



Conservation Board

Conservation Board - Monday, September 11, 2023, 5:30 PM, Zoom or Front Conference Room at 645 Pine Street

PLEASE NOTE:

This meeting will be held on Zoom and in-person in the Front Conference Room at 645 Pine Street. Zoom Info:

Zoom: <https://zoom.us/j/97267291894?pwd=cCtpUE9WY1BxdGxQMHNbVHN3cWNqZz09>

Webinar ID: 972 6729 1894

Password: 344917

Telephone: 1 309 205 3325

1. Minutes

1.1. Accept minutes from July 10 & August 7, 2023 meetings

1.2. Draft minutes of September 11, 2023

2. Board Comment

3. Public Comment

4. Open Space Subcommittee

5. Project Review

5.1. ZP-23-398; 300 Flynn Ave (NMU, Ward 5) Howard Ctr for Human Services
Demolition of existing building and construction of new 50,100 sf building and related site improvements

6. Adjournment

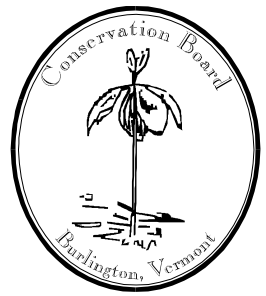
7. Informational and Non-Discrimination Statements

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Burlington Conservation Board

645 Pine Street
Burlington, VT 05401
<http://www.burlingtonvt.gov/DPI/CB>
Telephone: (802) 865-7189

*Zoe Richards, Chair
Rebecca Roman
Don Meals
Ryan Crehan
Hannah Brislin
Miles Waite
Caryn Connolly
Kyle Tansley
Elizabeth Cunningham, Student*



Conservation Board Meeting Minutes

Monday, July 10, 2023 – 5:30 pm

Remote & In Person Meeting

Attendance

- **Board Members:** Zoe Richards (ZR), Caryn Connolly (CC), Miles Waite (MW), Rebecca Roman (RR), Ryan Crehan (RC), Don Meals (DM), Elizabeth Cunningham (EC), Kyle Tansley (KT)
- **Absent:** Hannah Brislin (HB)
- **Public:** Kelley DesRoches, Jovial King, Peter Lazorchak, Cynthia Knauf, Jess Ruben, Scott Mapes, Daniel Voisin, Graham Bradley, Peter Smiar, Cleary Buckley
- **Staff:** Garret King (Permitting & Inspections)

ZR, Chair, called the meeting to order at 5:40 p.m.

Minutes

A MOTION was made by MW and SECONDED by CC:

Adopt the minutes of May 1, 2023 as written.

Vote: 8-0-0, motion carried.

Board Comment

ZR thanked Board members for coming to the retreat last month.

Public Comment

Jess Ruben requested 20 minutes at the November Conservation Board meeting to present findings on the Barge Canal work she and others have done.

Sharron Bushor spoke about the New North End, open space lots for development, conservation vs city goals for housing, and understanding the importance of breathability within the built environment.

DM asked for clarification.

Sharon Bushor said that she has recently talked to one of the city planners about an open parcel catalog. There is presently an incomplete list.

Project Review

1. **ZP-23-253; 453 Pine Street (E-LM, Ward 5S) Derrick Davis / Kelley DesRoches**
Construct 30,000 sf health club (spa/bathhouse) and 12,400 sf retail/commercial building and associated site improvements.

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Kelley DesRoches, Jovial King, Peter Lazorchak, Cynthia Knauf, Scott Mapes, and Daniel Voisin appeared on behalf of the application.

Kelly DesRoches introduced and overviewed the project and changes since last Board presentation.

DM asked about space by the main building. Ms. DesRoches replied that its outdoor seating.

ZP, one story building? Ms. DesRoches, yes.

Peter Lazorchak (hydrogeology and stormwater engineering) presented methods for stormwater management. RR asked about 10 or 15 year storms. Perter Lazorchak, around 10 year storm event for the level spreader.

MW asked about the reasons for construction type. Mr. Lazorchak replied that the soil types drive the design.

DM inquired about the perforated pipe feature and the level spreader. Mr.Lazorchak explained the relationship.

RC, what is in the 50ft state buffer? Mr. Lazorchak, two discharge points are inside the 50 foot buffer. RC, did the state say anything about this? Mr. Lazorchak- someone from state did request some changes but overall agreement. Tina Heath is satisfied.

CC, is this overall improvement for stormwater management? Mr. Lazorchak, yes.

ZR, is this at the 103' elevation for discharge point? Mr. Lazorchak, most updated will be over the 103` elevation. ZR, its not draining at 103.' Mr. Lazorchak, correct, its neutral.

Cynthia Knauf, worked with Tina Heath, and she was involved in stormwater plans. Remove phragmites with herbicides, and restore with native species, normal garden techniques and not spraying in any buffer area. RR mentioned low dose Roundup for removal of phragmites.

Jess Ruben suggested that Mike Bald get involved with this work. Cynthia Knauf overviewed restoration areas, plans for the areas and maintenance.

RR, what type of plan for phragmites do you have, and what about ongoing treatment? Cynthia Knauf, we have consulted with the state, but we are unsure of how successful treatment will be. RR, one treatment, and then will you come back if needed?

DM, do you need state approval? RC, state and city can permit the work and plants to be used. Look again at what is in the 50 buffer. ZR, yes, Mike Bald may be good to work with.

RC, allowed use in buffer city vs state, seems to be all good. MW asked about the wetland delineation. Scott Mapes said there have been no significant changes.

RC asked about future plans to have a building in phase two. Kelley DesRoches said that phase two will be under a different permit.

ZP, any other questions or comments? MW asked about soils. Daniel Voisin said that the goal is to prevent any compression of the soil and to maintain current hydrology. Soil will have to be removed and managed, soil is much better than expected in many areas. Trucking will be necessary for about 82 hundred tons but unsure exactly how much. Graham Bradley will be creating a presentation to and for the superfund conditions.

MW, did any of the lines change for location of peat? Daniel Voisin, it is changing over the site but lines seem accurate as possible.

MW, as to hydrogeology, is groundwater monitoring happening? Daniel Voisin, yes we are monitoring now and going forward and 2 years post construction, using recording and modeling, we have several options for construction.

RR, noted the plans for mowing and requirements to uphold.

Jess Ruben commented on areas and plants in those areas, drainage ways to buffer areas and remediation.

MW, will there be soil remediation onsite? Daniel Voisin, no, due to our soil types. Considerations have been extensive. MW, has there been any surface water testing? Mr. Voisin, most of the monitoring has been at the superfund area and is groundwater that has been monitored and recorded.

A MOTION was made by DM and SECONDED by MW:

Endorse the proposal with a corrective action plan and removal of non-native plants inside 50'-100' wetland buffers.

Vote: 7-0-0, motion carries.

2. ZP-23-284; 266 College Street (FD5, Ward 8E) 266 Greencastle, LLC / Giri Burlington Property, LLC

Proposed renovation of existing building to construct a 6-story addition with rental housing and two levels of parking below street grade.

Peter Smiar and Cleary Buckley appeared on behalf of this application.

RR, what is first floor use? Peter Smiar, residential and maybe a coffee shop. RR, will the units be rentals? DM, will they be affordable?

RC noted that the building and site work cover most of the lot. Peter Smiar, yes, and yes inclusionary zoning will require affordable housing units. Everything is basically impervious, and stormwater treatment is currently lacking.

MW, is the old brick sewer shown? Mr. Smiar, its almost at the edge of the site, most flows to treatments, soils are quite bad, and the site has some contamination. There will be new routing of the stormwater discharge.

ZR, the city still has combined storm and sewer in this area. Mr. Smiar, yes, that is correct.

MW asked about stormwater detention type. Is it just a large cylinder? Mr. Smiar, yes, its just for holding runoff from the roofs prior to discharge. MW, what is the diameter of pipe? Mr. Smiar said that 36" is currently proposed, but changes are possible.

RR asked about green roof plantings. Mr. Smiar, said that they are mainly to address impervious requirements, but it does serve some retention of stormwater.

RC asked about the prior project proposal as compared to this one. Mr. Smiar said they are about the same, but we are working with DPW for the stormwater currently.

MW, contamination is noted. Do you know the details? Mr. Smiar said that there is some tar, but he's unsure about the details.

RC, will there be any street plantings? Mr. Smiar said that there will be 4 total tree wells. There is slightly more impervious than the last proposal. RC, have you considered heat island effect? Mr. Smiar, it may

be possible to address, but he's unsure as to what plantings can be installed, as they would be in the city right of way.

MW, will you fix the alleyway trash situation? Mr. Smiar said that additional traffic will help, and will be more visible and hopefully should mitigate the problem of others leaving trash there.

RR, is it the same entrance and exit for cars? Mr. Smiar, yes, same opening for entry and exit.

DM, what about bike parking and EV charging? Mr. Smiar, yes, there will be short term and long term bike parking. EV is under consideration but not yet finalized.

Mr. Smiar noted that the applicants are aiming for LEED gold standard.

Cleary Buckley, we have some EV charging stations included for LEED standard, and 65 parking spaces are currently proposed for 89 units.

A MOTION was made by RR and SECONDED by CC:

Approve the project as proposed.

RC recommended that additional trees be added. RR accepted that recommendation.

Vote: 7-0-0, motion carried.

Executive Session

A MOTION was made by DM and SECONDED by RR:

Enter executive session.

Vote: 8-0-0, motion carried.

A MOTION was made by DM and SECONDED by RR:

Exit executive session.

Vote: 8-0-0, motion carried.

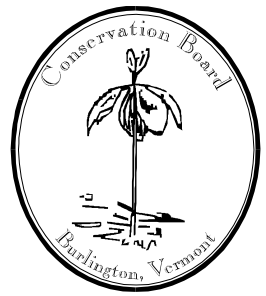
Adjournment

7:45 PM.

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Conservation Board Meeting Minutes

Monday, August 7, 2023 – 5:30 pm

Remote & In Person Meeting

Attendance

- **Board Members:** Hannah Brislin (HB), Caryn Connolly (CC), Rebecca Roman (RR), Elizabeth Cunningham (EC), Kyle Tansley (KT)
- **Absent:** Zoe Richards (ZR), Miles Waite (MW), Ryan Crehan (RC), Don Meals (DM)
- **Public:** Sharon Bushor
- **Staff:** Scott Gustin (Permitting & Inspections), Dan Cahill, Daniel Schmidt (Parks & Rec)

SG, staff, called the meeting to order at 5:35 p.m.

Minutes

Lacking a quorum, action on the July 10 minutes was deferred until the September meeting.

Board Comment

None.

Public Comment

Sharon Bushor noted concern, as to the Legacy Fund grant, if a grantee receives money and the project doesn't happen. She thinks the present wording is vague. If something goes wrong, there needs to be a process for repayment. She hopes this wording will be looked at by the attorney's office. She also noted that she heard on NPR that the color black always fades in. It absorbs heat, but white reflects it. There may be a need to have light colors, especially on rooftops. Doing so can help to cool the city.

SG mentioned that there is a draft grant agreement in the works with the City Attorney's Office for use with Legacy Fund grants. It is based on an agreement used by Denver, CO for a similar grant program. It does outline process in the event that a project is not done as awarded.

Update & Discussion

1. Proposed Legacy Fund grant structure

Review and comment on proposed administrative structure for Legacy Fund grant program.

