suction noises.
- The other end of the pipe must end its course in the floor drain or a condensate pump. Using a bucket is not recommended, because the MINOTAIR will fill it quickly on humid days, which will then cause spills on the floor.
- Check drain regularly, because if it becomes clogged, water will accumulate in the unit and eventually spill on the floor through the two overflow holes on the sides.
- Using Minotair genuine filters will reduce the risk of small particulates eventually clogging the drain.

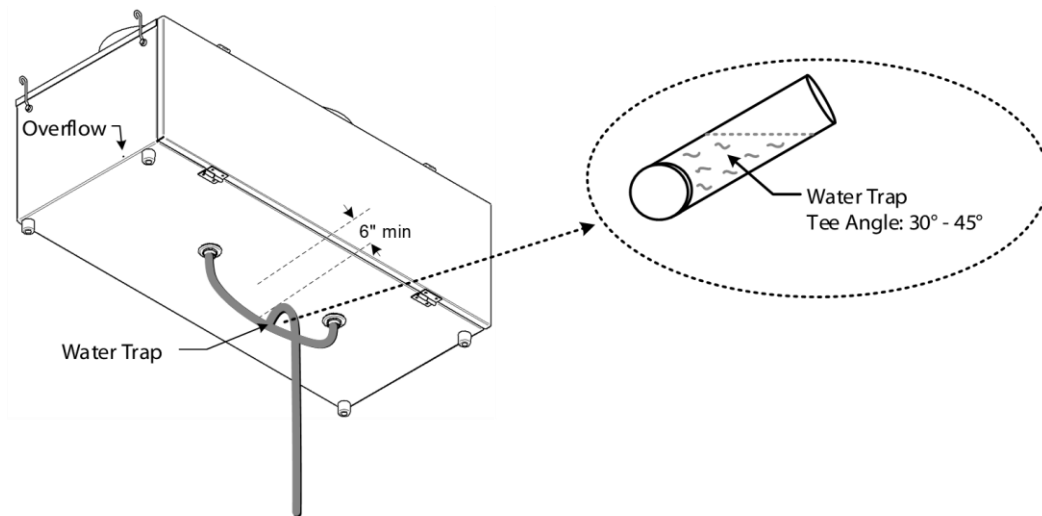


Figure 15 – Position the Tee fitting to form a water trap.

CONNECTING TO AUXILIARY DEVICES (INSTALLATION OPTIONS)

- If one of the two forced air ventilation system installation methods were chosen, the system's ventilator control terminal must be connected to the "G" terminal of the MINOTAIR terminal strip, which will send a 24 VAC signal when it is in operation.
- If the auxiliary heating unit is controlled by the MINOTAIR, the heat generator's control terminal must be connected to the "W" terminal, which will send a 24 VAC signal when the MINOTAIR calls for auxiliary heat.
- If the auxiliary cooling unit is controlled by the MINOTAIR, the air conditioner's control terminal must be connected to the "Y" terminal, which will send a 24 VAC signal when the MINOTAIR calls for auxiliary cooling.
- If the auxiliary humidifier is controlled by the MINOTAIR, its control terminal must be connected to the "H" terminal, which will send a 24 VAC signal when the MINOTAIR calls for humidity.
- If a motorized damper controls a fifth port, its control terminal must be connected to the "5" terminal, which will send a 24 VAC signal when the MINOTAIR operates in Recirculation or Heat Pump modes. In these modes, a fifth port will ensure household odors from the kitchen or bathrooms will not be introduced into the living spaces of the home environment.
- In all cases mentioned above, each device's "common" control wire must be connected to the "C" terminal on the MINOTAIR.

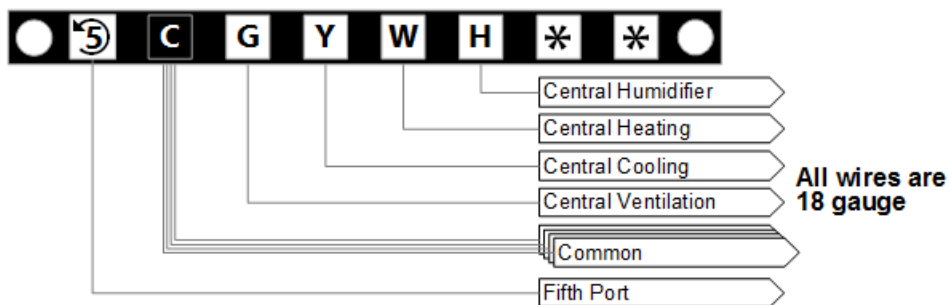


Figure 16 – Connection to a forced air ventilator and other auxiliary devices.

- **CAUTION!** In case the MINOTAIR is connected to a forced air ventilation system, the MINOTAIR's minimum airflow must be confirmed in order to deal with the large pressure differences between the forced air systems and the MINOTAIR. To do this, run the forced-air system ventilator at full speed while running the MINOTAIR at its lowest speed, i.e. 80 cfm (40 l/s), in Air Exchanger mode. Verify that the static pressure reported by the MINOTAIR is greater than or equal to 0.1 inch of water column (25 Pa) (refer to the "ventilation" menu). If it is not (i.e., the pressure is equal to 0.0 inches of water column (0 Pa)), you will need to install a register key (Figure 9 and Figure 10) and adjust it until the static pressure indicates 0.1 inch of water column (25 Pa). That's it! The MINOTAIR constant airflow fans will ensure real time tuning of supply and exhaust airflow from now on.

CONNECTING TO A 5 kW ELECTRIC COIL (INSTALLATION OPTION)

- It is possible to connect an electric coil (duct heater) of a maximum capacity of 5 kW in line with the MINOTAIR main distribution conduit. The selected coil model must be one that is able to modulate its intensity according to the actual airflow and using the coil outlet temperature as the reference point. The reference temperature should be set between 35°C and 50°C (95°F and 122°F) in a heating application or set to -10°C (14°F) in a preheating application.
- In the case of an electric coil, terminal "W" of the MINOTAIR controls the coil (see Figure 16). Ensure the MINOTAIR auxiliary heating option is set to "YES" in the "Temperature" menu while specifying that the fan source is the MINOTAIR itself and not that of another auxiliary device such as a furnace.
- In the case of an electric coil, its 24 VAC "common" control wire must be connected to the "C" terminal on the MINOTAIR (see Figure 16).

CONNECTING TO AN AUXILIARY HEAT PUMP (INSTALLATION OPTION)

- It is possible to connect a heat pump to the MINOTAIR. In this case, there must be a 120 VAC relay (not supplied) that will connect in parallel with the reversing valve (Terminal NO2 on the microcontroller) located inside the MINOTAIR which will then act as "O" terminal or "B" according to the heat pump model. You have to choose the relay according to whether an "O" terminal (normally open relay) or "B" terminal (normally closed relay) is required.
- In the case of a heat pump, MINOTAIR terminal "W" is used to control the auxiliary heating of the heat pump "AUX", which in this case is essentially the third stage of heating.
- In the case of a heat pump, MINOTAIR terminal "Y" is used to control the compressor "COMP (Y)" of the auxiliary heat pump.
- In the case of a heat pump, its 24 VAC "common" control wire must be connected to the "C" terminal on the MINOTAIR.

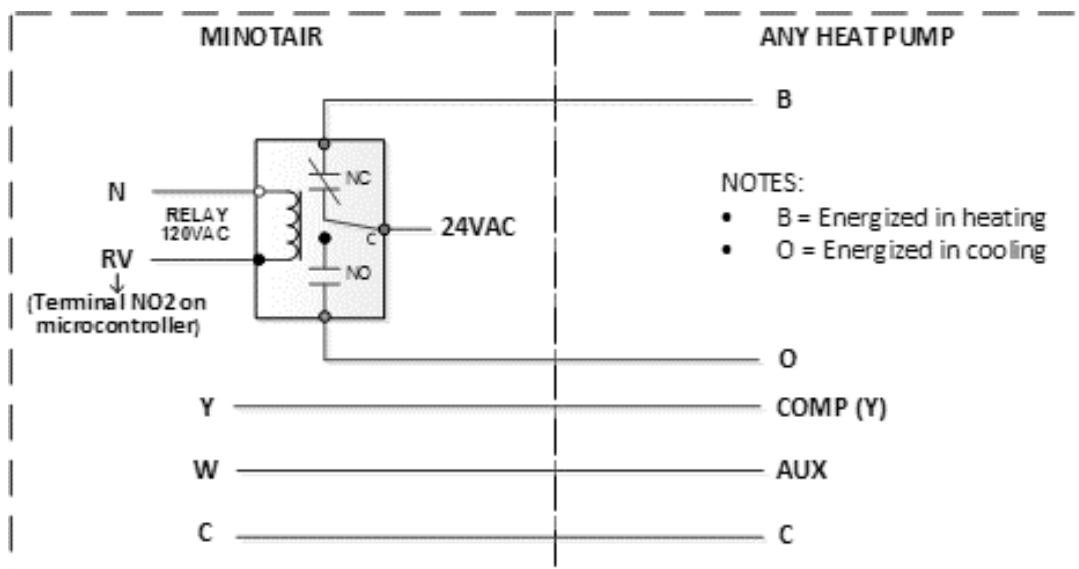


Figure 17 – Connection of a heat pump to the MINOTAIR.

- **Relay-controlled equipment.** In cases where a device must be controlled through dry contacts – as is often the case with humidifiers – a relay (not supplied) must be added, to be activated by the 24 VAC signal sent by the corresponding terminal and whose “normally open” and “common” contacts will connect to the dry contact terminal of the device in question (Figure 18). **IMPORTANT:** Always use a relay whose coil is equipped with a surge suppressor circuit to avoid damaging fragile electronic components such as bathroom timers and the microcontroller. The use of a contactor is strictly prohibited. Ask us for advice if in doubt.

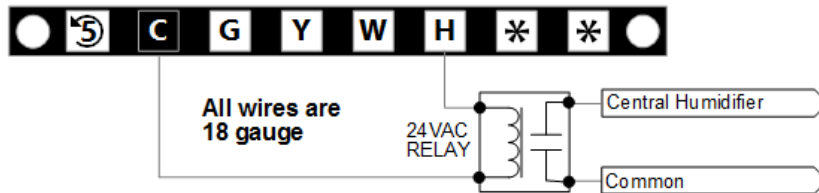


Figure 18 – Connecting to a dry contact-controlled humidifier with the use of a relay.

CONNECTING TO A BATHROOM TIMER (INSTALLATION OPTION)

- Bathrooms can be equipped with timers to activate ventilation in air exchanger mode when needed.
- The MINOTAIR timers can be turned on for periods of 10, 20 or 30 minutes. They can remain continuously turned on by simply pressing their button for 3 seconds.
- Up to 10 timers can be installed in parallel.
- **CAUTION!** Never apply electrical voltage on starred (*) terminals, because this will irreparably damage the microcontroller and will not be covered by the warranty.

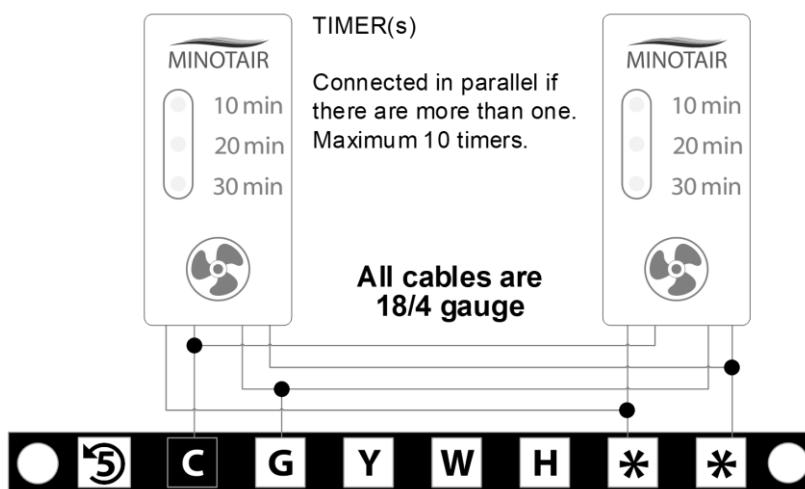


Figure 19 – Connecting bathroom timers.

INSTALLING THE WALL MOUNT CONTROL (INSTALLATION OPTION)

- In addition to the digital control integrated in the microcontroller, it is possible to connect up to two wallmount digital controls per MINOTAIR unit for even more convenience.

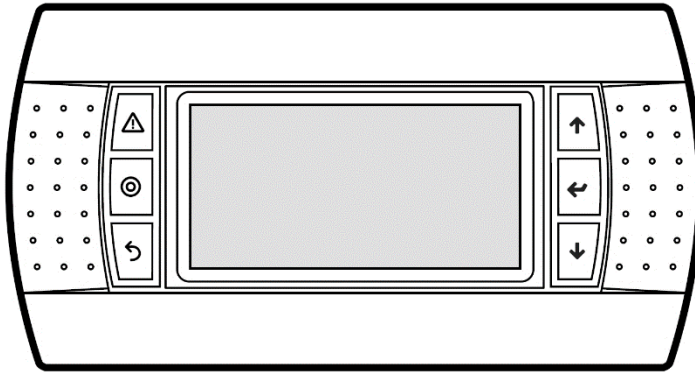


Figure 20 – Wall Mount Digital Control

SELECTING THE LOCATION

- Note that there are no temperature or humidity sensors in the wall mount control, which means it can be installed just about anywhere. However, we recommend an easily accessible location where it can often be consulted. For example, hallways leading to the bedrooms, the living room or the dining room are good locations.
- The digital control is installed on the wall using four screws (supplied). The height should be chosen to facilitate reading.

ADJUSTING DISPLAY CONTRAST

- Once the digital control is installed, it is possible to adjust its contrast. To do so, hold down both Δ + $\odot$ keys and use $\uparrow$ or $\downarrow$ to increase or decrease contrast on the digital control.

CABLE CONFIGURATION

- Connecting a wall mount digital control is done using a 6-wire telephone cable.
- The connectors must be 6-position RJ12 (6P6C) type.
- Maximum cable length for connections is 150 ft. (45 m).
- One end of the cable connects to the back of the digital control, while the other end connects to the 6-position jack labelled "MINO-CONTROL", located on top of the MINOTAIR.

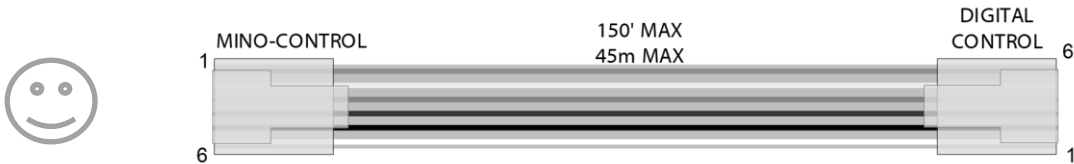


Figure 21 – Cable configuration for a single wall mount digital control

- **Warning!** Be sure not to cross endings, as this will render all communications with the microcontroller impossible. Note that this will not damage the digital control, but a *NO LINK* message will appear.

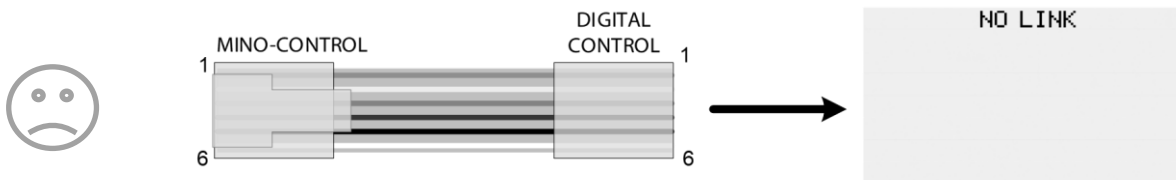


Figure 22 – Wrong configuration

- If the installation includes two wallmount digital controls, a cable splitter (optional) must be connected into the "MINO-CONTROL" jack located on top of the device. This will double the "MINO-CONTROL" jack so that each control can have its own cable.

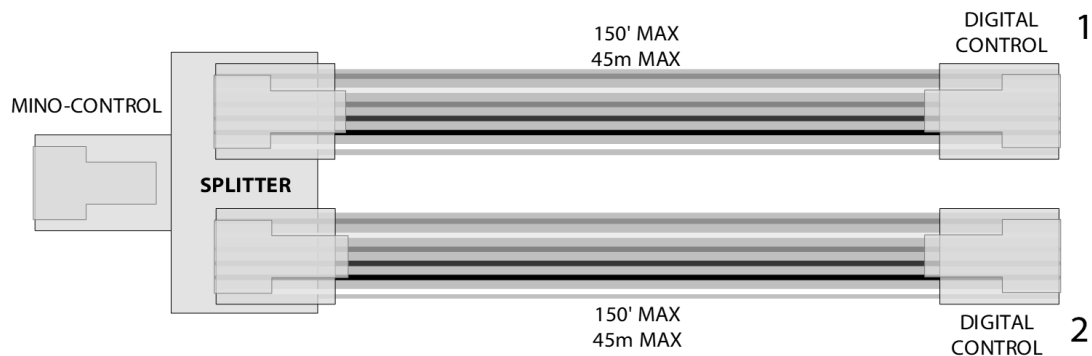


Figure 23 - Cable configuration for two wallmount digital controls

WALL-MOUNTING

- The digital control consists of three main parts (A, B, C in Figure 24):
 - A. The back piece,
 - B. The electrical board and
 - C. The snap-on cover.
- Before mounting, you must disassemble the digital control. To do this, use your fingers to lift one corner of the snap-on cover **C** until it comes off. Be careful not to lose the small black plastic frame around the screen, and be sure to memorize its position to facilitate reassembly later.
- For wall-mounting, you must first affix the back-piece **A** in one of two ways:
 1. On an electrical box. In this case, use the corresponding rounded-head screws (supplied) and make sure the electrical box is mounted horizontally, or
 2. Directly onto the wall. In this case, use the plastic pins (supplied), as required, and the corresponding rounded-head screws (supplied).
- Ensure the back-piece **A** is level.
- Then proceed to connect the phone cable by passing it through the square opening of the back-piece **A** and inserting the connector into the terminal of the electric board **B**.
- Rest the electrical board **B** on the back-piece **A** and fasten the parts together using the flush-head screws (supplied) made for plastic.
- Finally, put back the small black plastic frame around the screen, and fit the snap-on cover **C**.

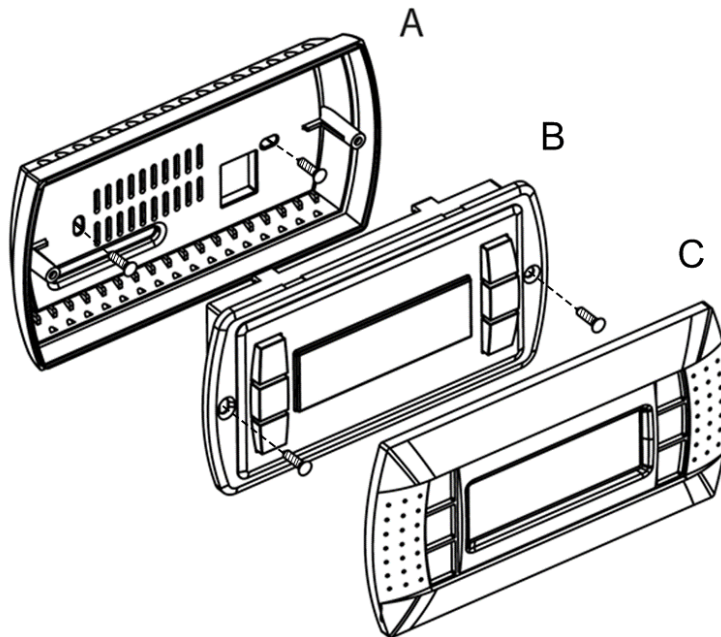


Figure 24 – Wall-Mounting

CONNECTING THE MINOTAIR

- This is the last step before powering on the MINOTAIR.
- A 120 VAC/15A circuit must be used and the connection must be made by a qualified electrician. It is always advised to install a wall switch nearby the MINOTAIR that can be used to cut power during repair or maintenance activities (Figure 25).
- No other device can share the same circuit as the MINOTAIR. If a condensate pump is required, it must be connected to a different circuit.

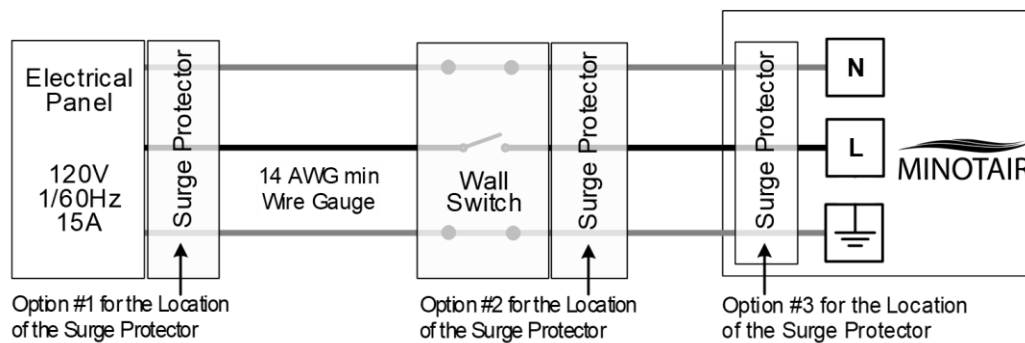


Figure 25 – Connecting the device.

- **IMPORTANT!** If you suspect the power source to be of poor quality (i.e. subject to transient overvoltage, spikes, brownouts, electrical noise, etc.), it is required to install a surge protector to avoid damages to the electronic components contained in the microcontroller and the fans. The surge protector must be installed upstream of the MINOTAIR either at the electrical panel (option 1) or at the MINOTAIR junction box (option 2). If space permits, it can also be installed inside the MINOTAIR electrical compartment (option 3). There is not one option better than the other. Damage caused by the poor quality of the power source is not covered by the warranty.

DIGITAL CONTROL BASICS

The MINOTAIR is controlled through a digital control featuring a backlit display and 6 buttons. The interface is designed around a house theme.

MAIN SCREEN

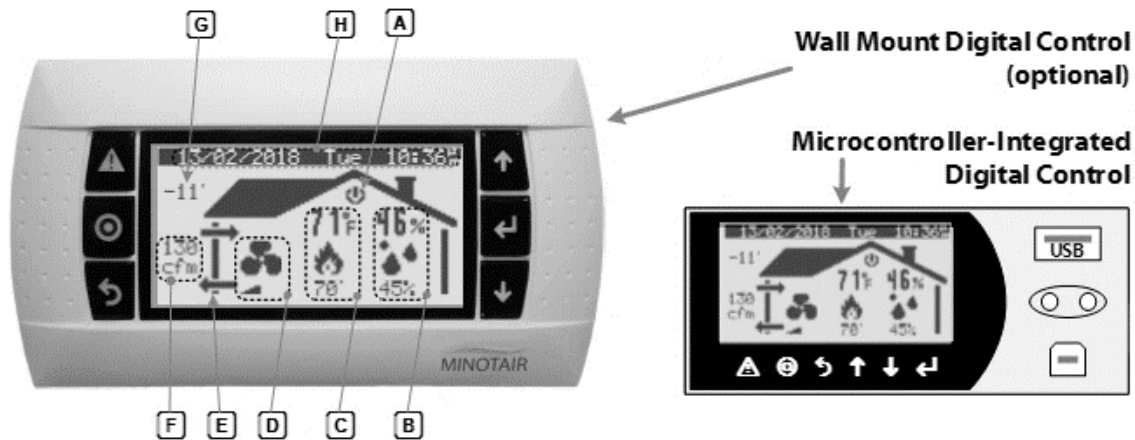


Figure 26 – MINOTAIR digital control main screen¹.

Inside the house

- A Device status {on () , off () }²
- B Indoor relative humidity level in bold, with setpoint humidity displayed under.
- X Indoor temperature in bold {°C, °F}, icon indicating the temperature control mode {heating, cooling}, with setpoint temperature displayed under.
- Δ Ventilation speed {low, high}.
- E Ventilation mode {Air Exchanger, Recirculation, Heat Pump, and Intermittent 10/20/30/40, Smart}.

Outside the house

- Φ Current airflow {cfm (cubic feet per minute), l/s (liters per second)}.
- Γ Outside temperature with its trend {  (upward),  (stable),  (downward) }.
- H Date, day of the week and current time.

¹ For information purposes only. The actual screen may differ from the image shown here. For simplicity, only the wall mount control is used in subsequent examples. However, the principles are equally applicable to the microcontroller-integrated digital control.

² The values shown within brackets represent the available options. The underlined option is the option used in the example.

DIGITAL CONTROL BUTTONS

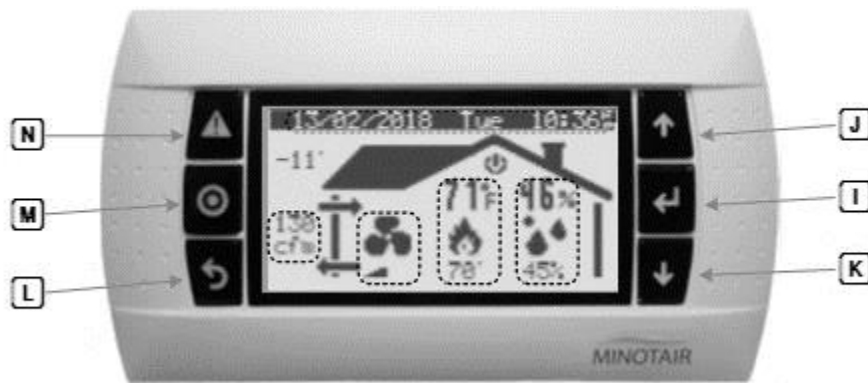


Figure 27 – Buttons of the digital control.

- I The “Enter” $\leftarrow$ button changes a value or allows a value to be changed by the “Up” $\uparrow$ and “Down” $\downarrow$ arrows.
- J The “Up” $\uparrow$ button increases a value or moves the cursor up.
- K The “Down” $\downarrow$ button decreases a value or moves the cursor down.
- L The “Escape” $\curvearrowright$ button returns to the previous screen.
- M The “Setpoint” $\odot$ button serves to set the temperature and humidity. If depressed for 3 seconds, it displays the main menu to adjust system settings.
- N The “Alarm” $\triangle$ button displays the state of various alarms if applicable. It is also used to turn on and off the unit.

NOTE: The buttons light up when pressed. They shut off after 10 minutes of idle time.

NOTE: The screen lights up when a button is pressed. It shuts off after 10 minutes of idle time, unless it is configured to always stay backlit. This setting is accessible from the main menu.

NOTE: The “Alarm” $\triangle$ button flashes red to indicate an alarm. By pushing on it, the corresponding message will display and the system will reset the alarm if the conditions that triggered it are no longer present. If the conditions remain, the button will continue to light up. Note that each alarm is logged in the events log. If there is more than one simultaneous alarm, they can be reviewed in the log one after the other using the $\uparrow$ and $\downarrow$ arrows.

LISTING OF SYMBOLS

The digital control uses symbols to represent the current state of different functions. For example, a static flame indicates that the device is ready to call for heat while an animated flame means that heating is occurring.

Ventilation					
 On  Off	 Low Speed	 High Speed	 10 or  20 or  30 or  40 Intermittent Mode		
 Air Exchanger Mode	 Heat Pump Mode	 Recirculation Mode	 smart or  smart or  smart Smart Mode		
Temperature					
 Heating	 Auxiliary Heating	 Cooling	 Auxiliary Cooling	 Free Cooling	 Turbo Cooling
Humidity					
 or  Dehumidification		 or  Humidification		 Winter Conditions	
7-Day Program					
 or  Day Setpoint		 or  Night Setpoint		 or  Away Setpoint	
Various					
 or  or  Exception, Alarm or Self-Diagnostic		 Defrost	 or  Compressor Pause	 or  10 or  20 or  30 Bathroom Timer	

Table 3 – Animated symbols used for various MINOTAIR features.

ADJUSTING DISPLAY CONTRAST

Integrated Control: Hold down both ⤵ + ⤴ buttons and use ↑ or ↓ to increase or decrease contrast on the digital control.

Wall mount Control: Hold down both ⬆ + Ⓞ buttons and use ↑ or ↓ to increase or decrease contrast on the digital control.

BOOT SEQUENCE

Like most computers, every time you power on the MINOTAIR or after a power outage, the MINOTAIR initiates a boot sequence that lasts approximately 30 seconds. During this period, the digital control is not in operation and the screen may be blank or display messages like "No Link". Once the boot sequence is complete (Figure 28), the device will resume its operation as it was before it was rebooted or lost power, and will remember its settings.



Figure 28 – 30-second boot sequence screen.

NOTE: If the device is turned on for the first time or if you have just updated the microcontroller, you may be asked to cut power to the MINOTAIR for 30 seconds (Figure 29) by closing the circuit breaker or the circuit switch. This procedure is normal. Switch power back on after 30 seconds.

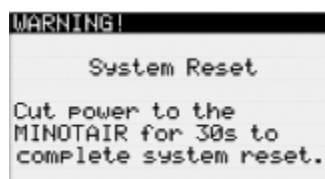


Figure 29 – Switch off power to the MINOTAIR when requested.

TURNING THE DEVICE ON AND OFF

Press Δ to turn on the device. Ventilation will start (Figure 30).

NOTE: The MINOTAIR does not display temperature or humidity when it is turned off. The MINOTAIR's ventilation must be in operation for this information to show.

NOTE: The MINOTAIR does not control auxiliary heating and cooling units when it is turned off. The MINOTAIR's ventilation must be in operation to control these devices.

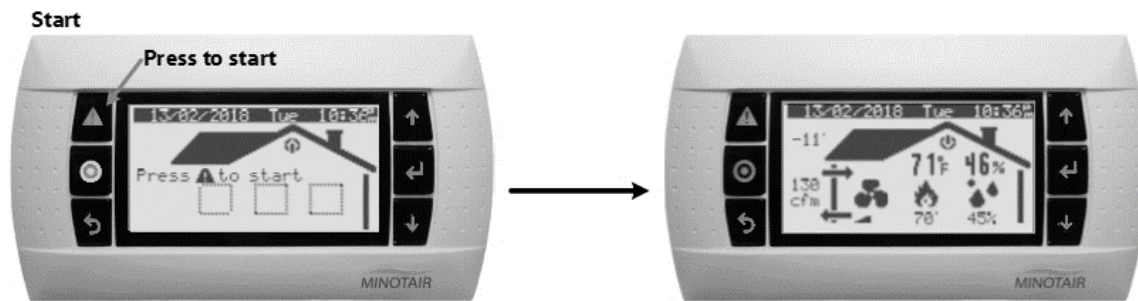


Figure 30 – To turn on the MINOTAIR, press Δ .

To turn off the device, simply hold down the Δ button for 3 seconds. Ventilation will stop and the screen becomes as shown on Figure 31.

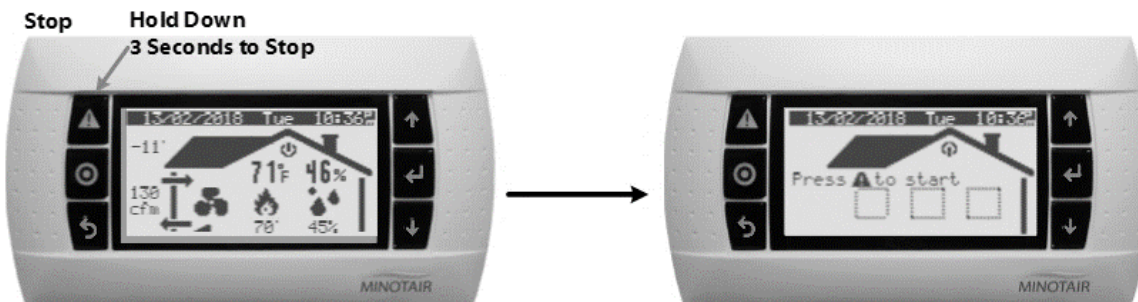


Figure 31 – To turn off the MINOTAIR, hold down Δ for 3 seconds.

ADJUSTING INDOOR TEMPERATURE

Press the setpoint button  once.

Press  to move the cursor to the temperature setpoint of the current mode. Press  to display two arrows " " making it possible to increase or decrease the setpoint using the  and  buttons. After 5 seconds of inactivity or pressing a second time on  disables the arrows.

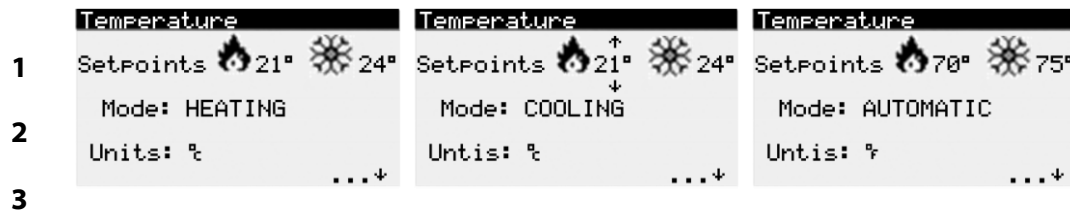


Figure 32 - Examples of options to adjust the temperature setpoint, mode and units.

1 Setpoints:

- . Desired setpoint when the device is in heating mode. To change this value, the mode must be set to "HEATING". The heating setpoint must always be lower than the cooling setpoint. The device will automatically correct it, if needed.
- . Desired setpoint when the device is in cooling mode. To change this value, the mode must be set to "COOLING". The cooling setpoint must always be higher than the heating setpoint. The device will automatically correct it if needed.

2 Mode:

- **HEATING.** The device will only function in heating mode.
- **COOLING.** The device will only function in cooling mode.
- **AUTOMATIC.** The device will function in either heating or cooling mode, depending on the season. It switches between modes based on a sophisticated algorithm that protects against false changes of season. For example, in the winter, the device will avoid switching to cooling mode even if a secondary heating source (fireplace, woodstove, etc.) heats the house over the setpoint temperature.

3 Units:

- **°C.** Temperature will display in Celsius units
- **°F.** Temperature will display in Fahrenheit units.

ADJUSTING INDOOR RELATIVE HUMIDITY

Press the setpoint button Ⓢ twice.

Press ↑ or ↓ to increase or decrease the relative humidity setpoint.

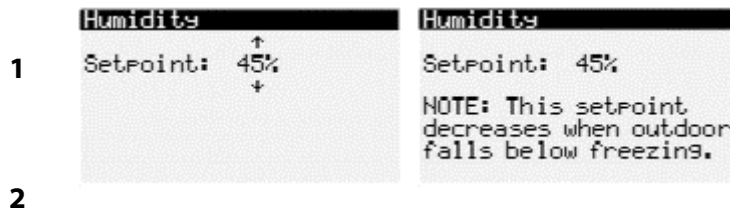


Figure 33 – Adjusting the humidity setpoint and the effect of automatic winter decrease.

1 Setpoint:

- **30% to 60%.** Set the desired relative humidity. During the winter months, a 35% indoor humidity level is ideal (30-40%), while a 45% indoor humidity level is very comfortable (40-60%).

2 NOTE:

- If humidity was set to *winter automatic mode* in the main menu, the setpoint displayed on the main screen will automatically decrease as the outside temperature falls below freezing, but without ever going under 30%.

ACTIVATE THE VIRTUAL BATHROOM TIMER

Hold down the escape button ↵.

Press the setpoint button ⊙ once to activate the timer for 10 minutes.

Press the setpoint button ⊙ a second time to activate the timer for 20 minutes.

Press the setpoint button ⊙ a third time to activate the timer for 30 minutes.

Press the setpoint button ⊙ a fourth time to stop the timer.

Note that physical bathroom timers always take precedence over the virtual timer.

Note also that the bathroom timer ventilation speed is set in the Main menu.



Figure 34 – Activation of the Virtual Bathroom Timer is done by pressing ↵ and ⊙.

MAIN MENU

The MINOTAIR includes several settings that are accessible from the main menu screen. You can access the main menu by pressing the “Setpoint” Ⓢ button for 3 seconds.

1. VENTILATION SETTINGS

Press the Ⓢ button for 3 seconds to display the main menu. Then, using the ↑ and ↓ arrows, navigate to the “Ventilation” submenu and press ↵ to select (Figure 35).

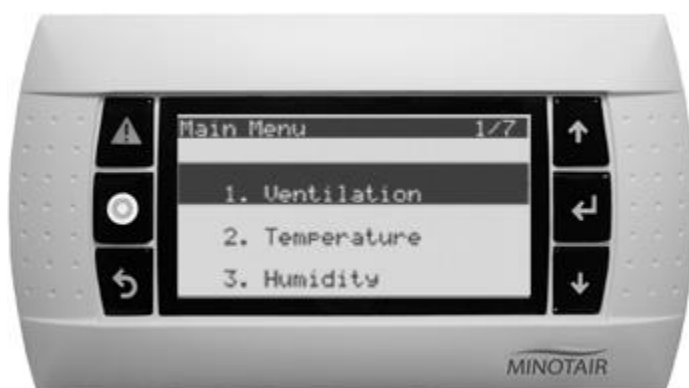


Figure 35 – Main menu – Ventilation settings.

“VENTILATION” SETTINGS SCREEN

There are 11 available options displayed over several screens. Press ↓ or ↑ to move the cursor between options. Once the desired option is selected, press ↵ to change the setting (Figure 36).

The following options are available:

	Ventilation	Ventilation	Ventilation
1.1	Mode: AIR EXCHANGER	Mode: RECIRCULATION	Mode: HEAT PUMP
1.2	Fresh Air: 20 cfm	Fresh Air: 40 l/s	Fresh Air: 120 cfm
1.3	Units: cfm ...↑	Units: l/s ...↑	Units: cfm ...↑

Figure 36 – Examples of options to adjust ventilation mode, fresh air setpoint and units.

1.1 Mode:

- **AIR EXCHANGER.** The device ventilates and continuously renews the air. It filters air while removing pollutants from the house and oxygenates indoor air with fresh air from outside. It dehumidifies and cools air in the summer, and dehumidifies and recovers heat in the winter.
- **HEAT PUMP.** The device recirculates the air keeping heat indoor in the winter, and coolness in the summer. It dehumidifies and cools air in the summer and heats air in the winter. It filters air while providing uniform humidity and temperature conditions. The device does not renew air in this mode.

- **RECIRCULATION.** The device recirculates and filters air while providing uniform humidity and temperature conditions. This mode consumes very little energy because it does not heat or cool. The device does not renew air in this mode.
- **SMART.** The device prioritizes air exchanger mode and switches to heat pump mode during calls for heat or cooling. Switches to recirculation mode when weather conditions are unsuitable for air exchanger or heat pump modes.
- **INTERMITTENT – 10, 20, 30, 40.** Alternates between air exchanger and recirculation modes in order to provide fresh air over a predefined period of time varying between 10, 20, 30 and 40 minutes per hour. Intermittent-10 mode is ideal during long absences in which the house is unoccupied.

1.2 Fresh Air Setpoint:

- **20 to 180 cfm (10 to 85 l/s).** Set the ventilation supply rate according to the fresh air requirement of the house³.

NOTE: It is important to choose a ventilation supply rate that corresponds to the house's requirements. A low supply rate can lead to a decrease in comfort and indoor air quality. On the other hand, a high supply rate can dry out the air and cause cracks in the wood, as well as increasing heating and cooling costs.

1.3 Units:

- **cfm.** Ventilation speed will display in cubic feet per minute.
- **l/s.** Ventilation speed will display in liters per second.

³ Use the fresh air supply rate calculated in Table 1 – Airflow planning.

"VENTILATION" SETTINGS SCREEN (CONT'D)

	Ventilation ...↑	Ventilation ...↑
1.4	Recirculation Mode Default Speed: LOW	Recirculation Mode Default Speed: HIGH
1.5	Bathroom Timers and Shower : TURBO Detector Speed. ...↓	Bathroom Timers and Shower : TURBO Detector Speed. ...↓

Figure 37 – Examples of options to adjust the default bathroom timers and recirculation speed.

1.4 Recirculation Mode Default Speed:

- **LOW.** Ventilation speed will be equal to the configured fresh air setpoint in the previous "Ventilation" screen, but never less than 80 cfm (40 l/s).
- **HIGH.** Ventilation speed will be double the configured setpoint in the previous "Ventilation" screen, but not more than the device's upper limit but never less than 80 cfm (40 l/s).

1.5 Bathroom Timers and Shower Detector Default Speed:

- **TURBO.** Ventilation speed will be the maximum airflow rate allowed by the machine 180 cfm – 250 cfm (85 l/s – 120 l/s). This cannot be changed.