SG overviewed the background of the Legacy Fund grant program for supporting nature-based climate solutions and noted the recent City Council approval of the redistribution of monies within the fund – 30% stewardship, 40% acquisition, and 30% for nature based climate solution work. He noted that the Open Space Subcommittee is an ad hoc group. For the purposes of reviewing grant applications, we'll need 3 Conservation Board members to commit. He'll ask for 2 Parks Commission members to participate in review as well. RR and HB volunteered to be on the committee. SG noted that DM offered to participate as well. SG said the grant program will launch this coming October with applications due by the end of

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November. The committee will review applications in December and January and make awards in January.

RR suggested, as to project report reporting, definitely include photos, note who was involved in the project, and provide a short narrative or video. We should allow for reporting out in various mediums.

RR asked about marketing. Dan Cahill said he'll work with Jules (marketing staff for Parks) to develop a promotional plan. Let him know if anyone is interested in joining that effort. RR suggested sending an invite to the whole Board.

SG mentioned a pre-launch September meeting for review committee members to get up to speed on what the grant application and review process will look like.

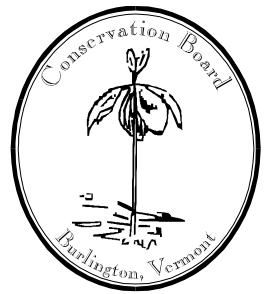
Adjournment

6:04 PM.

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Conservation Board Meeting Minutes

Monday, September 11, 2023 – 5:30 pm

Remote & In Person Meeting

Attendance

- **Board Members:** Zoe Richards (ZR), Miles Waite (MW), Ryan Crehan (RC), Hannah Brislin (HB), Caryn Connolly (CC), Rebecca Roman (RR), Elizabeth Cunningham (EC), Kyle Tansley (KT), Lina Swislocki (LS)
- **Absent:** Don Meals (DM)
- **Public:** Sharon Bushor, Kevin Worden, Sam Beal, Julia Ginorio, Sandy Maguire, Art Gilman
- **Staff:** Scott Gustin (Permitting & Inspections), Dan Cahill (Parks & Rec)

ZR, chair, called the meeting to order at 5:31 p.m.

Minutes

- July 10 minutes

MW noted that the section of minutes stating the conclusion was to endorse the proposal with a CAP should be revised to state endorsement is contingent on the applicant obtaining approval from VT DEC of a CAP.

A MOTION was made by RR and SECONDED by HB:

Approve the July 10 minutes as amended.

Vote: 8-0-0, motion carried.

- August 7 minutes

A MOTION was made by HB and SECONDED by LS:

Approve the July 10 minutes as amended.

Vote: 8-0-0, motion carried.

Board Comment

SG mentioned the 389 Riverside Ave FEMA buy-out project. The grant application was recently approved by FEMA. Demolition and conversion to green space will likely take place next spring or summer. The vacant lot will become city property. LS noted just upstream of the property is vincaria verna, AKA Lessor selindine. It is an invasive exotic plant that we want to avoid spreading to this site.

RR said it would behoove us to look into changing the stormwater standard from the 10-year event to the 100-year event. ZR noted we should have the stormwater folks in the room to better understand this. HB, can we plan a future meeting to talk this over? RR agreed that this would be good.

ZR noted the preliminary work being done on the comprehensive forest plan for the city. The effort will include work with UVM's spatial analysis lab. There is some possibility they may be able to use their thermal sensor to help measure deer density in the Intervale.

Public Comment

None.

Open Space Subcommittee

RR noted we had our pre-launch meeting for Legacy Fund grant review. We have two folks from the Parks & Rec Commission and three from the Conservation Board. We reviewed the scoring matrix. The grant application period opens next month. We'll review applications in December.

LS said she has an idea for a neighborhood to apply for an invasive species project. SG said she could be part of an applicant team because she'll not be on the review committee.

Project Review

1. ZP-23-398; 300 Flynn Ave (NMU, Ward 5) Howard Ctr for Human Services

Demolition of existing building and construction of new 50,100 sf building and related site improvements

Kevin Worden, Sam Beal, Julia Ginorio, Sandy Maguire, and Art Gilman appeared on behalf of the application.

Kevin Worden overviewed the site. The upland portion is where the development is proposed. To the north is Englesby and the wetlands around it. The building will front on Pine Street and Flynn Avenue. The project will allow for all of Howard Center's functions under one roof. The redevelopment does not include much digging down. Existing conditions drain into Englesby without any treatment. The proposed will meet state standards for the 10-year storm event. Stormwater will be collected and discharged at a controlled rate into Englesby.

Art Gilman delineated the wetlands in the ravine. It's a flat bottom with steep slopes around it. The slope does not discharge ground water. The wetland is heavily treed and lacks the invasive species more common in open-to-the-sun wetlands. We will apply for a VT wetlands permit for the small amount of buffer impact. Tree retention and replacement will limit adverse impacts.

ZR noted that this corridor has foxes, raccoons, wood ducks, and herons. Mr. Gilman noted the pinch point coming under Pine Street. Considering its surroundings, the wetlands are in pretty good shape, and the project is such that it will limit impacts. Japanese knotweed is present in a small area by the dumpster. Effort should be made to avoid its spread.

RC asked what the slope has for vegetation now. Mr. Gilman said its kind of bare now under the trees. Its wooded. Kevin Worden noted the new trees that will be planted onsite.

RC, are all of the buffer impacts permanent disturbances? Kevin Worden noted the site disturbance under existing conditions. The new building will be set over some existing lawn. New development runoff will be collected and discharged at a lower rate than existing conditions.

MW asked about the stormwater outfalls. Will the issues identified by Stone in their 2016 report be addressed in this project? Mr. Worden said that stormwater will be comprehensively addressed in this project. Pine Street is lower than the parking lot. He has a hard time imagining that runoff from the street

goes across the property. The report may address property to the north of the site. Julia Ginorio said that not all of the impervious areas are detained. MW, what's driving that? Ms. Ginorio, the footprint of the detention system is large, but relatively shallow due to ledge. MW, so as much as can be detained will be.

RC, impervious surface will be increased. How do the proposed conditions relate to existing? Julia Ginorio, 1- and 10- and 25-year storms are less. Above that, similar to existing conditions. Kevin Worden noted that the discharge is not into a combined system. RC noted that it wasn't long ago that Blanchard Beach was permanently closed to swimming due to water quality. It's important to protect the resource.

RC noted that a lot of cultivars are proposed in the landscaping plan. For areas within the riparian buffer, he suggests staying away from the cultivars. RC suggested native plantings.

CC asked about the amount of water for a 10-year storm event.

MW, has soil quality been tested? Will soil be exported offsite? Mr. Worden said the development team is still working on it. We've been careful to avoid a significant soil export. There's a place onsite to fill urban soils with a cap.

RC, do you see space for any additional plantings? Art Gilman said there's not very much space in light of the existing tree line that will remain. Priority should be given to retaining this tree line.

A MOTION was made by: LS and SECONDED by: CC

Recommend approval subject to the following condition:

- Encourage native plants throughout the site and particularly within the buffer areas.

Vote: 8-0-0, motion carried.

Adjournment

6:34 PM.



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: August 10, 2023

Re: Howard Center 300 Flynn Redevelopment – Project Narrative

Howard Center is proposing to redevelop their property located at 300 Flynn Avenue. This narrative provides a brief 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 300 Flynn Redevelopment project will involve demolition of the existing approximately 24,042 square foot building and construction of a new 3 story, approximately 50,100 square foot building. The current and proposed use of the property is a combination of mental health crisis center and related medical and general office uses. Mental health crisis center is a conditional use in the underlying zoning district.

Howard Center and the project team met with the Ward 5 NPA on December 15, 2022, the City’s Technical Review Committee on February 9, 2023, and the Development Review Board (“DRB”) on May 16, 2023 for sketch plan review.

Dimensional Standards and Density

Zoning District: The underlying zoning district is Neighborhood Mixed-Use (NMU).

Overlay Districts: Design Review Overlay District; Natural Resource Protection including the Riparian and Littoral Conservation Zone along Englesby Brook and the Wetland Conservation Zone for the wetland along Englesby Brook.

Building Setbacks: Proposed building setbacks: 11feet from Flynn Avenue (10 foot minimum required), 18 feet from Pine Street (10 foot minimum required), 104 feet from the west property line (zero feet minimum required), 164 feet from north property line (zero feet minimum required), and 3.4 feet from southeast property line (zero feet minimum required).

Lot Coverage: The proposed lot coverage is 58% (80% maximum lot coverage allowed).

Building Height: The proposed building height is 36.5 feet as measured from the building's main finish floor elevation (FFE) of the primary facade facing Flynn Avenue (see South Elevation on A3-0.0 for the measurement of building height). Maximum allowable building height in the NMU District is 35 feet. Per Article 5.2.6(c)(6) of the CDO, the applicant requests consideration for a 5% variation in the allowable building height to account for grade changes across the site. An additional 1.5 feet in building height will help the design team with managing the grades as they modulate towards Englesby Brook and will enable the building to better support the fully electric air-based building systems needed to provide the clients and staff with good indoor air quality.

Parking

Vehicle Parking: The property is located within the Multi-Modal Mixed Use Parking District. Table 8.1.9-1 of the CDO does not list a maximum off-street parking requirement for mental health crisis centers. The land use category most similar to mental health crisis center for parking purposes is "crisis counseling center", which allows maximum parking of 3 spaces per 1,000 gfa. The programmed use of the building will be a blend of scheduled outpatient services and unscheduled, drop in, as needed services. The latter relates primarily to our crisis services and intake services which will be located at this site with a visitor flow that more closely aligns with the "crisis counseling center" use.

The maximum allowable number of on-site parking spaces is 150 (50,100 sf / 1,000 sf x 3 spaces = 150). The project proposes 106 total on-site parking spaces including 5 ADA accessible spaces, 2 EV charging spaces, and 8 tandem spaces. The total number of proposed parking spaces that count toward the maximum allowed is 99.

Bicycle Parking: Section 8.2.4 of the CDO requires 6 short term (50,100 sf / 8,000 sf = 6) and 10 long term (50,100 / 5,000 sf = 10) bike parking spaces for this project. For short-term bike

parking, 3 U-racks (6 bike parking spaces) are proposed near the main entrance on Flynn Avenue and 2 U-racks (4 bike parking spaces) are proposed near the entrance on Pine Street for a total of 10 short-term parking spaces. A minimum of 10 long term bike parking spaces will be accommodated in the basement (see basement floor plan Sheet A1-0 in architectural plan set).

Traffic/Transportation

As indicated in the attached Howard Center Traffic Analysis memo prepared by VHB and dated 8/9/23, the project is projected to produce 52 net new trips in the AM peak hour and 60 net new trips in the PM peak hour compared to existing conditions. While VTrans and Burlington Public Works (“BPW”) policy does not require a traffic study if the net increase in peak hour trip ends is less than 75, Howard Center went ahead and analyzed the project’s potential impact on the Pine Street/Flynn Avenue intersection. With conservative assumptions regarding mode split and trip distribution, the new trips are expected to have minimal effect on the intersection. An overall Level of Service B is expected to remain in the Build condition for the AM and PM peak hours. The Traffic Analysis memo concludes that the project is not anticipated to generate unreasonable congestion conditions on the adjacent roadway network.