"VENTILATION" SETTINGS SCREEN (CONT'D)

	Ventilation ...↑	Ventilation ...↑
1.6	Stop exchanging air in winter if or if:	Stop exchanging air in winter if or if:
1.7	Out. temperature < -20° Humidity too low : YES ...↓	Out. temperature < -04° Humidity too low : NO ...↓

Figure 38 – Examples of options to adjust winter limits.

1.6 Air exchanger mode outside temperature limit:

- **-30°C to 0°C (-22°F to 32°F).** This setting applies to air exchanger mode during winter months. Set the minimum outside temperature at which the device will stop ventilation in air exchanger mode. The device will then switch to recirculation mode and display an exception symbol [!].

1.7 Indoor humidity too low:

- **YES.** When indoor humidity drops below setpoint, the device will stop ventilation in air exchanger mode. The device will then switch to recirculation mode and display an exception [!].
- **NO.** When indoor humidity drops below setpoint, the device will continue to ventilate per normal but at the risk of further drying out the indoor air.

"VENTILATION" SETTINGS SCREEN (CONT'D)

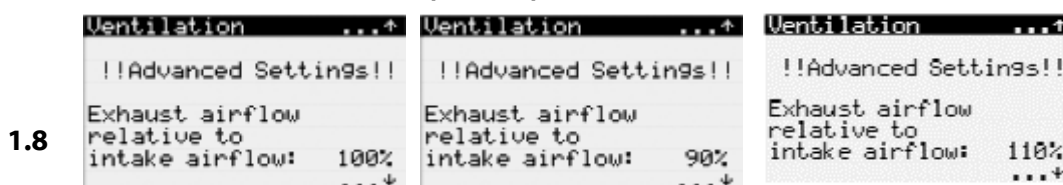


Figure 39 – Examples of options to adjust exhaust airflow.

1.8 Exhaust airflow relative to intake airflow:

- **90% to 110 %.** Set the exhaust fan airflow to make it lower or higher than the intake fan airflow in order to balance the airflows with greater accuracy. See "Balancing the MINOTAIR" for more information.

NOTE: This is an advanced setting and only ventilation professionals equipped with proper measuring equipment should adjust it.

"VENTILATION" SETTINGS SCREEN (CONT'D)



Figure 40 – Examples of options to adjust the maximum airflow.

1.9 Maximum Airflow:

- **250 cfm – 180 cfm (120 l/s – 85 l/s).** Adjust this setting to the highest airflow rate that will allow the static pressure to remain lower than or equal to 1.6" WC when the unit is operating in either Air Exchanger mode and Recirculation mode at High speed. Start by setting the Minotair to Recirculation mode at High speed with a Fresh Air setpoint of 125 cfm (60 l/s), i.e. will run at 250 cfm (120 l/s) at High speed. Adjust for the highest airflow by waiting 30 seconds between each adjustment. Once you are satisfied with the setting, trigger the bathroom timer to switch to Air Exchanger mode. Readjust the maximum airflow setting downward if the static pressure becomes higher than 1.6" WC. Once done, do not forget to readjust the Fresh Air setting as required.
- **See next page to determine the static pressure.**

"VENTILATION" SETTINGS SCREEN (CONT'D)

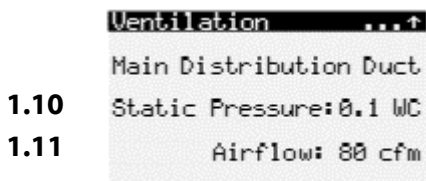


Figure 41 – Static pressure at current airflow.

1.10 Static Pressure:

- This setting screen is useful when you want to validate the ducts installation generates less than 1.6 inches of water column.
- This setting screen is also used to validate the connection of the main air distribution duct to the main return of a forced air ventilation system. Indeed, due to significant differences in pressure between the MINOTAIR and the forced-air system ventilator it is being connected to, the MINOTAIR's minimum airflow must be confirmed. To do this, run the forced-air system ventilator at full speed while running the MINOTAIR at its lowest speed, i.e. 80 cfm (40 l/s), and verify that the static pressure reported by the MINOTAIR is greater than or equal to 0.1 W.C. (25 Pa). If it is not (i.e., the pressure is equal to 0.0 W.C. (0 Pa)), you will need to install a register key and adjust it until the static pressure indicates 0.1 W.C. (25 Pa). Once adjusted, the MINOTAIR constant airflow fans will ensure real-time calibration of supply and exhaust airflows from now on.

NOTE: The static pressure is displayed only in inches of Water Column (W.C.)

1.11 Airflow Rate:

- The airflow rate currently in progress for information purposes.
NOTE: The airflow is displayed only in cfm units.

2. ADJUSTING HEATING AND COOLING SETTINGS

Press the **⊙** button for 3 seconds to display the main menu (Figure 42) and use the **↑** and **↓** arrows to navigate to the “Temperature” submenu. Press **↵** to select.



Figure 42 – Main menu – Temperature settings.

“TEMPERATURE” SETTINGS SCREEN

There are 8 available options displayed over several screens. Press **↓** or **↑** to move the cursor between options. Once the desired option is selected, press **↵** to change the setting (Figure 43).

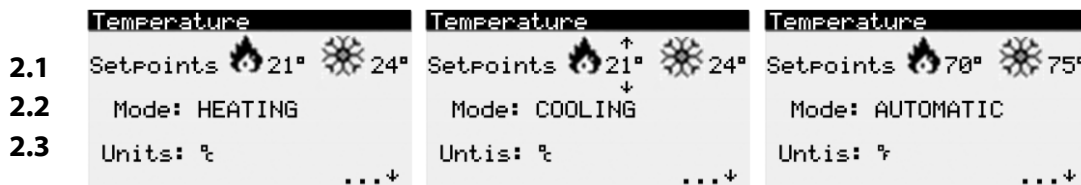


Figure 43 - Examples of options to adjust the temperature setpoint, mode and units.

2.1 Setpoints:

- . Desired setpoint when the device is in heating mode. To change this value, the mode must be set to “HEATING”. In Automatic mode, the heating setpoint must always be lower or equal to the cooling setpoint. The device will automatically correct it, if needed.
- . Desired setpoint when the device is in cooling mode. To change this value, the mode must be set to “COOLING”. In Automatic mode, the cooling setpoint must always be higher or equal to the heating setpoint. The device will automatically correct it, if needed.

2.2 Mode:

- **HEATING.** The device will only function in heating mode.
- **COOLING.** The device will only function in cooling mode.
- **AUTOMATIC.** The device will function in either heating or cooling mode, depending on the season. It switches between modes based on a sophisticated algorithm that protects against false changes of season.

2.3 Units:

- **°C.** Temperature will display in Celsius units
- **°F.** Temperature will display in Fahrenheit units.

"TEMPERATURE" SETTINGS SCREEN (CONT'D)



Figure 44 – Examples of options to adjust auxiliary (central) heating units.

The MINOTAIR can control auxiliary heating units such as electric and gas furnaces and heat pumps as long as they can be controlled through a 24 VAC signal.

NOTE. Forced air units must be connected to the "G" terminal to synchronize ventilation with that of the MINOTAIR.

2.4 Auxiliary Heating?

- **NO.** The MINOTAIR does not control any auxiliary heating unit.
- **YES.** The MINOTAIR controls an auxiliary heating unit. The control signal follows a call for heat for which the MINOTAIR was unable to reach the requested temperature setpoint within 5 to 25 minutes depending on outside air temperature, or if indoor temperature is 1°C (1.8°F) under the temperature setpoint.

2.4.1 Fan Source:

- **MINOTAIR.** The MINOTAIR controls a 5-kW electric coil (not supplied) in line with its distribution conduit. The control signal is a 24 VAC voltage to the "W" terminal. See "Connecting to a 5 kW Electric Coil (Installation Option)" for further details.
- **AUXILIARY.** The MINOTAIR sends a heating signal to the heating terminal "W" located on the connection terminal block and will let the auxiliary unit manage the transition from one stage to another if appropriate. In the case of a heat pump, the signal will rather come from the "Y" terminal. See "Connecting to an Auxiliary Heat Pump (Installation Option)" for further details.

2.4.2 Lockout:

- **Setpoint.** In the case of a heat pump, the MINOTAIR uses the lockout temperature to determine the limit at which the heat pump will cease to function and instead favor the auxiliary or emergency heat controlled by terminal "W". The lockout setpoint is also used to determine when to call upon the auxiliary heating if the heat pump was unable to reach the desired temperature setpoint within 5 to 25 minutes depending on the outside temperature. See "Connecting to an Auxiliary Heat Pump (Installation Option)" for further details.

"TEMPERATURE" SETTINGS SCREEN (CONT'D)

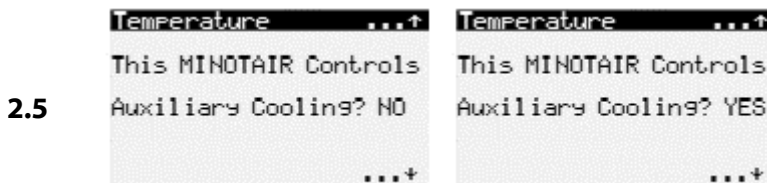


Figure 45 – Examples of options to adjust auxiliary cooling units.

The MINOTAIR can control auxiliary cooling units such as air conditioners and heat pumps as long as they can be controlled through a 24 VAC signal. When these devices are forced air systems, the MINOTAIR can control their ventilation.

NOTE. Forced air units must be connected to the "G" terminal to synchronize ventilation with that of the MINOTAIR.

2.5 Auxiliary Cooling?

- **NO.** This MINOTAIR does not control any auxiliary cooling unit.
- **YES.** This MINOTAIR will send a signal to the "Y" cooling terminal on the terminal board and will let the auxiliary unit manage its own speed switching, if applicable. This signal follows a cooling call for which the MINOTAIR was unable to reach the requested temperature setpoint within 5 to 20 minutes depending on the outside air temperature, or if indoor temperature is 1°C (1.8°F) over the temperature setpoint.

"TEMPERATURE" SETTINGS SCREEN (CONT'D)

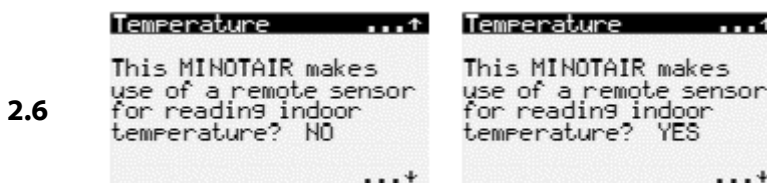


Figure 46 – Examples of options to adjust a remote sensor.

2.6 Use of a remote sensor?

- **NO.** This MINOTAIR uses its internal sensor.
- **YES.** For greater indoor temperature accuracy, this MINOTAIR uses a remote sensor. This option only appears if the MINOTAIR controls an auxiliary heating or air conditioning system.

"TEMPERATURE" SETTINGS SCREEN (CONT'D)

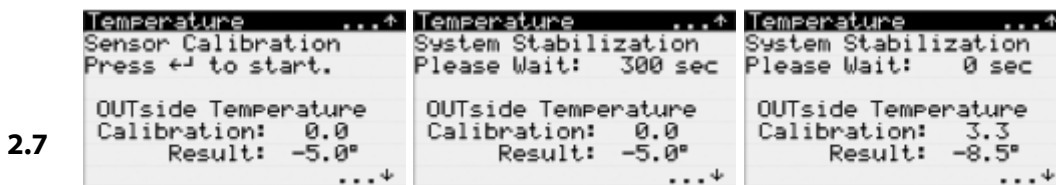


Figure 47 – Examples of options to adjust outside temperature calibration.

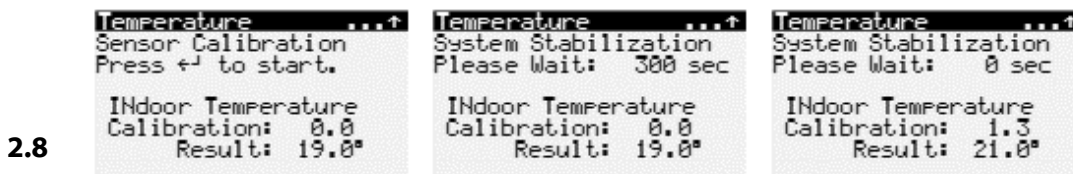


Figure 48 – Examples of options to calibrate the inside temperature sensor.

The MINOTAIR uses sensors to measure outside and indoor temperatures. However, since the sensors are integrated into the device, their temperature readings may differ from what the sensors would have measured if they had been located outside the house (for outside temperature) or in a living space like the living room (for indoor temperature). In fact, temperatures measured by each sensor will be directly impacted by the air intake duct's level of insulation and airflow rate.

To compensate for this discrepancy, the MINOTAIR temperature sensors must be calibrated. The calibration process is performed once the device's installation is complete. For best results, a difference of at least 10°C (20°F) between outside and indoor temperatures is preferred when calibrating. The greater the difference, the more precise the calibration will be.

2.7 Calibrating outside temperature. Press $\leftarrow$ to start the calibration process. The device will take 360 seconds to stabilize. During this time, measure the outside temperature with a thermometer. Once the device is stable, press $\leftarrow$ to display two arrows " $\uparrow \downarrow$ " making it possible to increase or decrease the setpoint using the $\uparrow$ and $\downarrow$ buttons. Increase the calibration value until the result value is equal to the temperature measured with the thermometer. A normal calibration value should range between 1.0 and 8.0. If the value is much more than this, indoor air is likely infiltrating the intake duct (check the ductwork) or the temperature sensor is defective.

2.8 Calibrating indoor temperature. If the device has already been stabilized, it is not necessary to wait 360 seconds again. After measuring the indoor temperature with a thermometer, press $\leftarrow$ to display two arrows " $\uparrow \downarrow$ ". Increase the calibration value until the result value is equal to the temperature measured with the thermometer. A normal calibration value should range between 0.1 and 5.0. If the value is much more than this, cold air is likely infiltrating the return ducts (check the ductwork) or the temperature sensor is defective.

3. ADJUSTING INDOOR HUMIDITY SETTINGS

Press the **⊙** button for 3 seconds to display the main menu and use the **↑** and **↓** arrows to navigate to the “Humidity” submenu. Press **↵** to select (Figure 49).



Figure 49 – Main menu – Humidity settings.

“HUMIDITY” SETTINGS SCREEN

There are 4 available options displayed over several screens. Press **↓** or **↑** to move the cursor between options. Once the desired option is selected, press **↵** to change the setting (Figure 50).

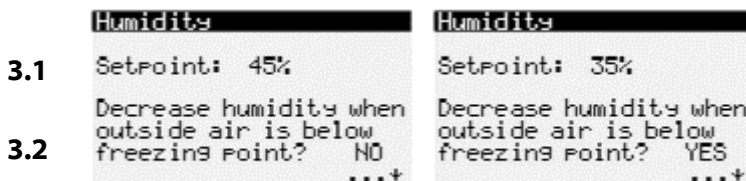


Figure 50 – Examples of options to adjust humidity settings and automatic winter adjustment.

3.1 Setpoint:

- **30% to 60%.** Set the desired relative humidity. During the winter months, a 35% indoor humidity level is ideal (30-50%), while a 45% indoor humidity level is very comfortable (40-60%). At all time, the indoor humidity setpoint may be hard to maintain if your house is not airtight.

3.2 Decrease humidity if outside air is below freezing point?

- **YES.** When outside temperature falls below freezing, the humidity setpoint will progressively decrease to reach 35 % at -15°C (5°F), and as low as 30% at - 20°C (-4°F) or less. Humidity level cannot be set below 30% for reasons of comfort and health.
- **NO.** The humidity setpoint will remain unchanged if outside air falls below freezing point.

"HUMIDITY" SETTINGS SCREEN (CONT'D)

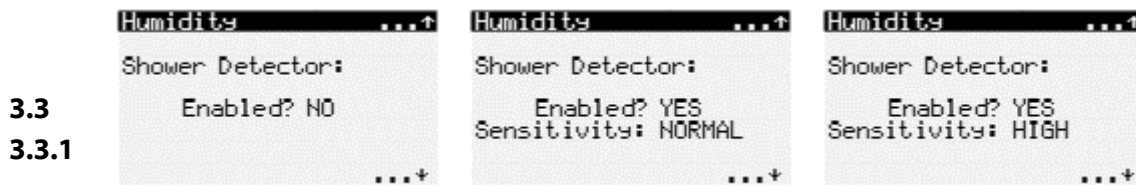


Figure 51 - Examples of options to adjust shower detector settings, part of HumiWatch365© system.

3.3 Shower Detector Enabled?

- **YES.** The shower detector is operational and will exhaust moisture outside if the indoor humidity level was equal to or above the setpoint at the time of detection, or will spread moisture in the house if the indoor humidity level was below the setpoint upon detection.

NOTE: Depending on the outside temperature, the quality of your windows and the amount of water vapor in the air, there may be fogging on the windows. This is normal and the fog will disappear as the shower detector exhausts water vapor out of the room.

- **NO.** The detector is not operational.

3.3.1 Sensitivity:

- **NORMAL.** This is the default detection sensitivity in most installations. There will be detection when there is an actual shower running. It may take up to 2 minutes before a shower is detected.
- **HIGH.** The detector is much more sensitive. Use this setting if there are several air returns in your installation having the effect of diluting the amount of moisture to the point where it becomes difficult to detect an actual shower running. Note that a high sensitivity may cause false detections. If so, opt for normal sensitivity.

"HUMIDITY" SETTINGS SCREEN (CONT'D)

	Humidity ...↑	Humidity ...↑	Humidity ...↑
3.4	This MINOTAIR controls a humidifier? NO	This MINOTAIR controls a humidifier? YES	This MINOTAIR controls a humidifier? YES
3.4.1		Heat Required? NON	Heat Required? NON
3.4.2			By: MINOTAIR

Figure 52 - Examples of options to adjust humidifier settings.

3.4 This MINOTAIR controls a humidifier?

- **YES.** This MINOTAIR controls a humidifier and will call for humidity when needed.
- **NO.** The MINOTAIR does not control any humidifier.

3.4.1 Heat Required?

- **YES.** This humidifier requires an external heat source to humidify the air. The MINOTAIR will start the humidifier when it next calls for heat.
- **NO.** This humidifier generates its own water vapor and can be started without having to wait for a call for heat.

3.4.2 By:

- **MINOTAIR.** The required heat source must be the MINOTAIR. This presumes that the moisture generated by the humidifier is mixed with the MINOTAIR's distribution air.
- **AUXILIARY HEATING.** The required heat source must be the warm air generator (the auxiliary heating unit). This presumes that the humidifier sends humidity in the main return duct of the heat generator.

4. ADJUSTING PROGRAM SETTINGS

Press the  button for 3 seconds to display the main menu and use the  and  arrows to navigate to the "Program" submenu. Press  to select (Figure 53).



Figure 53 – Main menu – Program settings.

"PROGRAM" SETTINGS SCREEN

There are 4 available options displayed over two screens. Press  or  to move the cursor between options. Once the desired option is selected, press  to change the setting (Figure 54).

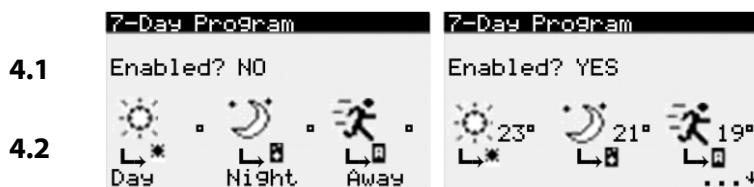


Figure 54 - Examples of options to adjust program settings.

4.1 Enabled?

- **NO.** The 7-day program is not enabled. It is not possible to access the subsequent screen, or the temperature setpoints.
- **YES.** The 7-day program is enabled.

4.2 Setpoints:

-  Day temperature.
-  Night temperature.
-  Away temperature.

NOTE: To facilitate the adjustment of the setpoint, pressing  will display two arrows "↑ ↓" making it possible to increase or decrease the setpoint using the  and  buttons. After 5 seconds of inactivity or pressing a second time on  disables the arrows.

"PROGRAM" SETTINGS SCREEN (CONT'D)

The daily profile screen enables you to preprogram the MINOTAIR to operate according to a predefined arrangement depending on the day of the week and the time of day.



Figure 55 - Examples of options to adjust daily profile settings.

4.3 "Day" copy to "day"?

- **Current Day profile.** Select the profile to display. Press ↑ to switch from one profile to another. Press ← to select the day to copy the current profile to. Press ↓ to access the details of the current profile.
- **Copy to day.** Press ↑ or ↓ to select the day to which to copy the current profile. Press ← to jump to the copy option.
 - **NO.** The profile is not copied.
 - **YES.** Press ↑ or ↓ to copy the profile. The current profile is copied to the selected day. Press ← to return to the current Day profile.

4.4 Profile details:

- Press ↑ or ↓ to jump from one time slot to the next.
- Press ← to select setpoint for corresponding time slot.
 - ☒ Day.
 - ☒ Night.
 - ☒ Away.
 - - Not Enabled.
The "Temperature" submenu setpoints are then used.
- Press ⏮ to return to Day selection.

5. ADJUSTING FILTER SETTINGS

Press the **⊙** button for 3 seconds to display the main menu and use the **↑** and **↓** arrows to navigate to the “Filters” submenu. Press **↵** to select (Figure 56).



Figure 56 – Main menu – Filter settings.

“FILTERS” SETTINGS SCREEN

There are 2 available options displayed over several screens. Press **↓** or **↑** to move the cursor between options. Once the desired option is selected, press **↵** to change the setting (Figure 57).

	Filter Replacement	Filter Replacement
	Prefilters:	Prefilters:
	Operation: 00397hrs	Operation: 00457hrs
	Reset Counter? NO	Reset Counter? NO
5.1		Thaw Filter? NO
5.1.1	HEPA Filter: NONE	HEPA Filter: YES
	Operation: 00000h	Operation: 00303h
5.2	Reset Counter? NO	Reset Counter? NO

Figure 57 – Examples of options to adjust filter settings.

5.1 Prefilters. The MINOTAIR must be equipped with manufacturer-approved MERV 8 (G4) prefilters to ensure proper functioning. Two prefilters protect the MINOTAIR from dust, which can quickly clog its coils and fan blades. The prefilters must be replaced every three months.

- **Operation.** The number of hours of fan operation since the prefilters were last replaced. This counter is only active when ventilation is running.
- **Reset counter?** Resets the prefilter counter. There needs to be a reset after every change of filters, normally after 3 months of ventilation.

5.1.1 Thaw Filter? At times during the heating season, moisture that comes into contact with the right coil will frost. The formed ice can make the removal of the right filter impossible; the latter being jammed in ice. To remove a jammed filter, it is necessary to defrost the coil. This procedure takes about 3 minutes and will then allow for filter removal without difficulty.

5.2 HEPA Filter. The MINOTAIR is equipped with a High Efficiency MERV 15 (F9) filter, which can eliminate up to 95% of dust and micro-organisms as small as 0.3µm. HEPA filters are recommended for asthma patients. These filters must be replaced every 12 months. Options:

- **YES.** The device is equipped with a HEPA filter.
- **NONE.** The device is not equipped with a HEPA filter.
- **Operation.** The number of hours of fan operation since the HEPA filter was last replaced. This counter is only active when ventilation is running.
- **Reset counter?** Resets the HEPA filter counter. There needs to be a reset after every change of HEPA filter, normally after 12 months of ventilation.

6. OTHER SETTINGS

Press the  button for 3 seconds to display the main menu and use the  and  arrows to navigate to the “Other Settings” submenu. Press  to select (Figure 58).



Figure 58 – Main menu – Other settings.

“OTHER SETTINGS” SCREEN

There are 4 available options displayed over several screens. Press  or  to move the cursor between options. Once the desired option is selected, press  to change the setting (Figure 59).

	Other Settings	Other Settings	Autres réglages
6.1	Language: ENGLISH	Language: ENGLISH	Langue: FRANÇAIS
6.2	Backlit Display: AUTO	Backlit Display: ALWAYS	Retroéclairage: AUTO
6.3	Clock: ADJUST	Clock: ADJUST	Horloge: AJUSTER
6.4	Tenant mode: ADJUST	Tenant Mode: ADJUST	Mode locatif: AJUSTER

Figure 59 – Examples of options to adjust other settings.

6.1 Language:

- **FRANÇAIS.** The MINOTAIR interface switches to the French language.
- **ENGLISH.** The MINOTAIR interface switches to the English language.

6.2 Backlit display:

- **AUTO.** The digital control screen will light up whenever a button is pressed. The backlight will turn off after 10 minutes of idle time.
- **ALWAYS.** The digital control screen will always stay lit. This option will shorten the life of the neon light used for the backlit display feature. This neon backlight is not covered by the manufacturer's warranty.

6.3 Clock:

- **ADJUST.** Takes you to the screen where you can adjust the time and date of the system clock.

"CLOCK" SCREEN 1

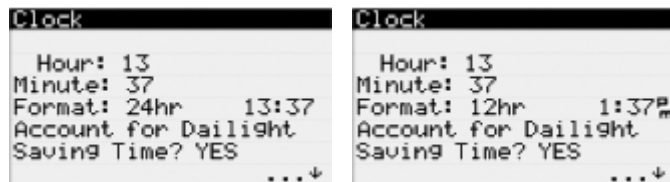


Figure 60 – Examples of options to adjust clock settings 1.

- **Hour:** Adjust the hour between 00 and 23 hours.
- **Minute:** Adjust minutes between 00 and 59 minutes.
- **Format:**
 - **24hr.** Displays the time in 24hr format.
 - **12hr.** Displays the time in 12hr format (AM and PM).
- **Account for daylight saving time?**
 - **YES.** The MINOTAIR will automatically adjust the time at 2 am on the second Sunday of March, and again at 2 am on the first Sunday of November.
 - **NO.** The MINOTAIR will ignore daylight saving time.

"CLOCK" SCREEN 2



Figure 61 - Examples of options to adjust clock settings 2.

- **Day:** Enter the day for today's date.
- **Month:** Enter the month for today's date.
- **Year:** Enter the year for today's date.
- **Format:** Adjust the format for today's date.

6.4 Tenant Mode:

- **ADJUST.** Takes you to the tenant mode settings.

"TENANT MODE" SCREEN



Figure 62 – Examples of options to adjust tenant mode settings.

6.4.1 Tenant Mode

- **NO.** Tenant mode is not activated. End users can access the main menu by pressing the setpoint Ⓢ button for 3 seconds.
- **YES.** Tenant mode is activated. End users will need to enter a password to access the main menu after pressing the Ⓢ button for 3 seconds. It is also possible to restrict the ability to power on and power off the unit, change temperature and humidity setpoints.

6.4.2 System On/Off

- **NO.** Do not allow end users to turn system On and Off.
- **YES.** Allow end users to turn system On and Off.

6.4.3 Temp. Setpoints.

- **NO.** Do not allow end users to modify the heating and cooling temperature setpoints, mode and units.
- **YES.** Allow end users to modify the heating and cooling temperature setpoints, mode and units.

6.4.4 Humid. Setpoint.

- **NO.** Do not allow end users to modify the relative humidity setpoint.
- **YES.** Allow end users to modify the relative humidity setpoint.

6.4.5 Change Password:

- **SET.** Allows to change the Tenant Mode password.



Figure 63 – Insert new tenant mode password.

7. SYSTEM INFO

Press the **⊙** button to display the main menu and use the **↑** and **↓** arrows to navigate to the "System info" submenu. Press **↵** to select (Figure 64).

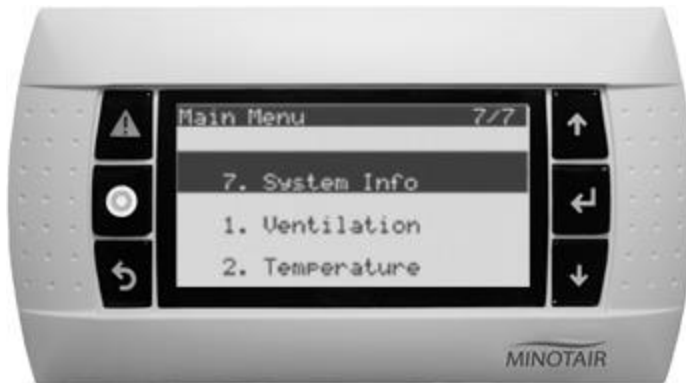


Figure 64 – Main menu – System info

"SYSTEM INFO – ODOMETER" SCREEN

On the "System info" screen, press **↓** or **↑** to display various information screens (Figure 51).

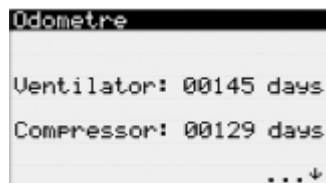


Figure 65 – Examples of information available in the "System info – Odometer" screen.

- **Ventilator:** Number of days the ventilators have been in operation. This counter is incremented only when ventilation is running.
- **Compressor:** Number of days the compressor has been in operation. This counter is incremented only when the compressor is running.

"SYSTEM INFO – SOFTWARE VERSION" SCREEN

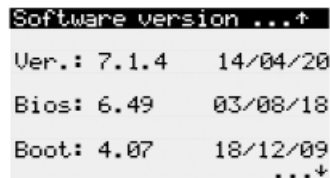


Figure 66 – Examples of information available in the "System info – Software version" screen.

- **Ver.:** Shows the software version of the microcontroller.
- **Bios:** Shows the bios version of the microcontroller.
- **Boot:** Shows the boot version of the microcontroller.

ALARM DESCRIPTIONS

The MINOTAIR is a smart device that can alert you when a situation arises which requires your attention. Its numerous sensors and advanced algorithms do most of the work for you. Furthermore, it speaks to you in a clear language without using complicated codes. This helps you establish a diagnosis, identify possible causes, and, most importantly, decide whether you need to call a technician or not.

When the MINOTAIR alerts you to a situation, the alarm icon “ Δ ” appears and flashes (Figure 67), except in the case of filter replacements – in which case the Δ is replaced with a “change filters” indicator.

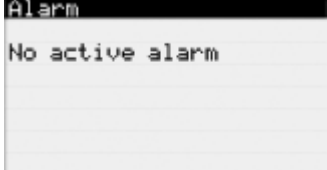
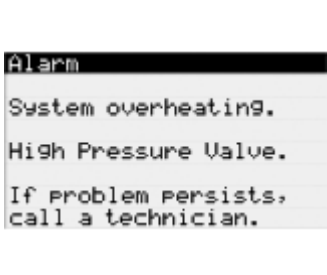
NOTE: During an alarm, the MINOTAIR will try to solve the problem by itself. If it succeeds, it will automatically reset the alarm and add it to the log. If it is not successful after a maximum of five attempts, it will display the alarm to bring it to the attention of the owner.



Figure 67 – Alarm button.

Press the Δ button to display the description of the current active alarm. Press Δ once more to reset the active alarm. Reset is only possible if the conditions that triggered the alarm are no longer present.

Alarm	Description	What to do?
	It is time to replace the MINOTAIR's 2 prefilters.	1. Replace the 2 filters with new filters designed for the MINOTAIR. 2. Reset the filter counter by accessing the menu under “5. Filters”, as previously described on page 59.
	It is time to replace the HEPA filter, if applicable.	1. Replace your HEPA filter with a new filter designed for the MINOTAIR. 2. Reset the filter counter by accessing the menu under “5. Filters”, as previously described on page 59.

	There are no alarms currently in effect.	1. No actions need to be taken. 2. Press Δ or ∇ to return to the main screen.
	Possible causes: • Particularly hot day. • Clogged filters, intake or outlet grilles. • Excess refrigerant. • Defective expansion valve. • Defective or disconnected high-pressure valve.	1. This is not cause for concern, unless the problem is reported several times within the same day or week. 2. Check filters and outside intake and outlet grilles. Replace or clean if needed. 3. Call a qualified technician if the problem persists.
	Possible causes: • Blown 2A Fuse. • Loose valve. • Defective soldering. • Punctured piping. • Defective or disconnected low pressure valve.	1. If the fuse is blown, you must find the cause before replacing it. 2. Otherwise, this is a problem which requires the intervention of a qualified technician. 3. Microcontroller will cease all operations, but will keep controlling auxiliary units if applicable. In this case, it remains possible to trigger the auxiliary heating or cooling systems by manually setting the indoor temperature setpoint. Note that the displayed temperature and humidity will be distorted by the fact that the ventilation is stopped.
	Possible causes: • Indoor temperature and humidity are too low. • Clogged expansion valve. • Defective or disconnected exhaust fan. • Refrigerant starting to leak. • Defective or disconnected low-pressure valve.	1. This is not cause for concern, unless the problem is reported several times within the same day or week. 2. Check filters and outside intake and outlet grilles. Replace or clean if needed. 3. In the case of a clogged expansion valve, the system should repair itself. 4. Call a qualified technician if the problem persists.

Alarm Clock Board Fault, or Dead Battery! Call a technician.	Possible causes: - Defective internal clock. - Clock battery is dead. - Defective controller.	- This is a problem which requires the intervention of a qualified technician. - Do not try to change the battery yourself, because you risk irreversibly damaging the microcontroller. - Batteries should have a life span of about 5 to 10 years.
Alarm Permanent Memory Fault Call a technician.	Possible cause: - Defective memory. - Defective controller.	This is a problem which requires the intervention of a qualified technician.
Alarm Exterior Temperature. Sensor B1 defective or disconnected! Call a technician.	Problem with the outside temperature sensor. Possible cause: - Defective or disconnected B1 sensor. - Defective controller.	- This is a problem which requires the intervention of a qualified technician. - The microcontroller will default to a -40°C (-40°F) outside temperature setting to force recirculation mode.
Alarm Conditioned Temp. Sensor B2 defective or disconnected! Call a technician.	Problem with the conditioned temperature sensor. Possible cause: - Defective or disconnected B2 sensor. - Defective controller.	This is a problem which requires the intervention of a qualified technician.
Alarm Defrost Temperature. Sensor B3 defective or disconnected! Call a technician.	Problem with the defrost temperature sensor. Possible cause: - Defective or disconnected B3 sensor. - Defective controller.	- This is a problem which requires the intervention of a qualified technician. - The microcontroller will default to a -15°C (5°F) to force a defrost cycle at regular intervals, in order to avoid freezing in the evaporator.
Alarm Indoor Temperature. Sensor B4 defective or disconnected! Call a technician.	Problem with the indoor temperature sensor. Possible cause: - Defective or disconnected B4 sensor. - Defective controller.	- This is a problem which requires the intervention of a qualified technician. - The microcontroller will default to a 21°C (70°F) indoor temperature. - Manually set indoor temperature setpoint according to your current heating and cooling needs.
Alarm Indoor Humidity. Sensor B6 defective or disconnected! Call a technician.	Problem with the indoor humidity sensor. Possible cause: - Defective or disconnected B6 sensor. - Defective controller.	- This is a problem which requires the intervention of a qualified technician. - The microcontroller will default to a 40% indoor humidity. - Manually set indoor humidity setpoint according to your current indoor humidity level needs.

Alarm Fan A StopPage. Cut Power to unit for 60 seconds. If problem persists, call a technician. Alarm Fan B StopPage. Cut Power to unit for 60 seconds. If problem persists, call a technician.	Possible causes: • Fan start-up failure due to poor quality of electricity. • Defective or disconnected ID1 sensor. • Defective or disconnected fan. • Defective controller.	1. This is not cause for concern, unless the problem is reported several times in a row 2. The microcontroller will cease all operations, but will keep controlling auxiliary units if applicable. In this case, it remains possible to trigger the auxiliary heating or cooling systems by manually setting the indoor temperature setpoint. Note that the displayed temperature and humidity will be distorted by the fact that the ventilation is stopped. 3. Call a qualified technician if the problem persists.
Alarm Too much air restriction! Verify filters and outside air intake.	Possible causes: • Dirty filters. • Outside intake grille clogged. • Dirty coils. • Implosion of flexible ducts due to negative static pressure. • Obstructed ventilation ducts or improperly installed. • Ventilation duct diameters are too small. • Supply or return grilles closed or clogged.	1. Check filters and outside intake and outlet grilles. Replace or clean if needed. 2. Microcontroller will cease all operations, but will keep controlling auxiliary units if applicable. In this case, it remains possible to trigger the auxiliary heating or cooling systems by manually setting the indoor temperature setpoint. Note that the displayed temperature and humidity will be distorted by the fact that the ventilation is stopped. 3. Call a qualified technician if the problem persists.
Alarm Fan A – B Fans are reversely connected. Call a technician.	Possible cause: • Fans A and B are swapped. • House is in severe negative pressure.	1. This is a problem which requires the intervention of a qualified technician. 2. Terminal Y3 controls Fan A (left) while terminal Y4 controls Fan B (right).

MAINTENANCE

The MINOTAIR is a powerful device, but it requires a certain amount of maintenance on a regular basis. Regular maintenance of this device will ensure optimal and worry-free working conditions. Furthermore, failure to perform this maintenance will render the device's warranty null and void. Please do not neglect the maintenance of your MINOTAIR.

Frequency	What to do?
Monthly	• Inspect the air intake and outlet grilles located outside and remove any clogging if necessary (leaves, dust, snow, etc.). • Inspect the condensate drain and clean if needed.
Every 3 months	• Replace filters with filters designed for the MINOTAIR
Every 12 months	• Change HEPA filter, if applicable • Clean humidifier according to the manufacturer's guidelines, if applicable. • Replace the filter cartridge on the humidifier's water line, if applicable.
When needed, at least every 12 months	• Disinfect the condensate pan. To do so: 1. Shut off power from the MINOTAIR by closing the circuit breaker or the circuit switch. 2. Using a vice grip, squeeze the flexible condensate pipe at its lowest point to prevent dripping into the floor drain. Do not squeeze too strongly, as it could damage the pipe wall. 3. Access the motorized damper (Figure 3). <i>You can take this opportunity to vacuum the interior by being careful not to damage the wires and sensors.</i> 4. Remove the orange plug located on the motorized damper compartment floor ("R" component in Figure 2). 5. Prepare 4 liters (1 gal) of bleach solution diluted in three parts cold water (1 liter bleach in 3 liters water = 4 liters). WARNING: Use gloves and wear goggles to handle this solution. Bleach can irritate the skin and discolor clothes. 6. Carefully pour the bleach solution into the motorized damper compartment. The solution will pour into the hole where you pulled the plug earlier. NOTE: Aluminum tarnishes when in contact with bleach. This will not affect the operation and durability of the device in any way. 7. Leave the solution in the condensate pan for approximately 20 minutes. 8. Remove the vice grip and carefully pour 4 liters (1 gal) of additional cold water into the motorized damper compartment. 9. Put back the plug on the motorized damper compartment floor. 10. Close the Main Access Panel and restart the unit.

LIMITED WARRANTY

Dedicated to offering the highest quality products, MINOTAIR Ventilation Inc., the “Manufacturer”, is pleased to offer a 5-year limited warranty on parts. The “Warranty” applies to the CATU-V12 and PentaCare V-12 Compact Air Treatment Unit, the “Product”.

- This Warranty only applies if the Product was purchased in Canada or the United States. If the Product was purchased elsewhere, please contact the authorized reseller in the country where it was purchased.
- The Manufacturer guarantees that all mechanical, electric and electronic components of the product are free from defects in material and workmanship, under normal use and maintenance. This Warranty is valid for 5 years, starting from the date of the original purchase.
- If the Product becomes defective during the period of this Warranty, provided this defect is not excluded from the Warranty, the Manufacturer will repair or replace, at its discretion, the Product using new or refurbished parts. In cases where the manufacturer decides to replace the Product, this Warranty will continue to apply to the replacement Product for the residual duration of the original Warranty.
- Warranty claims, other than those described above, are expressly excluded.

IMPORTANT: We ask that you carefully store your original proof of purchase, because without it the Warranty will be null and void. In the improbable case where you have to make a claim under this Warranty, we will need you to produce your original proof of purchase which we will return to you after the claim has been validated.

LIMITATIONS AND EXCLUSIONS

- This Warranty does not cover consumable items such as filters, fuses, batteries, etc.
- This Warranty does not cover third-party equipment such as humidifiers, condensate pumps, heating coil, etc. Refer to the manufacturers of these devices to learn more about their respective warranties.
- This Warranty does not cover cosmetic damages that do not affect the products’ functioning. This includes, without limitation: scratches, bumps, stains, backlight intensity, metal tarnish or discolor, etc.

IMPORTANT: While our products are tested and inspected in our factory before they are shipped, it is your responsibility to visually inspect the Product for defects upon delivery and to advise us of any defect within 24 hours.

- Any damages or defects resulting from improper handling, wrongful installation or use, or an act of God (fire, tornado, earthquake, flooding, etc.), or poor-quality power source (voltage variations, spikes, brownouts, electrical noise, etc.) are excluded from this Warranty.
- All modifications or repairs made by unauthorized personnel (including the user) will automatically void the Warranty.
- This Warranty does not cover handling, shipping and labor fees.
- No other person (distributor, reseller, vendor, etc.) is authorized to promise a Warranty on the Manufacturer’s part.

DAMAGE CLAIMS

The Manufacturer will not be liable towards the buyer or the owner for any loss or damage caused directly or indirectly and of any nature whatsoever. In no case will the Manufacturer’s responsibility be greater than the Product’s invoiced price or MSRP, whichever is less.

OTHER WARRANTY RIGHTS

This Warranty does not limit the buyer or the owner’s legal rights in any way as a consumer.

NOTES:

Department of Permitting and Inspections

Zoning Division
645 Pine Street
Burlington, VT 05401
<http://www.burlingtonvt.gov/PZ/>
Telephone: (802) 865-7188
(802) 865-7195 (FAX)

William Ward, Director
Theodore Miles, Code Compliance Officer
Charlene Orton, Permitting and Inspections Administrator
Scott Gustin, AICP, CFM, Principal Planner
Mary O'Neil, AICP, Principal Planner
Ryan Morrison, Associate Planner
Joseph Cava, Planning Technician
Celeste Crowley, Permit Administrator



MEMORANDUM

To: Development Review Board
From: Mary O'Neil, AICP, Principal Planner
Date: November 15, 2022
RE: ZP-22-528; 447 Main Street

Note: These are staff comments only. Decisions on projects are made by the Development Review Board, which may approve, deny, table or modify any project. THE APPLICANT OR REPRESENTATIVE MUST ATTEND THE MEETING.

File: ZP-22-528
Location: 447 Main Street
Zone: RL **Ward:** 6S
Parking District: Neighborhood
Date application accepted: September 16, 2022
Revisions received: October 31, 2022
Applicant/ Owner: Marcus Gonzales, Ramsey
Gourd Architects / Jeremy Dressley and Jane
Seymour, owners.
Estimated construction cost: \$396,000.



Request: Demolition and reconstruction of existing carriage barn. Both house and carriage barn are listed on the National Register of Historic Places within the University Green Historic District, as amended. After the fact permit for stone and slate patios, terraces, walkways.

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.
- **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 records indicate the upper floor is finished living space. The owners request demolition and replacement of the structure, continuing the existing expanded living area in the upper floor. Other lot features (terraces, patios, walkways) are requested after-the-fact.

The **Design Advisory Board** reviewed the application at their October 25 and November 8, 2022 meetings, and voted unanimously to approve the application with the following recommended conditions:

- The perimeter of the parking area shall be clearly defined to prevent parking creep;
- There shall be a method to organize trash and recycling, or it shall be relocated from the yard.
- DAB advises removal of the Juniper that has caused structural rot.

Recommended motion: Conditional use and Certificate of Appropriateness approval, per the following Findings and Conditions:

I. Findings

Article 4: Zoning Maps and Districts

Section 4.4.5 Residential Districts

(a) Purpose

The Residential Districts are intended to control development in residential districts in order to create a safe, livable and pedestrian friendly environment. They are also intended to create an inviting streetscape for residents and visitors. Development that places emphasis on architectural details and form is encouraged, where primary buildings and entrances are oriented to the sidewalk, and historic development patterns are reinforced. Parking shall be placed either behind, within or to the side of structures as is consistent with the district and/or the neighborhood. Building facades designed for parking shall be secondary to the residential aspect of a structure.

1. *The Residential Low Density (RL) district is intended primarily for low-density residential development in the form of single detached dwellings and duplexes. This district is typically characterized by a compact and cohesive residential development pattern reflective of the respective neighborhoods' development history.*

The removal and reconstruction of an existing carriage barn on the same footprint, replicating location, setback, details and features of the existing building, will continue to reinforce the historic development pattern of the district. **Affirmative finding.**

(b) Dimensional Standards and Density

Table 4.4.5-3 Residential District Dimensional Standards

RL	Max lot coverage 35%	Setbacks			Max Height 35'
		Front Ave. of 2 adjacent lots on both sides =/- 5'	Side: 10% of lot width or ave. of side yard setback of 2 adjacent lots on both sides	Rear 25% lot depth	
447 Main Street	15.21% estimated from 2006 approved site plan 34.35% Proposed with additional amenities	No change proposed.	Carriage barn setbacks are non-conforming. No change proposed.	Carriage barn setbacks are non- conforming. No change proposed.	The Carriages barn is non- conforming to height as an accessory structure, however no change is proposed.

Affirmative finding.

Article 5: Citywide General Regulations

Section 5.2.1 Existing Small Lots.

Not applicable.

Section 5.2.2 Required Frontage or Access

This is an existing, developed lot with frontage and access on Main Street. **Affirmative finding.**

Section 5.2.3 Lot Coverage Requirements

See Table 4.4.5-3, above.

Section 5.2.4 Buildable Area Calculation

Not applicable.

Section 5.2.5 Setbacks

See Table 4.4.5-3, above.

Section 5.2.6 Building Height Limits

See Table 4.4.5-3, above.

Section 5.2.7 Density and Intensity of Development Calculations

No change in use is proposed. The property remains a single family residence.

Part 3: Non Conformities

Section 5.3.5 Nonconforming Structures

(c) Demolition

A non-conforming structure may be replaced by a new structure retaining the same degree of nonconformity as the original structure. This provision is limited to the existing dimensional nonconformity (i.e. setback, lot coverage, or height) and shall not expand the degree of nonconformity except as provided for in (a) above. [Allowance for vertical expansion of existing single family homes and Community Centers that project into side and/or rear yard setbacks.] Zoning Permit application for the replacement structure shall be completed within 1 year of demolition of the nonconforming structure; failure to do so shall result in the loss of the ability to retain the nonconformity.

The replacement structure will retain the existing nonconformity of setback and height. The request for a replacement structure is integrated with the application for demolition, so a secondary application is not necessary. Retention of the non-conformity requires replacement within one year; however demolition of a listed historic structure requires construction within 6 months. See Section 5.4.8 (d), below. **Affirmative finding as conditioned.**

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.

[Staff note: There is no zoning permit for establishing of an accessory apartment. The upstairs is acknowledged by the Assessor's property database as existing, finished living space associated with the single family residence. The applicant does not seek a discrete second unit.]

(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 continued expanded living space on the upper floor. The applicant does not seek approval for 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, detailing 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.*

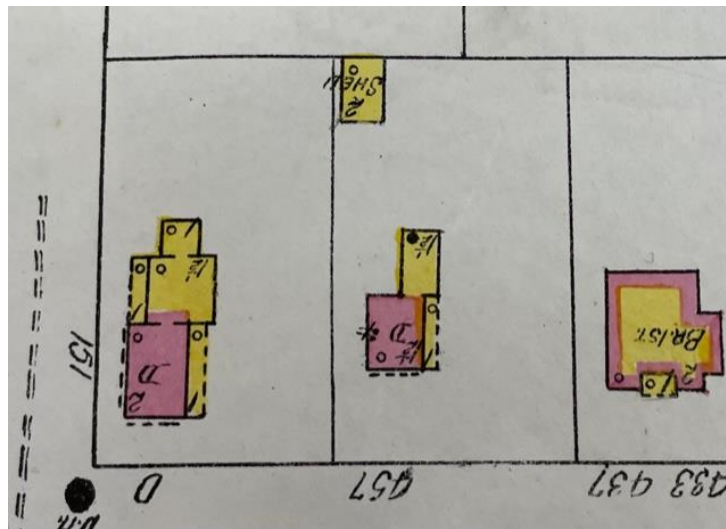
No conjectural features are proposed.

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. DAB members concurred that the existing material has reached a state of failure, and the foundation is inadequate.

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 disposition.

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. The west dormer is the sole diversion from existing design, and does not contribute to building height as it is limited to less than 50% of the roof width.

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.

Affirmative finding as conditioned.

Section 5.4.8 (d) Demolition of Historic Buildings

The purpose of this subsection is:

- *To discourage the demolition of a historic building, and allow full consideration of alternatives to demolition, including rehabilitation, adaptive reuse, resale, or relocation;*
- *Provide a procedure and criteria regarding the consideration of a proposal for the demolition of a historic building; and,*
- *To ensure that the community is compensated for the permanent loss of a historic resource by a redevelopment of clear and substantial benefit to the community, region or state.*

1. Application for Demolition.

For demolition applications involving a historic building, the applicant shall submit the following materials in addition to the submission requirements specified in Art. 3:

- A. *A report from a licensed engineer or architect who is experienced in rehabilitation of historic structures regarding the soundness of the structure and its suitability for rehabilitation;*

The applicants are an architectural team who provided testimony at the DAB hearing that the building has an insufficient and failing foundation; the walls have twisted and the ridge is sagging (see photos.)

- B. *A statement addressing compliance with each applicable review standard for demolition;*
- C. *Where a case for economic hardship is claimed, an economic feasibility report prepared by an architect, developer, or appraiser, or other person experienced in the rehabilitation and adaptive reuse of historic structures that addresses:*
 - (i) *the estimated market value of the property on which the structure lies, both before and after demolition or removal; and,*
 - (ii) *the feasibility of rehabilitation or reuse of the structure proposed for demolition or partial demolition;*

The identified structural instability does not support rehabilitation of the barn.

- D. *A redevelopment plan for the site, and a statement of the effect of the proposed redevelopment on the architectural and historical qualities of other structures and the character of the neighborhood around the sites;*

The purpose of the application is submission of a redevelopment plan.

and,

- E. *Elevations, drawings, plans, statements, and other materials which satisfy the submission requirements specified in Art. 3, for any replacement structure or structures to be erected or constructed pursuant to a development plan.*

Elevations, floor plans, sections and a site plan have been submitted in support of the application. **Affirmative finding.**

2. Standards for Review of Demolition.

Demolition of a historic structure shall only be approved by the DRB pursuant to the provisions of Art. 3, Part 5 for Conditional Use Review and in accordance with the following standards:

- A. The structure proposed for demolition is structurally unsound despite ongoing efforts by the owner to properly maintain the structure;*

The structure has been used for various home occupations (textile sales, antiques) by previous owners. Photographs reveal that openings have been patched to cover over original features while additional openings have been made to accommodate windows and doors occurring after its original construction. The existing structure is also leaning towards the north-east corner, twisting under its own weight. These are new owners who are seeking reconstruction for continued use.

or,

- B. The structure cannot be rehabilitated or reused on site as part of any economically beneficial use of the property in conformance with the intent and requirements of the underlying zoning district; and, the structure cannot be practicably moved to another site within the district;*

As noted, the barn has been used for vehicular storage, textiles sales and an antique shop. The noted structural failure, particularly that of the foundation, makes rehabilitation challenging. The possibility of lifting the building and pouring a new foundation was found to be not practical due to its close proximity to the property line and the lack of structural integrity of the building itself.

or,

- C. The proposed redevelopment of the site will provide a substantial community-wide benefit that outweighs the historic or architectural significance of the building proposed for demolition.*

The applicant/owners propose reconstruction of the building, utilizing the same footprint, dimensions, materials, and details as the existing structure. The applicants assert that a new building would enable the owners to use the space and preserve the legacy of the existing structure.

And all of the following:

- D. The demolition and redevelopment proposal mitigates to the greatest extent practical any impact to the historical importance of other structures located on the property and adjacent properties;*

The proposed reconstruction of the barn has no impact on the existing historic home, or any adjacent historic structure.

- E. All historically and architecturally important design, features, construction techniques, examples of craftsmanship and materials have been properly documented using the applicable standards of the Historic American Building Survey (HABS) and made available to historians, architectural historians and others interested in Burlington's architectural history;*

The applicant submission includes detailed photographs and measurements of existing structural features and finishes. The carriage barn at 447 Main Street does not rise to the importance that would require HABS recording standards; however submitted photographs of existing conditions will suffice for the zoning record.

and,

- F. The applicant has agreed to redevelop the site after demolition pursuant to an approved redevelopment plan which provides for a replacement structure(s).*
- (i) Such a plan shall be compatible with the historical integrity and enhances the architectural character of the immediate area, neighborhood, and district;*
 - (ii) Such plans must include an acceptable timetable and guarantees which may include performance bonds/letters of credit for demolition and completion of the project; and,*
 - (iii) The time between demolition and commencement of new construction generally shall not exceed six (6) months.*

This requirement may be waived if the applicant agrees to deed restrict the property to provide for open space or recreational uses where such a restriction constitutes a greater benefit to the community than the property's redevelopment.

The redevelopment plan is for reconstruction of a building with identical footprint, massing, height and materials (as allowed by life safety code) in the same location as the existing building. The timeline for replacement construction with existing non-conformities is one year; however demolition of the listed historic structure requires not more than 6 months between demo and redevelopment. **Affirmative finding as conditioned.**

3. Deconstruction: Salvage and Reuse of Historic Building Materials.

The applicant shall be encouraged to sell or reclaim a structure and all historic building materials, or permit others to salvage them and to provide an opportunity for others to purchase or reclaim the building or its materials for future use. An applicant may be required to advertise the availability of the structure and materials for sale or salvage in a local newspaper on at least three (3) occasions prior to demolition.

Building relocation or material salvage are recommended where it can be accomplished without danger to the public and the site remains secured.

All materials shall be disposed of in a safe and legal manner. **Affirmative finding as conditioned.**

Section 5: Performance Standards

Section 5.5.1 Nuisance Regulations

Nothing within the application suggests the introduction of neighborhood or public nuisance. **Affirmative finding.**

Section 5.5.2 Outdoor lighting

No lighting fixtures are proposed. If any lighting fixtures are added to the project plan, fixture and illumination information shall be provided to staff for review and approval. **Affirmative finding as conditioned.**

Section 5.5.3 Stormwater and Erosion Control

The project does not meet the site disturbance threshold for requiring an Erosion Prevention and Sediment Control Plan. Not applicable.

Section 5.5.4 Tree Removal

The Design Advisory Board has recommended removal of a juniper that has contributed to the structural failure and rot of the barn. Section 3.1.2 (c) exempts tree removal from any lot containing a single family home or duplex which consists of no more than three quarters (3/4) of an acre. The parcel at 447 Main Street is 19,417 sf; less than the ¾ acre threshold. In this instance, removal of the offending tree does not require zoning approval. Not applicable.

Article 6: Development Review Standards

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. The Design Advisory Board recommends removal of a juniper tree that has contributed to the structural failure. **Affirmative finding as conditioned.**

(b) Topographical Alterations:

No topographical alterations are included in the proposal. **Affirmative finding.**

(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

See Section 5.4.8, above.

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

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

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. **Affirmative finding.**

(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. **Affirmative finding.**

(i) Vehicular Access:

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

(j) Pedestrian Access: This detached barn has direct access from the driveway paved area, which connects northward to Main Street and a public sidewalk. The application includes after-the-fact consideration of a network of interior walkways, patios, and landscape walls, which enhance site circulation. **Affirmative finding.**

(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. The DAB has requested definition of the parking perimeter, to prevent parking lot creep.

Affirmative finding as conditioned.

(m) Landscaping and Fences:

The last approved site plan was in 2006; a comparison with a submitted, current site plan shows significant addition of walkways, gravel, patios, pavers and slate walls/walk. As per the revised plans submitted, all features meet required setbacks and collectively do not exceed allowable lot coverage limits. **Affirmative finding.**

(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. **Affirmative finding as conditioned.**

(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. The DAB has required that a plan be in place for trash and recycling containers to prevent them left on the lawn area; preferably they will be stored within the reconstructed barn. **Affirmative finding as conditioned.**

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. In massing, height and scale, the proposed building relates to its environment. **Affirmative finding.**

2. Roofs and Rooflines.

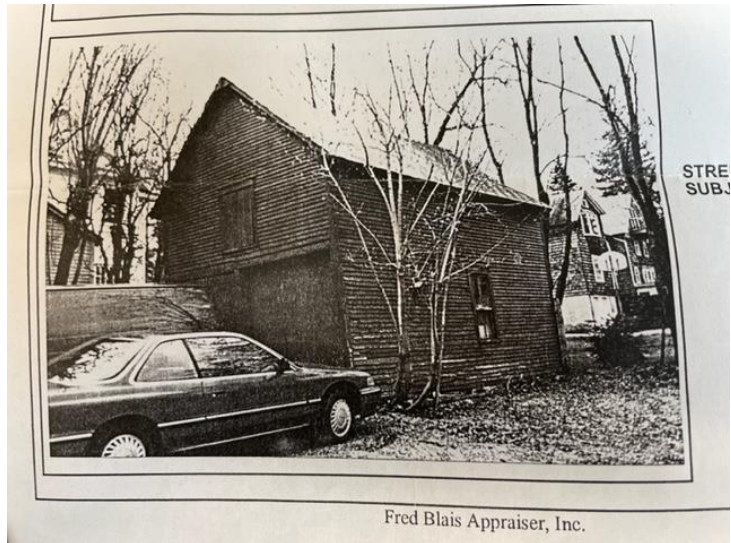
The replacement building will continue the gable roof configuration, with the addition of a small dormer to the west. A skylight has been included on that same roofplane. **Affirmative finding.**

3. Building Openings

The sliding barn door enclosure has proposed two potential alterations: A wood garage door with siding applied, or a more traditional overhead door with painted wood trim. See Plan A-2.1. The DAB has shown a preference for the second option.

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. **Affirmative finding.**



(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.

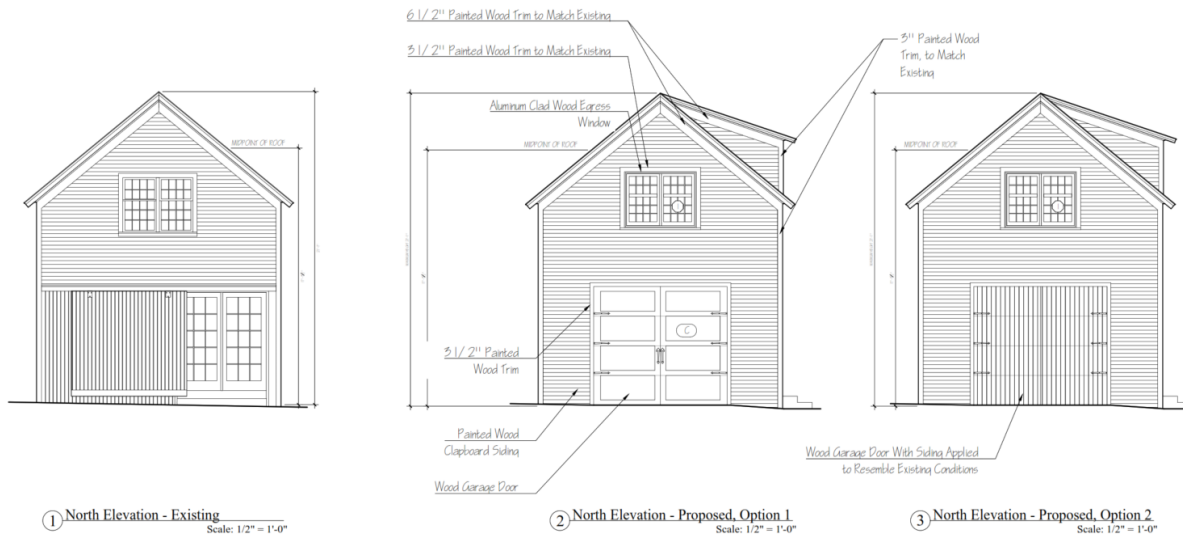
See Section 5.4.8.

(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. Two options for the garage door have been submitted for consideration; the DAB has shown a preference for the second option, and opined that the change was warranted as an understandable alteration for function and insulatory value. **Affirmative finding.**



(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 on the north and west, with a fiber cement option on the east and south (to meet building code requirements) are proposed. Aluminum-clad wood windows, painted wood trim and a standing seam metal roof are defined. All are considered durable for purposes of new construction. **Affirmative finding.**

(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. **Affirmative finding as conditioned.**

(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 officials. **Affirmative finding as conditioned.**

Article 8: Parking

There are no minimum parking standards per Zoning Amendment ZA22-07, as warned. The reconstructed barn will provide one vehicular parking space, and room for another in the driveway. The DAB has recommended that the parking perimeter be defined so as to prevent parking lot creep onto abutting landscaping. **Affirmative finding as conditioned.**

II. Conditions of Approval

1. Reconstruction post demolition of a historic structure must occur within 6 months.
2. Trash and recycling shall be organized within a structure, enclosed on all sides to prevent blowing trash. Storage within the barn is recommended. The applicant shall define **prior to release of the zoning permit.**
3. Building relocation or material salvage are recommended for consideration as long as there is no danger to public safety and the site remains secured. All materials shall be disposed of in a safe and legal manner.
4. If lighting is included, fixture information and illumination levels shall be submitted to staff for review and approval.
5. All new electrical shall be undergrounded.
6. The parking perimeter shall be defined so as to prevent parking lot creep. The method shall be submitted to staff **prior to release of the zoning permit.**
7. If any HVAC or other mechanical equipment is proposed, they shall be illustrated on building elevations and/or site plan as appropriate; subject to review by staff.
8. The applicant will be required to submit a Residential Building Energy Standards form (RBES) for assurance of compliance with Vermont Residential Building Energy Standards.
9. The property remains a single family dwelling. The additional habitable space remains associated with the principal use, and is not approved as a discrete unit or an Accessory Dwelling Unit without requesting the change of use within permit review.
10. Standard Permit Conditions 1-15.

NOTE: These are staff comments only. The Development Review Board, who may approve, table, modify, or deny projects, makes decisions.



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)

<u>Impervious Surface Coverage:</u>			
Principal			
Structure:	3,189 sf	3,189 SF	
Accesry 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%)

<u>Set Backs (principal structure):</u>			
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'

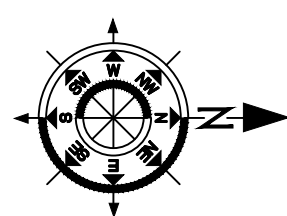
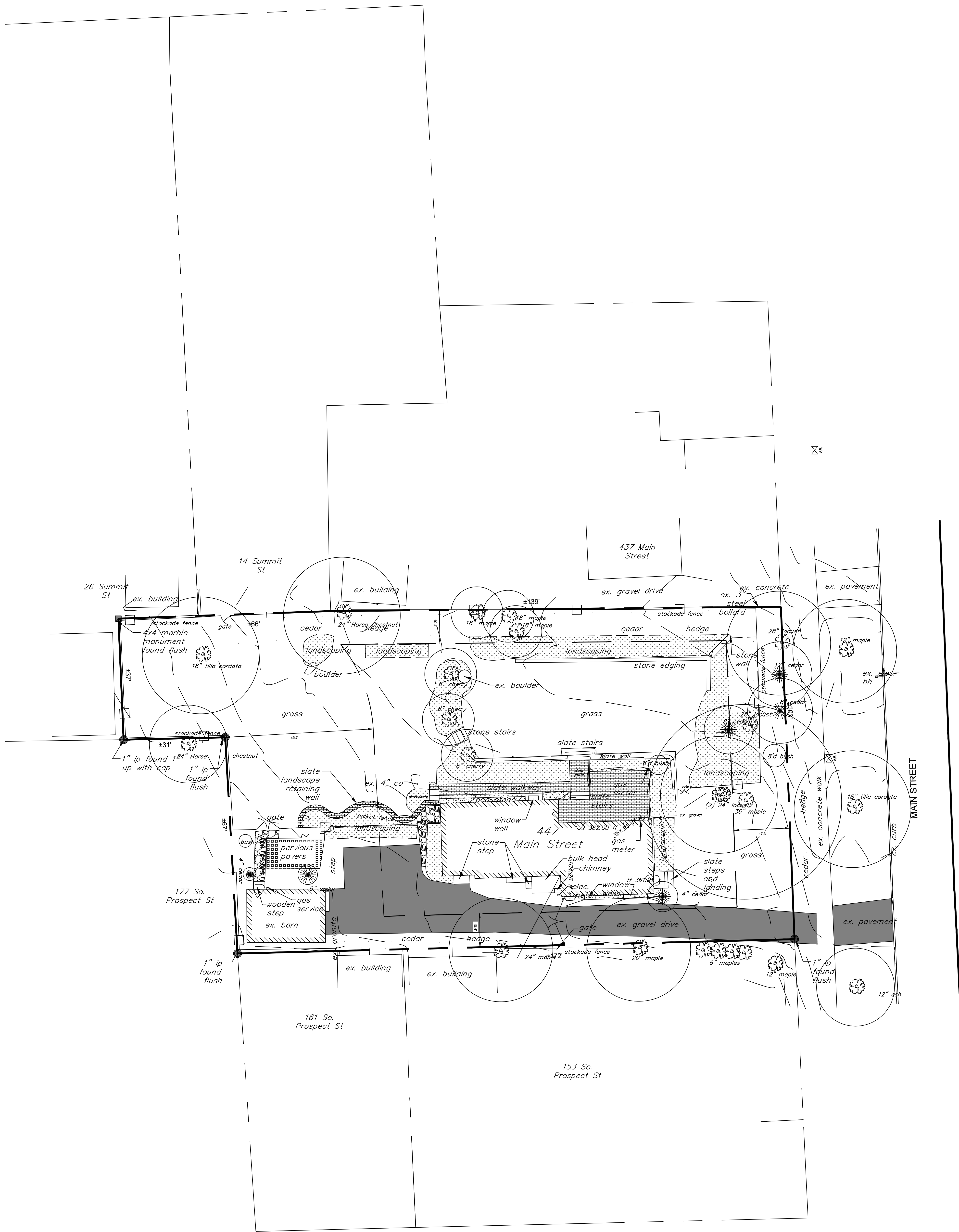
<u>Set Backs (accessory structure/garage):</u>			
North:	143'-8"	143'-8"	25'
South:	~3'-0 1/2"	to match ex.	25% of lot
East:	~3'-3"	to match ex.	10% of W. or 5'
West:	66'	to match ex.	10% of W. or 5'

<u>Accessory Structure:</u>			
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'

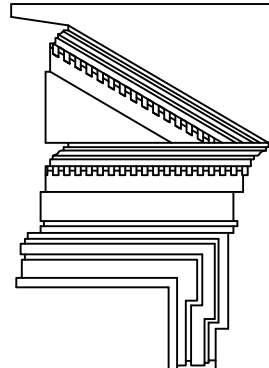
Within 200' of another municipality? **No**
Adjacent to County road? **No**
Adjacent to State road? **No**
Conforming Use? **Yes**

NOTE:
-ALL TRIM SIZES TO MATCH EXISTING TRIM. PLEASE SEE S-1.3 FOR EXISTING CONDITIONS
-TRASH CANS TO BE STORED IN ACCESSORY STRUCTURE
-EDGE OF PARKING AREA TO BE MORE CLEARLY DEFINED



Si

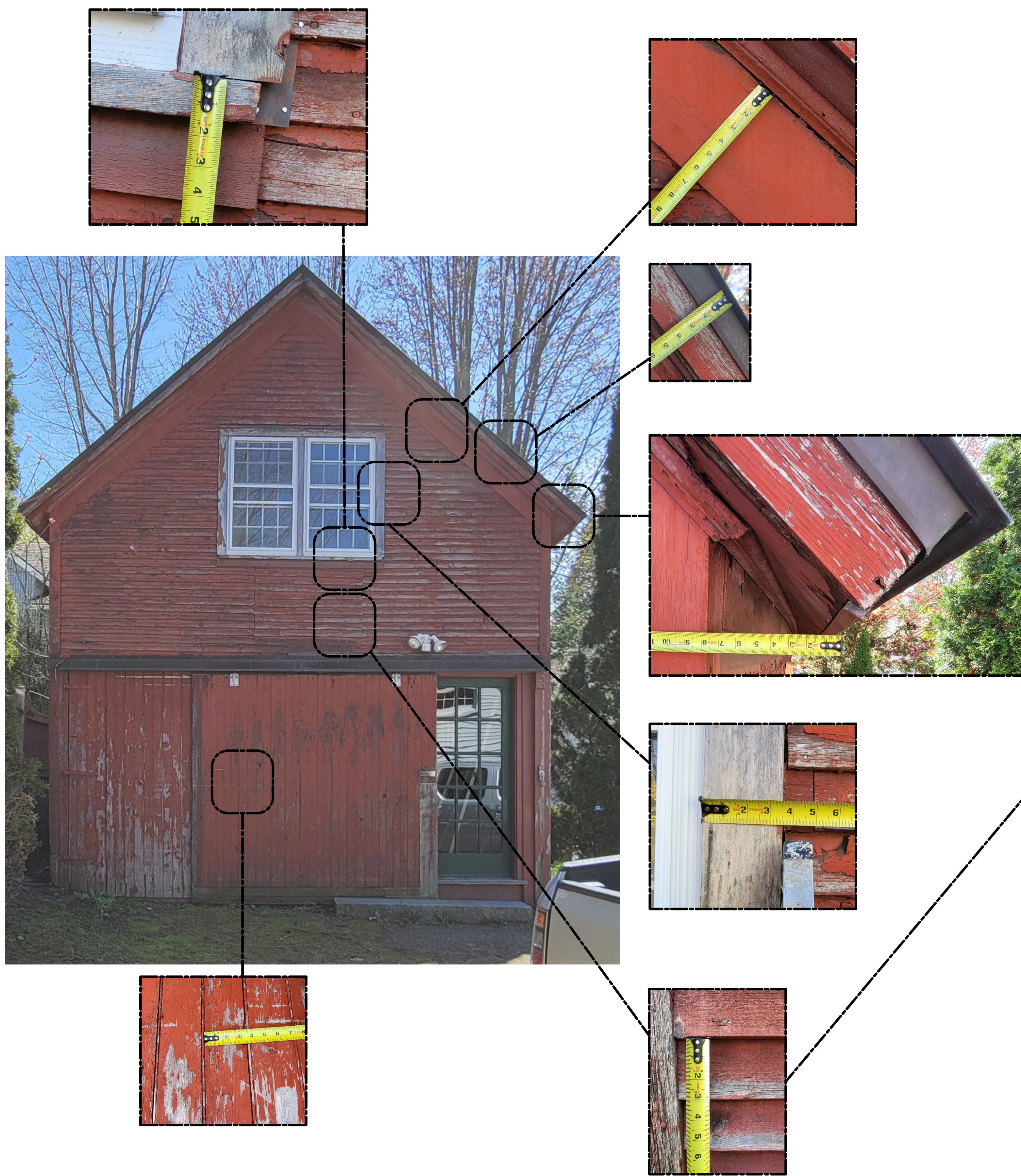
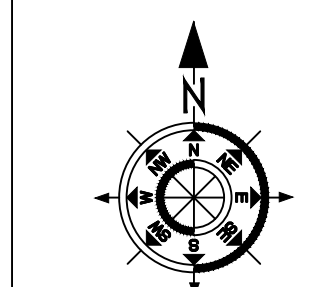
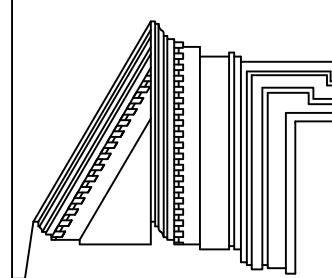
Site Plan



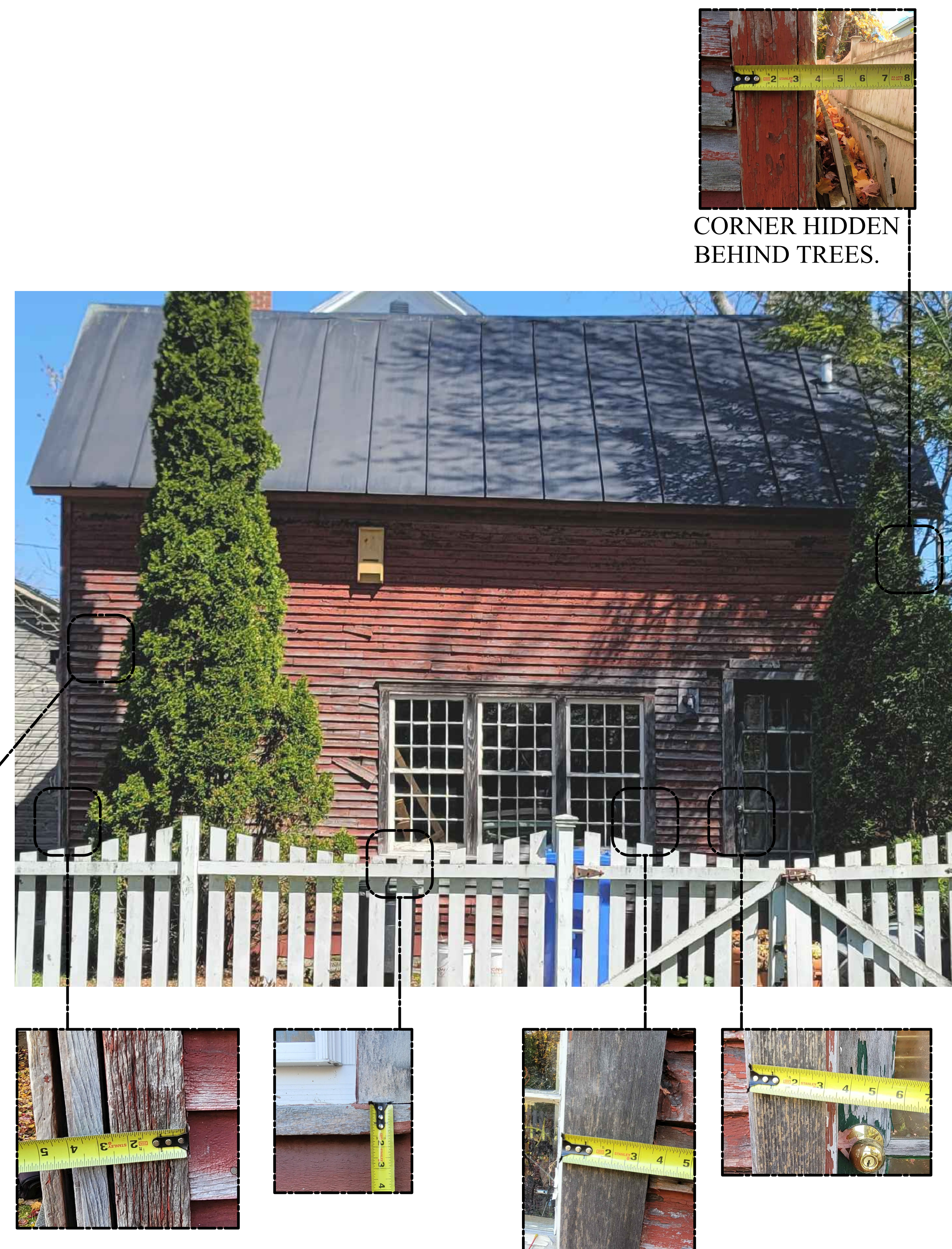
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Drawn By: M.I.G.
Date: 27 October 2022

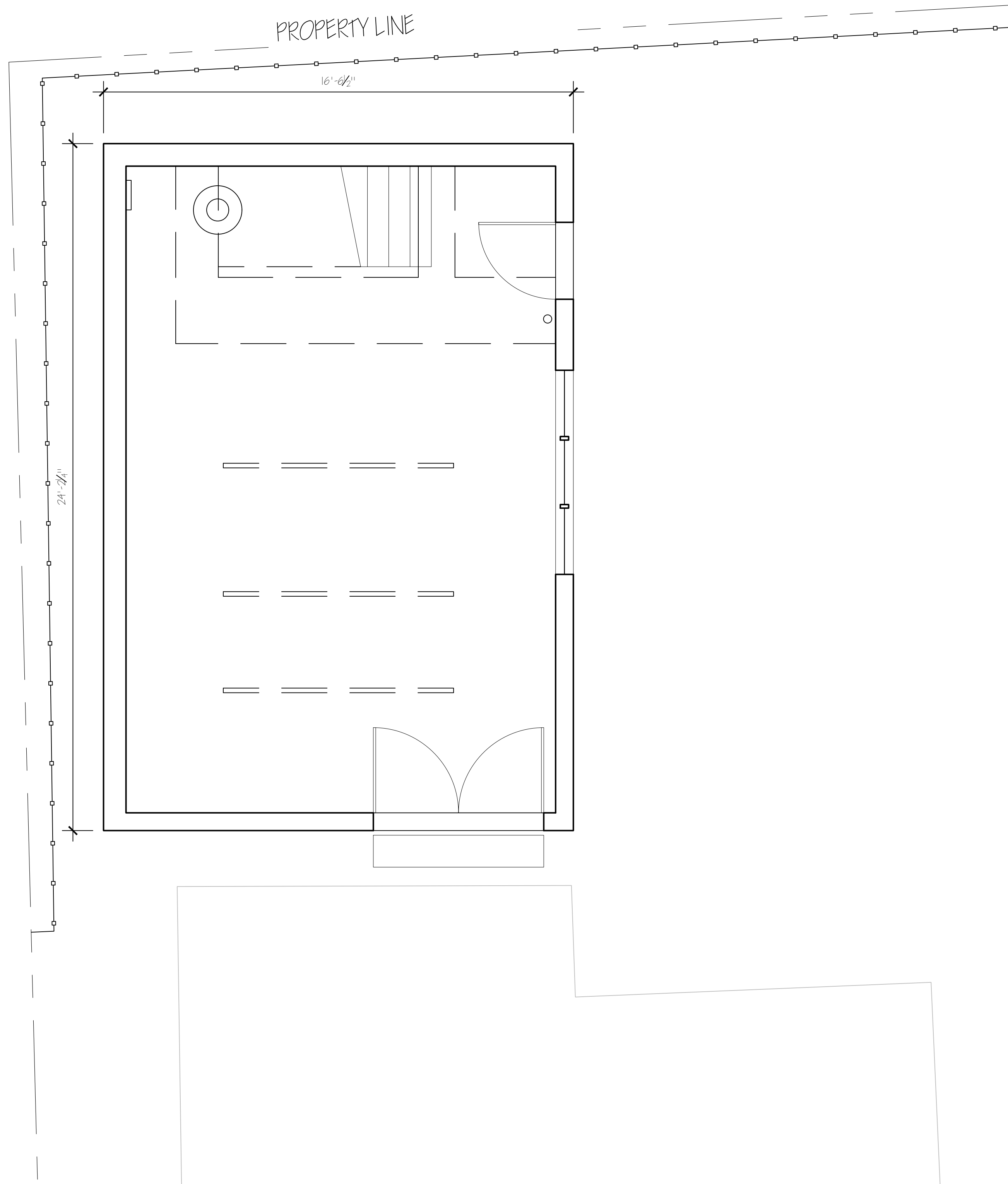
Revisions:



TYPICAL SIDING REVEAL

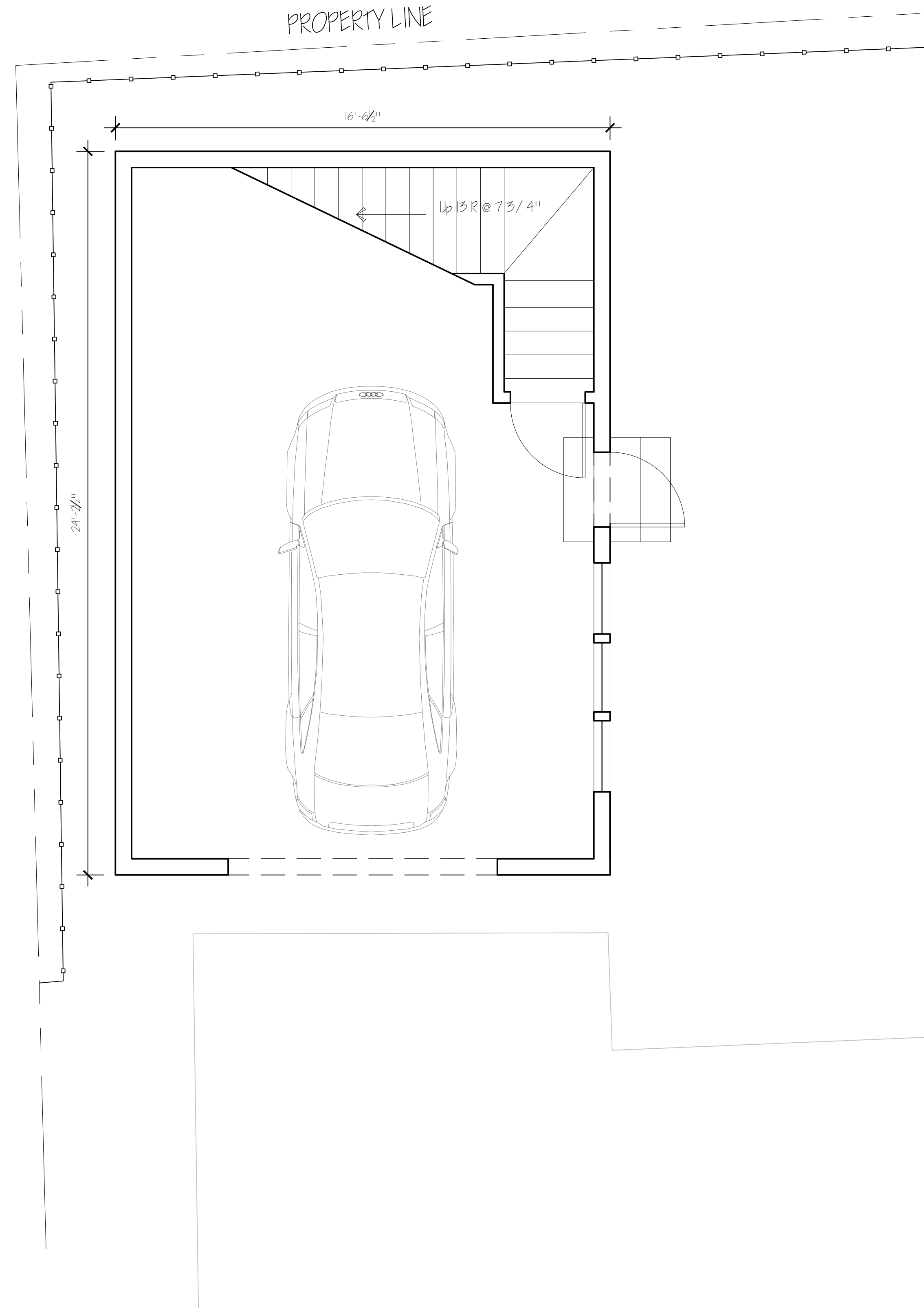


CORNER HIDDEN
BEHIND TREES.