As shown on Sheet C2.0 of the civil plan set, the existing bus stop on Pine Street will be relocated several feet to the south. GMT has approved relocation of the bus stop as proposed.

Transportation Demand Management Plan

Attached is a Transportation Demand Management (TDM) plan for the project.

Stormwater

The proposed stormwater management plan will significantly improve the detention and treatment of stormwater on the site compared to existing conditions. The stormwater management plan involves the installation of practices to both treat and detain runoff from the site to reduce pollutant load and peak flows to Englesby Brook and the surrounding wetland. Stormwater from the building roof and parking areas will be directed to high-flow vegetated filters which will provide water quality treatment. The water will then flow into a system of buried chambers which have a controlled outlet. This system allows for the slow release of stormwater back towards the wetland without increasing peak flows. This proposed system surpasses the plan outlined in the Englesby Brook Flow Restoration Plan.

The stormwater management and EPSC plans, detail sheets and the attached Stormwater General Permit Narrative have been submitted to and have been preliminarily reviewed by James Sherard at the City’s Stormwater Division.

Natural Resource Protection

As shown on the attached civil plans, the northern portion of the site is comprised of Englesby Brook and an associated Class II wetland. The limits of the wetland were delineated by Gilman & Briggs Environmental and are depicted on the plan. The plan also shows the limits of the state's regulated 50-foot wetland buffer and the City's 100-foot wetland and riparian and littoral conservation zones.

The project reduces the area of impact to the 50' wetland buffer zone, 100' wetland buffer zone, and 100' riparian buffer zone compared to the existing site (see zoning table on Sheet C0.0 in the civil plan set). The tree line will not be significantly altered, and best management practices will be used to prevent erosion and control sedimentation during construction. In addition, the stormwater management system will effectively treat runoff before it enters the wetland/riparian buffer zones and control the release of runoff to protect the existing stream channel.

Attached is a wetland and natural resources evaluation memorandum prepared by Gilman & Briggs. Gilman & Briggs concluded that the project is well designed with better water quality infrastructure than currently exists and there will be no negative impact to the wetland, wetland buffer or natural resource areas.

Steep Slopes

Areas of steep slopes exist on the site beginning just beyond the existing development and sloping down to and ending at the wetland surrounding Englesby Brook (see sheets C1.0 and C2.0 in the civil plan set). The intent of the site design is to minimize disturbance and avoid encroachment into this area to the extent practicable. Work within areas of steep slopes will be extremely minimal and will involve removal of three existing drainage pipes which discharge midway down the slope. Minimal grade changes (~200 SF) are proposed near the Pine Street parking lot to convey more area to stormwater treatment and away from the municipal system. All disturbed areas will be backfilled or fine graded, seeded, and covered with erosion control matting. No difference to the overall area of steep slopes is proposed in the pre and post site condition.

Architectural Design

See attached architectural design narrative prepared by Duncan Wisniewski Architects.

Energy Efficiency/Sustainability

The project will not use any fossil fuels on site. To achieve this, the building will be insulated above code minimums with a goal of meeting the Passive House air sealing requirements. Heating and cooling will be accomplished using geothermal heat pumps. Ventilation is provided using high efficiency balanced ventilation with heat recovery. The central ventilator will be located on the roof and screened from public view. Domestic hot water will utilize air source heat pump technology. The roof has been designed for future rooftop solar. The design team is working with Burlington Electric Department to maximize opportunities for energy efficiency.

Landscaping and Lighting

The attached landscape planting plan (sheets L2.00 and L2.01 in LA plan set) proposes a mix of trees, shrubs, ornamental grasses and perennials. Eight (8) new shade trees are proposed within and around the Flynn Avenue parking lot. The plan also proposes to save the existing, large, mature tree along the west property line. The 8 new trees plus the existing mature tree complies with the shading requirements for parking lots and the intent of the regulations as it relates to the number of trees for parking lots.

A photometric lighting plan, light fixture and pole specifications, and lighting statistical area summary are provided on sheets L4.00 – L4.02 in the LA plan set.

Conditional Use Criteria

Existing or planned public utilities, facilities or services: The project will not introduce any identified adverse impacts on public utilities, facilities or services in the area. The project team has met with DPW, BED and GMT to review the project and get their input regarding utilities and services for the project. The stormwater management system will significantly improve management and treatment of stormwater compared to existing conditions.

Character of the area as defined in the zoning ordinance and the municipal development plan:

The project is compatible with the purpose of the Neighborhood Mixed Use District as it will preserve and enhance a historically mixed commercial/residential area while reinforcing the compact scale and development pattern within the neighborhood. The proposed use will provide employment opportunities within walking or biking distance of the nearby residential neighborhoods. The project will further several goals/objectives contained in the plan including coordination of land use and development with availability and capacity of public services, facilities and utilities, and enable the provision of treatment facilities in accessible locations for residents who need them.

Nuisance impacts from noise, odor, dust, heat, and vibrations: The project will continue and expand the existing use of the property to accommodate the range of caregivers and providers on staff. No additional impacts to the zoning district are anticipated.

Transportation system capable of supporting the proposed use in addition to the existing uses in the area: As indicated in the Howard Center Traffic Analysis memo prepared by VHB dated 8/9/12, the project is not anticipated to generate unreasonable congestion conditions on the adjacent roadway network. Howard Center will also implement the TDM plan which will reduce the need for parking and vehicular travel to and from the site.

Utilization of renewable energy resources: The project will not result in an undue adverse effect on the utilization of renewable energy resources. As stated in the Energy Efficiency/Sustainability section above, the project will not use any fossil fuels on site. The building will be insulated above code minimums with a goal of meeting the Passive House air sealing requirements and heating/cooling will be accomplished using geothermal heat pumps.

Domestic hot water will utilize electric air source heat pump technology. The roof has been designed for future rooftop solar.

Standards or factors set forth in City bylaws and city and state ordinances: The project will comply with all City bylaws and city and state ordinances.



LOCATION MAP
SCALE: 1" = 1,000'

ZONING TABLE			
NEIGHBORHOOD MIXED USE DISTRICT			
CRITERIA	LIMITATION	EXISTING	PROPOSED
INTENSITY	2.0 FAR MAX.	0.26	0.63
LOT COVERAGE	80% MAX.	41%	58%
FRONT BUILDING SETBACK	0 FT. MIN.*	21 FT.	11 FT.
SIDE/REAR BUILDING SETBACK	0 FT. MIN.**	3 FT.	3 FT.
BUILDING HEIGHT	22 FT. MIN. 35 FT. MAX.		36.5 FT.***
* A MIN. SETBACK OF 10' IS REQUIRED ALONG FLYNN AVE. AND PINE ST. ** STRUCTURES SHALL BE SET BACK A MIN. OF 15 FT. FROM ANY RESIDENTIAL ZONING DISTRICT BOUNDARY LINE *** WITHIN 5% ALLOWABLE OVER STANDARD			
OVERLAY DISTRICTS			
DISTRICT		EXISTING	PROPOSED
WETLAND CONSERVATION ZONE	DISTURBANCE IN 50' BUFFER	5,140 SF	4,110 SF
	DISTURBANCE BETWEEN 50' & 100' BUFFER	16,290 SF	16,180 SF
RIPARIAN AND LITTORAL CONSERVATION ZONE	DISTURBANCE 100' UPLAND OF ENGLSBY BROOK	11,560 SF	10,581 SF
STEEP SLOPES DISTRICT	AREAS STEEPER THAN 15%	18,250 SF	18,250 SF

CIVIL SYMBOL LEGEND

PROPOSED FEATURES		EXISTING FEATURES	
	BOUND		BOUND
	BENCHMARK		BENCHMARK
	DRILL HOLE		DRILL HOLE
	SURVEY POINT		SURVEY POINT
	IRON PIN		IRON PIN
	TEST PIT		TEST PIT
	BORING		BORING
	PERC TEST		PERC TEST
	CATCH BASIN (SQUARE)		CATCH BASIN (SQUARE)
	CATCH BASIN (ROUND)		CATCH BASIN (ROUND)
	HEADWALL		HEADWALL
	FLARED END SECTION		FLARED END SECTION
	STONE APRON		STONE APRON
	DRAIN MANHOLE (DMH)		DRAIN MANHOLE (DMH)
	DRAINAGE CLEAN OUT		DRAINAGE CLEAN OUT
	SANITARY SEWER MANHOLE (SMH)		SANITARY SEWER MANHOLE (SMH)
	SANITARY CLEAN OUT		SANITARY CLEAN OUT
	HYDRANT		HYDRANT
	WATER SHUTOFF		WATER SHUTOFF
	TAPPING SLEEVE & VALVE		TAPPING SLEEVE & VALVE
	GATE VALVE		GATE VALVE
	WELL		WELL
	UTILITY POLE		UTILITY POLE
	GUY POLE		GUY POLE
	ELECTRICAL MANHOLE		ELECTRICAL MANHOLE
	FLOOD LIGHT		FLOOD LIGHT
	LIGHT POST		LIGHT POST
	TELEPHONE MANHOLE		TELEPHONE MANHOLE
	NATURAL GAS MANHOLE		NATURAL GAS MANHOLE
	COMMUNICATION MANHOLE		COMMUNICATION MANHOLE
	STEAM MANHOLE		STEAM MANHOLE
	BOLLARD		BOLLARD
	SINGLE POLE SIGN		SINGLE POLE SIGN
	DOUBLE POLE SIGN		DOUBLE POLE SIGN
	SPOT ELEVATION		SPOT ELEVATION
	ACCESSIBLE PARKING STALL		ACCESSIBLE PARKING STALL
	DRAINAGE FLOW		DRAINAGE FLOW
	DECIDUOUS TREE		DECIDUOUS TREE
	CONIFEROUS TREE		CONIFEROUS TREE