1 First Floor Plan - Existing

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



2 First Floor Plan - Proposed

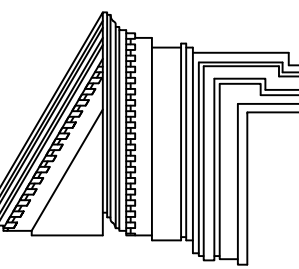
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Revisions:

Drawn By:

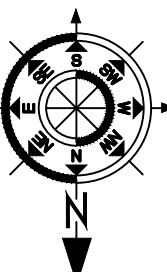
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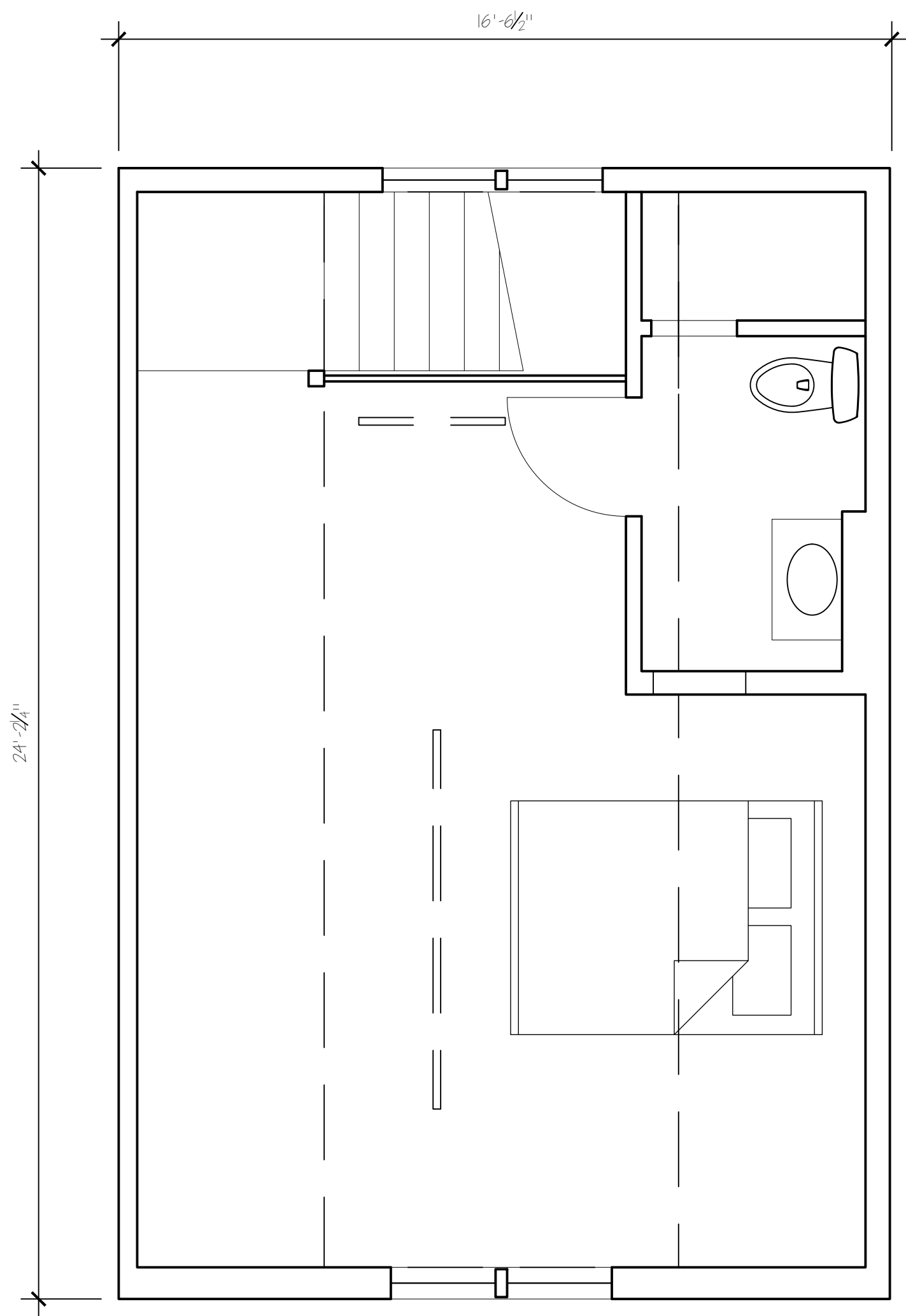
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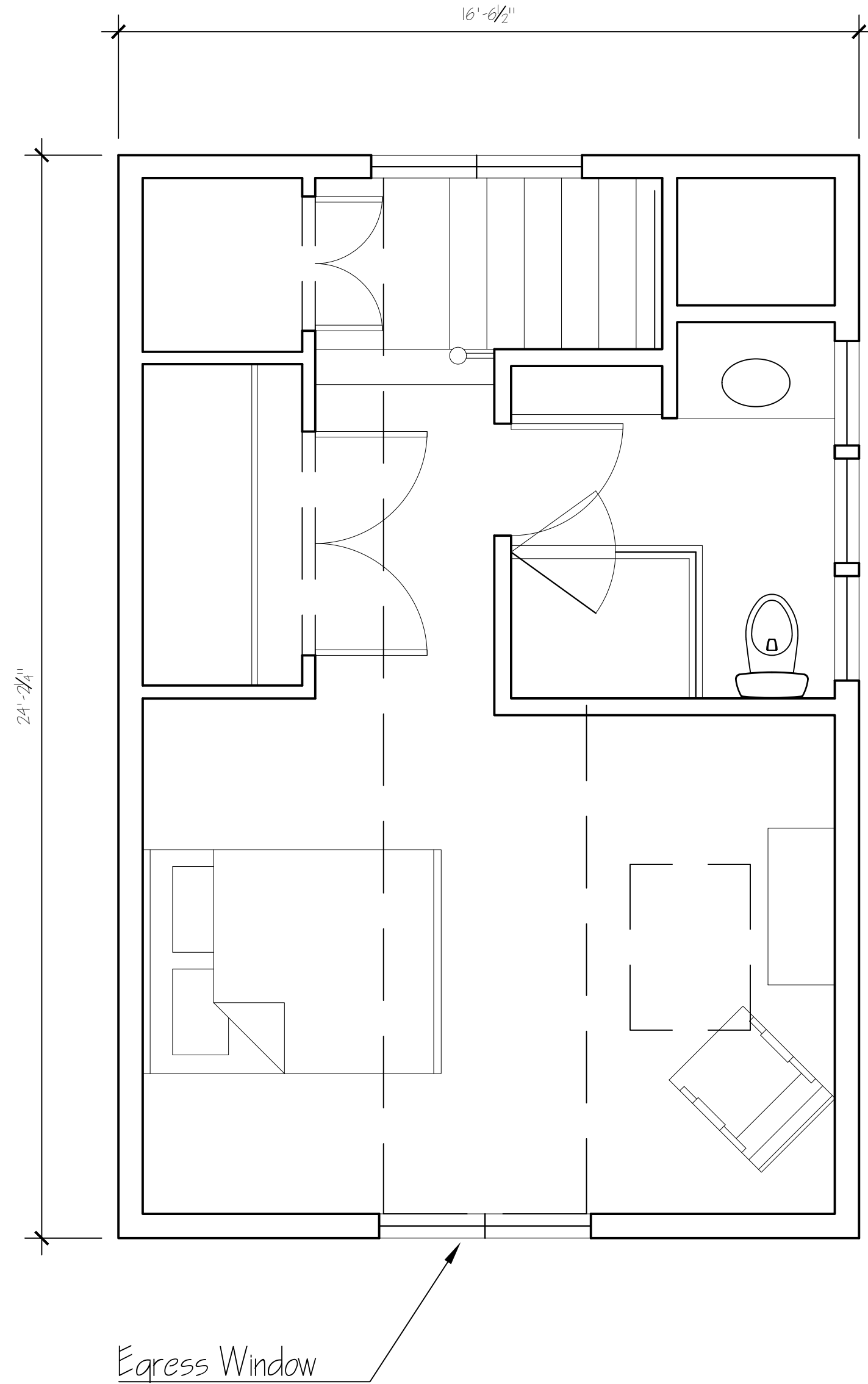
Floor Plans

A-1.1





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

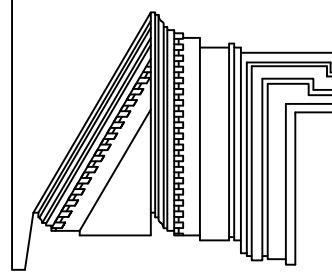


④ Second Floor Plan - Proposed
Scale: 3/8" = 1'-0"

Revisions:

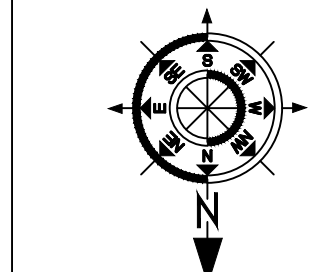
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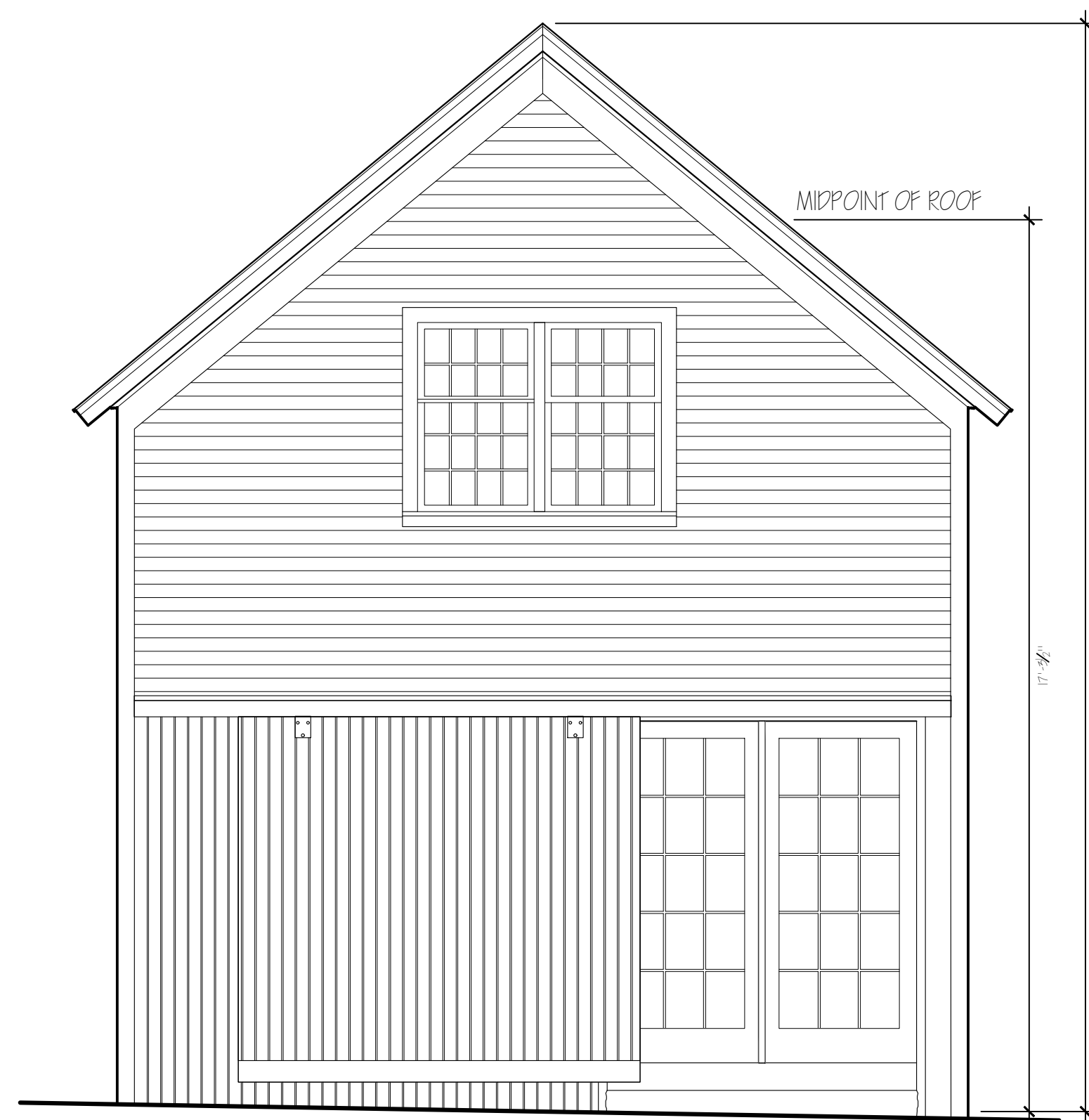
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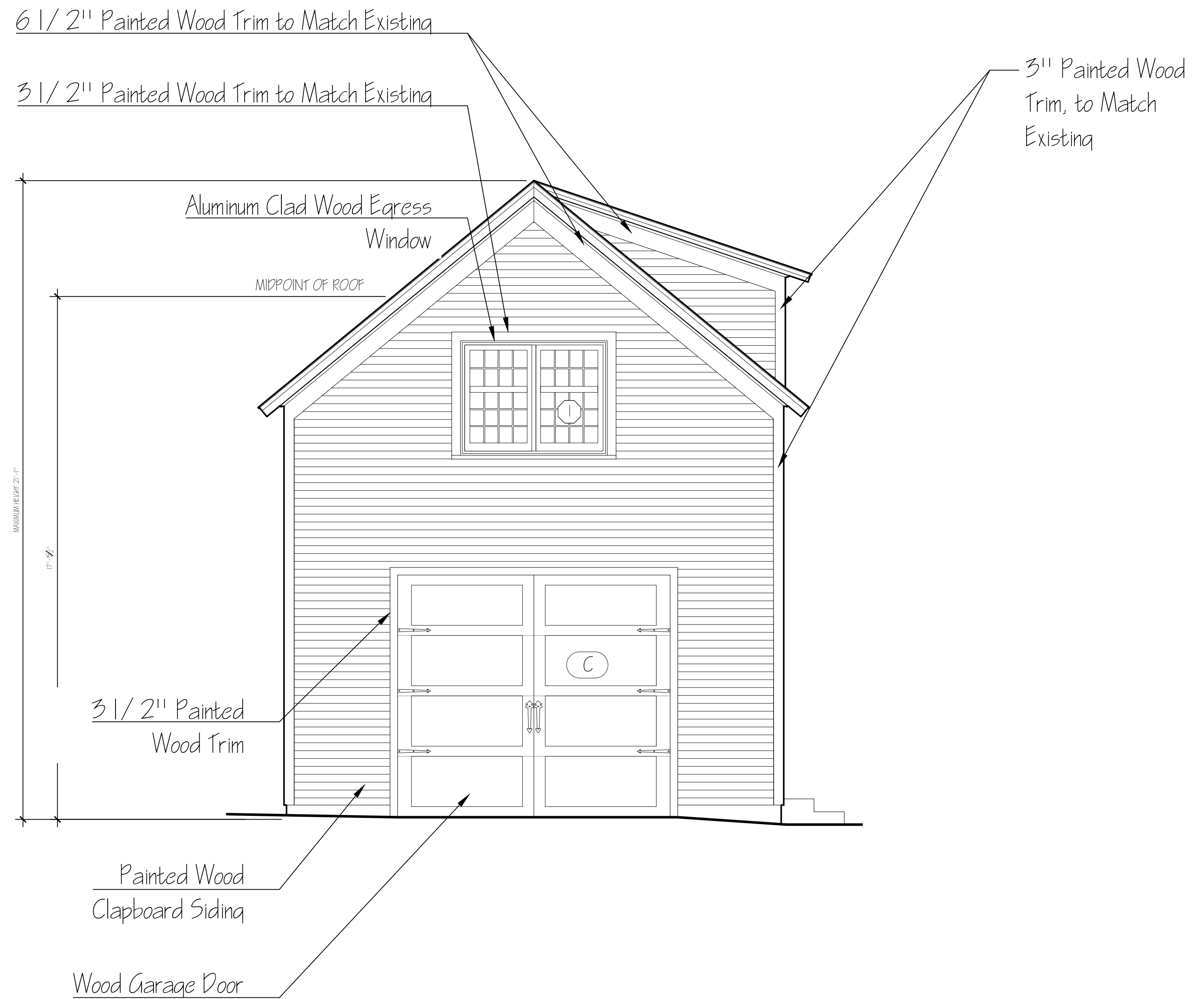
Floor Plans

A-1.2





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



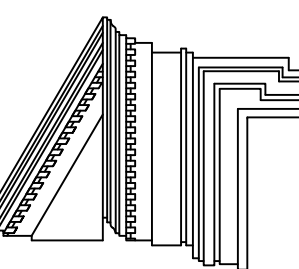
② North Elevation - Proposed
Scale: 1/2" = 1'-0"

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Exterior Elevation

A-2.1



① West Elevation - Existing

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



② West Elevation - Proposed

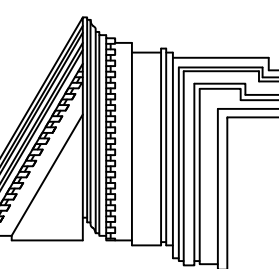
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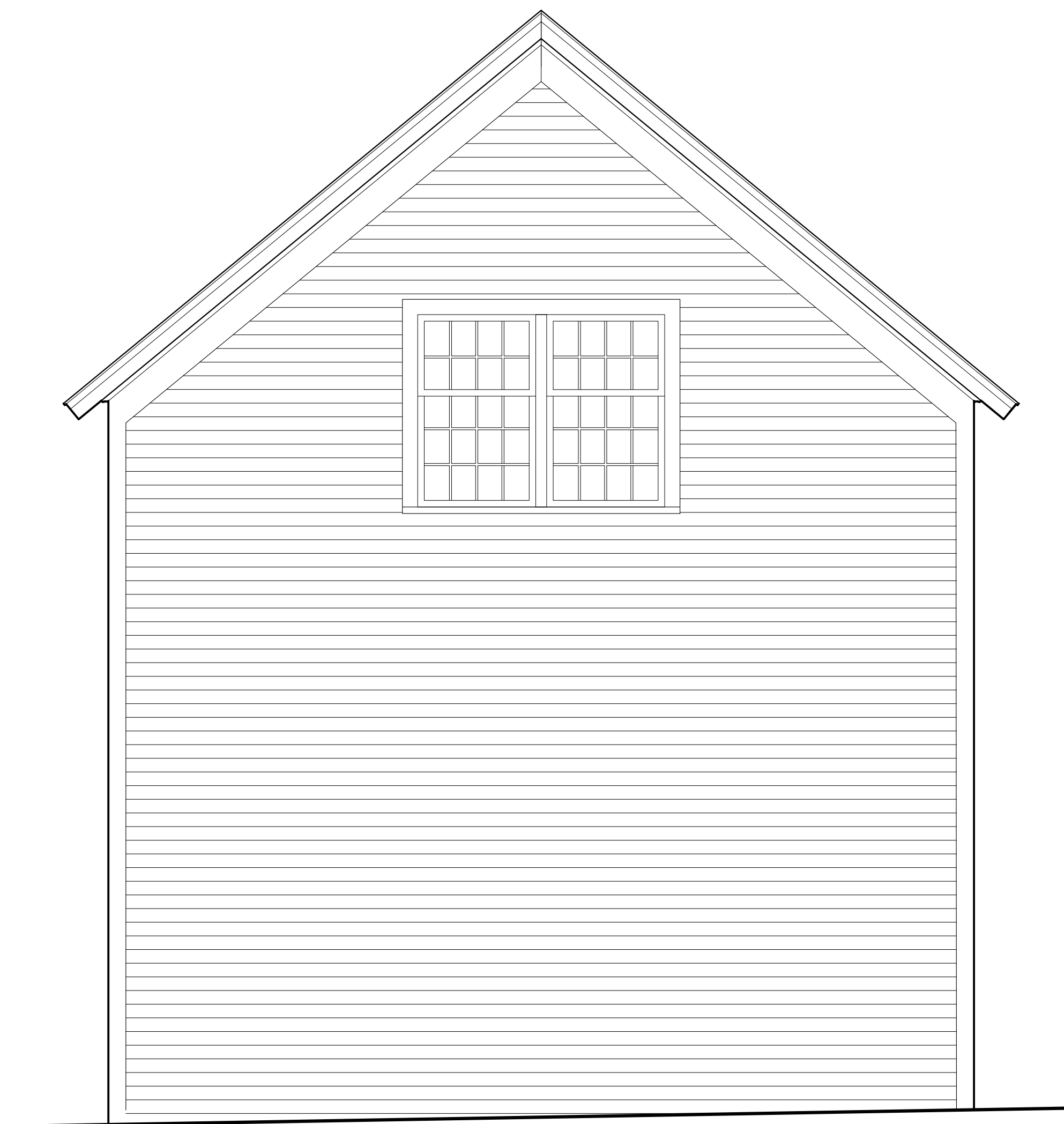
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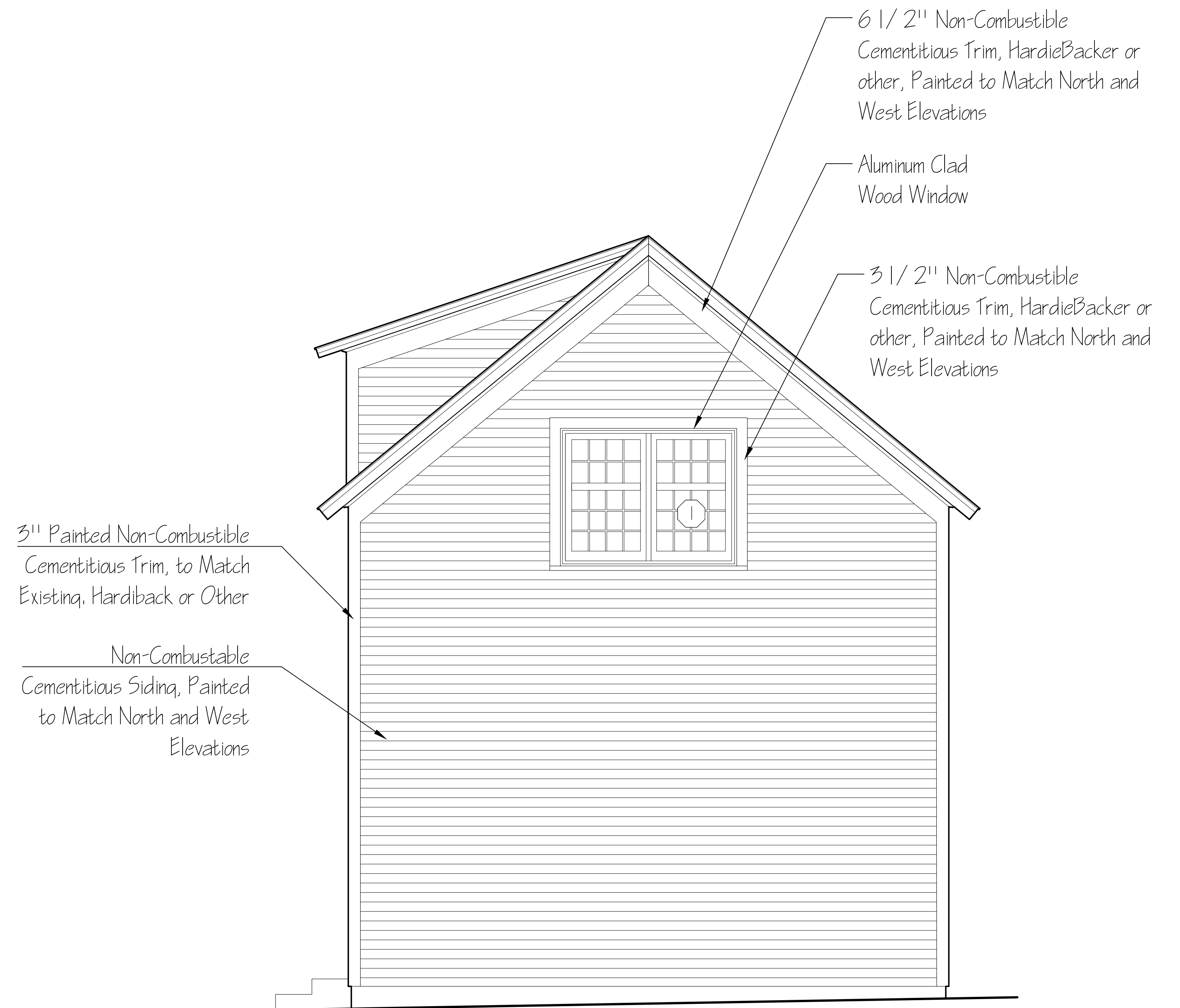
Exterior Elevation

A-2.2



① South Elevation - Existing

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



② South Elevation - Proposed

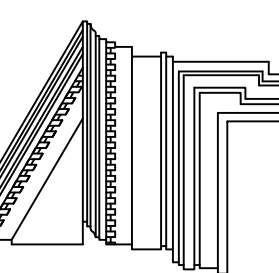
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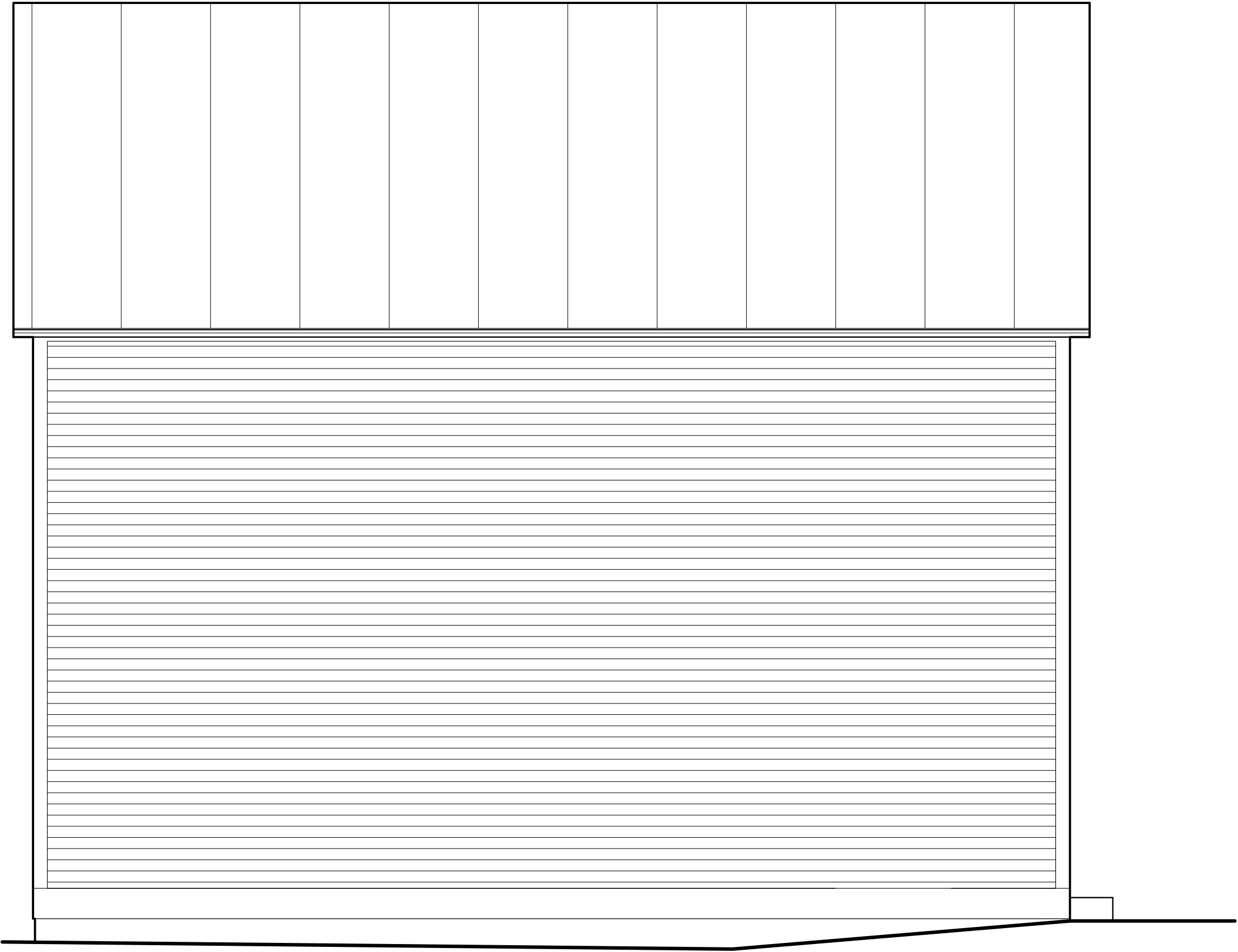
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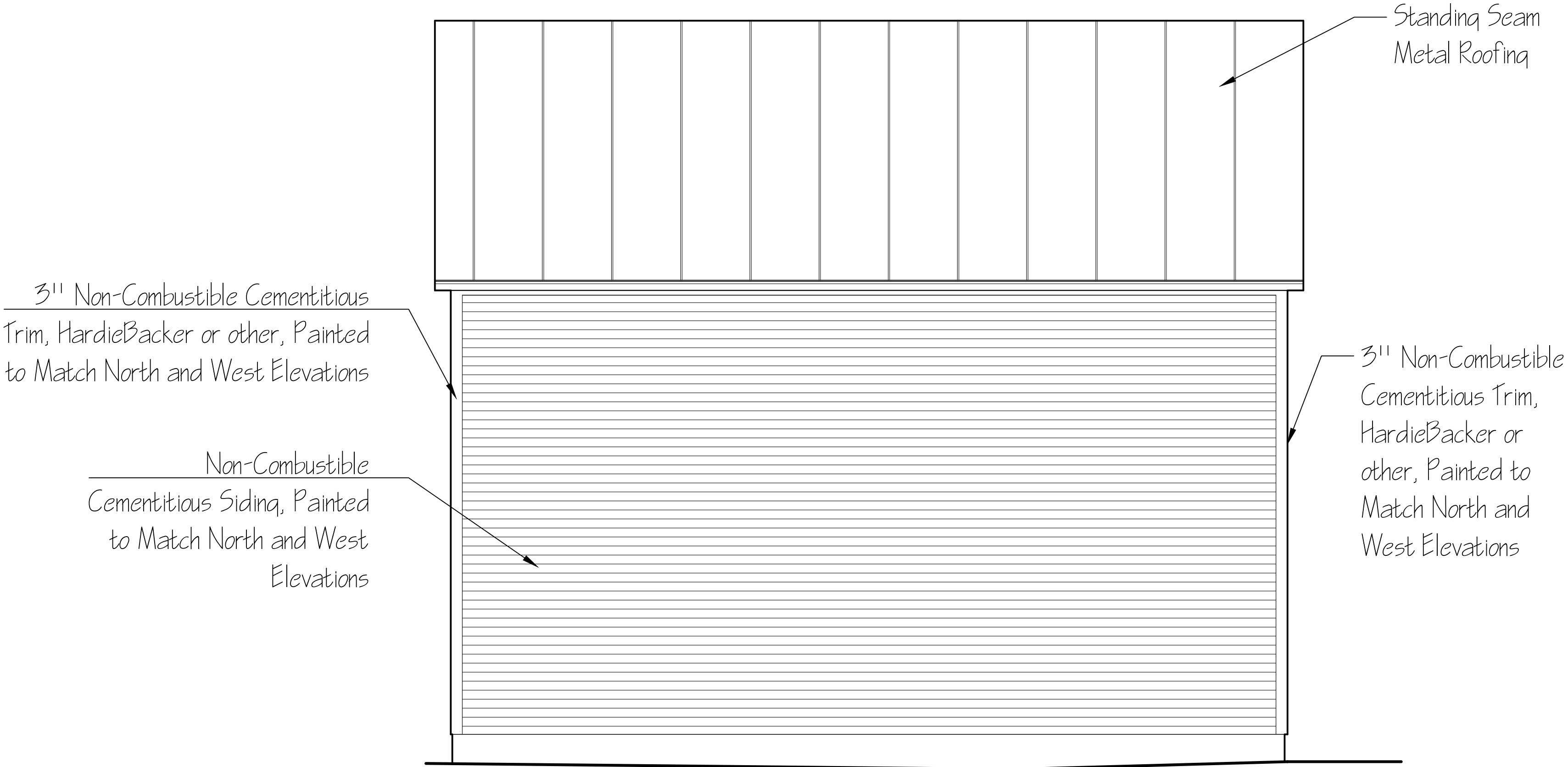
Exterior Elevation

A-2.3



① East Elevation - Existing

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



② East Elevation - Proposed

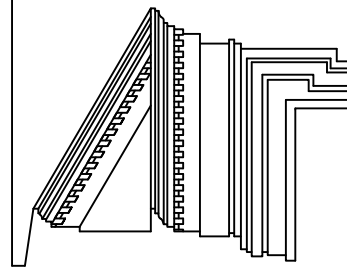
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Revisions:

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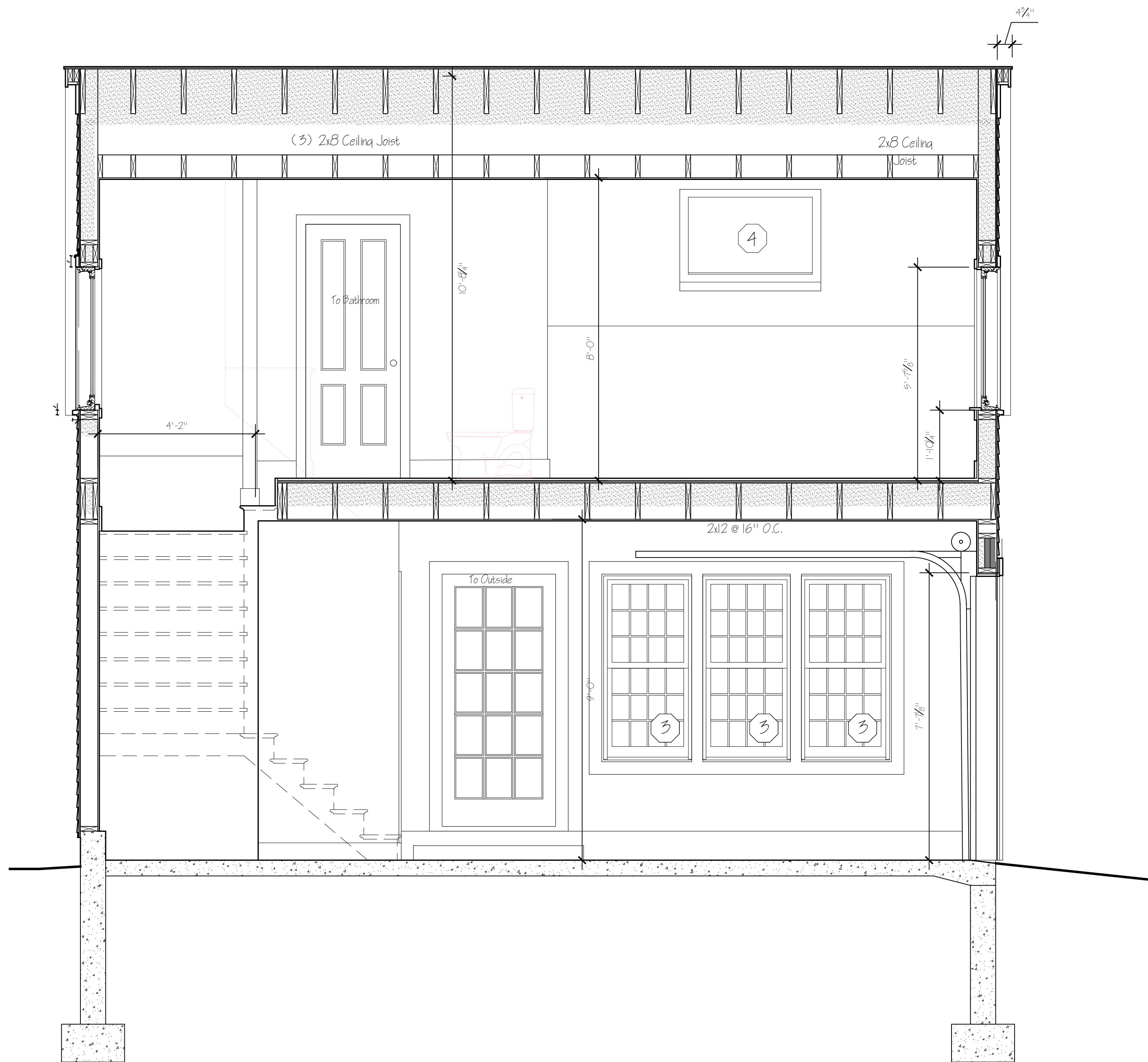
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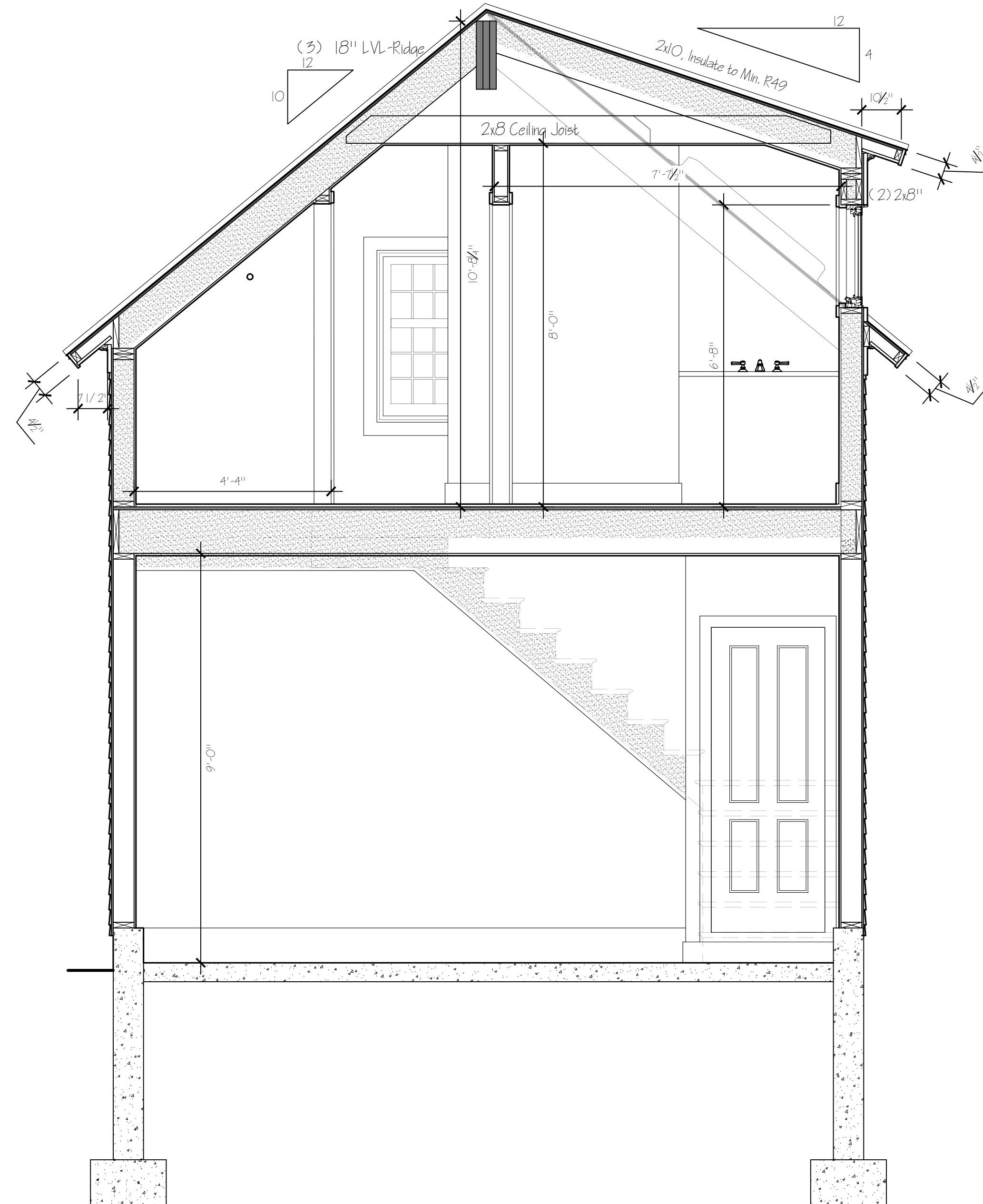
Exterior Elevation

A-2.4



1 Building Section

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



2 Building Section

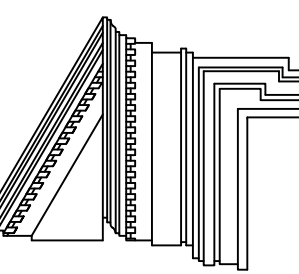
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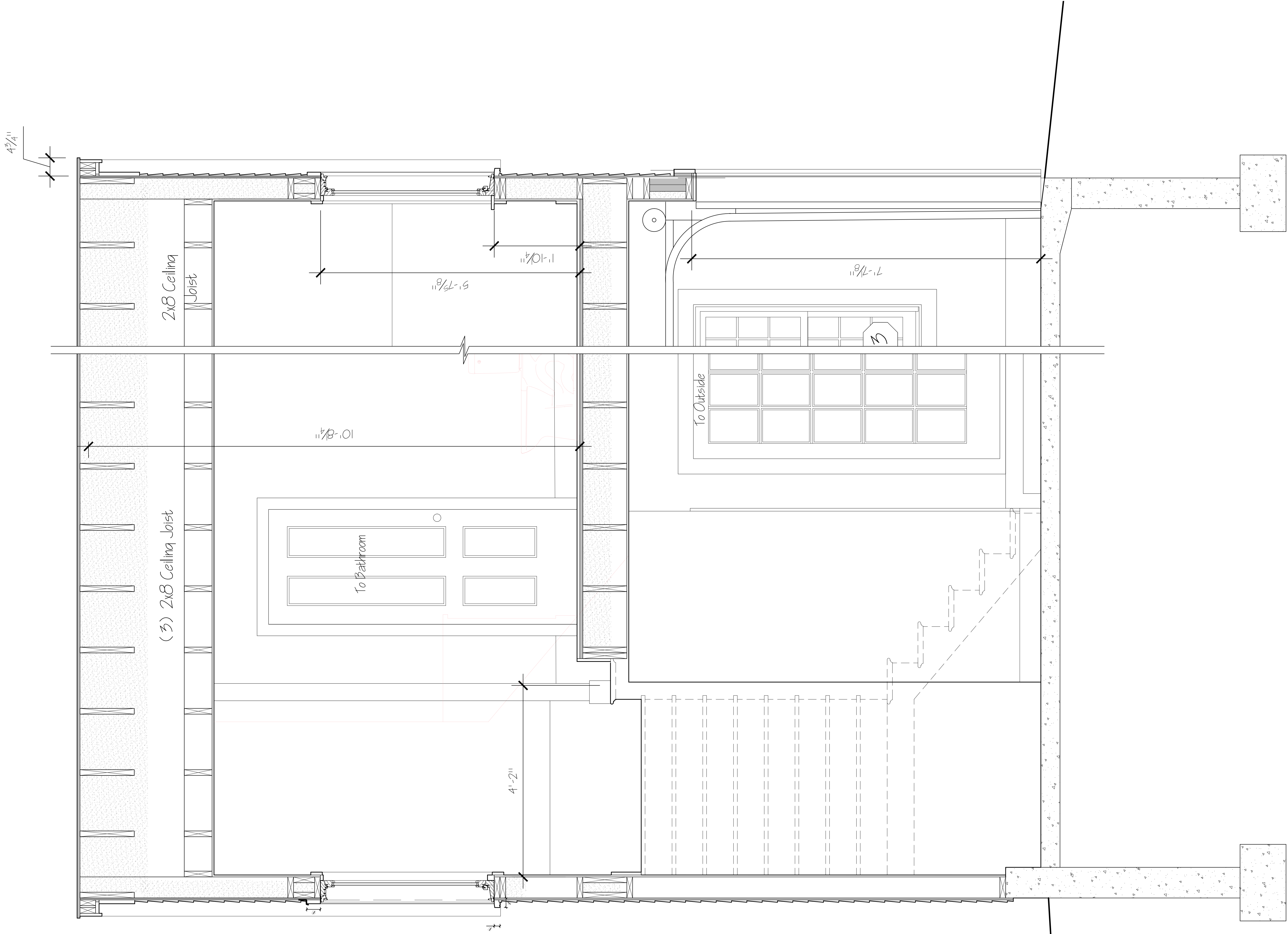
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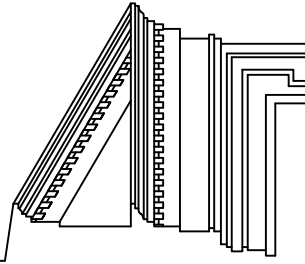
Sections

A-3.1



1 Building Section

Scale: 1" = 1'-0"



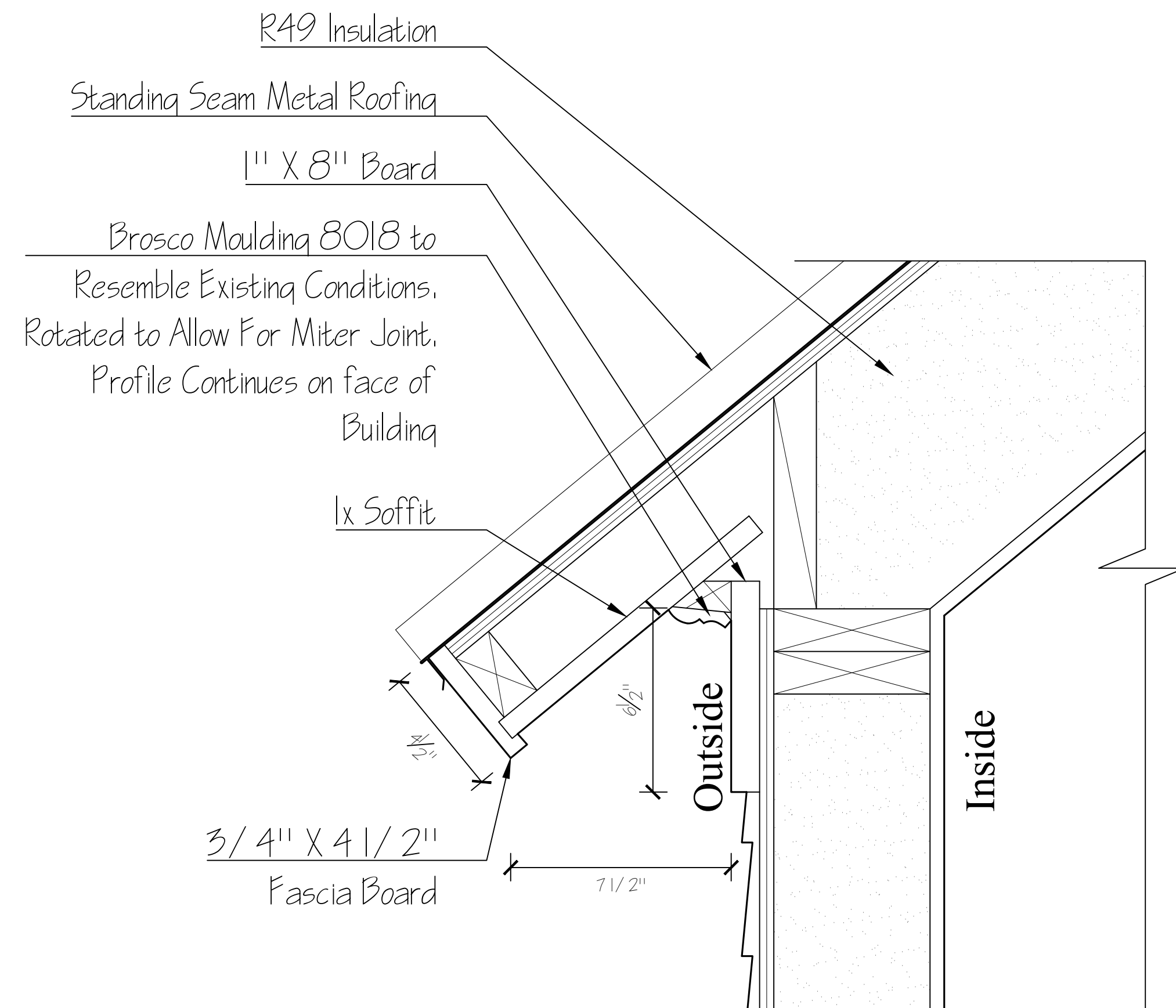
Sections

A-3.2

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Revisions:



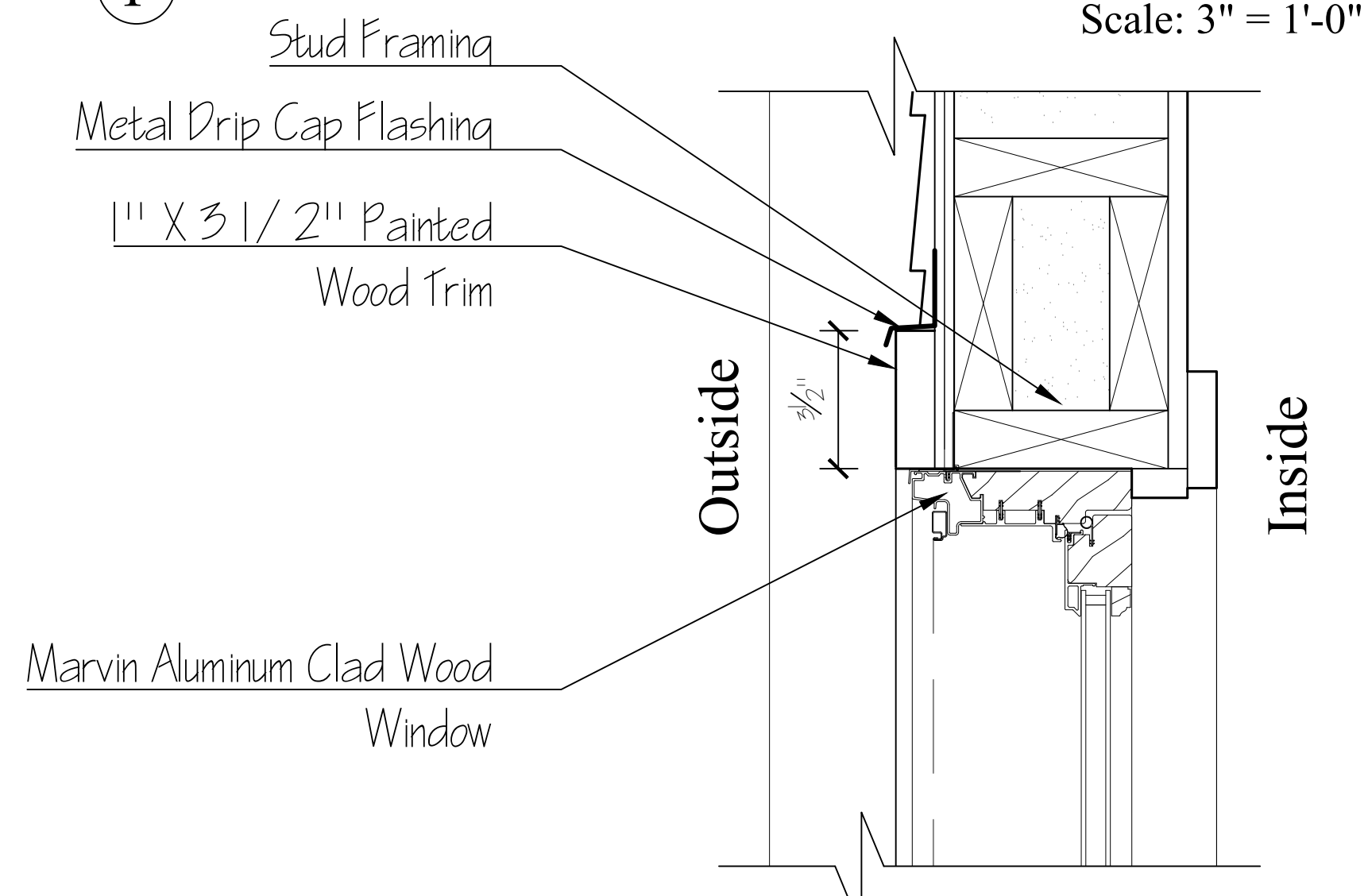
① Typical Eave Detail

Scale: 3" = 1'-0"



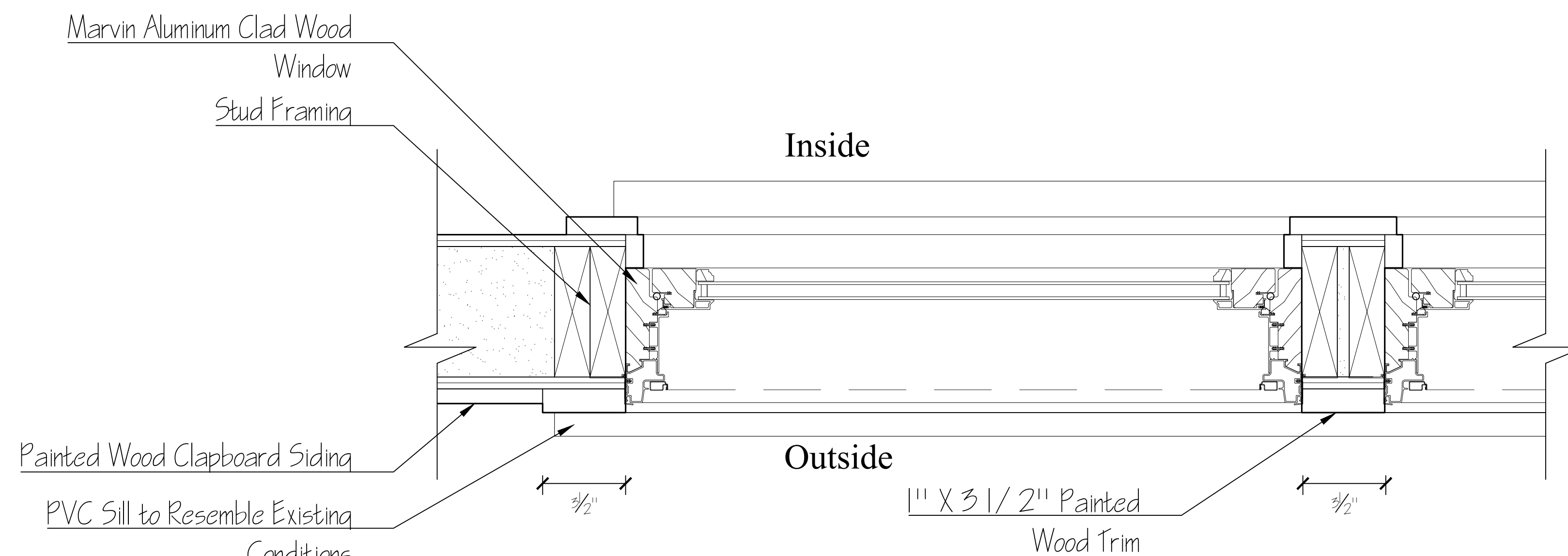
② Typical Eave Detail, Existing

Scale: NTS



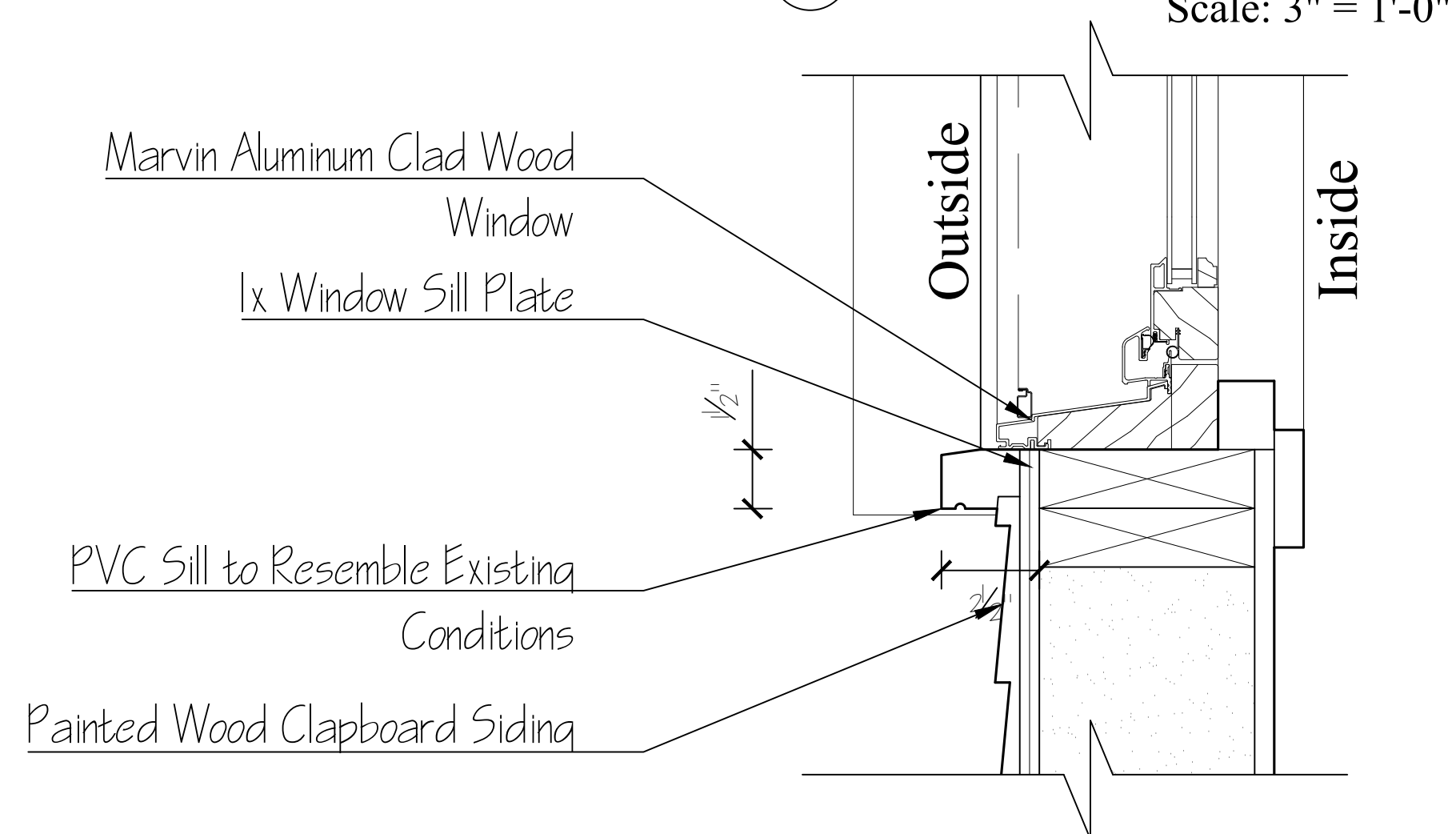
③ Window Head Detail

Scale: 3" = 1'-0"



⑤ Window Plan Detail

Scale: 3" = 1'-0"



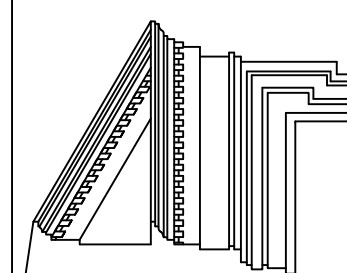
④ Window Sill Detail

Scale: 3" = 1'-0"

Revisions:

Drawn By:

Date: 09 November 2020



Sections

A-4.1



Venting Deck Mount (VS/E/S) Unit Skylight - Guide Specification

For over 80 years, VELUX has been delivering energy efficient daylight to living spaces where people, live, work, and play. VELUX is the world leader in harnessing the benefits of the sun, providing energy efficient top lighting solutions, and recognized as one of the strongest brands in the global materials and home improvement industry.

VELUX manual (VS), electric (VSE), and solar (VSS) venting deck mount skylights are designed for residential sloped roof applications. Daylighting provided through VELUX skylights improves the energy efficiency and visual comfort of these residential spaces. The VELUX VS/E/S skylight is a category leader with a maintenance free frame, structural seal, and durable thermal pane options with performance levels meeting project specifications. The thermal pane glazing options carry a 20 year warranty against seal failure, and have a specially formulated LoE³ - 366™ coating. This coating, specifically designed for skylight applications, provides a high visible light transmission while reducing solar heat gain and UV penetration.

VELUX test facilities ensure that new products comply with regulations and market demands for technical performance. VELUX testing ensures that our products are able to withstand the most difficult climatic conditions to which VELUX products are typically exposed to in the markets where they are sold. Our test procedures include load capacity, air and water tightness in a test chamber and a weather simulator, mechanical tests, impact test results, durability tests, U-factor and solar heat gain tests, burn brand resistance and visual inspection of the surface quality.

Contact **VELUX America LLC.**, Greenwood, SC 29648; www.VELUXusa.com; 800-888-3589, specifications@veluxusa.com.

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SECTION 08 62 00 -UNIT SKYLIGHTS

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Venting deck mount unit skylight with formed counter flashing for mounting on the roof deck, for low-slope and steep-slope roofing applications.

1.2 REFERENCE STANDARDS

Specifier: If retaining optional "References" article, edit to include standards cited in edited Section.

- A. General: Applicable edition of references cited in this Section is current edition published on date of issue of Project specifications, unless otherwise required by building code in force.
- B. American Architectural Manufacturers Association (www.aama.net), Window & Door Manufacturers Association (www.wdma.com), Canadian Standards Association (www.csagroup.org/us/en/services)
 - 1. AAMA/WDMA/CSA 101/I.S.2/A440 - North American Fenestration Standard/ Specification for Windows, Doors, and Skylights (NAFS)
 - 2. CSA A440S1-19 - Canadian Supplement to AAMA/WDMA/CSA 101/I.S.2/A440
 - 3. AAMA 2603 - Voluntary Specification, Performance Requirements and Test Procedures for Pigmented Organic Coatings on Aluminum and Panels
- C. ASTM International: www.astm.org:
 - 1. ASTM B 209 - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate
 - 2. ASTM E 108 - Standard Test Methods for Fire Tests of Roof Coverings
 - 3. ASTM E 283 - Standard Test Method for Determining Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen
 - 4. ASTM E 331 - Standard Test Method for Water Penetration of Exterior Windows, Skylights, Doors, and Curtain Walls by Uniform Static Air Pressure Difference
 - 5. ASTM E 408 - Standard Test Methods for Total Normal Emittance of Surfaces Using Inspection-Meter Techniques
 - 6. ASTM E 1886 - Standard Test Method for Performance of Exterior Windows, Curtain Walls, Doors, and Impact Protective Systems Impacted by Missile(s) and Exposed to Cyclic Pressure Differentials
 - 7. ASTM E 1996 - Standard Specification for Performance of Exterior Windows, Curtain Walls, Doors, and Impact Protective Systems Impacted by Windborne Debris in Hurricanes
- D. Code of Federal Regulations:
 - 1. 29 CFR 1910.29 (e) (1) - Occupational Safety and Health Standards for Fall Protection Systems and Falling Object Protection - Criteria and Practices.

- E. Illuminating Engineering Society of North America (IESNA): www.ies.org:
 - 1. IESNA - The Lighting Handbook.
- F. National Fenestration Rating Council: www.nfrccommunity.org:
 - 1. NFRC 100 - Procedure for Determining Fenestration Product U-factors
 - 2. NFRC 200 - Procedure for Determining Fenestration Product Solar Heat Gain Coefficient and Visible Transmittance at Normal Incidence

1.3 COORDINATION

- A. Coordinate unit skylight interior termination locations with structural layout, ceiling grid layouts, and other ceiling-mounted items.

1.4 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct conference at Project site prior to delivery of unit skylight and installation of roof deck.

1.5 ACTION SUBMITTALS

- A. Product Data: For unit skylights. Include standard construction details, product performance characteristics, and material descriptions, dimensions of individual components and profiles, and finishes.
 - 1. Include test reports of qualified independent testing agency or third party certificates verifying compliance with performance requirements.

Specifier: Retain "LEED Submittals" Paragraph when required for Project; this Paragraph stipulates documentation required from Contractor to support cited construction-phase credits.

Review design-phase credits available related to unit skylights, including contribution to IEQ Cr 6.1 Controllability of Systems, IEQ Cr 8.1. Daylighting, EA Cr 1 Energy Optimization, and ID Cr 1 Innovation in Design credits. Consult VELUX representative for detailed support data.

B. LEED Submittals:

- 1. Credit MR 4 Recycled Content: Documentation indicating the following:
 - a. Percentages by weight of post-consumer and pre-consumer recycled content.
 - b. Total weight of products provided.
 - c. Include statement indicating costs for each product having recycled content.
- C. Shop Drawings: For unit skylight work. Include plans, elevations, sections, details, and connections to supporting structure and other adjoining work.
 - 1. Lighting photometric study indicating compliance with performance requirements in accordance with IESNA. Include layout, spacing criteria and foot-candle report.

1.6 INFORMATIONAL SUBMITTALS

Specifier: Retain paragraphs below when Project requirements include compliance with Federal Buy American provisions. VELUX Venting Deck Mount skylights complies with requirement.

- A. Florida State Product Approval Listing Number: Indicating that products comply with requirements of Florida State Building Code.
www.floridabuilding.org/pr/pr_app_srch.aspx
- B. Warranty: Sample of special warranty.

1.7 CLOSEOUT SUBMITTALS

- A. Operation and Maintenance Data.

1.8 QUALITY ASSURANCE

Specifier: VELUX America, LLC. has been producing skylights in the US for over 30 years and in Europe for an additional 30 years prior to that. VELUX has a reputation among architects and contractors as the most reliably performing skylight in the world.

- A. Manufacturer Qualifications: A qualified manufacturer listed in this Section with minimum 30 years' experience in the US manufacturing similar products in successful use on similar projects and able to provide unit skylights meeting requirements.

Specifier: Retain "Approval of Manufacturers and Comparable Products" Subparagraph if Owner will consider product substitutions.

- 1. Approval of Manufacturers and Comparable Products: Submit the following in accordance with project substitution requirements, within time allowed for substitution review:
 - a. Completed and signed Substitution Request form.
 - b. Product data, including photometric data and independent test data indicating compliance with requirements.
 - c. Sample product warranty.

1.9 WARRANTY

- A. Manufacturer's Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of unit skylights that fail in materials or workmanship under normal use within specified warranty period.
 - 1. Failures include, but are not limited to, the following:
 - a. Deterioration of metals, metal finishes, dome, and other materials beyond normal weathering.
 - b. Breakage of glazing.
 - 2. Warranty Period:
 - a. Unit Skylight and Flashing Product Warranty: 10 years from date of purchase.

- b. Unit Skylight and Flashing Installation “No Leak” Warranty: 10 years from date of purchase.
- c. Hail Breakage Warranty for Skylight Glass: 10 years from the date of purchase on all insulated glass units using laminated glass.
- d. Insulating Glass Seal Failure Warranty: 20 years from date of purchase.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Basis-of-Design Product: Subject to compliance with requirements, provide products of **VELUX America LLC.**, Greenwood, SC 29648; www.VELUXusa.com; (800) 878-3589, specifications@veluxusa.com.

Specifier: Retain "Substitutions" Paragraph and select one of two options based upon Project requirements.

- B. Substitutions: [None allowed by Owner] [As permitted under Instructions to Bidders and Section 012500 "Substitution Procedures"].
- C. Source Limitations: Obtain unit skylights through single source from single manufacturer.

2.2 Venting Deck Mounted [Manual Unit Skylight (VS)][Electric Unit Skylight (VSE)][Solar Unit Skylight (VSS)] Skylights

- A. System Description: Venting deck mounted unit skylight consisting of the following main integrated components – an interior condensation drainage gasket, pre-finished white wooden frame [Special order stain grade wooden frame available on request], exterior maintenance-free [aluminum] [copper] cladding/counter flashing, ASA corner keys, and an insulating thermal pane glass unit with two seals, warm edge spacer system, three coats of LoE³ silver to increase visible light transmittance while reducing solar heat, and a continuous deck seal mounting system with durable foam seal. VS/E/S skylights shall be suitable for installation on roof decks ranging from 14 degrees up to 85 degrees from horizontal.

- 1. Basis of Design: **VELUX America, LLC, Model [VS][VSE][VSS] Venting Deck Mount Skylight.**

Specifier: **VS/E/S** standard unit sizes are not available as a stocked product for all glazing options. Custom sizes not available. Size M02 for VSS and VS only. Stain grade for VSS and VS only. Copper cladding for VSE and VS only.

- B. Wood: Kiln-dried, laminated Ponderosa Pine and Eastern White Pine [pre-finished white] [stain grade]. Wood shall be Forest Stewardship Council (FSC) certified or have an FSC certified chain of custody certification.
- C. Maintenance free exterior cladding: [Roll formed 0.57 mm aluminum frame coverings with neutral gray Kynar[®] polyvinylidene fluoride resin finish,] [0.55 mm copper frame coverings,] production engineered, and fabricated to fit exterior exposed surfaces.

1. Unit Sizes: [C01], [C04], [C06], [C08], [M02], [M04], [M06],[M08], [S01], [S06][as indicated on Drawings].
- D. Operator for Opening and Closing Skylight:
1. [Manual operator (VS) with hook for in-reach or out-of-reach applications (VS).]
 2. [Electric operator (VSE) requiring 120 volts, 40 watts, 60 Hz rating, integral rain sensors and assembly that uses a robust chain driven system to open the skylight 11 inches. A 2.4 GHz radio frequency remote control pad is standard component with each VSE.]
 3. [Solar operator (VSS) powered by a solar charged battery operator. Battery pack is a 9 cell Panasonic NiMH 10.8V, 2100 mAh. 60 Hz rating assembly that uses a robust chain driven system to open the skylight 11 inches. Skylight provided with integral photovoltaic cells and rain sensor. A 2.4 GHz radio frequency remote control pad is standard component with each VSS.]
- E. Weather stripping: Factory applied neoprene and thermoplastic elastomeric weather stripping throughout entire frame, profiled to effect weather seal.
- F. Insulated Glass Unit: Factory assembled with low emissivity exterior pane and clear interior pane separated by a stainless steel spacer sealing the space between panes with 90% argon gas.
1. Exterior Pane: 0.125 inch (3mm) thick tempered glass with Neat® exterior coating and interior surface coated with three layers of low emissivity silver (LoE³) coating LoE³ 366.

Specifier: Retain one of the three interior pane options below. VELUX product codes list the standard laminated pane as 04 with heat strengthened interior panes using a clear interlayer. VELUX offers an interior pane option for wind-borne debris regions. The wind-borne debris laminated interior pane with a thicker polyvinyl butyral interlayer is listed by VELUX as an impact 06 glazing for use in wind zone 3 regions requiring a class C missile level. A snow load laminated interior pane is offered with the laminated panes being tempered. Laminated panes are typically required by building codes when any portion of the glass is higher than 12 feet above finished floor. VELUX laminated panes are marketed as "Clean, Quiet and Safe" glass.

2. Interior Pane:
 - a. [Standard [with i89 coating]: Laminated, Two clear 0.090 inch (2.3 mm) heat-strengthened panes with a 0.030 inch (0.76 mm) clear polyvinyl butyral interlayer sandwiched together.] [interior pane surface with Indium Tin Oxide (ITO) coating (LoE-i89® coating)]
 - b. [Impact: Laminated for wind-borne debris regions, Two clear 0.090 inch (2.3 mm) heat-strengthened panes with a 0.090 inch (2.3 mm) clear polyvinyl butyral interlayer sandwiched together.]
 - c. [Snow Load: Laminated, Two clear 0.12 inch (3 mm) tempered panes with a 0.030 inch (0.76 mm) clear polyvinyl butyral interlayer sandwiched together.]
- G. Structural Sealant: Factory applied Instant glaze sealant, clear color, bonding the glass pane to the aluminum frame and suitable for external exposure.

- H. Mounting System: Continuous corrosion resistant mounting system with a durable foam seal and rough opening alignment notches.

Specifier: VS/E/S skylight supplied 26 mounting fasteners.

- I. Mounting Fasteners: 10 gauge 1.25 inch (32 mm), ring shank nails provided with skylight. Ring shank nails are double hot dipped zinc coated. The field installed nails secure skylight to roof deck as indicated in manufacturer's installation instructions.

2.3 Flashings

Specifier: Type EDL step flashing designed for use with roofing material less than 0.5 inch (13 mm) thick (typically asphalt shingles, cedar shingles and slate) and for use on roof slopes 14 degrees or greater and not more than 85 degrees. Type EDW high profile flashing designed for use with high profiled roofing materials (clay tile, concrete tile and cedar shakes) not greater than 4.75 inches (120 mm) in height, and for use on roof slopes 14 to 85 degrees. EDL or EDW flashing is required with skylight in order for VELUX 10 year "No Leak" warranty to be valid.

- A. Step Flashing: Roll formed aluminum, neutral grey finish, factory engineered and fabricated seams, consisting of head flashing, sill flashing, step flashing pieces and adhesive underlayment suitable for use on roof pitches 14 to 85 degrees from horizontal.

1. Basis of Design: **VELUX America, LLC, EDL Step Flashing.**
2. Size: As required for skylight sizes indicated.
3. Material:
 - a. Head flashing 23 gauge (0.57 mm) thick aluminum with polyester lacquer finish.
 - b. Sill flashing 22 gauge (0.65 mm) thick aluminum with Kynar 500 finish.
 - c. Step pieces 27 gauge (0.42 mm) thick aluminum with polyester lacquer finish.
 - d. Adhesive underlayment: 9 inches (229 mm) wide x 21 feet (6.4 m) length x 0.03 inch (0.8 mm) thick, SBS modified bitumen with white polyethylene backing sheet.

- B. High Profile Flashing: Roll formed aluminum, neutral grey finish, factory engineered and fabricated seams, consisting of head flashing, sill flashing, side gutter pieces, counter flashing and adhesive underlayment suitable for use on roof pitches 14 to 85 degrees from horizontal.

1. Basis of Design: **VELUX America, LLC, EDW High Profile Flashing.**
2. Size: As required for skylight sizes indicated.
3. Material:
 - a. Head flashing 23 gauge (0.57 mm) thick aluminum with polyester lacquer finish.
 - b. Sill flashing 22 gauge (0.65 mm) thick aluminum with polyester lacquer finish and 9 inch (229 mm) pleated apron.
 - c. Side gutter pieces 23 gauge (0.57 mm) thick aluminum with polyester lacquer finish.

- d. Adhesive underlayment: 12 inches (305 mm) width x 21 feet (6.4 m) length x 0.03 inch (0.8 mm) thickness, SBS modified bitumen with white polyethylene backing sheet.

2.4 ACCESSORIES

- A. Pleated Blinds:
Solar powered, [room darkening double pleated] [light filtering single pleated] fabric with [white] [beige] [special] color as indicated on drawings. 24 volt dc blinds operated via 2.4 GHz radio frequency [basic wall mounted remote control provided with blind].
- B. VELUX Active:
Indoor climate control and monitoring system for use with VELUX skylights and blinds.
- C. Power supplies and electric controls are available but sold separately.
 - a. [KLB 100 Battery backup for VSE]
 - b. [[KLI 310 Wall mounted keypad for use with [VSS] [VSE]]
 - c. [[KLF 200 Home automation integration kit and signal repeater for use with [VSS] [VSE]]
 - d. [ZMT 300 6-10' motorized rod for VS]
- B. Manual Controls for VS are available but sold separately.
 - a. [ZCT 300 6-10' telescopic rod]
 - b. [ZCT 100 3' extension to ZCT 300 or ZMT 300]
 - c. [ZZZ 201 Crank handle]
 - d. [ZZZ 203 Angle adaptor for chain operator]

2.5 PERFORMANCE REQUIREMENTS

- A. The [VS][VSE][VSS] deck mounted skylight is independently tested in accordance with AAMA/WDMA/CSA 101/I.S.2/A440 (NAFS-17) for compliance with International Building Code, International Energy Conservation Code and International Residential Code as follows:
 - 1. Water Test Pressure: No water penetration noted as measured in accordance with ASTM E 331 with a test pressure differential of 720 Pa (15.0 psf).
 - 2. Air Leakage Rate: Maximum of 0.05 CFM/ft² of total unit area, measured at a pressure of 75 Pa (1.57 psf) in accordance with ASTM E 283.
 - 3. Canadian Air Infiltration/Exfiltration Rating: A3. (0.3 L/s/m² maximum)
 - 4. Design Pressure (DP):
 - a. [[04 Standard Laminated Pane] [89 standard Laminated Pane with i89 Coating]: [S06 and S01 sizes design pressure = +300/-65 psf (+14.4/-3.11 kPa)] [and] [M08 and smaller sizes design pressure = +400/-105 psf (+19.2/-5.03 kPa)].]
 - b. [[06 Impact Pane: [S06 and S01 sizes design pressure = +200/-65 psf (+9.58/-3.11 kPa)] [and] [M08 and smaller sizes design pressure = +230/-65 psf (+11.0/-3.11 kPa)].]
 - c. [[10 Snow Load Pane: [S06 and S01 sizes design pressure = DP = +800/-80 psf (+38.3/-3.83 kPa)] [and] [M08 and smaller sizes design pressure = +1150/-150 psf (+55.1/-7.18 kPa)] [and] [C06 and smaller sizes design pressure = +1300/-150 psf (+62.2/-7.18 kPa)].]

- B. Daylighting: Provide daylighting photometric performance comparable to basis of design product at layout indicated, based upon daylighting profile of March 21, 9:00 am local time, at Project location by simulation in accordance with IESNA guidelines.
- C. [Windborne-Debris Resistance: Wind Zone 3 or Less: Provide unit skylights capable of resisting impact from windborne debris, based on the pass/fail criteria as determined from testing glazed representative of those specified, according to ASTM E 1886 and ASTM E 1996. Missile Level C, Wind Zone 3 requirements, and +50/-50 psf cycle pressure minimum.]
- D. Fire Ratings for Roof Assemblies with Fire Classifications: Unit skylight tested in accordance with ASTM E 108 and listed as passing Burning Brand test with target classification of Class B.
- E. Energy Performance ratings for any size venting deck mounted unit skylight with tempered exterior glass pane and interior pane as follows:

Specifier: Retain the appropriate option in the 3 paragraphs below that corresponds to the type of insulated glass unit used on Project.