CIVIL LINETYPE LEGEND

PROPOSED FEATURES		EXISTING FEATURES	
	MAJOR CONTOUR		MAJOR CONTOUR
	MINOR CONTOUR		MINOR CONTOUR
	EDGE OF RIVER		EDGE OF RIVER
	EDGE OF POND		EDGE OF POND
	FLOOD PLAIN		FLOOD PLAIN
	PROPERTY LINE		PROPERTY LINE
	RIGHT OF WAY		RIGHT OF WAY
	SETBACK		SETBACK
	EASEMENT		EASEMENT
	LIMIT OF CONSTRUCTION		LIMIT OF CONSTRUCTION
	LIMIT OF DISTURBANCE		LIMIT OF DISTURBANCE
	SILT FENCE		SILT FENCE
	DEMOLITION WORK		DEMOLITION WORK
	CENTERLINE		CENTERLINE
	EDGE OF PAVEMENT		EDGE OF PAVEMENT
	EDGE OF GRAVEL		EDGE OF GRAVEL
	EDGE OF CONCRETE		EDGE OF CONCRETE
	CURB		CURB
	FENCE (BARBED WIRE)		FENCE (BARBED WIRE)
	FENCE (CHAIN LINK)		FENCE (CHAIN LINK)
	FENCE (WOODEN)		FENCE (WOODEN)
	GUARD RAIL		GUARD RAIL
	TREE LINE		TREE LINE
	EDGE OF WETLANDS		EDGE OF WETLANDS - DELINEATED
	EDGE OF WETLANDS - APPROXIMATE		EDGE OF WETLANDS - APPROXIMATE
	STONE WALL		STONE WALL
	SANITARY SEWER		SANITARY SEWER
	SANITARY SEWER APPROX.		SANITARY SEWER APPROX.
	SEWER FORCEMAIN		SEWER FORCEMAIN
	SEWER SERVICE		SEWER SERVICE
	DISPOSAL AREA LATERAL		DISPOSAL AREA LATERAL
	STORM LINE		STORM LINE
	STORM LINE APPROX.		STORM LINE APPROX.
	UNDER DRAIN		UNDER DRAIN
	FOUNDATION DRAIN		FOUNDATION DRAIN
	ROOF DRAIN		ROOF DRAIN
	DITCH/SWALE		DITCH/SWALE
	TELECOMM		TELECOMM
	TELECOMM APPROX.		TELECOMM APPROX.
	UNDERGROUND TELECOMM		UNDERGROUND TELECOMM
	OVERHEAD TELECOMM		OVERHEAD TELECOMM
	ELECTRIC LINE		ELECTRIC LINE
	ELECTRIC APPROX.		ELECTRIC APPROX.
	UNDERGROUND ELECTRIC		UNDERGROUND ELECTRIC
	OVERHEAD ELECTRIC		OVERHEAD ELECTRIC
	ELECTRICAL SITE LIGHTING		ELECTRICAL SITE LIGHTING
	WATER LINE		WATER LINE
	WATER APPROX.		WATER APPROX.
	WATER SERVICE		WATER SERVICE
	GAS LINE		GAS LINE
	GAS APPROX.		GAS APPROX.
	CABLE TV		CABLE TV
	CABLE TV APPROX.		CABLE TV APPROX.
	UNDERGROUND CABLE TV		UNDERGROUND CABLE TV
	OVERHEAD CABLE TV		OVERHEAD CABLE TV

PARKING TABLE		
CRITERIA	EXISTING	PROPOSED
TOTAL SPACES	56	106
ADA ACCESSIBLE	2	5
EV CHARGING	0	2
TANDEM	0	8

Stamp

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Description					
No.					

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DUNCAN WISNIEWSKI ARCHITECTURE

255 SOUTH CHAMPLAIN STREET
BURLINGTON, VT 05401
(802) 864-6693

LEGEND AND NOTES

Project Title: HOWARD CENTER REDEVELOPMENT
855 PINE STREET/300 FLYNN AVENUE
CITY OF BURLINGTON, CHITTENDEN COUNTY, VERMONT

Sheet Title:

EV Project # 22488

Drawn By: JG

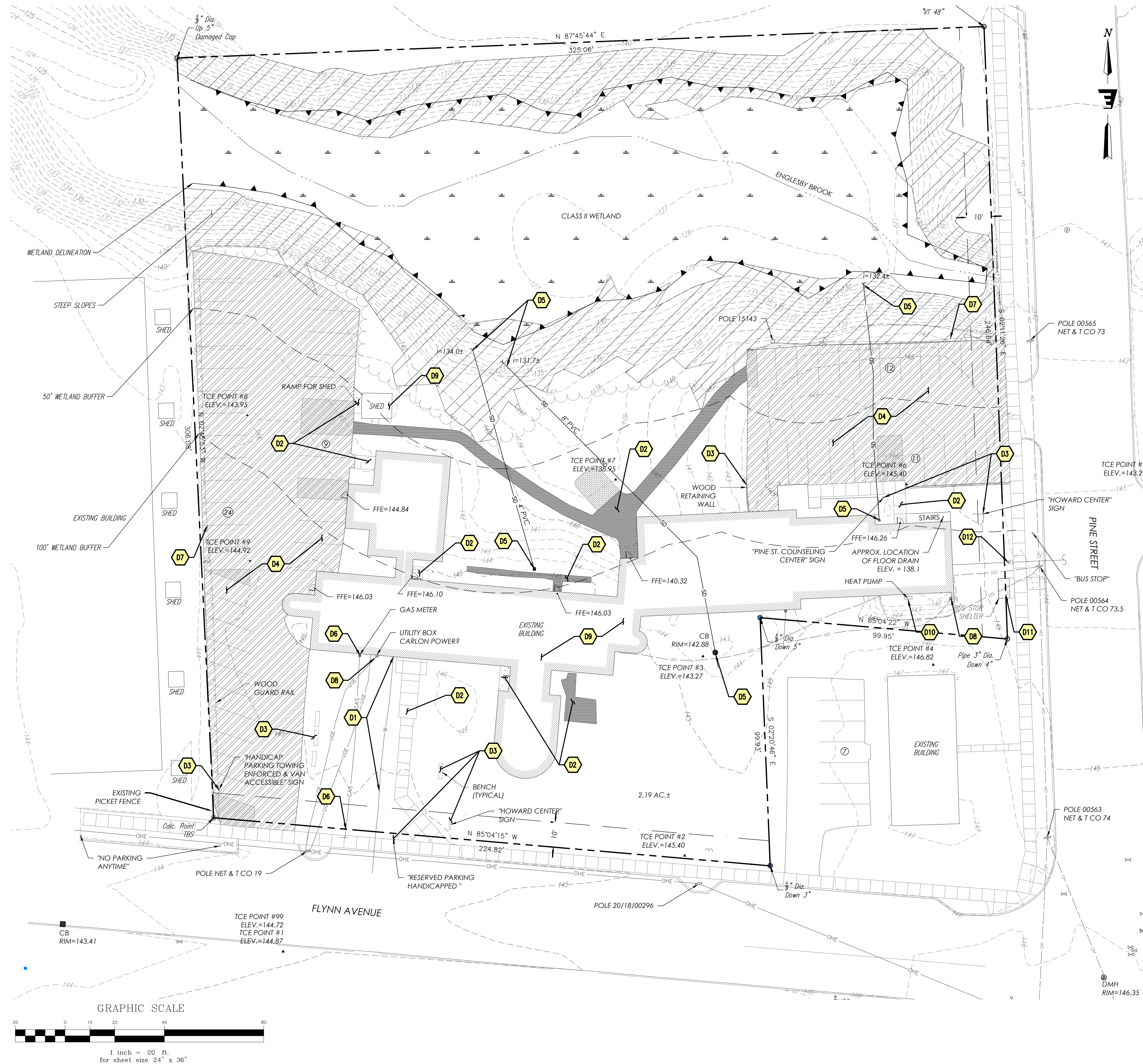
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Date: 08/03/2023

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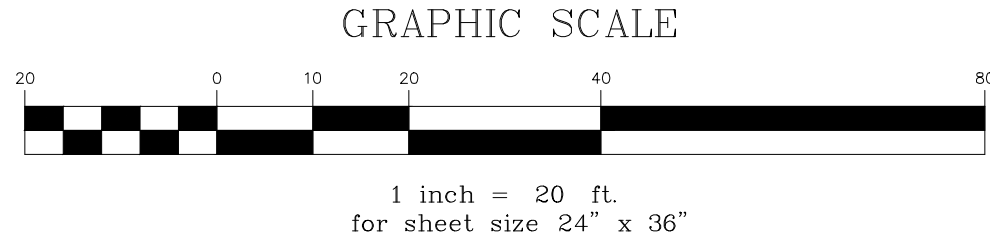


1. EXISTING PHYSICAL FEATURES AND TOPOGRAPHY SHOWN HERE HAS BEEN TAKEN FROM A SURVEY PREPARED BY TRUDELL CONSULTING ENGINEERS IN NOVEMBER, 2021.
2. PROPERTY BOUNDARY BASED ON A SURVEY BY LATITUDES LAND SURVEYING IN SEPTEMBER, 2022.
3. UTILITIES SHOWN DO NOT PURPORT TO CONSTITUTE OR REPRESENT ALL UTILITIES LOCATED UPON OR ADJACENT TO THE SURVEYED PREMISES.
4. NORTH ORIENTATION IS REFERENCED TO VERMONT GRID NORTH USING VIVRS CORS STATION.
5. ELEVATIONS ARE REFERENCED TO APPROXIMATE NAVD 88 DERIVED FROM GPS READINGS.
6. ELEVATIONS NORTH OF THE SURVEYED AREA ARE REPRESENTED BY LIDAR DATA FROM THE VERMONT CENTER FOR GEOGRAPHIC INFORMATION, 2017.
7. WETLAND DELINEATION WAS CONDUCTED BY GILMAN & BRIGGS ENVIRONMENTAL ON SEPTEMBER 09, 2022 AND LOCATIONS SURVEYED BY LATITUDES LAND SURVEYING ON SEPTEMBER 20, 2022.
8. EXISTING UTILITIES SHOWN ON PLANS WERE TAKEN FROM FIELD OBSERVATIONS OF VISIBLE UTILITIES AND PAINTED MARKINGS. CONTRACTOR SHALL BE RESPONSIBLE FOR FIELD VERIFYING UTILITY LOCATIONS PRIOR TO COMMENCING WORK. NOTIFY ENGINEER OF ANY DISCREPANCY BETWEEN UTILITIES AS SHOWN AND AS FOUND. THE CONTRACTOR SHALL CONTACT DIG SAFE (811 or 888-344-7233) A MINIMUM OF 72 HOURS, BUT NOT INCLUDING SATURDAYS, SUNDAYS AND LEGAL HOLIDAYS, PRIOR TO ANY CONSTRUCTION.

1. ALL ITEMS FROM THE DEMOLITION, UNLESS NOTED BY THE OWNER TO BE STORED OR REUSED, BECOME THE PROPERTY OF THE CONTRACTOR AND SHALL BE PROMPTLY REMOVED FROM THE SITE. SOIL DISPOSAL SHALL BE AS DIRECTED BY ENGINEER. ALL DEMOLITION MATERIALS SHALL BE REMOVED AND DISPOSED OF IN ACCORDANCE WITH REQUIREMENTS OF REGULATORY AGENCIES HAVING JURISDICTION (INCLUDING BUT NOT LIMITED TO THE CITY OF BURLINGTON AND THE VERMONT AGENCY OF NATURAL RESOURCES).
2. ALL ADJACENT FACILITIES AND STRUCTURES NOT INDICATED AS INCLUDED IN THE SCOPE OF WORK SHALL BE PROTECTED FROM DAMAGE DURING CONSTRUCTION. ALL ADJACENT FACILITIES OR STRUCTURES DAMAGED DURING CONSTRUCTION SHALL BE REPAIRED OR REPLACED TO PRE-CONSTRUCTION CONDITION OR BETTER.
3. IF UTILITY CONNECTIONS REQUIRE DISCONNECTION OR RE-ROUTING, THE CONTRACTOR SHALL COORDINATE WITH THE UTILITY COMPANY AND/OR THE CITY OF BURLINGTON. ALL DEMOLISHED ONSITE PIPING, WIRING, CONDUITS & STRUCTURES SHALL BE REMOVED FROM THE SITE.
4. IF HAZARDOUS MATERIALS OR WASTE IS ENCOUNTERED DURING DEMOLITION WORK, THE CONTRACTOR SHALL CONTACT THE REGULATORY AGENCIES AND COMPLY WITH THE JURISDICTIONAL REQUIREMENTS. HAZARDOUS MATERIALS AND WASTES MUST BE REMOVED BY A PERMITTED HAZARDOUS WASTE CONTRACTOR TO A PERMITTED HAZARDOUS WASTE SITE PERMITTED TO ACCEPT THE CHARACTERIZED WASTE.
5. TAKE ALL PRECAUTIONS NECESSARY TO PROVIDE A SAFE WORK AREA DURING DEMOLITION PROCEDURES. THE CONTRACTOR SHALL MINIMIZE DUST AND NOISE POLLUTION GENERATED DURING DEMOLITION AND CONSTRUCTION ACTIVITIES.
6. PRIOR TO DEMOLITION, HAND EXCAVATE ANY UNDERGROUND UTILITIES. NOTIFY THE OWNER IF ANY OTHER UTILITIES NOT NOTED ON THE DRAWINGS ARE FOUND.
7. CARE SHALL BE TAKEN NOT TO DAMAGE OR DISTURB ANY TREES NOT CALLED OUT FOR REMOVAL DURING CONSTRUCTION. KEEP CONSTRUCTION ACTIVITIES AND EQUIPMENT OUTSIDE OF DRIP LINE OF BOTH EXISTING TO REMAIN AND NEWLY PLANTED TREES.
8. ALL DEPRESSIONS OR VOIDS IN THE GROUND SURFACE RESULTING FROM DEMOLITION WORK SHALL BE BACKFILLED WITH CLEAN, GRANULAR FILL MATERIALS MEETING EARTHWORK SPECIFICATIONS AND SHALL BE COMPACTED TO A MINIMUM 90% MODIFIED PROCTOR DENSITY AND PLACED IN 12" LIFTS MAXIMUM.