- 1. Thermal Transmittance: NFRC 100 maximum U-factor:
 - a. [04 Standard Laminated: 0.43 Btu/hr* ft^2 *deg F (2.49 W/m 2 *deg C).]
 - b. [06 Impact Laminated: 0.41 Btu/hr* ft^2 *deg F (2.36 W/m 2 *deg C).]
 - c. [89 Standard Laminated with i89 Coating: 0.38 Btu/hr* ft^2 *deg F (2.16 W/m 2 *deg C).]
 - d. [10 Snow Load Laminated: 0.42 Btu/hr* ft^2 *deg F (2.4 W/m 2 *deg C).]
- 2. Solar Heat-Gain Coefficient (SHGC): NFRC 200 maximum SHGC:
 - a. [04 Standard Laminated: 0.23]
 - b. [06 Impact Laminated: 0.23]
 - c. [89 Standard Laminated with i89 Coating: 0.22]
 - d. [10 Snow Load Laminated: 0.23]
- 3. Visible Transmittance (Vt): NFRC 200 maximum Vt:
 - a. [04 Standard Laminated: 0.53]
 - b. [06 Impact Laminated: 0.53]
 - c. [89 Standard Laminated with i89 Coating: 0.52]
 - d. [10 Snow Load Laminated: 0.52]

- F. Fall Protection Standard Compliance: 29 CFR 1910.29: Testing for all laminated venting deck mount unit skylights.

2.6 MATERIALS

- A. Aluminum Sheet: Flat sheet complying with ASTM B 209/B 209M.

- B. Joint Sealants: As specified in Section 079200 "Joint Sealants."
- C. Mastic Sealants: Polyisobutylene; nonhardening, nonskinning, nondrying, nonmigrating sealant.

2.7 FINISHES

- A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.
- B. Appearance of Finished Work: Noticeable variations in same piece are not acceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine openings, substrates, structural support, anchorage, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
- B. Proceed with unit skylight installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. Install unit skylights in accordance with manufacturer's written instructions and approved shop drawings. Coordinate installation of units with installation of substrates, air and vapor retarders, roof insulation, roofing membrane, and flashing as required to ensure that each element of the Work performs properly and that finished installation is weather tight.
 - 1. Anchor unit skylights securely to supporting substrates.
 - 2. Install unit skylights on curbs specified in another section with tops of curbs parallel to finished roof slope.
- B. Where metal surfaces of unit skylights will contact incompatible metal or corrosive substrates, including preservative-treated wood, apply bituminous coating on concealed metal surfaces, or provide other permanent separation recommended in writing by unit skylight manufacturer.
- C. Additional testing and inspections, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.
- D. Prepare test and inspection reports.

3.3 CLEANING AND PROTECTION

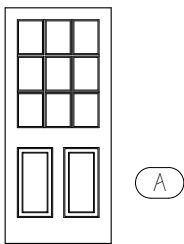
- A. Clean exposed unit skylight surfaces according to manufacturer's written instructions. Touch up damaged metal coatings and finishes. Remove excess sealants, glazing materials, dirt, and other substances.

- B. Replace glazing that has been damaged during construction period.
- C. Protect unit skylight surfaces from contact with contaminating substances resulting from construction operations.

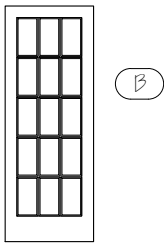
END OF SECTION

DOOR SCHEDULE

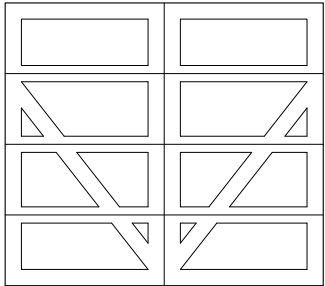
Notes: - 7/8" SGL w/ spacer bar, Dual Pane, Low-E2.



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



QTY: 1
2'-6" x 6'8" DOOR
SIMPSON OR SIM.
IN-SWING
RO. 2'-8" X 6'-9 1/2"
NOTES:
simpson 7015 THERMAL FRENCH



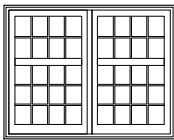
QTY: 1
8'0" x 9'0" OVERHEAD DOOR
WOOD - MAHOGANY
RO. 8'-0" X 9'-0"
NOTES:

C

WINDOW SCHEDULE

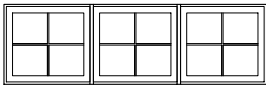
Notes: MARVIN ULTIMATE --

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



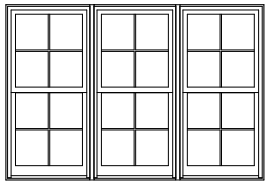
QTY: 4
MARVIN ULTIMATE
LFCAL
2-WIDE IN-SWING CASEMENT
RO. 4'-11" X 3'9 7/8"

1



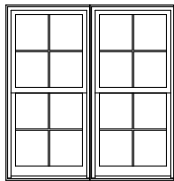
QTY: 6
MARVIN ULTIMATE
LAWN5028
3-WIDE AWNING
RO. 7'-6 1/8" X 2'-3 5/8"

2



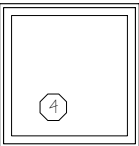
QTY: 3
MARVIN ULTIMATE
LDHG2 2426
DOUBLE HUNG
RO. 7'-3 7/8" X 5'-0"

3



QTY: 2
MARVIN ULTIMATE
LDHG2 2426
DOUBLE HUNG
RO. 4'-9 1/2" X 5'-0"

3



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

4

Drawn By:
Date: 21 Sep

PROJECT TITLE
City, State
Street Address



Window
Sche

SC-

Department of Permitting & Inspections

Zoning Division
645 Pine Street
Burlington, VT 05401
Telephone: (802) 865-7188

William Ward, Director
Scott Gustin, AICP, CFM, Principal Planner
Mary O'Neil, AICP, Principal Planner
Ryan Morrison, Associate Planner
Joseph Cava, Permit Technician
Ted Miles, Zoning Specialist
Charlene Orton, Permitting & Inspections Administrator



MEMORANDUM

TO: Development Review Board
FROM: Ryan Morrison, Associate Planner
DATE: November 15, 2022
RE: ZP-22-416; 323-325 College Street

=====

Note: These are staff comments only; decisions on projects are made by the Development Review Board, which may approve, deny, table or modify any project. THE APPLICANT OR REPRESENTATIVE MUST ATTEND THE MEETING.

Zone: RH Ward: 8E

Owner/Applicant: Advanta IRA Services LLC, FBO Peter C. Potts / Benjamin Frye

Request: 4 unit addition to the existing 13 unit multifamily development. Proposal includes associated utility work and minor grading.

Applicable Regulations:

Article 3 (Applications, Permits, and Project Reviews), Article 4 (Zoning Maps & Districts), Article 5 (Citywide General Regulations), Article 6 (Development Review Standards), Article 8 (Parking)

Overview:

323-325 College Street is a connected, 13 unit apartment complex. 5 units are within the original 1832 Chauncey Goodrich/Luther Hagar House at 325 College Street, while 8 are in the 2010 four story addition west of the historic house. The original structure is listed on the National Register of Historic Places within the **Main Street College Street Historic District**. This application proposes a primary frontage, four story addition to the 2010 ell to include four additional residential units for a collective total of 17 residential units.

The Design Advisory Board reviewed this application on July 26, 2022 and voted unanimously (5-0) to recommend approval to the Development Review Board, with no additional conditions.

Previous zoning permit action:

- **Zoning Permit 21-778;** 4 unit addition. Expired
- **Zoning Permit 21-0329CA;** 4 unit addition. Withdrawn
- **Zoning Permit 19-0203CA;** Site changes and parking reconfiguration associated with ZP18-0977LL, ZP18-0976LL and ZP18-0975CA, 308 Main Street. Approved October 2018.

- **Zoning Permit 18-0977LL**; Boundary line adjustment with 308 Main Street. See also ZP19-0203CA (323-325 College Street) and ZP18-0976LL and 18-0975CA (308 Main Street.). Approved October 2018.
- **Zoning Permit 18-0230CA**; Alterations to site plan approved under ZP17-0791CA and window replacement under ZP17-0790CA. Add steps on south elevation, window changes, and boiler exhaust penetrations. Approved August 2017.
- **Zoning Permit 18-0060CA**; Establish paved connection with 308 Main Street for shared parking; relocation of dumpster and one tree. Application withdrawn September 2017.
- **Zoning Permit 17-0791CA**; Renovate existing ell for an additional 4 residential units; re-stripe parking for additional spaces. Requires DRB discretionary review of parking space dimensional standards silent in Article 8, Table 8.1.11-1. No change to coverage or setbacks. Approved April 2017.
- **Zoning Permit 17-0790CA**; Replace existing windows on rear ell with new clad wood windows. Approved March 2017.
- **Zoning Permit 11-0086**; Amendment to original approval issued November 3, 2010; specifically, site plan revisions, new access road, revised parking layout and substantially upgraded stormwater retention infrastructure. Approved July 2011.
- **Zoning Permit 11-0086 CA/MA**; Construct an attached building addition with 8 new dwelling units; convert the existing 5 unit building to a single unit with attached laundry/storage area; a net total of 9 dwelling units. (Re-arrangement of the number of units between buildings: 1 to be located in the existing structure; 8 in the new structure.) Demolish existing garage, expand parking area. Approved November, 2010.
- **Zoning Permit 04-496**; Move existing fence and install children's play equipment. Approved April 2004.
- **Zoning Permit 03-170**; Installation of fenced enclosure, 4' high green vinyl chain link. Approved, October 2002.
- **Zoning Permit 83-123**; Erect a 4' chain link fence along 75' of eastern property line and 125' along property line and 84' along northern property line. Approved April 1983.
- **Zoning Permit 80-962**; New doors, installation of a window where there was a door. Interior work. Approved May 1980.
- **Zoning Permit 79-146**; Install 70' of 4' chain link fencing. Approved May 1979.
- **ZBA request** to convert a three apartment house to five apartments. Approved November 1972.

Recommendation: **Certificate of Appropriateness Approval** as per the following findings:

I. Findings

Article 3: Applications, Permits and Project Reviews

Part 3: Impact Fees

Section 3.3.2 Applicability

Any new development or additions to existing buildings which result in new dwelling units or in any new non-residential buildings square footage are subject to impact fees.

Impact fees shall be calculated based on the total gross square footage of the principal use. Per the submitted plans, the fees are:

SF of Project 3,483

Department	<u>Residential</u>	
	Rate	Fee
Traffic	0.224	780.19
Fire	0.253	881.20
Police	0.051	177.63
Parks	0.848	2,953.58
Library	0.525	1,828.58
Schools	1.095	3,813.89
Total	2.996	\$ 10,435.07

Affirmative finding as conditioned.

Section 3.3.8 Time and Place of Payment

Impact fees must be paid to the city's chief administrative officer / city treasurer according to the following schedule:

- a) *New buildings: Impact fees must be paid at least seven days prior to occupancy of a new building or any portion thereof.*

Affirmative finding as conditioned.

Article 4: Zoning Maps and Districts

Section 4.4.5 Residential Districts

(a) 5. *The **Residential High Density (RH)** district is intended primarily for high density attached multi-family residential development. Development is intended to be intense with high lot coverage, large buildings, and buildings placed close together. Parking is intended to be hidden either behind or underneath structures.*

The property currently contains a 13 unit apartment building, and the applicant proposes adding 4 additional units in a new building addition. While some shuffling around of parking spaces will occur, the total number of existing spaces will remain, located at the rear and side of the structure.

Affirmative finding.

(b) Dimensional Standards and Density

Table 4.4.5-1 Minimum Lot Size and Frontage; RL, RL-W, RM and RM-W

The property is zoned RH, where minimum lot size and frontage are not required. **Not applicable.**

Table 4.4.5-2 Base Residential Density

Proposed unit total: 17 / (33,261 lot size / 43,560 acre) or 17 / .8 = 21.25; < 40 units per acre limitation. The proposal complies with the base residential density of the RH zoning district.

Affirmative finding.

Table 4.4.5-3 Residential District Dimensional Standards

Zoning District	Max. Lot Coverage ¹	Setbacks ^{1, 3, 4, 5, 6}				Max. Height ¹
		Front ²	Side ³	Rear	Waterfront	
RH	80%	Min/Max:	Min:	Min:	NA	35-feet

Zoning District	Max. Lot Coverage ¹	Setbacks ^{1, 3, 4, 5, 6}				Max. Height ¹
		Front ²	Side ³	Rear	Waterfront	
		Ave of 2 adjacent lots on both sides +/- 5-feet	10% of lot width Or ave. of side yard setback of 2 adjacent lots on both sides Max required: 20-feet	25% of lot depth but in no event less than 20' Max required : 75-feet		
323-325 College Street	74.3%	Average front yard setback is 30 ft. Proposed front yard setback is 30 ft.	Lot width: 137 ft = 13.7' side yard setback. Proposed side yard setback (west): 24 ft.	N/A	N/A	36' 7 1/2" to roof deck; 38' 11 1/2" to top of parapet. See Sec. 5.2.6 (a) (2) (A) & Sec. 5.2.6 (c) (6) which allows for height greater than 35'.

Affirmative finding.

(c) Permitted and Conditional Uses

Multifamily dwellings are permitted uses in the RH zoning district. **Affirmative finding.**

(d) District Specific Regulations

1. *Setbacks*

No setback encroachments are proposed or sought. **Not applicable.**

2. *Lot Coverage*

No exceptions to lot coverage are included or sought. **Not applicable.**

3. *Accessory Residential Structures and Uses*

No new accessory structures or uses are proposed. **Not applicable.**

4. *Residential Density*

A. *Additional Unit to Multi-Family*

Not Applicable.

B. *Additions to Existing Residential Structures*

Not Applicable.

C. *Residential Occupancy Limits*

The occupancy of all units on the property is limited to members of a family as defined in Article 13. Any divergence from the limitations of functional family and occupancy of more than four unrelated adults is subject to Conditional Use Review and approval by the DRB.

Affirmative finding as conditioned.

5. *Uses*

There is no Neighborhood Commercial Use at this location. **Not applicable.**

6. *Residential Development Bonuses*

No development bonuses are included or sought. **Not applicable.**

Article 5: Citywide General Standards

Section 5.2.3 Lot Coverage Requirements

See Table 4.4.5-3, above. **Affirmative finding.**

Section 5.2.4 Buildable Area Calculation & Steep Slopes Overlay District

This provision only applies to properties 2-acres or greater in size, and in the RCO, WRM, RM, WRL, and RL zoning districts. Also, there are no steep slopes present on the property. **Not applicable.**

Section 5.2.5 Setbacks

(a) Setbacks Required

See Table 4.4.5-3, above. **Affirmative finding.**

(b) Exceptions to Yard Setback Requirements

5. Accessory Structures and Parking Areas

Accessory structures no more than fifteen (15) feet in height, parking areas, and driveways may project into a required side and rear yard setback provided they are no less than five (5) feet from a side or rear yard property line where such a setback is required.

Portions of the existing parking layout encroach into the 5 ft side/rear yard setback areas. This existing condition has been recognized through previous zoning permits, and is considered existing, nonconforming. No additional infringement into the side/rear yard setbacks will occur because of this development. **Affirmative finding.**

Section 5.2.6 Building Height Limits

(a) Height Measurement

(2) (A) Flat Roof: the highest point of the decking of a flat or flat-topped roof mansard roof. A parapet no taller than four (4) feet shall not be considered part of a flat roof for the purposes of measuring building height.

The plans include a parapet that rises 2' 4" above the roof deck. The roof deck itself is at the maximum height allowance, as explained in Subsection C *Exceptions to Height Limits* below.

Affirmative finding.

(c) Exceptions to Height Limits

6. The administrative officer may allow for up to a 5% variation in the maximum building height to account for grade changes across the site. In no event however, shall such additional height enable the creation of an additional story beyond the maximum permitted.

In and around the footprint of the proposed addition, the grade changes between 258' and 252' in elevation (approx.). As a result, a 5% variation in the maximum building height is allowable. The RH zone sets 35' as the maximum building height allowed. With the 5% variation, the maximum building height increases to 36.75'. The proposed building height to the roof deck is 36' 7 ½", and meets the 5% variation to the 35' maximum building height. And as noted above, a parapet extends 2' 4" above the roof, which is permissible. **Affirmative finding.**

Section 5.2.7 Density Calculations

See Table 4.4.5-2, above. **Affirmative finding.**

Section 5.3.5 Nonconforming Structures

(a) Changes and Modifications

Any change or modification to a nonconforming structure, other than to full conformity under this Ordinance, shall only be allowed subject to the following:

- 1. Such a change or modification may reduce the degree of nonconformity and shall not increase the nonconformity...*

Many existing parking spaces extend into the 5 ft side/rear yard setback areas. These have been acknowledged as existing nonconformities in previous zoning permits, documented on associated site plans. No new infringement into the side/rear yard setbacks are proposed. **Affirmative finding.**

Section 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.

(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 existing Goodrich/Hagar historic structure at 325 College Street remains residential, as it was originally constructed. **Affirmative finding.**

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.*

Although no physical changes are proposed for the historic Goodrich/Hagar house (325 College St), the entire building mass at 323 College Street is an addition to that building (ZP 11-0086CA/MA). The increased setback reflected in the existing conditions plan was deliberate, so the new building mass would be appropriately deferential to the historic home. This new plan eliminates that purposeful setback, removing the intentional space before the 323 residential addition and changing the spatial relationship between the two building ell.

This new project was reviewed by the DAB on January 11, 2022 DAB (under expired permit ZP-21-778) where they recommended that the top floor of this new addition be set back so that it does not extend past the front of the historic structure. The plans were revised as part of this new application to comply with that recommendation, and the DAB subsequently voted to recommend approval of the application at their July 26, 2022 meeting. However, even with the top floor recessed to match the Goodrich/Hagar house's front setback, the lower floors still project closer to the street and visually minimize the historic building, thus altering the spatial relationship of the historic structure's streetscape. **Affirmative finding per DAB recommendation.**

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.*

While no conjectural features are proposed, the elimination of the intentional setback of the 2010 building addition changes the relationship to the historic structure. However, as noted above, the design of the building was revised to setback the top floor of the new addition to accommodate the DAB's concern that views of the historic building would be blocked. That top floor setback alleviates some, but not all, of the new addition's view-blockage of the historic structure on site. **Affirmative finding per DAB recommendation.**

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

The 2010 addition has not acquired historic significance in its own right. **Not applicable.**

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

The Goodrich/Hagar house will not be altered because of this proposal. The 2010 building addition does not include any particular craftsmanship, feature, finishes or construction techniques requiring preservation. **Affirmative finding.**

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.

No deteriorated historic building features are proposed for replacement. **Not applicable.**

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.

Not applicable.

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

There are no identified archaeological resources at this location. If project development reveals any resources, construction will cease until appropriate authorities assess, evaluate, and assign appropriate disposition of them. **Affirmative finding.**

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.

The 2010 approval for the 8 unit addition was very intentional in setting the building mass back from the street and allowing the historic structure to retain prominence. This proposal will be differentiated from the old in terms of design; however much of the new addition's siding will be brick – which matches the siding of the existing historic structure. The building massing, while similar in scale and size (to the 2010 addition), steps boldly toward the street and in its location the potential to diminish the importance and the physical ability to view the 1832 structure. Were this project proposed on a separate, abutting lot, the prominence and modern vocabulary of the new work would be easily interpreted. But this remains an addition, appended to a listed historic property. The DAB took this into consideration and recommended that the top floor of the new addition be setback so that it does not extend past the front of the historic structure to preserve somewhat of a view to the Goodrich/Hagar House. While there is a mild grade change between the historic structure and the new addition, the bottom three floors (that extend forward of the historic structure) will still block views of the historic structure from the west, as demonstrated in the elevation and color schemes plans. **Affirmative finding per DAB recommendation.**

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.

It is possible to imagine that if the entire westerly addition were removed, the 1832 Goodrich/Hagar house would retain its integrity. **Affirmative finding.**

Section 5.4.9 Brownfield Remediation

Not applicable.

Section 5.5.1 Nuisance Regulations

None identified. **Affirmative finding.**

Section 5.5.2 Outdoor Lighting

The applicant proposes wallpack light fixtures at both entrances. Spec sheets have been provided, which indicate compliance with the lighting standards of this section. The elevation plans will have to be updated to include the light fixture at the north entrance. **Affirmative finding as conditioned.**

Section 5.5.3 Stormwater and Erosion Control

While part of the review for previous zoning permit (ZP21-0329CA – withdrawn), an Erosion Prevention and Sediment Control plan and a Stormwater plan was approved on November 17, 2020. The addition's footprint and associated site improvements do not appear to differ between the 2020 EPSC approval and this new application. However, confirmation from the Stormwater Program Manager must be received prior to the release of this zoning permit, acknowledging that the 2020 EPSC approval remains effective. Otherwise, new EPSC and stormwater plans must be submitted for review and approval. **Affirmative finding as conditioned.**

Section 5.5.4 Tree Removal

The plans indicate that one birch tree will be removed to accommodate the new structure. **Affirmative finding.**

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:

Plan Sv-1 shows a birch tree in the location of the proposed addition which will be removed. No other alterations to natural features are included. **Affirmative finding.**

(b) Topographical Alterations:

The applicant includes a plan for minor grading to accommodate the addition. The site grading and utility plan are C2.01. **Affirmative finding.**

(c) Protection of Important Public Views:

There are no protected public views from or through this property. **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 above. **Affirmative finding.**

(e) Supporting the Use of Renewable Energy Resources:

There is no mention of renewable energy resources in the application. At the very least, and in support of Burlington's renewable energy goals, it is recommended that infrastructure (conduit) be provided to accommodate a future solar installation. **Affirmative finding.**

(f) Brownfield Sites:

The site is not listed on DEC's Brownfield site list. **Not applicable.**

(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.

The City's stormwater engineering staff approved an EPSC/Stormwater plan on November 17, 2020. This approval was based on the plans submitted under ZP21-0329CA, and may remain adequate for this proposal since there are no changes in ground disturbance or lot coverage for this re-application. The applicant will need to verify with the Stormwater Program Manager whether an updated EPSC/Stormwater plan will be required.

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.

Doors are illustrated on both the north and west elevations (Plan A2), each of which include a canopy above. The applicant provided a snow management plan with previous applications, which remains the same and involves trucking snow off-site. **Affirmative finding as conditioned.**

(h) Building Location and Orientation:

The new addition is appended to the 2010 building addition; prominently facing the street and drawing up to a setback line as established by averaging two adjacent properties on either side. In location and orientation, it fills in the street wall. **Affirmative finding.**

(i) Vehicular Access:

The property has a driveway with two curb cuts onto College Street that circles around the existing building (entrance - eastern driveway; exit - western driveway). Zoning Permit 19-0203CA further confirmed this clock-wise circulation path, with additional traffic flow from 308 Main Street through the site south-to-north (through the SW corner of the subject lot). This circulation pattern will remain. **Affirmative finding.**

(j) Pedestrian Access:

A walkway is illustrated from the public sidewalk on College Street to the new entrance on the street facing side of the addition (Plan C1.01.) The westerly entrance directly abuts the driveway, and between two parallel parking spaces. The plans indicate this to be an accessible entrance with pavement marking to differentiate between pedestrian and vehicular areas. All other pedestrian access will remain as existing. **Affirmative finding.**

(k) Accessibility for the Handicapped:

As originally approved, the building remains handicap accessible from the southerly entrance. One handicap parking space is identified on the site plan nearest to the southerly entrance. The building inspector has jurisdiction for the compliance of ADA standards. **Affirmative finding.**

(l) Parking and Circulation:

Vehicular circulation had been previously approved in a clock-wise pattern; entering from the easterly drive and circulating around the rear of the existing structure, and out the westerly drive. In addition, the parking plan for 308 Main Street (8 residential units) allows for that traffic to move through this site from south to north. The drive width of 10' on the western side of the building should be adequate for most residential vehicles, but potentially challenging for trash haulers accessing the dumpster in the southeastern corner of the lot.

ZP-19-0203CA identified 34 on-site parking spaces for the 13 units. While 3 spaces will be relocated on the site, there will be no change to the total number of spaces. The property also has a shared parking agreement with 308 Main Street, which will remain in effect. Both 323-325 College Street and 308 Main Street are within the Multi-Modal Mixed Use Parking District (adopted 9.14.20), which eliminates parking requirements for those properties with street frontage on major thoroughfares to a depth of 200'. Therefore, there are no new parking requirements with the addition of four new residential units. **Affirmative finding.**

(m) Landscaping and Fences:

A landscape plan has been provided that includes a mixture of shrubs and grasses, along with 1 hardwood and 1 softwood tree. No new fencing is included, however a new 3ft tall retaining wall (with top railing) will be constructed at the front of the property, and an existing retaining wall near the east property line will be slightly adjusted to make room for a wider driveway width. **Affirmative finding.**

(n) Public Plazas and Open Space:

No public plazas are proposed. There is, however, some open space in the front yard for tenant use. **Affirmative finding.**

(o) Outdoor Lighting:

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

The applicant proposes wallpack light fixtures at both entrances. Spec sheets have been provided which indicate compliance with the lighting standards of Sec. 5.5.2. The elevation plan shall be updated to show the location of the exterior fixture at the north entrance. **Affirmative finding as conditioned.**

(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.

The existing dumpster is in the southeast corner of the parcel. Mailboxes will be in the residential entry lobby on the south as previously approved.

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.

The applicant notes that all mechanical units will be inside. **Affirmative finding.**

Part 3: Architectural Design Standards

Sec. 6.3.2 Review Standards

(a) Relate development to its environment:

1. Massing, Height and Scale:

This addition will be appended to the historic structure's 2010 addition, maintaining that addition's height and width. It will also maintain the common front yard setback of structures on neighboring properties. **Affirmative finding.**

2. Roofs and Rooflines.

The front portion of the new addition will be three stories tall, and the rear portion will be four stories tall to match the 2010 addition. Both sections of roof are flat, consistent with the existing addition. **Affirmative finding.**

3. Building Openings

Window openings are symmetrically arranged; in 2 columns on the north and east elevations, and slightly differentiated columns on the west elevation in accordance with the building and unit layouts. New entrances are figured on the north and west elevations. **Affirmative finding.**

(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. **Affirmative finding.**

(c) Protection of Important Public Views:

Not applicable.

(d) Provide an active and inviting street edge:

Although similar to the existing addition approved in 2010, the new addition removes the blind entrance at the 2010 addition's lower level with a relocation of entrances to the west and north sides. **Affirmative finding.**

(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.

The addition will be sheathed in a combination of brick, fiber cement boards, and stone. Windows will be of a fiberglass material, and doors are unknown at this time. Spec sheets for all exterior doors will be required. Essentially, a variety of window/door types are acceptable for new construction. **Affirmative finding as conditioned.**

(f) Reduce energy utilization:

All new construction is required to meet the Guidelines for Energy Efficient Construction pursuant to the requirements of Article VI. Energy Conservation, Section 8 of the City of Burlington Code of Ordinances.

New structures should take advantage of solar access where available, and shall undertake efforts to reduce the impacts of shadows cast on adjacent buildings where practicable, in order to provide opportunities for the use of active and passive solar utilization.

At the very least, the addition should be constructed toward the inclusion of solar utilization in the future by incorporating conduit within the plan. **Affirmative finding as conditioned.**

(g) Make advertising features complementary to the site:

No signage is proposed. **Not applicable.**

(h) Integrate infrastructure into the building design:

See Section 6.2.2. (p), above. **Affirmative finding.**

(i) Make spaces secure and safe:

Construction shall comply with all required building and life safety codes as determined by the building inspector and fire marshal.

Building entrances/entry points shall be visible and adequately lit, and intercom systems for multi-family housing should be incorporated where possible, to maximize personal safety.

Both entrances are proposed to have exterior light fixtures (although lighting at the north elevation entrance needs to be included on the plans). **Affirmative finding as conditioned.**

Article 8: Parking

Sec 8.1.8 Minimum Off-Street Parking Requirements

The property is located within the Multimodal Mixed Use Parking District, where minimum parking requirements have been eliminated. There is, however, a maximum parking allowance. See Table 8.1.9 below. **Affirmative finding.**

Table 8.1.9 Maximum On-Site Parking Spaces

Multi-unit attached dwellings in the Multimodal Mixed Use Parking District have a maximum parking space allowance of 1 space per dwelling unit. In total, 323-325 College Street will have 17 units, and thus a maximum parking space allowance of 17 parking spaces. Currently, as documented on previously approved zoning permits, 34 parking spaces exist onsite. The existing parking count is allowed to remain as is, but no additional spaces can be allowed. The proposal calls for no additional parking spaces.

Since there are fewer than 10 new dwelling units created as part of this development, a Transportation Demand Management Plan will not be required. **Affirmative finding.**

Table 8.2.4-1 Bicycle Parking Requirements

Bicycle parking is required at the rate of 1 short term space per 10 units, and 1 long term space per 2 bedrooms. With 4 new units, and a total of 7 bedrooms, 1 short term space and 3.5 (4) long term spaces are required. The plans indicate 4 long term and 4 short term spaces at the southeast corner of the historic building. **Affirmative finding.**

I. Conditions of Approval

1. **At least 7 days prior to the issuance of a certificate of occupancy**, the applicant shall pay to the City Treasurer's Office or the Permitting and Inspections Department impact fees as calculated by staff based on the net new square footage of the proposed development. As submitted, Impact fees are:

SF of Project **3,483**

Department	<u>Residential</u>	
	Rate	Fee
Traffic	0.224	780.19
Fire	0.253	881.20
Police	0.051	177.63
Parks	0.848	2,953.58
Library	0.525	1,828.58

Schools	1.095	3,813.89
Total	2.996	\$ 10,435.07

Said fees **may be waived in whole or in part** based on the number of inclusionary housing units. Any waiver shall be substantiated by the Housing Trust Fund Manager and formalized with a letter of compliance from that office.

2. **Prior to the release of the zoning permit**, the applicant shall obtain a letter from the Dept. of Public Works confirming adequate water and sewer capacity.
3. **Prior to the release of the zoning permit**, confirmation from the Stormwater Program Manager that the Nov. 17, 2020 EPSC approval is still effective must be received; OR new EPSC and stormwater plans must be submitted and approved.
4. **Prior to the release of the zoning permit**, the following items shall be addressed on revised plans or submitted individually:
 - A light fixture at the north entrance.
 - Manufacturer's spec sheets for windows, doors, roofing material, mechanical units.
5. No certificate of occupancy for a project shall be granted unless and until a Certificate of Inclusionary Housing Compliance has been issued by the Housing Trust Fund Manager. For 7 net new units within the last 12 months that the applicant/developer has applied for, 1 IZ unit is required. Exercise of **Section 9.1.13 Off-Site and Payment in Lieu Options** shall meet the conditions and requirements of that Section, and be subject to confirmation of compliance by the Housing Trust Fund Manager.
6. It is recommended that infrastructure (conduit) be provided to accommodate a future solar installation.
7. All new construction is required to meet the Guidelines for Energy Efficient Construction pursuant to the requirements of Article VI. Energy Conservation, Section 8 of the City of Burlington Code of Ordinances.
8. Residential occupancy limits apply. The occupancy of all dwelling units is limited to members of a family as defined in Article 13. Not more than four unrelated adults may occupy any dwelling unit.
9. Should the applicant wish to alter the use, such alteration will require review and permitting under regulations in effect at that time.
10. The new units must comply with all building and life safety code as defined by the building inspector and fire marshal.
11. A State of Vermont wastewater permit is required.
12. Vermont Residential Building Energy Standards apply to this project. Compliance with the standards is the Owner's responsibility. Prior to requesting a Certificate of Occupancy, a copy of a completed Vermont Residential Building Energy Standards Certificate shall be submitted with a Certificate of Occupancy (final or temporary) request, and filed in the Land Records located at the Clerk/Treasurers office in City Hall (149 Church Street). For more information, see http://publicservice.vermont.gov/energy_efficiency.
13. Standard Permit Conditions 1-15.

Department of Permitting and Inspections

Zoning Division

645 Pine Street

Burlington, VT 05401

<http://www.burlingtonvt.gov/PZ/>

Telephone: (802) 865-7188

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



MEMORANDUM

To: Development Review Board

From: Mary O'Neil, AICP, Principal Planner

Date: November 15, 2022

RE: ZP-22-546 52 Institute Road (BHS BTC)

Note: These are staff comments only. Decisions on projects are made by the Development Review Board, which may approve, deny, table or modify any project. THE APPLICANT OR REPRESENTATIVE MUST ATTEND THE MEETING.

File Number: ZP-22-546

Zone: I- ICC/BHS (Institutional Core Campus Overlay District – Burlington High School Campus) **Ward:** 4

Date application submitted to Open Gov: October 4, 2022

Applicant/ Owner: Joe Weith, White & Burke / Burlington School District

Request: Demolish and remediate existing high school and construct new 250,000 square foot high school/technical center and greenhouse. Wood chip plant on far north of site to remain.

Request for bicycle parking waiver.



Background:

- **Zoning Sketch Plan Review ZSP-22-7**, Sketch Plan Review, demolish and rebuild high school/technical center. September 2022.
- **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.

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 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 and remediation of the existing high school and site, 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 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.***

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).

Recommended motion: Certificate of Appropriateness **Approval**, per the following Findings and Conditions:

I. Findings

Article 2: Administrative Mechanisms

Section 2.7.8 Withhold Permit

Per this standard, the applicant is required to remedy all violations and close out all zoning permits issued after July 13, 1989 prior to issuance of a Certificate of Occupancy for this permit. There are a number of zoning permits that require Certificates of Occupancy:

ZP-13-456 17126 – PROJECT...	Zoning Permit	Jun. 21, 2013	ACTIVE
ZP-13-289 17612 – PROJECT...	Zoning Permit	May. 1, 2013	ACTIVE
ZP-12-515 15407 – PROJECT...	Zoning Permit	Jul. 17, 2012	ACTIVE
ZP-11-436 26399 – PROJE...	Zoning Permit	Jun. 28, 2011	ACTIVE
ZP-09-102 13919 – PROJECT...	Zoning Permit	Mar. 17, 2009	ACTIVE
ZP-08-589 13660 – PROJECT...	Zoning Permit	Oct. 7, 2008	ACTIVE
ZP-08-529 3261 – PROJECT_...	Zoning Permit	Sep. 15, 2008	ACTIVE
ZP-08-455 5338 – PROJECT_...	Zoning Permit	Aug. 13, 2008	ACTIVE
ZP-06-17 3967 – PROJECT_...	Zoning Permit	Jan. 17, 2006	ACTIVE
ZP-06-14 874 – PROJECT_1...	Zoning Permit	Jan. 16, 2006	ACTIVE
ZP-04-612 3789 – PROJECT_...	Zoning Permit	Nov. 11, 2004	ACTIVE
ZP-04-411 9668 – PROJECT...	Zoning Permit	Jul. 25, 2004	ACTIVE
ZP-04-360 3780 – PROJECT_...	Zoning Permit	Jun. 29, 2004	ACTIVE

ZP-1999-363 31132 – PROJECT...	Zoning Permit	Jul. 13, 1999	ACTIVE
ZP-1998-550 23567 – PROJECT...	Zoning Permit	Oct. 4, 1998	ACTIVE
ZP-1998-16 38092 – PROJEC...	Zoning Permit	Jan. 20, 1998	ACTIVE
ZP-1997-423 31624 – PROJECT...	Zoning Permit	Aug. 19, 1997	ACTIVE
ZP-1996-399 35228 – PROJEC...	Zoning Permit	Jul. 17, 1996	ACTIVE

Affirmative finding as conditioned.

Article 3: Applications, Permits and Project Reviews

Part 3: Impact Fees

Section. 3.3.2 Applicability

*Any new development or additions to existing buildings which result in new dwelling units or in **new nonresidential buildings square footage are subject to impact fees** as is any change of use which results in an added impact according to Sec. 3.3.4.*

The proposed new gross area (253,865 sq. ft.) is less than the existing gross floor area (255,600 sq. ft). Unless plan revisions increase the gross floor area, no Impact Fees will be assessed.

Affirmative finding.

Part 5: Conditional Use and Major Impact Review

Section 3.5.2 Applicability

(a) Conditional Use Review

Within the BHS overlay, (Section 4.5.2 4. Uses, School, - Secondary and School-Trade or Professional) are permitted uses. **Affirmative finding.**

(b) Major Impact Review

Major Impact Review shall be required for the approval of all development involving any one or more of the following:

Institutional: A development footprint of twenty thousand (20,000) s.f. or more, or the creation of forty thousand (40,000) s.f. or more of gross floor area.

Section. 3.5.3 Exemptions

Major Impact Review shall not be required for applications involving one or more of the following:

(e) Projects where the scope and authority of municipal regulation is limited by statute pursuant to 24 VSA 4413.

Development at Burlington High School is exempt from Major Impact Review under § 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.*

Affirmative finding.

Article 4: Zoning Maps and Districts

Section 4.4.4 Institutional District

(a) *The Institutional District (I) as illustrated in Map 4.4.4-1 allows for increased development scale and intensity than would typically be found in the adjacent residential districts to support continued growth and flexibility of the city's major public and higher education and health care institutions within their respective institutional missions. New development is intended to be sensitive [to] the historic development pattern of the existing campuses as well as the surrounding residential neighborhoods.*

The district is intended to support a broad range of related uses reflecting the residential institution's roles as either regional education, healthcare, cultural and research centers or municipal educational facilities. Buildings should be designed with a high level of architectural detailing to provide visual interest and create enjoyable, human-scale spaces. Sensitive transitions between adjacent lower scale residential and open space areas and larger scale institutional development should be provided. Sites should be designed to be pedestrian friendly and encourage walking between buildings. Where parking is provided onsite, it is intended to be hidden behind, to the side, within, or underneath structures.

Section 4.5.2 Institutional Core Campus Overlay Districts

(b) Areas Covered

6. *Burlington High School Campus (BHS) is intended to provide for increased development scale and intensity than would typically be found in the adjoining and*



underlying districts to facilitate the long-term use of this site as the city's public high school, and a hub of educational and athletic uses and other district services. Buildings are designed with architectural detailing to provide visual interest and create an enjoyable human-scale experience, both within its internal circulation and in relation to the surrounding neighborhood, with the majority of parking to be located behind, to the side, within or underneath structures particularly with respect to frontage along North Avenue. Development should reflect the district's core educational values in both design and quality.

(h) District Specific Regulations: Burlington High School Campus (BHS)

1. Lot Coverage

Maximum lot coverage shall be applied to the aggregate of all lots located within the ICC-BHS District. Lot coverage shall not exceed 60%.

The proposed lot coverage for both parcels combined (north and south sides of Institute Road) is 27.35%; far less than the 60% lot coverage limitation. A late plan revision to include an access road for Stormwater maintenance is anticipated to minimally increase that number, but lot coverage remains far below the 60% limitation. **Affirmative finding as conditioned.**

2. Setbacks

A minimum 20 ft. front yard setback shall be applicable along North Avenue, and a 20 ft. minimum front yard setback along Institute Road. A minimum side setback of 10ft and a minimum rear setback of 20 ft. shall apply only along the perimeter of the ICC-BHS District.

The proposed setback from North Avenue is 318 feet, and 124 feet from Institute Road. (Plan C2.0 as revised.)

The irregular parcel boundaries of the two distinct lots create unique side boundaries. With front yard setbacks defined, and the remaining perimeter boundaries of the overlay, there are no rear yard setbacks. All buildings are placed the minimum 20' for Front Yard and Perimeter setback requirement.

Within the ICC-BHS district, School-Post Secondary & Community College, School-Secondary, School-Primary, School-Preschool (see Section 5.4.1) and School-Trade or Professional are permitted. When part of the educational program associated with a School Use or when hosted within a School facility, the following uses are also permitted:

<u>Permitted Uses:</u>	
<u>Automobile Body Shop</u>	<u>Museum Small</u>
<u>Automobile/Vehicle Repair</u>	<u>Museum Large</u>
<u>Café</u>	<u>Performing Arts Center</u>
<u>Community Center</u>	<u>Performing Arts Studio</u>
<u>Community Garden</u>	<u>Recreational Facility- Indoor</u>
<u>Conference Center</u>	<u>Recreational Facility- Outdoor</u>
<u>Composting</u>	<u>Recycling Center- Large</u>
<u>Daycare (See Sec. 5.4.1)</u>	<u>Recycling Center- Small</u>
<u>Health Club</u>	<u>Research and Development Facility</u>
<u>Library</u>	<u>Research Lab</u>
	<u>Park</u>

As would be anticipated, the redeveloped school will include a library, a 750 seat Auditorium/ performance space, a 12,000 sf gymnasium plus a 5,500 sf community gym, athletic facilities (including outdoor recreational facility with seating, and multiple technical / training program spaces.) All are permitted uses in this ICC-BHS overlay. **Affirmative finding.**

Article 5: Citywide General Regulations

Section 5.1.1 Uses

Previous to Zoning Amendment ZA 22-05, School-Secondary and School-Technical were not permitted uses in the RCO-RG zoning district. As the use was pre-existing / non-conforming, it could continue.

As a result of zoning amendment ZA-22-05 that re-zoned the BHS parcel, Post-Secondary & Community College, School-Secondary, School- Primary, School-Preschool and School-Trade or Professional are permitted. Additionally, all uses listed in the above table are permitted uses. **Affirmative finding.**

Section 5.2.1 Existing Small Lots

Not applicable.

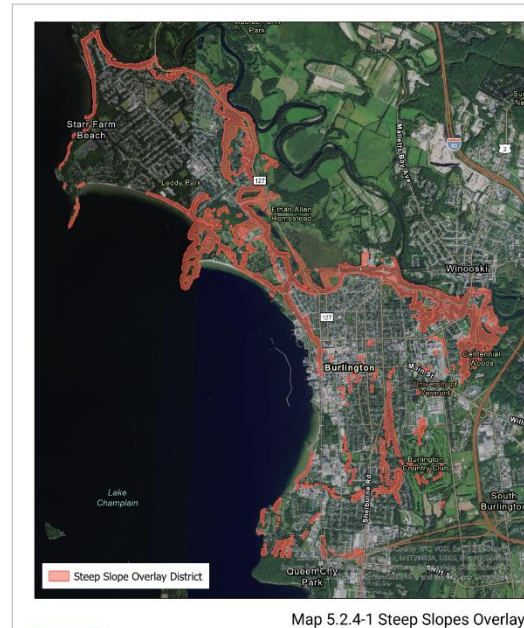
Section 5.2.2 Required Frontage or Access

52 Institute Road has frontage on both North Avenue and Institute Road, with vehicular access from the latter. The primary façade will front Institute Road, however the North Avenue elevation presents a distinct and welcoming expression. **Affirmative finding.**

Section 5.2.3 Lot Coverage Requirements

See Section 4.5.2 (h) 1, above.

Section 5.2.4 Buildable Area Calculation



(a) For any properties two (2) or more acres in size within any RCO, WRM, RM, WRL, or RL zoning district, the maximum building density or lot coverage shall be calculated using the buildable area only. With a change of zoning district to Institutional (ICC-BHS), this standard no longer applied. Not applicable.

(b) **Steep Slopes Overlay District** (As adopted by City Council August 15, 2022)

This overlay district consists of all lands delineated in Map 5.2.4-1 – Steep Slopes Overlay District. This overlay district contains expanses of contiguous land with an average slope of 15% or greater over 50-foot intervals and adjacent lands within 50 feet of the top of slope.

The boundaries shown on the Steep Slopes Overlay Map may be supplemented or modified by examination of one or more of the following sources

by the Development Review Board whenever an application is submitted for review.

- Contour maps prepared from the most current orthophotography.
- On-site survey prepared by a registered professional engineer or surveyor.

The Zoning Administrative Officer or Development Review Board shall determine whether or not the Steep Slope Overlay District has been shown accurately on the application plans. The applicant may be required to revise the steep slope boundaries shown on the application plans.

The burden of proving the correct boundary shall be on the applicant, supported by engineering and/or surveying data or mapping.

1. District Specific Regulations

- A. The Steep Slope Overlay District shall be an overlay on all zoning districts. The regulations in the overlay are in addition to those regulations of the underlying zoning district.
- B. These regulations apply to applications within the Overlay District that include 400 square feet or more of earth disturbance.
- C. Finished slopes of all cuts and fills shall not exceed 30%, unless the applicant can demonstrate that steeper slopes can be stabilized and maintained adequately to the satisfaction of the ZAO or DRB in consultation with the City Engineer.

D. Any fills placed on a steep slope shall be properly stabilized and, when necessary, supported by retaining walls or other appropriate measures as approved by the ZAO or DRB in consultation with the City Engineer.

E. Finished grades shall be reasonably safe from slide, collapse, or similar failure as determined by the ZAO or DRB in consultation with the City Engineer.

2. Additional Application Requirements

A. A site plan prepared by a registered professional engineer or surveyor that accurately depicts the proposed development and related land disturbance relative to the Steep Slope Overlay District boundaries, with all pertinent information describing the proposal, and a topographical survey depicting existing and proposed contour lines at no greater than 2-foot intervals. The plan shall depict all proposed cut, fill, and grading.

B. A plan depicting the extent of proposed vegetation clearing.

3. Approval Condition

A. Prior to construction, the applicant shall provide a geotechnical analysis prepared and stamped by a professional geotechnical engineer that determines the suitability of the steep slope for development.



The BHS Campus includes areas identified on the Steep Slopes Overlay Map. 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 Steep Slopes analysis was prepared by an engineering firm (CEA);

the plan was forwarded to the City Engineer for consultation. **Affirmative finding as conditioned.**

Section 5.2.5 Setbacks

See Section 4.5.2 (h) 2, above.

Section 5.2.6 Building Height Limits

See Section 4.5.2 (h) 3, above.

Section 5.2.7 Density and Intensity of Development Calculations

There is no specific density or intensity of development provision provided under the ICC-BHS overlay. No dwelling units are proposed. **Affirmative finding.**

Part 3: Non Conformities

With warning and adoption of ZA 22-05, the existing non-conformities of use and general dimensional standards of the RCO zoning district have been eliminated. The new structure conforms to the use and dimensional standards provided for with the rezoned parcel and as defined in the amendment (ZA22-05). **Affirmative finding.**

Section 5.4.8 Historic Buildings and Sites

Not applicable.

Section 5.4.9 Brownfield Remediation

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.

Affirmative finding as conditioned.

Part 5: Performance Standards

Section 5.5.1 Nuisance Regulations

The proposed project will continue the existing use; however in more energy efficient buildings with upgraded infrastructure and improved pedestrian and vehicular parking facilities. No nuisance impacts are anticipated. **Affirmative finding.**

Section 5.5.2 Outdoor Lighting

Proposed landscaping and lighting for the project is depicted in the Landscape-Lighting Permit Set.

The lighting plan includes full cutoff fixtures. Fixtures D and E are at the maximum mounting height of 25'. Photometrics confirm compliance with parking lot light levels. A revised lighting plan was provided 11.14.2022 to adjust walkway lighting toward compliance. The light fixture and pole specifications and statistical area summary are included on Plans L-400 - L405.

Affirmative finding.

Section 5.5.3 Stormwater and Erosion Prevention

At Technical Review, a water resources representative recommended distributed stormwater management design, rather than all in one place. There was also a suggestion to incorporate a “blue” roof. A Stormwater and Erosion Prevention and likely a PCSW will be required for review by the Stormwater engineering division. Comments submitted to staff 10.27.2022 include:

Preliminarily the direction for stormwater treatment looks good. However, there is one component that is lacking and is important for a system that will require frequent maintenance, that of a maintenance access road providing access to the Inlet Headwall, forebay, and sand filter bays. The maintenance access should be comprised of a gravel subbase and may have a layer of seeded topsoil placed over the access road.

Continued review of these plan sets will take place in the WR office.

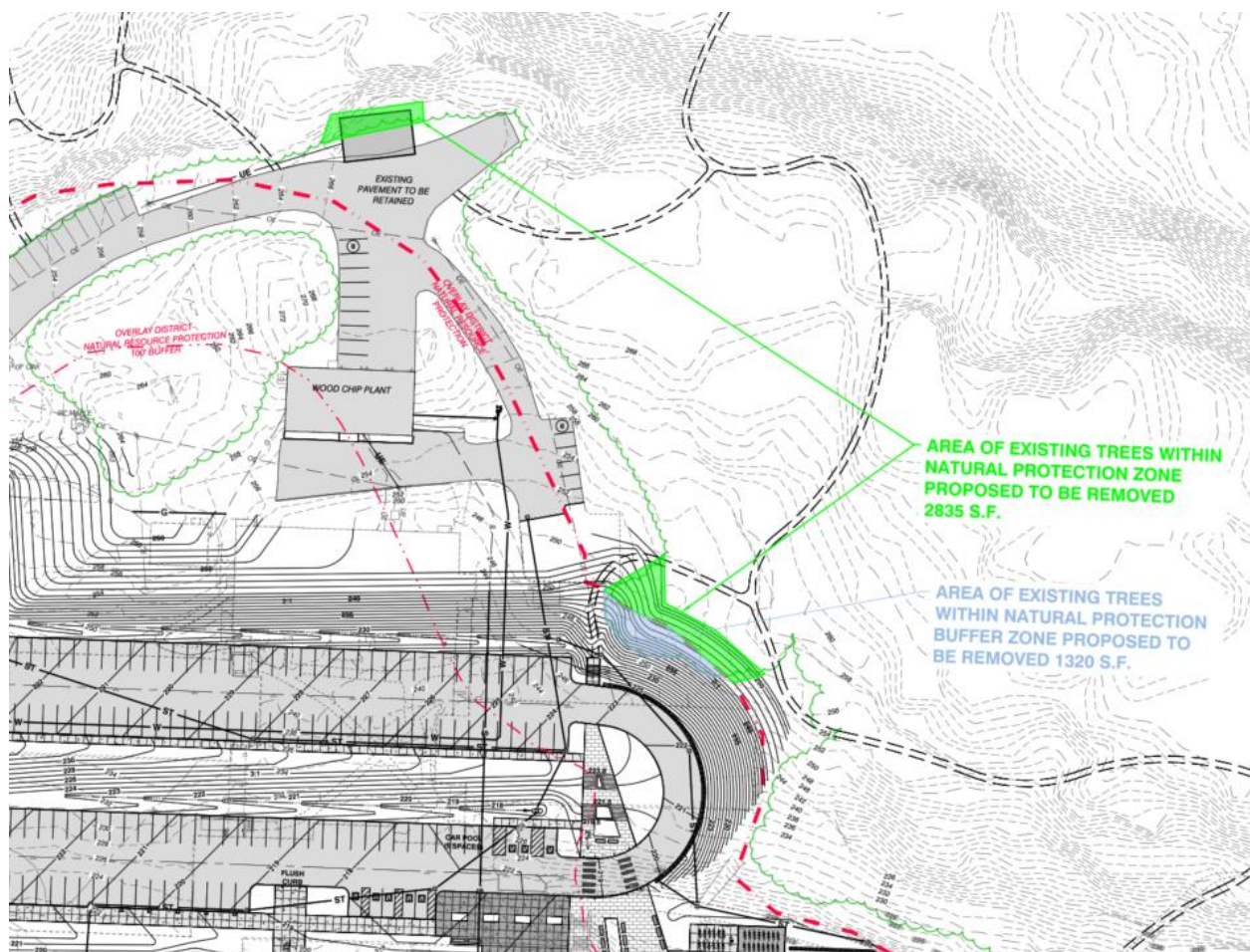
Any required revisions to the submitted plan must be forwarded to DPI and Water Resources unless specific conditions are imposed by the DRB. A revised plan was received 11.4.2022; see Plan C2.2.

Written approval by Water Resources and the Stormwater Program will be a condition of any permit.

Affirmative finding as conditioned.

Section 5.5.4 Tree Removal

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 at the far north of the site, and within 1,320 square feet of the Natural Resources Protection Buffer zone; an area northeast of the upper parking tray.



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.

The application was reviewed by the Conservation Board November 14, 2022 and their comments will be shared at the DRB hearing. **Affirmative finding as conditioned.**

Article 6: Development Review Standards

Part 1: Land Division Design Standards

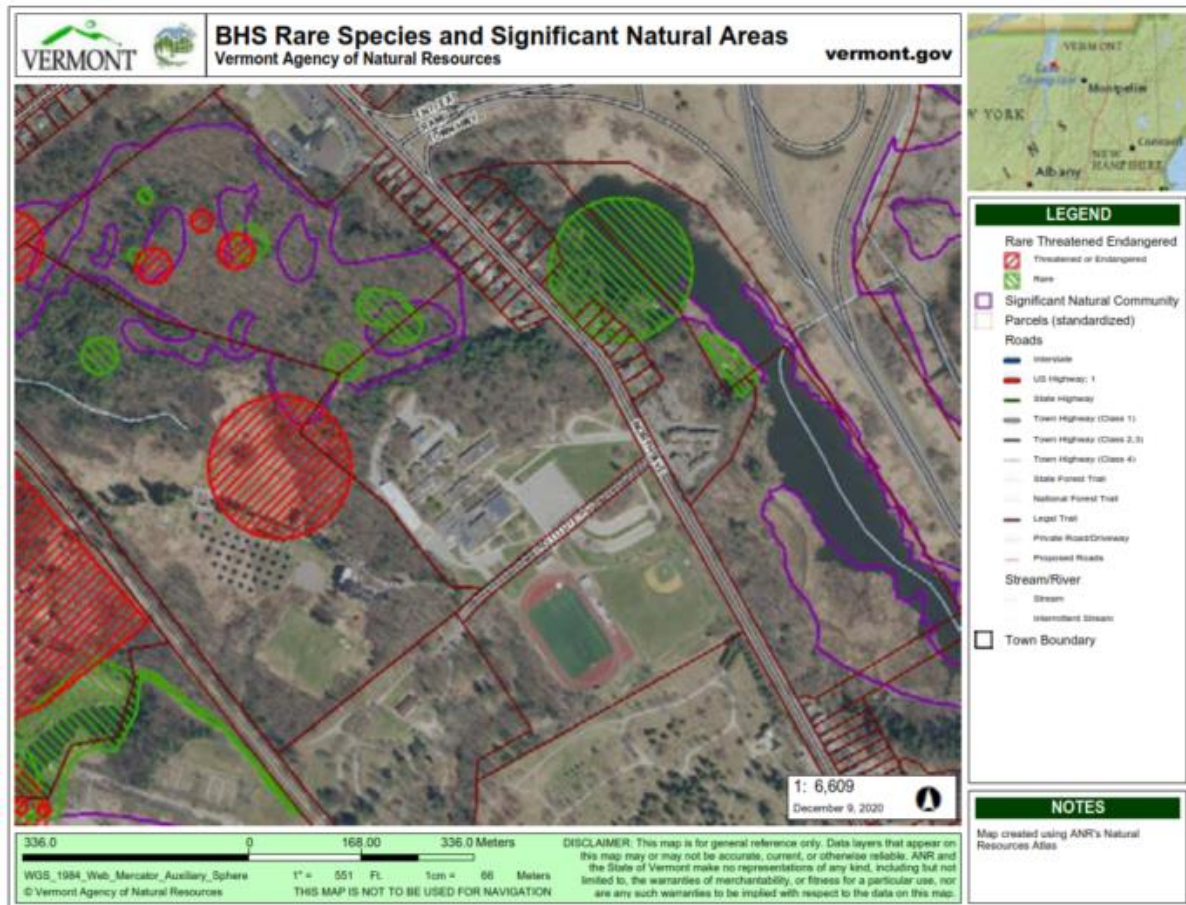
No land division is proposed. Not applicable.

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; provided in an earlier Skatch Plan Review and updated for this application. This analysis included a list of



identified plant and tree species, with mapping to indicate both rare and endangered species. 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.

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 Gilman & Briggs Environmental Plan will be reviewed by the Conservation Board November 14, 2022.

See information about steep slopes under 5.2.4 (b), above. **Affirmative finding as conditioned.**

(b) Topographical Alterations:

The redeveloped site will include limited sculpting to accommodate parking and access in regard to the inherent grade changes. Overall, the introduction of stormwater features will result in site modifications. The Stormwater Engineer has recommended installation of an access road to maintain the proposed Stormwater infrastructure. A revised plan C2.2 reflects that revision. See comments under Section 5.5.3, and Steep Slopes. **Affirmative finding as conditioned.**

(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 redevelopment plan intends to achieve LEED certification.

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. The project applicants 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. Recent site analysis has determined the presence of site contamination, which will be addressed within this project. The applicant has defined specific steps within the demolition scope of this application to ameliorate site materials and conditions, toward creating a Corrective Action Plan in step with Vermont DEC review. Reference is made to Section 5.4.9. **Affirmative finding as conditioned.**

(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 narrative defines the introduction of Stormwater Treatment; See comments from the Stormwater engineer under Section 5.5.3.

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.**

(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 building “front” is proposed on the north elevation. Redevelopment will continue to emphasize and enrich the existing orientation to the street. **Affirmative finding.**



(i)

North elevation, BHS proposed

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 on the west and north, and bus turnaround. **Affirmative finding.**

(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. **Affirmative finding.**

(k) Accessibility for the Handicapped:

A principal accomplishment of this redevelopment is to achieve access throughout the complex and across the campus. 10 HCParking is provided in the top two surface parking lots, and one near the (Institute Road) main entrance. Overall ADA access compliance is under the jurisdiction of Burlington's building inspector.

Affirmative finding as conditioned.

(l) Parking and Circulation:

No changes are proposed to the student lot(s) across Institute Road.

The north parcel (52 Institute Road) proposes 362 permanent parking stalls. The CDO provides a maximum limit for parking at 385 vehicular parking spaces, so the plan is compliant.

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

The parking on the south side of Institute Road is not proposed to be altered.

New surface parking at 52 Institute Road (north side of Institute Road) is proposed in two parking trays to the north/rear of the building (also beside the entrance to BTC). There are a limited number of parking spaces in the entrance arc along Institute Road; these are intended for short term and visitor parking. These parking spaces do not adhere to the *behind/next to/underneath* guidance, but at Sketch Plan Review the DRB found some facility considering the need for handicap and visitor parking in close proximity to the secured school entry.

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 has been provided.

Affirmative finding as conditioned.

(m) Landscaping and Fences:

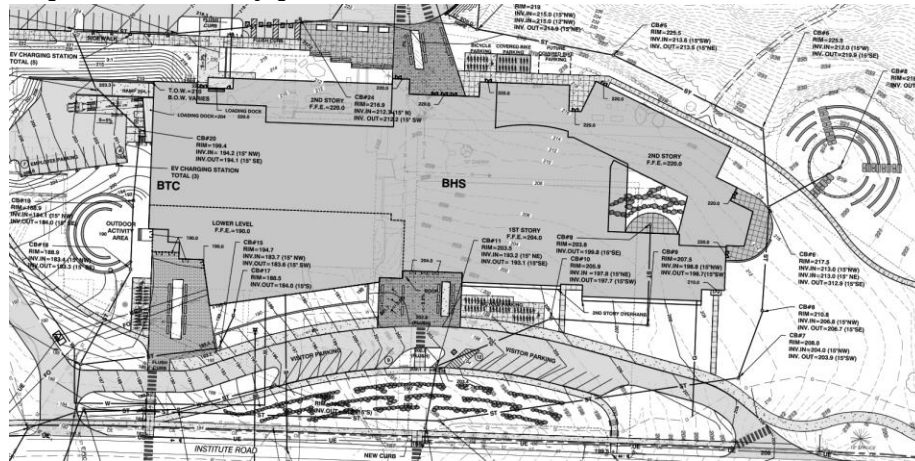
The applicant has submitted an updated version of the Gilman & Briggs plan relative to impacts to the natural areas. Landscaping plans are L4300-L305, and include a variety of deciduous and evergreen trees, as well as shrubs. The loading dock and dumpster area on the west end of the building will be screened by evergreen trees. The plant schedule is included.

The site is interconnected with walkways, seating walls, bicycle parking, meeting plazas and links to transportation paths; designed as a comprehensive whole.

Affirmative finding as conditioned.

(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 C2.0 and C2.1. Of course the existing athletic fields on the south side of Institute Road satisfy the need for active

Affirmative finding.

(o) Outdoor

Lighting:

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

A revised photometric plan was provided 11.14.2022 to adjust walkway lighting. See other comments under Sec. 5.5.2, above. **Affirmative finding.**

(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.

The slab and foundation walls of an existing greenhouse will be removed, and a new greenhouse will be constructed on the north/west of the site.

Underground electric utilities are required.

Dumpsters are located on the west near a loading dock. Anticipated as roll-off dumpsters with lids, they are self-contained and will be screened by evergreen landscaping.

Affirmative finding as conditioned.

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. **Affirmative finding.**

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. The 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 the BSD's plan to arrange for installation of solar PV by a third-party on the buildings' roof through a power purchase agreement. **Affirmative finding.***

(g) Make advertising features complementary to the site:

Any signage will require a separate sign permit.

(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. **Affirmative finding as conditioned.**

Article 8: Parking

Zoning Amendment ZA-22-05 re-assigned the parcel to the Multi Modal Mixed Use Parking District.

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	

As provided in the submitted Vehicle Parking Table, the maximum allowed number of parking spaces is 385 spaces (based on classrooms; 77 x 5); but the additional uses individually identified as associated with the secondary school could conceivably increase the maximum parking allowance to 1,275. The 362 parking spaces proposed, however, are compliant with the individual maximum allowance for Secondary School use.

Affirmative finding.

Sec. 8.1.16 Transportation Demand Management

(a) **Purpose:** *This section requires the implementation of a Transportation Demand Management (TDM) Program for certain projects for the purpose of advancing the goals of the City's land use and transportation plans, and promoting public health, safety, welfare, and protection of the environment by:*

- *Reducing parking demand;*
- *Reducing car ownership;*
- *Reducing vehicle miles traveled (VMT) and congestion; and,*
- *Increasing transit use and non-motorized travel;*

(b) **Applicability:** *A Transportation Demand Management Program shall be required for all projects located in the Multimodal Mixed Use Parking District (see Sec. 8.1.3(c)), and involving any one or more of the following:*

Dwelling Units	Creation of ten (10) or more dwelling units
Non-residential or Mixed Use Development	A building footprint of eight thousand (8,000) s.f. or more; or, the creation of fifteen thousand (15,000) s.f. or more of gross floor area.

For the redevelopment of BHS/BTC, a TDM is required.

(b) **Transportation Demand Management (TDM) Program:** *A TDM Program shall include each of the following elements at a minimum:*

a. Outreach and Education:

- i. *Designation of a Transportation Coordinator who directly, or indirectly through membership in a Transportation Management Association, shall be responsible for each of the following:*
 1. *Prepare and present informational and educational materials regarding available TDM strategies to all tenants and employees;*
 2. *Organize and host an annual meeting for all tenants and employees to present and discuss available TDM strategies, and opportunities for increased use and participation;*
 3. *Preparation and dissemination of an annual travel survey of all tenants and employees; and,*
 4. *Record-keeping and annual reporting to City of all TDM activities offered and rates of participation (including parking utilization if applicable).*

The TDM submitted from VHB (dated 9.22.2022) includes:

The ordinance requires assignment of a Transportation Coordinator who will be responsible for providing employees and students with information on TDM strategies during an annual meeting as well as on request. In addition, the Transportation Coordinator is required to prepare and disseminate an annual travel survey of employees and provide record keeping to the City.

The Burlington High School has committed that [REDACTED] will serve as the Transportation Coordinator. **THIS PERSON/OFFICE** will survey the employees yearly regarding mode choices and submit the findings to the City. **THIS PERSON/OFFICE** will also provide information on alternative modes and the ease of using them to travel to and from the site.

The identification of the responsible party will be required with the final TDM submission docs.

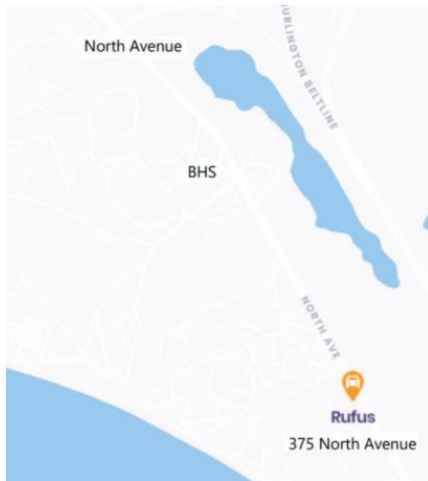
b. **TDM Strategies:** *In addition to compliance with the on-site Bicycle Parking requirements found in Article 8, Part 2, the following TDM strategies shall also be included at a minimum for a period of 10 years from receipt of a Certificate of Occupancy as follows:*

- i. *GMT Transit passes shall be provided to all tenants and employees for free for the first year of occupancy or employment, and at a minimum discount of 50% for every year thereafter; and,*
- ii. *A car share membership shall be offered to all tenants and employees for free for the first two years of occupancy or employment, and at a minimum discount of 50% for every year thereafter; or,*
- iii. *In lieu of i and ii above, maintain an ongoing and active membership in a Transportation Management Association (TMA) that offers equivalent TDM strategies or better.*

The ordinance requires GMT transit passes be provided to all employees and staff for free for the first year of occupancy and at a minimum discount of 50% for each year afterward. BSD will offer free transit passes to all staff at the high school. The Burlington School District works cooperatively with Green Mountain Transit (GMT) to provide bus transportation options for students traveling to and from school. At the Institute Road site, this includes School Tripper routes as well as Route 7. **Burlington High School students ride GMT busses fully subsidized, for free with their student ID.**

Green Mountain Transit offers bus routes referred to as "School Trippers" and the routes that include the current temporary downtown location of Burlington High School are, 334, 336, and 349. These routes have historically traveled from both the North End and South End to the Institute Road

The ordinance suggests offering a car share membership to all employees and staff. However, because Burlington High School and Technical Center is more aggressive in its subsidy of transit, and, as shown on the graphic below, there is currently one vehicle located 0.6 miles from the Burlington High School and Technical Center, employees that would like to occasionally participate in a carshare program, have that option within walking distance.



The TDM plan doesn't commit to membership In Carshare, as outlined in (b) above.

Parking Management: *Where on-site or off-site parking is also made available:*

- v. *Conduct parking utilization studies at least annually for a period of 10 years from receipt of a Certificate of Occupancy;*
- v. *With the exception of permanently affordable housing units, the cost of parking shall be un-bundled from all residential and non-residential leases and deeds and made available at a market rate;*
- i. *Where parking spaces are made available to off-site users, parking spaces may be made available by a renewable lease, provided the term of any lease does not exceed one (1) year; and,*
- vii. *Priority parking spaces - located in closest proximity to a primary building entrance and/or public street frontage - shall be made available for each of the following:*
 - 1. *Handicapped spaces;*
 - 2. *Bicycles, scooters, and motorcycles spaces;*
 - 3. *Car-share: where 1 space must be offered for every 20 residential units, not to exceed a total of 5 spaces, subject to an agreement with a car-share provider; and,*
 - 4. *Carpool and/or Vanpool vehicles: where more than 20 spaces are available for non-residential uses. In such cases, 5 spaces or 5% of the parking spaces on site, whichever is less, must be reserved for carpool/vanpool use before 9:00 AM on weekdays.*

Subsections ii., iii and iv 3. are not applicable for this redevelopment. (c) i. is required; iv. 2 is met. One van space is identified near the BTC entrance (Plan C2.1); however that is likely associated with delivering students to job sites. 5 carpool spaces are illustrated, as well, on Plan C2.1 (north parking area, near entrance plaza.) The applicant's TDM includes the following:

Per the Ordinance, Parking Utilization studies need to be conducted annually. The Project has committed to collect this data through the Transportation Coordinator and report the information when reporting on employee travel surveys.

Priority parking spaces closest to the primary building entrance are provided for handicapped parking, as well as bicycle, scooter and motorcycle, and carpool spaces. These spaces are each provided, as shown on the site plan. In addition to reducing auto trips by encouraging transit, the City of Burlington provides students and employees with many opportunities to access safe pedestrian and bike paths. Students and faculty can connect to paved bike routes along North Avenue or can easily connect to the Islandline Trail. This provides safe routes for students and faculty to be able to travel from the North End to the South End.

In order to determine the likely demand for bicycle parking, observations of bicycles parked around the current location of Burlington High School were made on three weekdays during Fall 2022. On these three good weather days (clear and warm), between 8 and 13 bikes were parked on the bike racks and an additional 12 to 17 bikes were attached to nearby objects. Taking the highest count, a total of 30 bicycles were counted. With enrollment currently at 979 students, demand can be calculated as 0.03 bicycles per student.

Were the new high school to reach its full capacity of 1594 students, we would anticipate demand for 48 bicycle parking spaces. **In order to further encourage cycling to the Institute Road site, in accordance with LEED standards, 136 bike parking spaces will be provided.**

- c. **TDM Agreement:** *Each TDM Plan shall include a signed commitment to and acknowledgement of each of the following on a form provided by the Administrative Officer:*
 - i. *Commitment to ongoing implementation of the TDM requirements as set forth above;*
 - ii. *Acknowledgement that the project has no claim to the ongoing availability of nearby on-street public parking, and that, as is the case with other on-street public parking, the City retains the right to charge for or remove such on-street parking at any time;*
 - iii. *Acknowledgement that failure to maintain transportation demand management as required above is a violation of this ordinance, and understanding that, pursuant to Sec. 2.7.8 of this ordinance, no zoning permit or certificate of occupancy may be granted until any such violation has been remedied; and,*
 - iv. *Commitment to notify any subsequent owners and tenants in writing of their obligations under this section as part of any purchase and sale and/or lease agreements.*

Review and Enforcement: *The Administrative Officer shall be responsible for determining compliance with the TDM Program requirements as set forth above, and ongoing implementation shall be included as a condition of any discretionary or administrative permit required for development subject to the conditions of this Section.*

Failure to maintain a TDM Program as required above shall be a violation of this ordinance, and pursuant to Sec. 2.7.8 of this ordinance no zoning permit or certificate of occupancy may be granted without a TDM Program in effect.

The Project is committing to this TDM plan and will provide the written documentation from the School Department committing to the ongoing implementation of the TDM requirements as set forth above; acknowledgement that the project has no claim to on street parking; acknowledgement that failure to maintain TDM as required is a violation of this ordinance and that no certification of occupancy be granted until any such violation has been remedied.

The submitted TDM plan lacks commitment to membership in a carsharing option as required under (b) ii above: *A car share membership shall be offered to all tenants and employees for free for the first two years of occupancy or employment, and at a minimum discount of 50% for every year thereafter.* The substitution of an active and ongoing membership in a Transportation Management Association will suffice.

The identification of the Transportation Coordinator or party responsible for annual reporting must be defined. **Affirmative finding as conditioned.**

Part 2: Bicycle Parking

Section 8.2.2

Bicycle parking requirements as set forth in this subpart shall apply to new development, changes in land use, and changes to a structure that cause an increase or decrease of 25% or greater in gross floor area, seating capacity, or number of dwelling units.

The new school facility will introduce approximately 253,900 sf of new development.

In this application, Burlington School District estimates future capacity at 1,594 students and 175 staff (1,769 total).

The requirement is:

Schools (6-12th grade) 1/20,000 sf **plus** 1/10 student population (Long Term) and
4/classroom (short term)

Rough staff calculations based on applicant estimates are:

13 (253,865/20,000) + 159 (1594/10) = 172 Long Term and

308 (4 x 77 classrooms) (Short term) for a total of **480 bike parking spaces.**

The applicant has included the following tables to compare ordinance-required parking, and minimum bicycle parking by LEED as well as observed bicycle parking:

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	

Although the building has been designed for a *maximum* population of 1,802 students, the estimated student capacity is 1,594 students (lower than existing) with 77 classrooms.

The applicant provides the following information for re-consideration of a bike parking waiver: *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.

Bicycle parking is illustrated as distributed across the campus; at main entrances (two areas of substantial bike parking on both Institute Road entrance locations, at the north plaza entrance and two areas of covered bike parking adjacent to those.) During the 2021 BHS application review, DPW requested that the DRB require 243 bike parking spaces, including 77 long term spaces and 166 short-term spaces as student capacity is not increasing.

The DRB approved that bicycle parking waiver request, which continues to make sense within this re-development application, particularly if included within the overall TDM plan.

Affirmative finding with DRB concurrence.

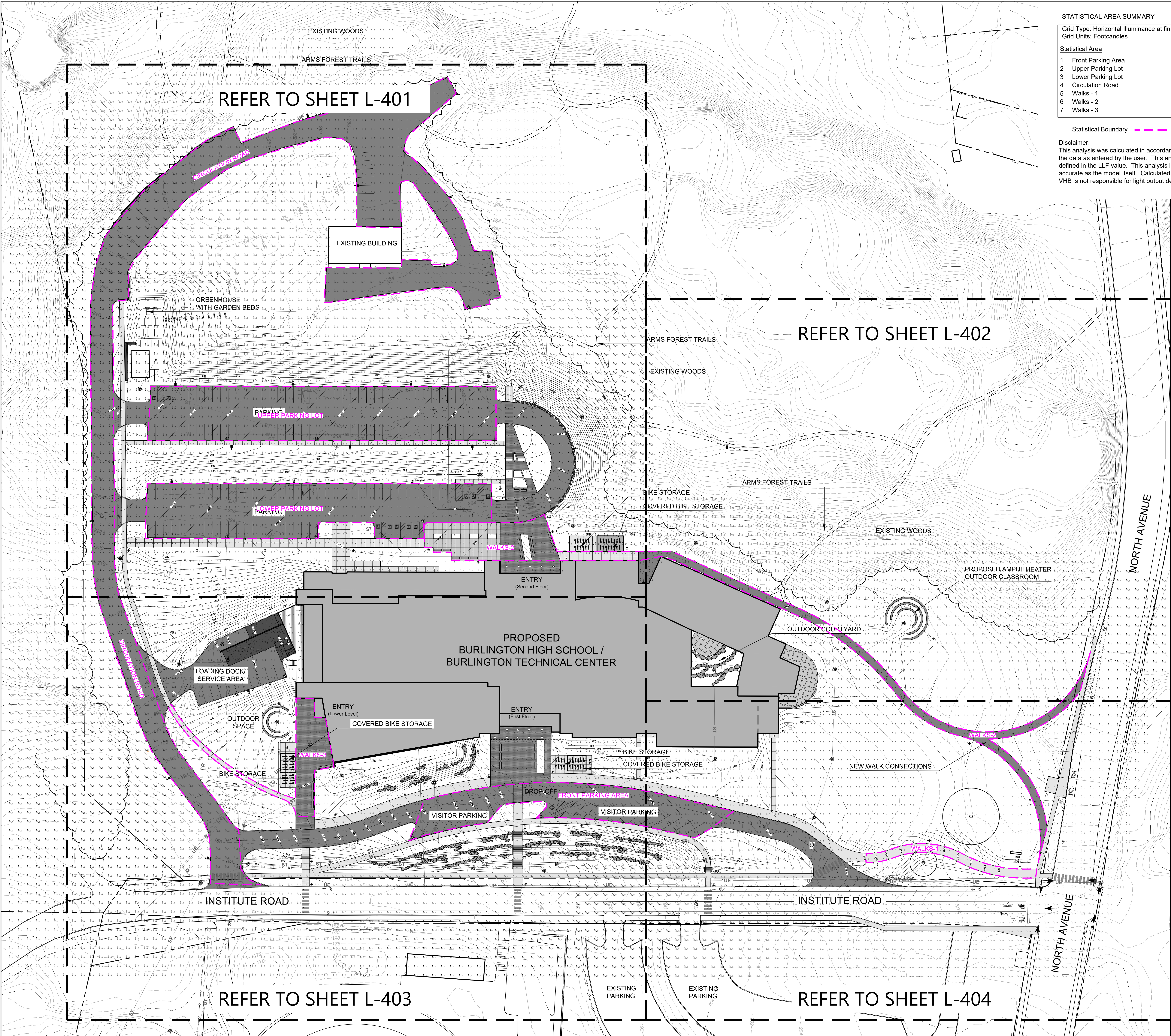
II. Conditions of Approval

1. Lot coverage shall be amended to reflect the addition of the Stormwater maintenance road, as appropriate.
2. **Per Section 2.7.8 Withhold Permit**, the applicant is required to remedy all violations and close out all zoning permits issued after July 13, 1989 prior to issuance of a Certificate of Occupancy for this permit. There are a number of zoning permits that require Certificates of Occupancy.
3. The applicant shall seek appropriate abatement, remediation, and a Corrective Action Plan, with concurrence of the Vermont Department of Environmental Conservation (VTDEC) for Sites Management, and any other EPA required notifications, closures, and disposal practices.
4. Prior to construction, the applicant shall provide a geotechnical analysis prepared and stamped by a professional geotechnical engineer that determines the suitability of the steep slope for development.
5. With DRB concurrence, the project will have a **four year permit life**. If the applicant team deems appropriate, a **phasing schedule** may accompany the application. This request should define the intended project segments and anticipated timing of each, which will, if approved by the DRB, allow for individual Certificates of Occupancy as each is completed.
6. The Stormwater Program will need an EPSC submitted as part of this effort. A Post Construction Stormwater Plan is likely.
Tor a system that will require frequent maintenance, a maintenance access road providing access to the Inlet Headwall, forebay, and sand filter bays is required. The maintenance access should be comprised of a gravel subbase and may have a layer of

seeded topsoil placed over the access road. The applicant shall work with Water Resources and the Stormwater Engineer for project review and approval.

7. If the Stormwater infrastructure crosses a property boundary, an easement may be required for installation of permanent infrastructure that impacts abutting property.
8. The number and arrangement of the accessible parking spaces will need review by the building official for compliance with ADA.
9. Parking is intended to be in the rear, side, within or underneath buildings in the Institutional zoning district (Section 4.4.4.) Parking spaces in front of the building shall be limited to handicap and short term visitor spaces.
10. As part of the **Transportation Demand Management Plan** (to identify, encourage, promote and support different modes of transit) a Transportation Coordinator shall be identified. Both requirements of 8.1.16 b) (b) i. and ii are required, unless the applicant *maintains an ongoing and active membership in a Transportation Management Association (TMA) that offers equivalent TDM strategies or better.*
11. With DRB concurrence in support of the request, a waiver of bicycle parking requirements are waived. (480 required by ordinance, 136 proposed.)
12. 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.
13. The Gilman & Briggs plan recommends limited tree clearing.
14. New electrical service shall be undergrounded.
15. Any conditions imposed by the Conservation Board.
16. Standard Permit Conditions 1-15.

NOTE: These are staff comments only. The Development Review Board, who may approve, table, modify, or deny projects, makes decisions.