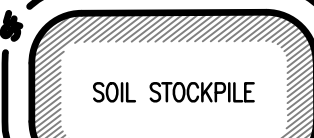
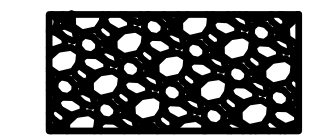
- | | |
|-----|--|
| D1 | DISCONNECT, REMOVE & CAP WATER SERVICE LINE AT MAIN, COORD. WITH MEP |
| D2 | DEMO. CONCRETE PAVING/PAVERS & REMOVE BASE MATERIAL AS REQ'D, TYP. |
| D3 | REMOVE SITE FURNISHING (BENCH, SIGN ETC.), TYP. |
| D4 | DEMO. EX. PAVEMENT & REMOVE BASE MATERIAL AS REQ'D, TYP. |
| D5 | DEMO. STORMWATER STRUCTURES & REMOVE ASSOC. PIPES, TYP. |
| D6 | REMOVE GAS METER & CAP LINE, COORD. WITH MEP |
| D7 | DEMO. & REMOVE WOOD GUIDE RAIL, TYP. |
| D8 | REMOVE TRANSFORMER & ABANDON EX. BURIED CONDUIT, COORD. WITH MEP |
| D9 | DEMO. BLDG. AND FOUNDATION MATERIAL AS REQ'D |
| D10 | REMOVE HEAT PUMP, COORD. WITH MEP |
| D11 | REMOVE & RELOCATE BUS SHELTER |
| D12 | DISCONNECT, REMOVE & CAP WATER SERVICE LINE AT MAIN, COORD. WITH MEP |

[illegible]



EPSC LEGEND

EROSION PREVENTION AND SEDIMENT CONTROL STRATEGY
 THE FOLLOWING TECHNIQUES WILL BE UTILIZED AS PART OF A SEDIMENT AND EROSION CONTROL PROGRAM. THE SEDIMENT AND EROSION CONTROL PROGRAM WILL BE IMPLEMENTED IN STAGES. CERTAIN ITEMS FROM ONE STAGE WILL LIKELY OVERLAP OR TAKE PLACE CONCURRENTLY WITH ITEMS FROM OTHER STAGES.



TEMPORARY STABILIZED CONSTRUCTION ENTRANCE
 THIS STRUCTURAL MEASURE IS A STABILIZED PAD OF AGGREGATE UNDERLAIN WITH FILTER FABRIC LOCATED AT ANY POINT WHERE TRAFFIC WILL BE ENTERING OR LEAVING A CONSTRUCTION SITE TO OR FROM A PUBLIC RIGHT-OF-WAY, STREET, ALLEY, SIDEWALK, OR PARKING AREA. THE PURPOSE OF A STABILIZED CONSTRUCTION ENTRANCE IS TO REDUCE OR ELIMINATE THE TRACKING OF SEDIMENT ONTO PUBLIC RIGHTS-OF-WAY OR STREETS. THIS WILL REMAIN IN PLACE AND BE MAINTAINED UNTIL THE PROJECT SITE HAS BEEN PERMANENTLY STABILIZED. ONCE REMOVED, THE IMPACTED AREA SHALL BE SEEDED AND MULCHED.

TEMPORARY STAGING AND WASTE AREAS (APPROXIMATE)
 THESE ARE APPROVED LOCATIONS WHERE NON-SOIL, NON-ERODIBLE MATERIALS MAY BE STORED. SOILS SHALL NOT BE STORED IN THESE AREAS.

TEMPORARY SOIL STOCKPILE AREAS (APPROXIMATE)
 THESE ARE APPROVED LOCATIONS WHERE TOPSOIL AND OTHER SOIL MATERIALS MAY BE STORED. THESE STOCKPILES WILL BE PROTECTED FROM EROSION BY A NUMBER OF METHODS, INCLUDING INSTALLING SILT FENCING AROUND THE DOWN GRADIENT PERIMETER OF THE STOCKPILE AND SEEDING AND MULCHING THE STOCKPILE WHEN NOT IN USE FOR MORE THAN FIVE DAYS.

CONSTRUCTION (CF) OR CHAIN LINK (C) FENCING
 THIS STRUCTURAL MEASURE IS INSTALLED ALONG THE PERIMETER OF THE PROJECT AREA. THE FENCING IS EFFECTIVE WHEN USED TO SEPARATE THE PROJECT AREA FROM ADJACENT AREAS USED BY THE PUBLIC. THESE WILL REMAIN IN PLACE AND BE MAINTAINED UNTIL THE PROJECT SITE HAS BEEN PERMANENTLY STABILIZED. CONFIRM LOCATION, EXTENTS AND GATES WITH OWNER. FENCE LOCATION AND GATES TO BE RE-ADJUSTED AS NECESSARY BASED ON OWNER REQUIREMENTS AND COORDINATION.

TEMPORARY SILT FENCING
 THIS STRUCTURAL MEASURE IS A TEMPORARY BARRIER OF GEOTEXTILE FABRIC USED TO INTERCEPT SEDIMENT LADEN RUNOFF FROM SMALL DRAINAGE AREAS OF DISTURBED SOIL. IT IS INSTALLED ALONG THE PERIMETER OF IMPACTED AREAS AND ALONG THE BASE OF THE FILL SLOPES. SILT FENCING IS EFFECTIVE IN REDUCING STORMWATER RUNOFF VELOCITIES, ASSIST IN THE DEPOSITION OF TRANSPORTED SEDIMENT LOAD AND PREVENT EROSION OF SOILS ONTO ADJACENT AREAS. THESE WILL REMAIN IN PLACE AND BE MAINTAINED UNTIL THE PROJECT SITE HAS BEEN PERMANENTLY STABILIZED.

LIMITS OF DISTURBANCE
 THE CONTRACTOR SHALL CONTAIN ANY EARTH MOVING ACTIVITIES WITHIN THE DESIGNATED LIMITS SHOWN ON THIS PLAN. THE ENGINEER SHALL REVIEW THE SITE TO MAKE ANY ADJUSTMENTS TO ACCOUNT FOR ENVIRONMENTALLY SENSITIVE AREAS, SPECIMEN TREES AND SPECIAL AREAS OF CONCERN.

Stamp

Date

Description

No.

ENGINEERING VENTURES PC

DUNCAN WISNIEWSKI
 ARCHITECTURE
 255 SOUTH CHAMPLAIN STREET
 BURLINGTON, VT 05401
 (802) 864-6693

PRE-CONSTRUCTION &
 DEMOLITION EPSC PLAN

PROJECT TITLE:
 HOWARD CENTER REDEVELOPMENT
 855 PINE STREET/300 FLYNN AVENUE
 CITY OF BURLINGTON, CHITTENDEN COUNTY, VERMONT

EV Project #
 22488

Drawn By:
 JG

Checked By:
 KW

Scale:
 1" = 20'

Date:
 08/03/2023

C1.1

DESIGN DEVELOPMENT
 NOT FOR CONSTRUCTION
 08/03/2023

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SITE SCHEDULE

- C1 ASPHALT PAVEMENT, TYP.
- C2 CONCRETE SIDEWALK, TYP.
- C3 PERVIOUS CONCRETE PAVERS
- C4 6" VERTICAL GRANITE CURB, TYP.
- C5 6" FLUSH GRANITE CURB, TYP.
- C6 WOOD GUIDERAIL
- C7 CONCRETE PAD SURROUNDED BY PRIVACY FENCE WITH LOCKING GATE SIZED FOR (2) REFUSE DUMPSTERS AND (2) TITERS
- C8 TRANSFORMER ON CONCRETE PAD, COORDINATE WITH MEP
- C9 TIMBER BUS SHELTER ON CONCRETE PAD
- C10 ADA ACCESSIBLE PARKING SPACE, TYP.
- C11 EV CHARGING ACCESSIBLE PARKING SPACE, TYP.
- C12 U-SHAPED BICYCLE RACK, TYP.
- C13 RIVERSTONE DRIP EDGE
- C14 SNOW STORAGE AREA

Stamp	
Date	
Description	
No.	

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 (802) 864-6693

SITE LAYOUT & GRADING PLAN
HOWARD CENTER REDEVELOPMENT
855 PINE STREET/300 FLYNN AVENUE
 CITY OF BURLINGTON, CHITTENDEN COUNTY, VERMONT

EV Project # 22488
 Drawn By: JG
 Checked By: KW
 Scale: 1" = 20'
 Date: 08/03/2023

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SITE UTILITY SCHEDULE

- E1** TRANSFORMER, COORDINATE WITH MEP
- E2** EV CHARGING STATION WITH (2) PORTS, COORDINATE WITH MEP
- W1** 6" D.I. WATER SERVICE LINE FROM EX. MAIN TO PROP. BLDG, INCLUSIVE OF GATE VALVE PER BURLINGTON DPW STANDARD
- W2** 2" TYPE "K" COPPER DOMESTIC WATER SERVICE LINE FROM W1 TO PROP. BLDG, INCLUSIVE OF GATE VALVE PER BURLINGTON DPW STANDARD
- SS1** 6" PVC SANITARY SEWER SERVICE LINE FROM PROP. BLDG. TO EX. MAIN IN FLYNN AVE., INCLUSIVE OF CLEANOUT WITH BACKFLOW PREVENTER PER BURLINGTON DPW STANDARDS
- ST1** 4' I.D. MANHOLE
RIM: 145.72
INV. IN (E): 141.26 (12" HDPE)
INV. OUT (N): 141.16 (12" HDPE)
- ST2** 3' I.D. DEEP SUMP CATCH BASIN
RIM: 144.95
INV. OUT (W): 142.85 (12" HDPE)
- ST3** 2' X 2' DEEP SUMP CATCH BASIN
RIM: 144.35
- ST4** 4' I.D. MANHOLE
RIM: 144.03
INV. IN (N): 139.93 (12" HDPE)
INV. OUT (W): 139.83 (12" HDPE)
- ST5** 4' I.D. MANHOLE
RIM: 144.87
INV. IN (E): 139.56 (12" HDPE)
INV. IN (S): 140.58 (12" HDPE)
INV. OUT (N): 139.46 (12" HDPE)
- ST6** 4' I.D. MANHOLE
RIM: 143.16
INV. IN (W): 138.28 (12" HDPE)
INV. OUT (NE): 138.18 (12" HDPE)
- ST7** FLARED END SECTION
- ST8** 6" PERF. PVC FOOTING DRAIN
- ST9** FLARED END SECTION WITH STONE APRON
- ST10** 12" I.D. YARD DRAIN
RIM: 142.21
INV. OUT (N): 141.00 (8" PVC)
- ST11** RIP-RAP END SECTION
- ST12** RIP-RAP END SECTION
- ST13** 3' I.D. DEEP SUMP CATCH BASIN
RIM: 142.82
INV. OUT (N): 141.66 (12" HDPE)
- ST14** RIP-RAP END SECTION
- STF1** FOCAL POINT TREATMENT AREA (350 SF)
- STF2** FOCAL POINT TREATMENT AREA (25 SF)
- STF3** FOCAL POINT TREATMENT AREA (87 SF)
- STF4** FOCAL POINT TREATMENT AREA (32 SF)
- STT** STORMTECH SC-310 CHAMBERS (14X12)

PIPE SCHEDULE

NAME	TYPE	LENGTH	SLOPE
ST5-ST4	12" HDPE	50.6	0.5%
STF1-ST1	12" HDPE	95.0	0.5%
ST1-ST4	12" HDPE	112.6	0.5%
STF2-ST12	12" HDPE	22.2	1.0%
STF3-ST4	12" HDPE	31.8	0.5%
ST7-ST8	12" HDPE	9.0	1.0%
ST10-ST11	8" PVC	115.7	1.0%
ST8-ST9	8" PVC	33.2	2.0%
STF4-ST14	12" HDPE	7.7	2.8%

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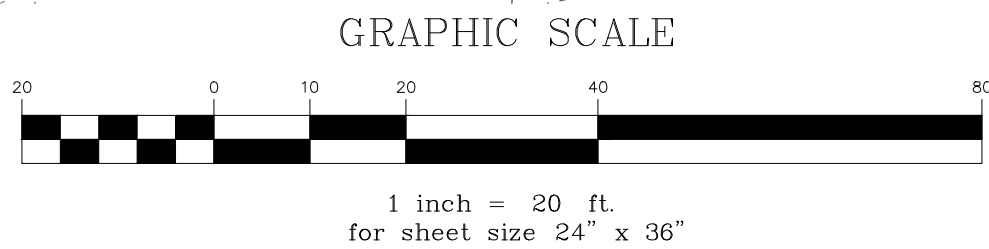
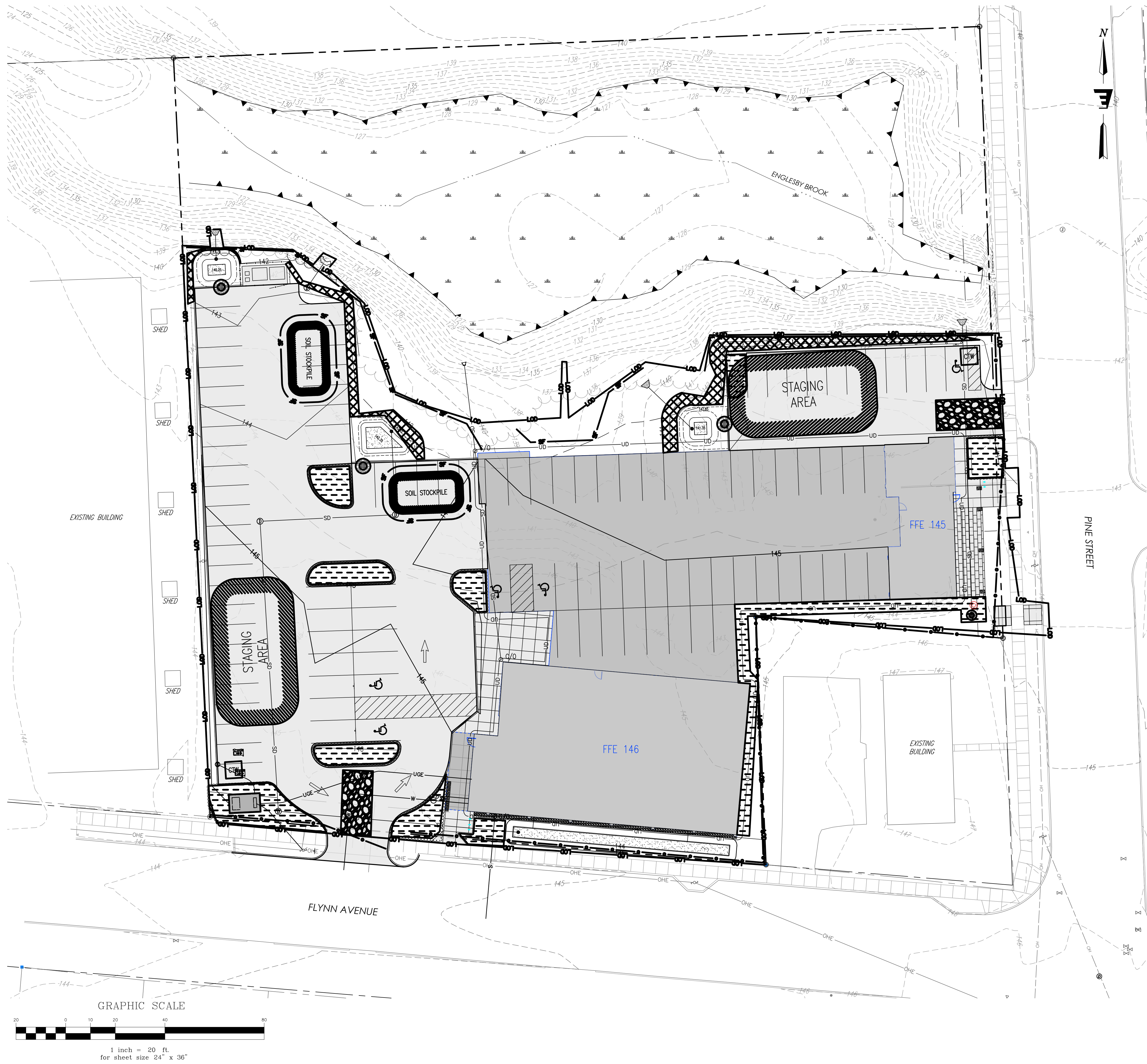
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SITE UTILITY PLAN

HOWARD CENTER REDEVELOPMENT
855 PINE STREET/300 FLYNN AVENUE
CITY OF BURLINGTON, CHITTENDEN COUNTY, VERMONT

EV Project #	22488
Drawn By:	JG
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EPSC LEGEND

- EROSION PREVENTION AND SEDIMENT CONTROL STRATEGY**
THE FOLLOWING TECHNIQUES WILL BE UTILIZED AS PART OF A SEDIMENT AND EROSION CONTROL PROGRAM. THE SEDIMENT AND EROSION CONTROL PROGRAM WILL BE IMPLEMENTED IN STAGES. CERTAIN ITEMS FROM ONE STAGE WILL LIKELY OVERLAP OR TAKE PLACE CONCURRENTLY WITH ITEMS FROM OTHER STAGES.
- TEMPORARY STABILIZED CONSTRUCTION ENTRANCE**
THIS STRUCTURAL MEASURE IS A STABILIZED PAD OF AGGREGATE UNDERLAIN WITH FILTER FABRIC LOCATED AT ANY POINT WHERE TRAFFIC WILL BE ENTERING OR LEAVING A CONSTRUCTION SITE TO OR FROM A PUBLIC RIGHT-OF-WAY, STREET, ALLEY, SIDEWALK, OR PARKING AREA. THE PURPOSE OF A STABILIZED CONSTRUCTION ENTRANCE IS TO REDUCE OR ELIMINATE THE TRACKING OF SEDIMENT ONTO PUBLIC RIGHTS-OF-WAY OR STREETS. THIS WILL REMAIN IN PLACE AND BE MAINTAINED UNTIL THE PROJECT SITE HAS BEEN PERMANENTLY STABILIZED. ONCE REMOVED, THE IMPACTED AREA SHALL BE SEEDED AND MULCHED.
- TEMPORARY STAGING AND WASTE AREAS (APPROXIMATE)**
THESE ARE APPROVED LOCATIONS WHERE NON-SOIL, NON-ERODIBLE MATERIALS MAY BE STORED. SOILS SHALL NOT BE STORED IN THESE AREAS.
- TEMPORARY SOIL STOCKPILE AREAS (APPROXIMATE)**
THESE ARE APPROVED LOCATIONS WHERE TOPSOIL AND OTHER SOIL MATERIALS MAY BE STORED. THESE STOCKPILES WILL BE PROTECTED FROM EROSION BY A NUMBER OF METHODS, INCLUDING INSTALLING SILT FENCING AROUND THE DOWN GRADIENT PERIMETER OF THE STOCKPILE AND SEEDING AND MULCHING THE STOCKPILE WHEN NOT IN USE FOR MORE THAN FIVE DAYS.
- TEMPORARY INLET PROTECTION** - INSTALL AS INDICATED ON PLANS. STONE TO BE REMOVED AND REPLACED WITH CLEAN STONE WHEN SEDIMENT IS $\leq 1/2$ DEPTH OF STONE. REMOVE ALL SEDIMENT IF COLLECTED IN STRUCTURE AS SOON AS POSSIBLE.
- CONCRETE TRUCK WASHOUT**
THIS IS AN APPROVED LOCATION WHERE CONCRETE TRUCK MIXERS AND EQUIPMENT CAN BE WASHED AFTER THEIR LOADS HAVE BEEN DISCHARGED, TO PREVENT HIGHLY ALKALINE RUNOFF FROM ENTERING STORM DRAINAGE SYSTEMS OR LEACHING INTO THE SOIL. THE FACILITY SHALL BE LINED TO PREVENT RUNOFF FROM LEACHING INTO THE SOIL. TEMPORARY SIGNAGE SHALL BE PROVIDED TO DIRECT DRIVERS TO THE FACILITY.
- CONSTRUCTION (CF) OR CHAIN LINK (C) FENCING**
THIS STRUCTURAL MEASURE IS INSTALLED ALONG THE PERIMETER OF THE PROJECT AREA. THE FENCING IS EFFECTIVE WHEN USED TO SEPARATE THE PROJECT AREA FROM ADJACENT AREAS USED BY THE PUBLIC. THESE WILL REMAIN IN PLACE AND BE MAINTAINED UNTIL THE PROJECT SITE HAS BEEN PERMANENTLY STABILIZED. CONFIRM LOCATION, EXTENTS AND GATES WITH OWNER. FENCE LOCATION AND GATES TO BE RE-ADJUSTED AS NECESSARY BASED ON OWNER REQUIREMENTS AND COORDINATION.
- TEMPORARY SILT FENCING**
THIS STRUCTURAL MEASURE IS A TEMPORARY BARRIER OF GEOTEXTILE FABRIC USED TO INTERCEPT SEDIMENT LADEN RUNOFF FROM SMALL DRAINAGE AREAS OF DISTURBED SOIL. IT IS INSTALLED ALONG THE PERIMETER OF IMPACTED AREAS AND ALONG THE BASE OF THE FILL SLOPES. SILT FENCING IS EFFECTIVE IN REDUCING STORMWATER RUNOFF VELOCITIES, ASSIST IN THE DEPOSITION OF TRANSPORTED SEDIMENT LOAD AND PREVENT EROSION OF SOILS ONTO ADJACENT AREAS. THESE WILL REMAIN IN PLACE AND BE MAINTAINED UNTIL THE PROJECT SITE HAS BEEN PERMANENTLY STABILIZED.
- LIMITS OF DISTURBANCE**
THE CONTRACTOR SHALL CONTAIN ANY EARTH MOVING ACTIVITIES WITHIN THE DESIGNATED LIMITS SHOWN ON THIS PLAN. THE ENGINEER SHALL REVIEW THE SITE TO MAKE ANY ADJUSTMENTS TO ACCOUNT FOR ENVIRONMENTALLY SENSITIVE AREAS, SPECIMEN TREES AND SPECIAL AREAS OF CONCERN.