STATISTICAL AREA SUMMARY

Grid Type: Horizontal Illuminance at finish grade.
Grid Units: Footcandles

Statistical Area	Avg	Max	Min	Avg/Min	Max/Min
1 Front Parking Area	1.39	3.90	0.20	6.95	19.50
2 Upper Parking Lot	2.01	3.40	0.30	6.70	11.33
3 Lower Parking Lot	1.54	3.20	0.20	7.70	16.00
4 Circulation Road	1.70	3.60	0.00	N.A.	N.A.
5 Walks - 1	0.71	1.80	0.10	7.10	18.00
6 Walks - 2	0.68	1.90	0.00	N.A.	N.A.
7 Walks - 3	0.79	1.90	0.20	3.95	9.50

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: Selux
Fixture: SACL - Saturn Cutoff LED
Optics: R3
Mounting: 1
Light Engine: 5G700
Color Temperature: 3,000K
Finish: SV (Silver)
Options: DM, PCT
Mounting Height: 16-feet
Voltage: 120-277V

Fixture B
Manufacturer: Selux
Fixture: SACL - Saturn Cutoff LED
Optics: R5R
Mounting: 1
Light Engine: 5G700
Color Temperature: 3,000K
Finish: SV (Silver)
Options: DM, PCT
Mounting Height: 16-feet
Voltage: 120-277V

Fixture C
Manufacturer: Selux
Fixture: SACL - Saturn Cutoff LED
Optics: R3
Mounting: 1
Light Engine: 5G450*
Color Temperature: 3,000K
Finish: SV (Silver)
Options: DM, PCT
Mounting Height: 16-feet
Voltage: 120-277V
* - Reduce output of approx. 45% factory setting

Fixture D
Manufacturer: Beacon Lighting
Fixture: VP-Micro Strike
LED Engine: Size 2 - 320L-145
Color Temperature: 3,000K
Distribution: Type 3
Configuration: Single
Finish: Black Matte Textured
Pole Height: 25-feet
Voltage: 120-277V

Fixture E
Manufacturer: Beacon Lighting
Fixture: VP-Micro Strike
LED Engine: Size 2 - 320L-145
Color Temperature: 3,000K
Distribution: Type 4 Wide
Configuration: Single
Finish: Black Matte Textured
Pole Height: 25-feet
Voltage: 120-277V

Fixture F
Manufacturer: Selux
Fixture: SACL - Saturn Cutoff LED
Optics: R3
Mounting: 1
Light Engine: 5G450*
Color Temperature: 3,000K
Finish: SV (Silver)
Options: DM, PCT
Mounting Height: Wall Mounted - 14-feet
Voltage: 120-277V
* - Reduce output of approx. 45% factory setting

Fixture G
Manufacturer: Prescolite
Fixture: LFR-6RD
Optics: Wide
Lumens: 1,000
Color Temperature: 3,000K
Mounting Height: Canopy Mounted
varies 8-feet to 12-feet

SCHEMATIC DESIGN

NOT FOR CONSTRUCTION

81 Maple Street • Burlington VT 05401
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Architects • Planners • Interiors

Colin Lindberg Architects
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vhb
Landscape Architecture
40 Oak Drive, Building 100
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 09/30/22
Staff Comments 11/11/22

SHEET CONTENTS:
OVERALL
LANDSCAPE
LIGHTING PLAN

SHEET NO:

L-400

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vhb

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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"=20'

DRAWN BY: JRD/MKW CHECKED BY: MKW

ISSUE LOG:
Zoning Permit 09/30/22
Staff Comments 11/11/22

SHEET CONTENTS:

LANDSCAPE LIGHTING PLAN

SHEET NO: L-401



SCHEMATIC
DESIGN

NOT FOR
CONSTRUCTION

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BURLINGTON
HIGH SCHOOL
&
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TECHNICAL
CENTER

BURLINGTON, VT

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

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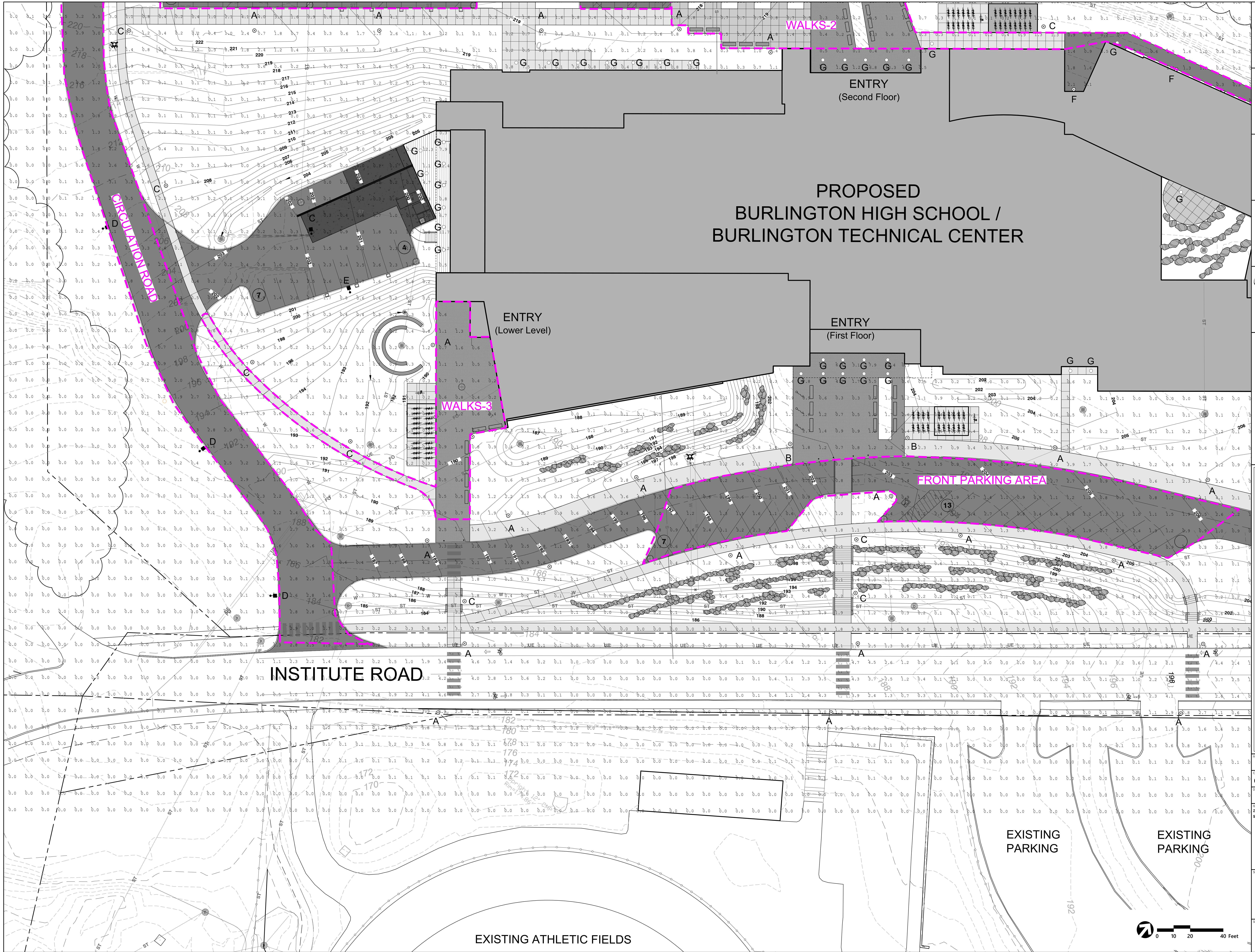
SHEET CONTENTS:

LANDSCAPE
LIGHTING
PLAN

SHEET NO:

L-402

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SCHEMATIC DESIGN

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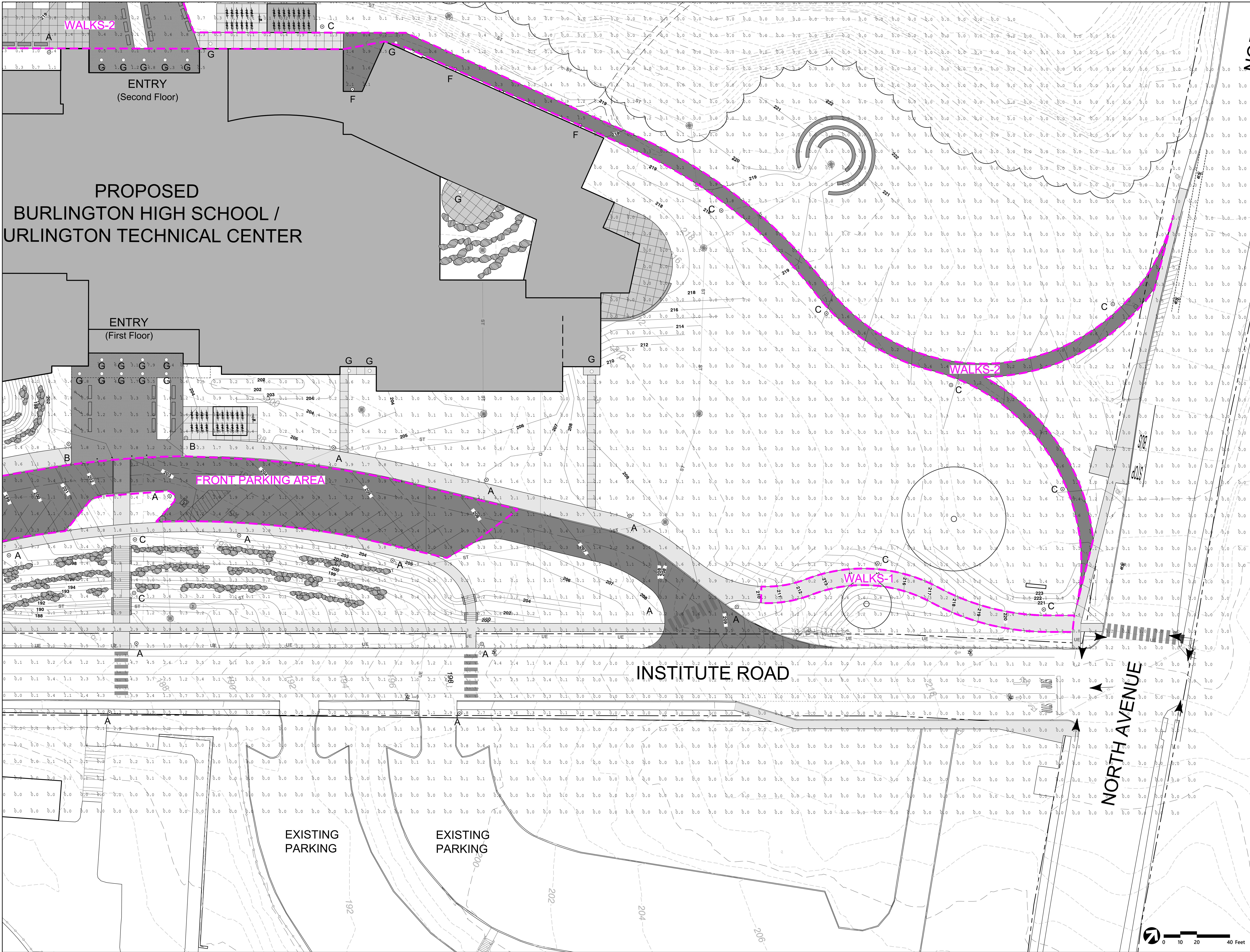
BURLINGTON HIGH SCHOOL & BURLINGTON TECHNICAL CENTER

BURLINGTON, VT

PROJECT NO:	2170
DATE:	07/01/2022
DRAWN BY:	JRD/MKW
CHECKED BY:	MKW
ISSUE LOG:	09/30/22 11/11/22

LANDSCAPE LIGHTING PLAN

L-403



SCHEMATIC DESIGN

NOT FOR CONSTRUCTION

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vhb

Landscape Architecture
40 Elm Drive, Building 100
Suite 200
South Burlington, VT 05403

BURLINGTON HIGH SCHOOL & BURLINGTON TECHNICAL CENTER

PROJECT NO: 2170

DATE: 07/01/2022

DRAWN BY: JRD/MKW

CHECKED BY: MKW

ISSUE LOG:
Zoning Permit 09/30/22
Staff Comments 11/11/22

SHEET NO: L-404

Date: _____ Customer: _____
Project: _____
Type: _____ Qty: _____

selux

Fixtures A, B, C, and F

Saturn Cutoff LED



Order Code:	Pole Order Code:	Series	Height	Finish	Options
SACL	Series	SACL Saturn Cutoff LED			
Optics	R1 Type I R2 Type II R3 Type III (Hood) R3W Type IV (Round) R4 Type V (Square) R5 Type V (Square) R5Q Type V (Rectangle)				
Mounting	1 Single 1A Single Arm Mount 2 Double W Wall Mount				
Light Engine	5G450 50700 5G105				
CCT	27K 30K 40K				
Power Cord Length	08 10 12 14 16 18 XX				
Finish	WH White BK Black BL Semi-Matte Black BZ Brushed SV Silver SP Specialty Premium Color				
Voltage	UNV 120 240 277 347 480				
Options	DM* Dimmer (0-10V) HS* Phase Shift Shield (0-10V) HL30* HL30-LED Switching Low-Capact 30% HL50* HL50-LED Switching Low-Capact 50% DS No Light Finish PCT* Photocell Sensor (See page 3 for order code)				

Product Modifications

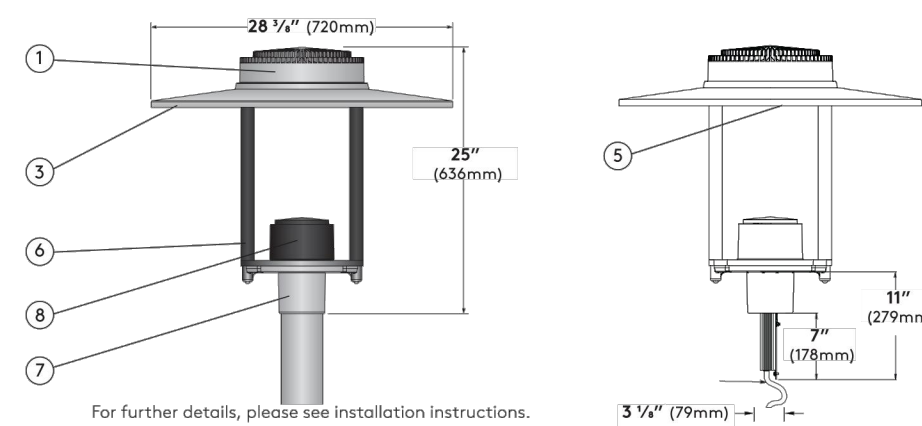
Approvals

Date:

Selux Corporation © 2022. T 846-834-1400, F 846-834-1400, 800-738-8927, F 846-834-1400, www.selux.us
In a continuing effort to offer the best product possible, we reserve the right to change, without notice, specifications or materials that in our opinion will not alter the function of the product. Specification sheets found at www.selux.us are the most recent versions and supersede all other printed or electronic versions.

Saturn Cutoff LED

SACL-1-XX-DS



Specifications

- Luminaire Cover** - Die cast aluminum cover made from low copper alloy, designed to ensure optimal thermal management for extra long life time of LED light engine.
- Gasketing** - (not shown) Continuous gasket provides weatherproofing, dust and insect control at all fixture connections.
- Luminaire Hood** - Aluminum shade with white painted interior.
- LED Array** - (not shown) High Flux LEDs mounted to PCB boards and attached to aluminum heat sink for maximum LED performance and life. CCT tolerance ± 4 step binning for 3000K, and 4000K. CRI minimum 80. Complete light engine can be removed easily for future upgrade. LED light engine provides a reported lumen maintenance of 93% at 50,000 hours. LDI calculated greater than 100,000 hours.
- LED Optics** - Technical Optics (R1, R2, R3, R3W, R4, R5S, R5Q and R5R) use Selux signature light pattern acrylic lens holder to secure proprietary silicone optics. Internal micro house side shield available for distributions types I, II, III & IV.
- LED Driver** - (not shown) LEDs are driven by RoHS compliant constant current programmable LED driver. Driver includes 0-10V dimming to 10%, meets the requirements of IP66. Driver assembly located inside the hood.
- Hood Supports** - Two aluminum arms support shade and optic assembly and attach to the die cast aluminum pole fitter (shown painted matte black for DS option).
- Pole Fitter** - Self-leveling, die-cast low-copper aluminum alloy. Fitter base secured to pole with three, stainless steel, Allen head set screws. Fitter for 3 1/2" (90mm) O.D. poles.
- Surge Protector** - (not shown) Designed to protect luminaire from electrical surge (20kA).
- Power Cord** - (not shown) Pre-installed at factory. Please specify power cord length in accordance to height of the pole. Add 2 feet to power cord length if double mounting (D) is specified.
- Exterior Luminaire Finish** - Selux utilizes a high quality Polyester Powder Coating. All Selux luminaires and poles are finished in our Tiger Drylac certified facility and undergo a five stage intensive pretreatment process where product is thoroughly cleaned, phosphated and sealed. Selux powder coated products provide excellent salt and humidity resistance as well as ultraviolet resistance for color retention. All products are tested in accordance with test specifications for coatings from ASTM and PCI.
- Standard exterior colors** are White (WH), Black (BK), Semi-Matte Black (BL), Bronze (BZ), and Silver (SV). Selux premium colors (SP) are available. Please specify from your Selux color selection guide.

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selux

BEACON

Fixtures D and E

VIPER Area/Site

VIPER LUMINAIRE

FEATURES

- Low profile LED area/site luminaire with a variety of IES distributions for lighting applications such as auto dealership, retail, commercial, and campus parking lots
- Featuring two different optical technologies, Strike and Micro Strike Optics, which provide the best distribution patterns for retrofit or new construction
- Rated for high-vibration applications including bridges and overpasses. All sizes are rated for 15G
- Control options including photo control, occupancy sensing, NX Distributed Intelligence™, wISCAPE® and 7-pin with networked controls
- New customizable lumen output feature allows for the wattage and lumen output to be customized in the factory to meet whatever specification requirements may entail
- Field interchangeable mounting provides additional flexibility after the fixture has shipped

UL IP65

CONTROL TECHNOLOGY

NX DISTRIBUTED INTELLIGENCE™

wISCAPE®

SPECIFICATIONS

CONSTRUCTION

ELECTRICAL

OPTICS

CONTROLS

WARRANTY

KEY DATA

Weight lbs. (kg)

Page 1 of 10

BEA-VIPER-6-SPEC

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701 Millennium Boulevard • Greenville, SC 29607 • Tel 864.678.0000 • Website www.beaconproducts.com

Hubbell Lighting

DATE: _____ LOCATION: _____
TYPE: _____ PROJECT: _____
CATALOG #:

Example: VP-2-320L-145-3K7-2-R-UNV-43-BLT

CATALOG #

VP Series

Optic Platform

Size

Light Engine

CCT/CRI

Distribution

Optic Rotation

Voltage

UNV 120 277V

208 208V

240 240V

277 277V

347 347V

480 480V

5000K

4000K

3000K

2700K

15000 lumens

10000 lumens

7500 lumens

6000 lumens

4500 lumens

3000 lumens

2000 lumens

1500 lumens

1000 lumens

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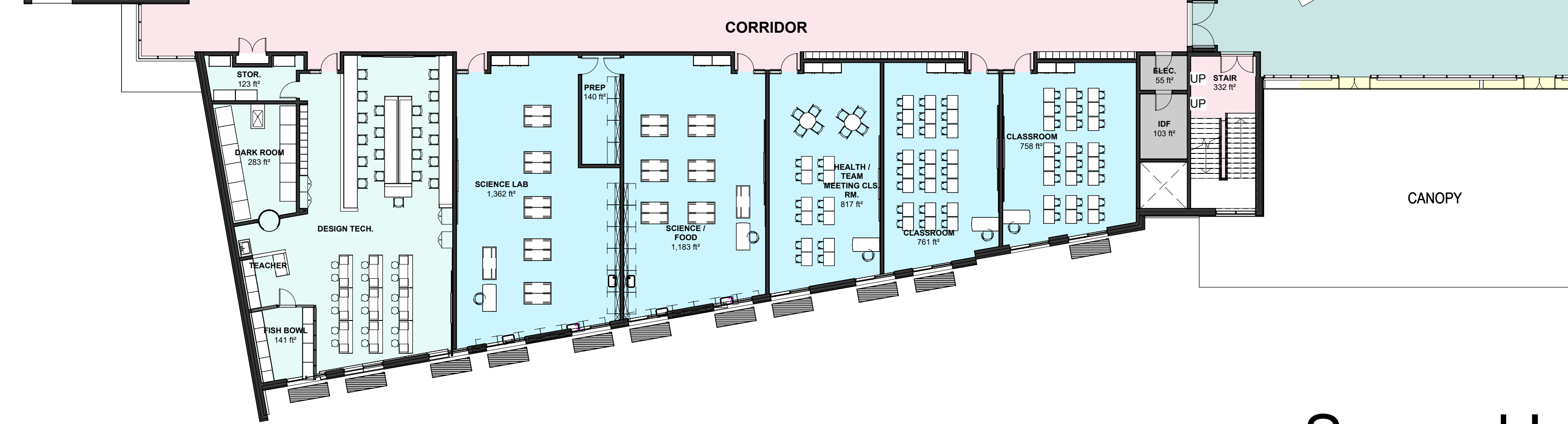
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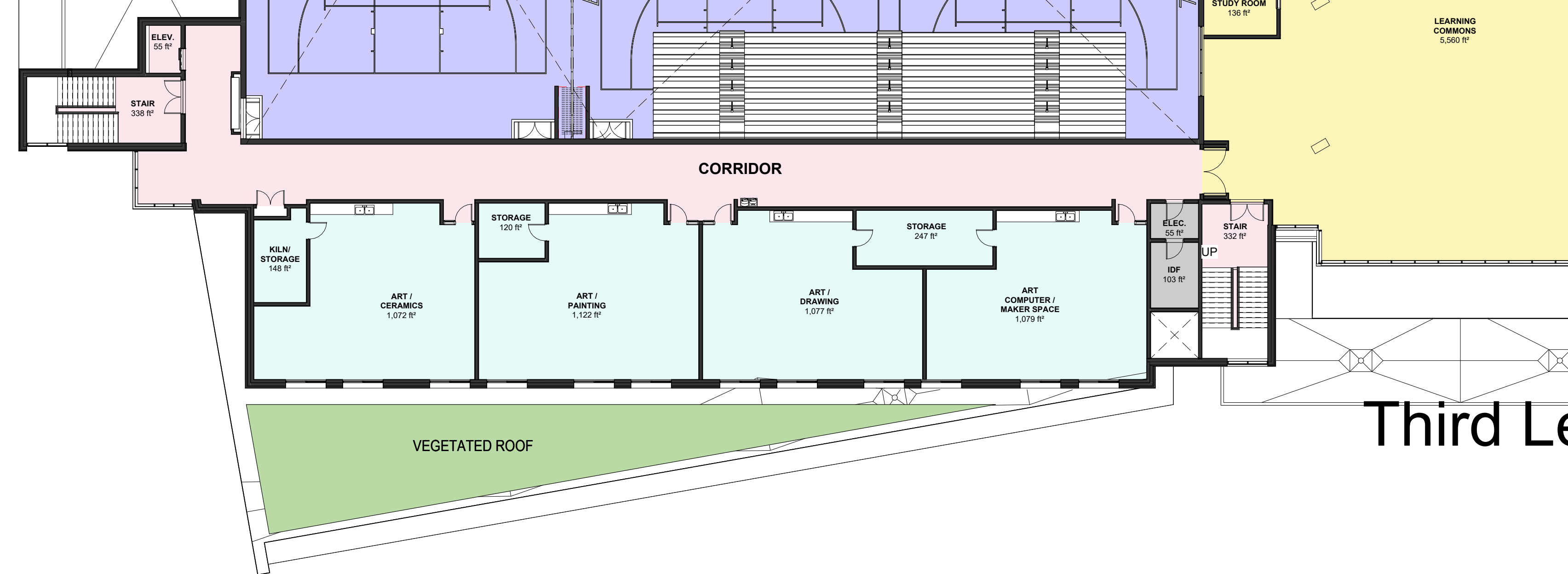




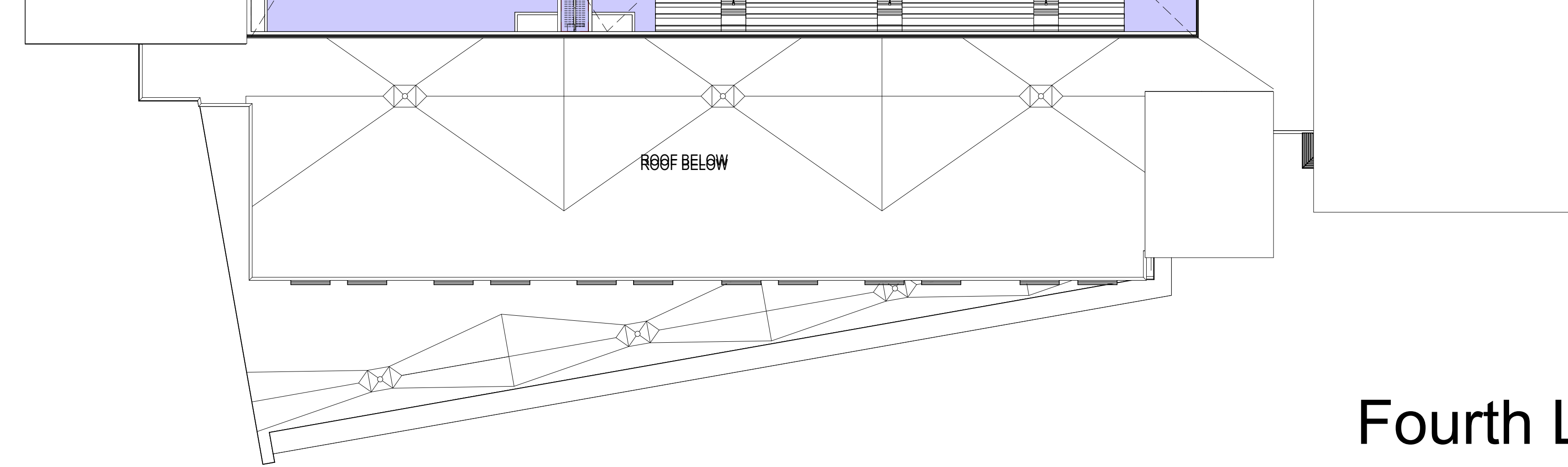
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BHS
10/18

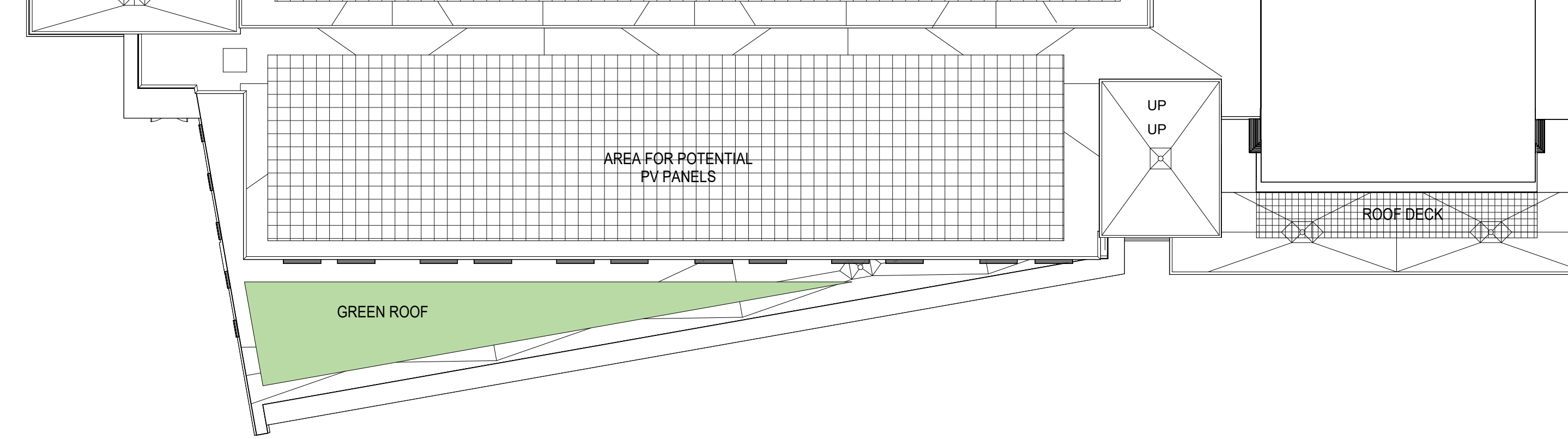


Third Le



Fourth L







North E



BHS
10/2

East Elevation



Burlington Development Review Board

Department of Permitting & Inspections
645 Pine Street
Burlington, VT 05401
www.burlingtonvt.gov/DPI/DRB
Telephone: (802) 865-7188
Fax: (802) 863-0466

AJ LaRosa
Caitlin Halpert
Geoff Hand
Brooks McArthur
Brad Rabinowitz
Leo Sprinzen
Chase Taylor
Sean McKenzie, (Alternate)



BURLINGTON DEVELOPMENT REVIEW BOARD

Tuesday, November 15, 2022, 5:00 PM

AGENDA

Remote Meeting

Zoom: <https://us02web.zoom.us/j/83225696227?pwd=SGQ0bTdnS000Wkc3c2J4WWw1dzMxUT09>

Webinar ID: 832 2569 6227

Passcode: 969186

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

- I. **Agenda**
- II. **Communications**
- III. **Minutes**
- IV. **Consent**

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

Renovations to City Pocket Park including associated site work and improvements. (Project Manager, Mary O'Neil)

V. Public Hearing

1. 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)

2. ZAP-22-4; 89 Chestnut Terrace (RL, Ward 6S) Jeannine Boix-Vives / Zachary Berger

Appeal of adverse determination ZP-22-503 as to separate lot. (Project Manager, Scott Gustin)

VI. Certificate of Appropriateness

1. 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)

2. ZP-22-416; 323-325 College Street (RH, Ward 8E) Advanta Ira Services, LLC / FBO Peter C. Potts / Benjamin Frye

Construction of 4-unit building addition with associated utility work and minor grading. (Project Manager, Ryan Morrison)

VII. Adjournment

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 Zoning Division at least 72 hours in advance so that proper accommodations can be arranged. For information call 865-7188 (TTY users: 865-7142).

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Sean McKenzie, (Alternate)



BURLINGTON DEVELOPMENT REVIEW BOARD

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PUBLIC HEARING NOTICE

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- 1. 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.
- 2. ZP-22-466; 187 South Champlain Street (CIVIC, Ward 5S) City DPW Parks & Recreation Department / Max Madalinski**
Renovations to City Pocket Park including associated site work and improvements.
- 3. ZAP-22-4; 89 Chestnut Terrace (RL, Ward 6S) Jeannine Boix-Vives / Zachary Berger**
Appeal of adverse determination ZP-22-503 as to separate lot.

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BURLINGTON DEVELOPMENT REVIEW BOARD

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AGENDA

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- I. **Agenda**
- II. **Communications**
- III. **Minutes**
- IV. **Consent**

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

Renovations to City Pocket Park including associated site work and improvements. (Project Manager, Mary O'Neil)

Approve

V. **Public Hearing**

- 1. **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)

Approve

- 2. **ZAP-22-4; 89 Chestnut Terrace (RL, Ward 6S) Jeannine Boix-Vives / Zachary Berger**

Appeal of adverse determination ZP-22-503 as to separate lot. (Project Manager, Scott Gustin)

Application Withdrawn

VI. **Certificate of Appropriateness**

- 1. **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)

Approve

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2. ZP-22-416; 323-325 College Street (RH, Ward 8E) Advanta Ira Services, LLC / FBO Peter C. Potts / Benjamin Frye

Construction of 4-unit building addition with associated utility work and minor grading. (Project Manager, Ryan Morrison)

Approve

VII. Adjournment

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Chase Taylor
Sean McKenzie, (Alternate)



BURLINGTON DEVELOPMENT REVIEW BOARD

Tuesday, November 15, 2022, 5:00 PM

MINUTES

Remote Meeting

Board Members Present: All members were remote. AJ LaRosa, Caitlin Halpert, Geoff Hand, Brooks McArthur, Brad Rabinowitz (5:07 PM), Leo Sprinzen, and Chase Taylor

Board Members Absent: Sean McKenzie

Staff Members Present: Scott Gustin, Mary O'Neil, Ryan Morrison, and Joseph Cava

- I. Agenda
- II. Communications
- III. Minutes
- IV. Consent

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

Renovations to City Pocket Park including associated site work and improvements. (Project Manager, Mary O'Neil)

Max Madalinski: Sworn in.

Geoff Hand: I am recused on this item.

AJ LaRosa: This agenda item is recommended for consent. Have you seen the staff report with comments on this?

Max Madalinski: Yes, I have seen it and am all set.

AJ LaRosa: Are there any questions or comments from the board? Hearing none, would someone like to make a motion?

AJ LaRosa: Motioned to approve and adopt staff recommendations, Leo Sprinzen 2nd. Vote 5-0. (Geoff Hand Recused, Brad Rabinowitz not present yet.) Motion carries.

V. Public Hearing

1. 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)

Ramsay Gourd: Sworn in.

AJ LaRosa: Can you tell us about this project?

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Ramsay Gourd: The structure is still standing, but there are concerns with the foundation. A new structure is proposed to occupy the same footprint with the addition of a shed dormer and garage doors.

AJ LaRosa: I appreciate that the proposed structure is keeping the same form and features and isn't an outright demolition by neglect.

Ramsay Gourd: The new design addresses egress and building code concerns and the goal is to retain as much as the original structure as possible.

AJ LaRosa: Are there any questions or comments from the board?

Geoff Hand: Will there be an additional application to designate this structure as an ADU?

Ramsay Gourd: This is a continuation of existing use and conditions.

AJ LaRosa: Mary, is this ADU permitted?

Mary O'Neil: From the Assessor's property records, the second floor has been finished for some decades. It remains unclear if this occurred when the Antique business was approved.

AJ LaRosa: So this isn't a standalone secondary unit?

Mary O'Neil: No, this is an expansion of living space from the existing single-family residence. There is no kitchen, so not a discrete unit.

AJ LaRosa: We will need to consider this during deliberation to discuss the expanded use of this structure. Are there any questions or comments from the public? Hearing none, I move we close the hearing on this item.

2. **ZAP-22-4; 89 Chestnut Terrace (RL, Ward 6S) Jeannine Boix-Vives / Zachary Berger**
Appeal of adverse determination ZP-22-503 as to separate lot. (Project Manager, Scott Gustin)

AJ LaRosa: This appeal was withdrawn by the appellants.

VI. Certificate of Appropriateness

1. **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)
Joe Weith, Brian Leet, Michael Willard, Jennifer Conley, Jesse Beck, Dave Marshall Andres Torizzo, Sharon Bushor: Sworn in.

Geoff Hand: I am recused on this item.

AJ LaRosa: Given the recent ballot vote, the DRB does not control the financial piece of this project, and we are only here to discuss what is within our role and authority as the DRB.

Joe Weith: I will turn this over to our architect, Brian, to discuss the design.

Brian Leet: Part of the proposal is for a new access road off Institute Rd. to connect with an entry commons area for the high school with an additional area to access the technical center. There will be a screened area for fleet vehicle access. The only building to remain is the wood chip heating

plant. The City would like to implement bike lanes on Institute Rd., which would eliminate street parking. As part of this proposal, the bus stop will be relocated north of Institute Rd. for greater pedestrian safety and movement of traffic. No development is proposed on the south side of Institute Rd., just the north side. There is a single point of entry into the commons that would direct visitors from the vestibule through the administrator's office. There are distinctive separation of spaces with the technical center and gymnasiums on the left side, the commons and library in the center, and academic classroom spaces on the right side of the building facing North Ave.

Michael Willard: The intent of the landscape plan is to use native plantings and species like evergreens to lead people down the drive along Institute Rd. There are also a proposal for ornamental grasses to create durable environmental conditions. Unlike invasive species, the ornamental grasses are targeted and won't expand.

Brad Rabinowitz: To clarify, the greenspaces along the walks will be available for students to use?

Michael Willard: Yes, this will be passive recreation sites.

Jennifer Conley: Transit passes will be available for students to manage traffic flow and transportation.

AJ LaRosa: There's not a lot of change from high school to high school, but I appreciate the thought being put into this project. One of the items mentioned in the staff report is Brownfield remediation, how does this get tracked from a zoning perspective to ensure compliance?

Mary O'Neil: This is managed by the State of Vermont. The timeline will be tracked by the cleanup of the site. The timelines will follow the DEC guidance.

AJ LaRosa: Do we have the authority to change timelines of the permitting should extensions not give enough time to complete the project?

Mary O'Neil: Any required federal or state permitting can toll the approval date. In addition, the applicant has requested a four year timeline to accommodate the required site remediation.

AJ LaRosa: One of the conditions is closing old permits, how do we do this?

Mary O'Neil: All these older permits will still need a CO, or have previous open permits superseded by this new application. The enforcement officer will look at these.

AJ LaRosa: Are there additional questions from the applicant?

Brian Leet: No.

Scott Gustin: In regard to the Conservation Boards recommendations, it is recommended to institute non-native species in conjunction with the City Arborist for retention of the existing site. In regards to car share memberships, this is policy that would need to be addressed. If you don't like the regulation, you must go to the policy makers. An amendments to Article 8 is currently before the City Council.

Leo Sprinzen: So a car share membership must be offered, but it is not required?

Scott Gustin: Correct, car share memberships have more to do with residential development, so the school must offer the memberships, but is not required to guarantee parking spaces.

Leo Sprinzen: What is the layout and orientation of parking off Institute Rd.?

Jesse Beck: There is no parallel parking proposed, only angled parking for drop off and pick up.

Leo Sprinzen: I was wondering if you could go into depth about the access road and how it relates to stormwater management.

Dave Marshall: Yes, there is a design for an access road to stormwater management ponds that would drain into a ravine that would collect solid debris before draining into Lake Champlain.

Andres Torizzo: The design would utilize the upper portion of the channel while utilizing sand filtration to create flow retention which would resolve deterioration that has been caused to the upper channel.

Mary O'Neil: (Requests Brian Leet relinquish the share screen so she can post Plan C2.2, a detail of the Stormwater outfall.)

Andres Torizzo: Looking at the plan, you can see that the access road is just to the left of the existing track field with four pools that spill over onto one another.

AJ LaRosa: How do you maintain this system?

Andre Torizzo: The fourth and final bay would be the collection point for any solid debris which can be resolved with annual maintenance.

AJ LaRosa: Are there any additional questions or comments from the board?

Brad Rabinowitz: There is a parking waiver for bicycle parking proposed as part of this plan, can you describe the parking demand of this feature?

Joe Weith: We have a capacity for 136 bicycle parking spaces.

Jennifer Conley: Any bikes around the facility could be locked to most anything.

Mary O'Neil: Please refer to the table under the Bike Parking Standards: I have included our regulations, recommended bicycle parking from the LEED standards, the results of a bicycle demand study submitted, and the number of spaces the applicant offers to provide.

Leo Sprinzen: Is there space near the current parking lot to address overflow bicycle parking?

Brian Leet: We could expand bicycle parking spaces, but we didn't see a need to incorporate more concrete and bike hoops until absolutely necessary.

Leo Sprinzen: Does the parking address the use by outside parties in regard to safety and security?

Jesse Beck: Security is a large priority and there are monitoring points where access can be restricted.

Brian Leet: Parking addresses this too by not creating more parking than the intended capacity of the building.

AJ LaRosa: Are there any questions or comments from the public?

Sharon Bushor: Leo touched on my concerns for parking, but I wanted to speak on the dual zone of this property which would allow for greater amounts of surface parking spaces. How will shuttling

be addressed to mitigate participation at communal events on the BHS campus? Does the school feel their request for a parking waiver is reasonable?

AJ LaRosa: You raise an interesting point about the traffic impact to this site.

Scott Gustin: The Conservation Board's recommendation is to consider educational opportunities with the stormwater system to address the increased impact of traffic on site.

Brian Leet: The plan for over 300 parking spaces will adequately address daily operations, and we have considered implementing an overflow parking area for special events. The consensus from this however, that the district can handle large scale events without increasing impervious parking areas. We would like to take the Conservation Board's recommendations to make changes to the existing plan in addition to facilitating an institutional parking demand response where we might provide event parking at the beach, at the campground, or maybe at other large venues on North Avenue and provide shuttle service.

AJ LaRosa: Hearing no additional questions, I move we close the hearing on this item.

2. ZP-22-416; 323-325 College Street (RH, Ward 8E) Advanta Ira Services, LLC / FBO Peter C. Potts / Benjamin Frye

Construction of 4-unit building addition with associated utility work and minor grading. (Project Manager, Ryan Morrison)

Bruce Baker, Dan Goltzman: Sworn in.

AJ LaRosa: Can you tell us about this project?

Dan Goltzman: This is a subsequent addition to the 2010 addition for a total of seventeen units on the property. The fourth story is setback to conform to the existing historic structure and utilizes similar colored bricks, clapboard, and cornice to conform to the 2010 addition. The ultimate goal is to tie all the buildings together with their own unique identities without challenging the original historic structure.

Leo Sprinzen: What are your thoughts on the relationship of these additions with the original building?

Bruce Baker: There is substantial pull and tug with the existing ordinance. Compared to developments like Cambrian Rise, the old orphanage building is sometimes overshadowed by the modern additions. In our case, the original structure has been given precedence over the additions.

Brad Rabinowitz: Can you talk about access to this addition?

Dan Goltzman: There is a separate entrance to the new addition in addition to the entrance around the back side of the original structure.

Brad: Can you tell us about lot coverage?

Bruce: The site has almost three-quarters of an acre, and we are not near lot coverage capacity.

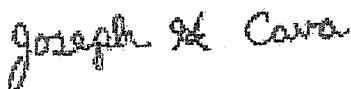
AJ LaRosa: Are there any questions or comments from the public? Hearing none, I move we close the hearing on this item.

VII. Adjournment
Hearing closed at 6:23 PM.



Alexander J. LaRosa, Chair of Development Review Board

1/5/23
Date



11-18-22

Joseph H. Cava, Permitting & Inspections Permit Technician

Date

Plans may be viewed upon request by contacting the Department of Permitting & Inspections between the hours of 8:00 a.m. and 4:30 p.m. Participation in the DRB proceeding is a prerequisite to the right to take any subsequent appeal. Please note that ANYTHING submitted to the Zoning office is considered public and cannot be kept confidential. This may not be the final order in which items will be heard. Please view final Agenda, at www.burlingtonvt.gov/dpi/drb/agendas or the office notice board, one week before the hearing for the order in which items will be heard.

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