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CONSTRUCTION EPSC PLAN

Sheet Title:

HOWARD CENTER REDEVELOPMENT

Project Title:

855 PINE STREET/300 FLYNN AVENUE

CITY OF BURLINGTON, CHITTENDEN COUNTY, VERMONT

EV Project # 22488

Drawn By: JG

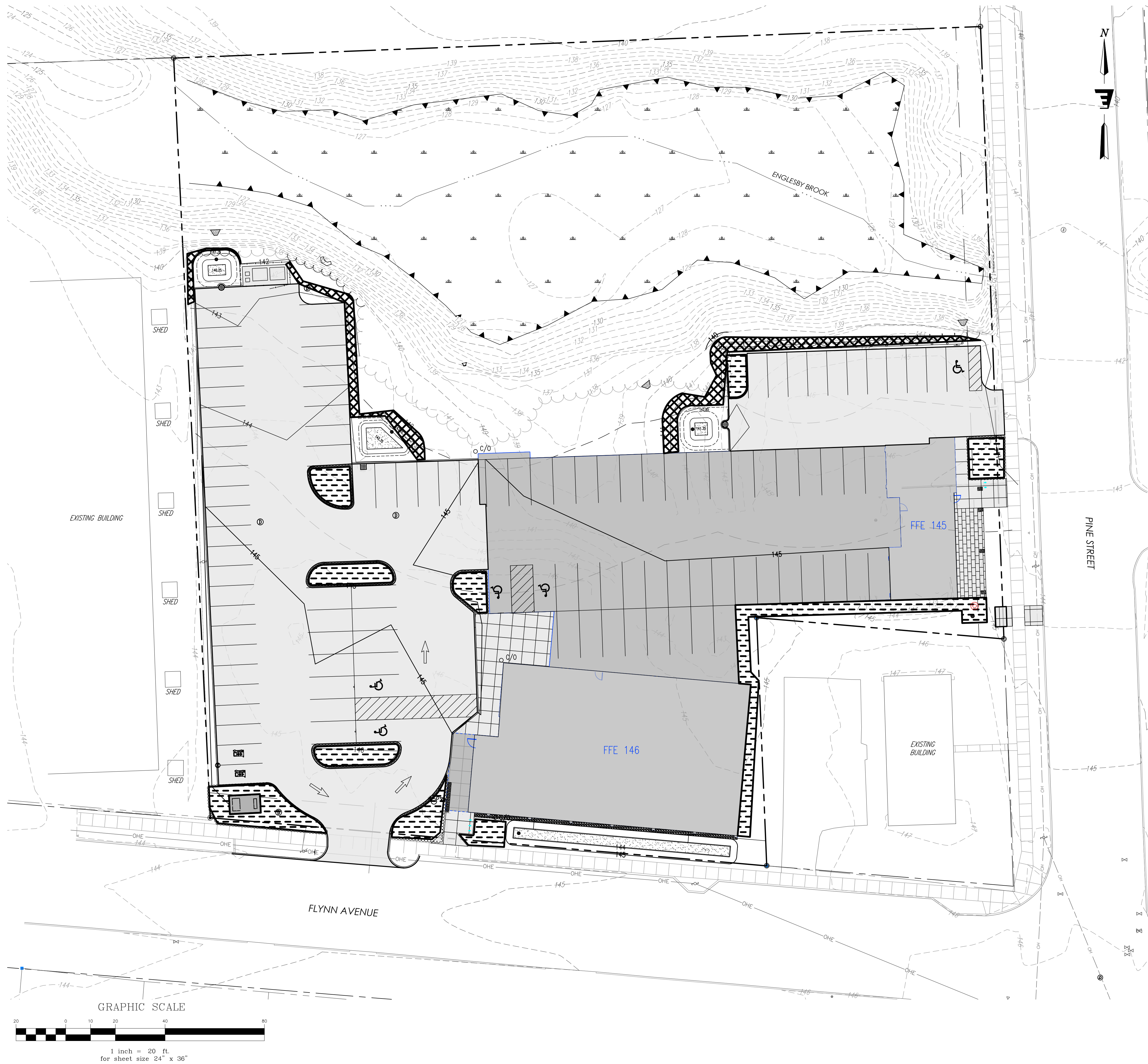
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Date: 08/03/2023

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EPSC LEGEND

EROSION PREVENTION AND SEDIMENT CONTROL STRATEGY
 THE FOLLOWING TECHNIQUES WILL BE UTILIZED AS PART OF A SEDIMENT AND EROSION CONTROL PROGRAM. THE SEDIMENT AND EROSION CONTROL PROGRAM WILL BE IMPLEMENTED IN STAGES. CERTAIN ITEMS FROM ONE STAGE WILL LIKELY OVERLAP OR TAKE PLACE CONCURRENTLY WITH ITEMS FROM OTHER STAGES.

- PERMANENT EROSION CONTROL NETTING
 THIS STRUCTURAL MEASURE IS INSTALLED IN AREAS THAT HAVE SLOPES 3:1 AND GREATER AND IN OTHER LOCATIONS INDICATED ON THIS PLAN TO STABILIZE THE SLOPE AND REDUCE THE EROSION POTENTIAL. THE NETTING IS TYPICALLY IMPREGNATED WITH GRASS SEED AND SOMETIMES STAPLED TO THE EXPOSED SOIL. THESE WILL REMAIN IN PLACE AND BE MAINTAINED UNTIL THE PROJECT SITE HAS BEEN PERMANENTLY STABILIZED.
- SOIL RESTORATION AREA AND TEST LOCATION
 AREAS TO BE RESTORED TO MEET THE POST-CONSTRUCTION SOIL DEPTH AND QUALITY STANDARD (SEE NOTES BELOW).

SOIL RESTORATION NOTES

TO THE MAXIMUM EXTENT PRACTICABLE, THE NATIVE TOPSOIL AND DUFF LAYER SHALL BE RETAINED IN AN UNDISTURBED STATE.
 FOLLOWING ROUGH SITE GRADING, INSTALLATION OF UTILITIES AND INFRASTRUCTURE, AND PRIOR TO PLANTING OF VEGETATIVE COVER, CONTRACTOR SHALL RESTORE SOIL QUALITY TO DISTURBED AREAS USING ONE OF THE FOLLOWING METHODS. CONTRACTOR SHALL PROVIDE NOTICE TO ENGINEER/OWNER PRIOR TO CONSTRUCTION OF SELECTED METHOD. AREAS EXEMPT FROM THIS STANDARD INCLUDE SLOPES STEEPER THAN 33%, IMPERVIOUS AREAS, AND THOSE INCORPORATED INTO STRUCTURAL STORMWATER TREATMENT PRACTICES.

- OPTION 1: LEAVE UNDISTURBED NATIVE VEGETATION AND SOIL IN PLACE
 - IDENTIFY AREAS OF THE SITE THAT WILL NOT BE STRIPPED, GRADED, OR DRIVEN ON, AND FENCE OFF THOSE AREAS TO PREVENT IMPACTS DURING CONSTRUCTION
 - FAILURE TO ESTABLISH AND MAINTAIN EXCLUSIONARY CONTROLS AROUND THESE AREAS DURING CONSTRUCTION MAY TRIGGER THE REQUIREMENT TO RESTORE SOILS PER ONE OF THE OPTIONS BELOW
- OPTION 2: AMEND EXISTING SITE TOPSOIL OR SUBSOIL IN PLACE
 - SCARIFY OR TILL SUBSOILS TO 4-INCH DEPTH OR TO DEPTH NEEDED TO ACHIEVE A TOTAL DEPTH OF 8-INCHES OF UNCOMPACTED SOIL AFTER CALCULATED AMOUNT OF AMENDMENT IS ADDED. EXCEPT FOR WITHIN THE DRIP LINE OF EXISTING TREES, THE ENTIRE SURFACE SHALL BE DISTURBED BY SCARIFICATION.
 - AMEND SOIL TO MEET ORGANIC CONTENT REQUIREMENT:
 - PRE APPROVED RATE: PLACE 1-INCH OF COMPOSTED MATERIAL* WITH AN ORGANIC MATTER CONTENT BETWEEN 40 AND 60% AND ROTOTILL INTO 3-INCHES OR SOIL, OR
 - CALCULATED RATE: PLACE CALCULATED AMOUNT OF COMPOSTED MATERIAL* OR APPROVED ORGANIC MATERIAL AND ROTOTILL INTO DEPTH OF SOIL NEEDED TO ACHIEVE 4-INCHES OF SETTLED SOIL AT 4% ORGANIC CONTENT.
 - RAKE BEDS TO SMOOTH AND REMOVE SURFACE ROCKS LARGER THAN 2-INCHES IN DIAMETER
 - WATER OR ROLL TO COMPACT SOIL IN TURF AREAS TO 85% OF MAXIMUM DRY DENSITY

- OPTION 3: REMOVE AND STOCKPILE EXISTING TOPSOIL DURING GRADING.
 - STOCKPILE SOIL ON SITE IN A DESIGNATED CONTROLLED AREA, AT LEAST 50-FEET FROM SURFACE WATER, WETLANDS, FLOODPLAINS, OR OTHER CRITICAL RESOURCE AREAS.
 - SCARIFY OR TILL SUBGRADE TO A DEPTH OF 4-INCHES. EXCEPT FOR WITHIN THE DROP LINE OF EXISTING TREES, THE ENTIRE SURFACE SHALL BE DISTURBED BY SCARIFICATION.
 - STOCKPILED TOPSOIL SHALL ALSO BE AMENDED, IF NEEDED, TO MEET THE ORGANIC CONTENT REQUIREMENTS:
 - PRE APPROVED RATE: COMPOST* SHALL BE INCORPORATED WITH AN ORGANIC MATTER CONTENT BETWEEN 40 AND 65% INTO THE TOPSOIL AT A RATIO 1:3, OR
 - CALCULATED RATE: INCORPORATE COMPOSTED MATERIAL* OR APPROVED ORGANIC MATERIAL AT A CALCULATED RATE TO ACHIEVE 4-INCHES OF SETTLED SOIL AT 4% ORGANIC CONTENT
 - REPLACE STOCKPILED TOPSOIL PRIOR TO PLANTING
 - RAKE TO LEVEL, AND REMOVE SURFACE ROCKS LARGER THAN 2-INCHES IN DIAMETER.

- OPTION 4: IMPORT TOPSOIL MIX, OR OTHER MATERIALS FOR MIXING, INCLUDING COMPOST, OF SUFFICIENT ORGANIC CONTENT AND DEPTH.
 - SCARIFY OR TILL SUBGRADE TO A DEPTH OF 4-INCHES. EXCEPT FOR WITHIN THE DRIP LINE OF EXISTING TREES, THE ENTIRE SURFACE SHALL BE DISTURBED BY SCARIFICATION
 - PLACE 4-INCHES OF IMPORTED TOPSOIL MIX ON SURFACE. THE IMPORTED TOPSOIL MIX SHALL CONTAIN 4% ORGANIC MATTER. SOILS USED IN THE MIX SHALL BE SAND OR SANDY LOAM AS DEFINED BY THE USDA SOILS CLASSIFICATION SYSTEM.
 - RAKE BEDS TO SMOOTH AND REMOVE SURFACE ROCKS LARGER THAN 2-INCHES IN DIAMETER.
 - WATER OR ROLL TO COMPACT SOIL IN TURF AREAS TO 85% OF MAXIMUM DRY DENSITY.
- * COMPOST OR OTHER MATERIALS USED TO AMEND SOIL SHALL HAVE A C:N RATIO BELOW 25:1 AND SHALL MEET THE CONTAMINANT STANDARDS IN THE VERMONT SOLID WASTE MANAGEMENT RULES

SOIL RESTORATION TESTING

ONCE SOIL QUALITY HAS BEEN RESTORED IN ACCORDANCE WITH THE SOIL RESTORATION METHODS OUTLINED, AND PRIOR TO PLANTING, THE CONTRACTOR SHALL PERFORM FIELD TESTING OF RESTORED SOIL QUALITY. TESTING SHALL BE IN LOCATIONS SHOWN ON THE PLANS OR AS APPROVED BY THE ENGINEER. A MINIMUM OF NINE TEST HOLES PER ACRE SHALL BE DUG TO A DEPTH OF 8-INCHES AND SHALL BE AT LEAST 50-FEET APART. TESTING SHALL BE PERFORMED USING A SPADE SHOVEL DRIVEN SOLELY BY THE WEIGHT OF THE INSPECTOR. CONTRACTOR SHALL PREPARE A REPORTING FORM THAT INCLUDES THE FOLLOWING INFORMATION:

- DATE/TIME OF TEST
- PERSONS PERFORMING AND WITNESSING TESTING
- LOCATION OF TEST
- OBSERVATIONS SHALL NOTE: EASE OF DRIVING SPADE (DIFFICULT, MODERATE, EASY), VERIFICATION OF SOIL AMENDMENTS, NOTE OF MATERIAL THICKNESS, TEXTURE AND OTHER NOTABLE SOIL FEATURES.

TESTS THAT INDICATE DIFFICULTY IN DRIVING A SPADE, LACK OF SOILS AMENDMENTS, AND TEXTURES NOT CONSISTENT WITH RESTORATION PRACTICE OPTIONS NOTED ABOVE SHALL HAVE AN ADDITIONAL TEST PERFORMED WITHIN 50-FEET OF THE TEST SHOWING 'POOR' RESULTS. IF THREE CONSECUTIVE TESTS SHOWING POOR RESULTS ARE OBTAINED THE AREA TESTED SHALL BE SUBJECT TO REWORK IN ACCORDANCE WITH RESTORATION PRACTICES NOTED AND SUBSEQUENTLY RETESTED.

UPON COMPLETION OF SUCCESSFUL TESTING, SURFACES SHALL BE PLANTED AND STABILIZED IN ACCORDANCE WITH TECHNICAL SPECIFICATIONS.

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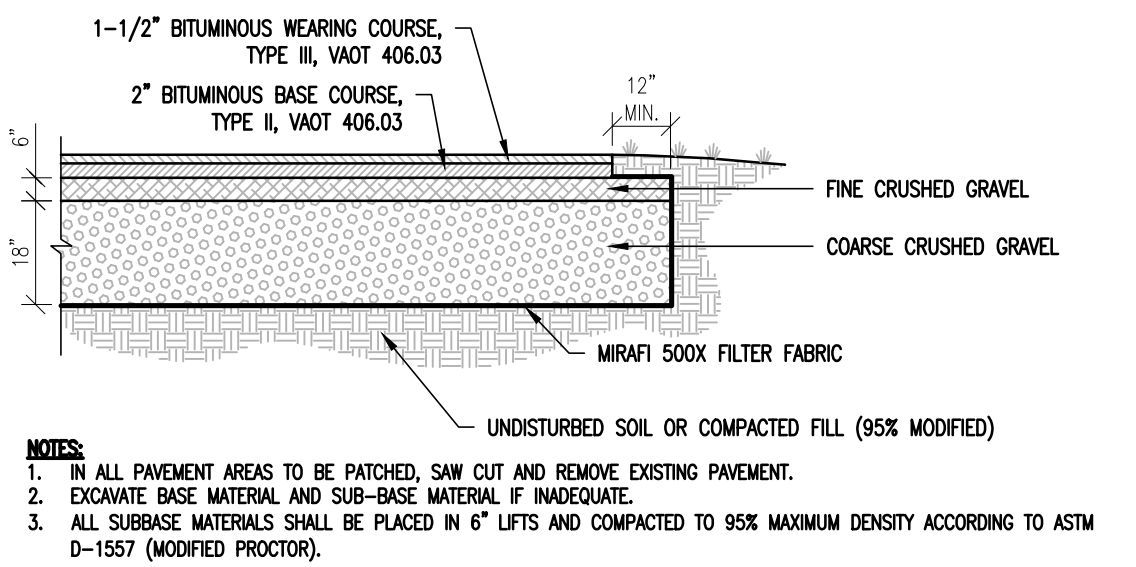
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EPSC STABILIZATION PLAN

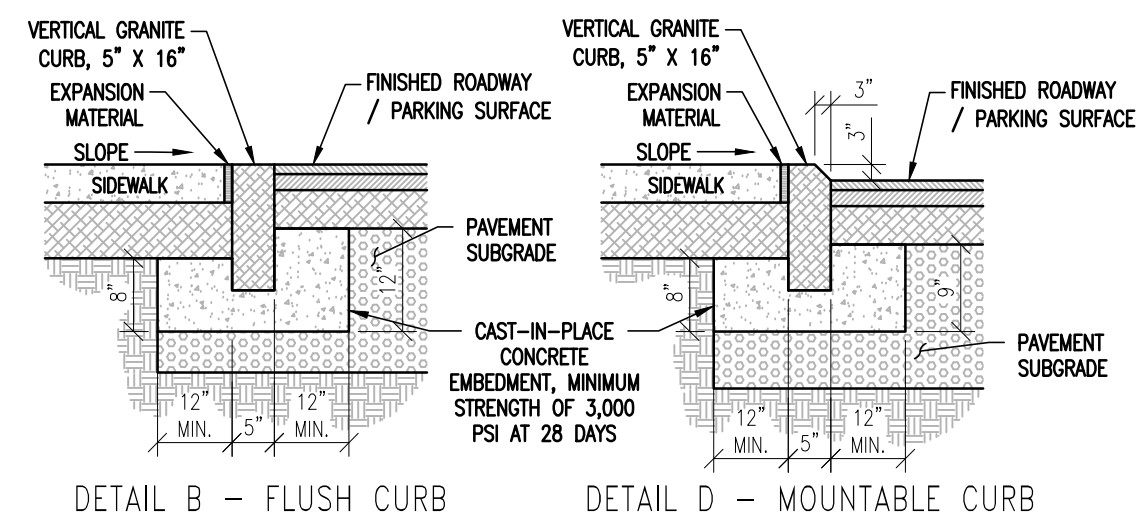
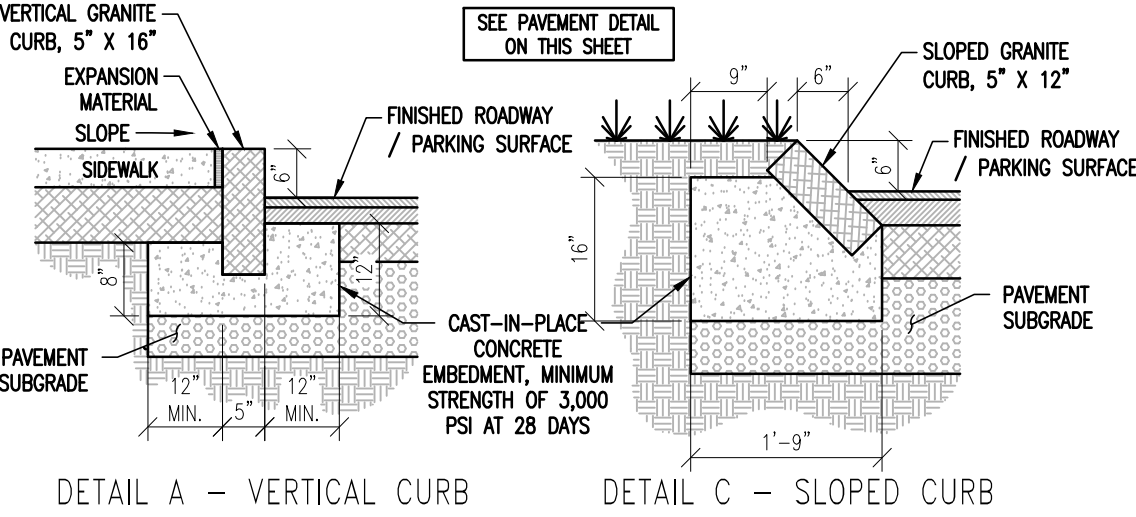
Project Title:
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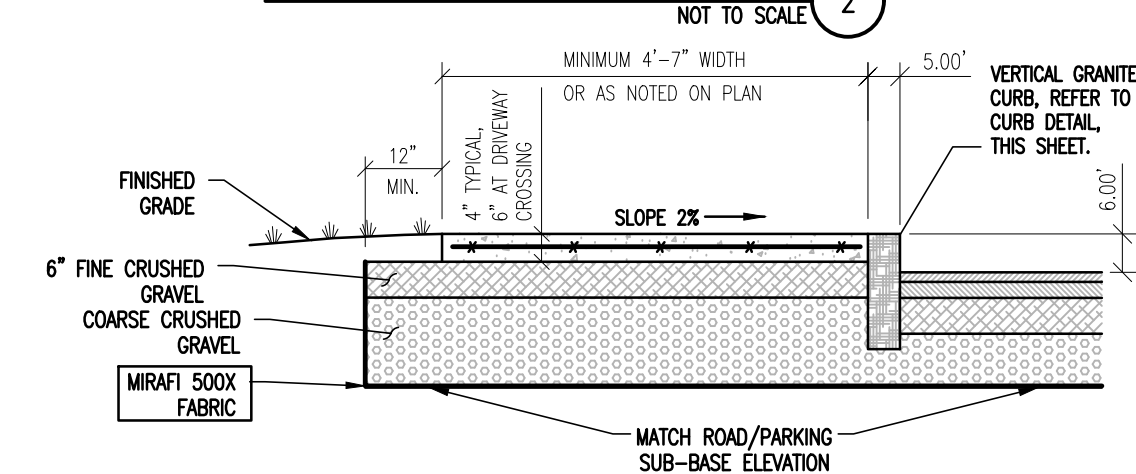


PAVEMENT DETAIL 1



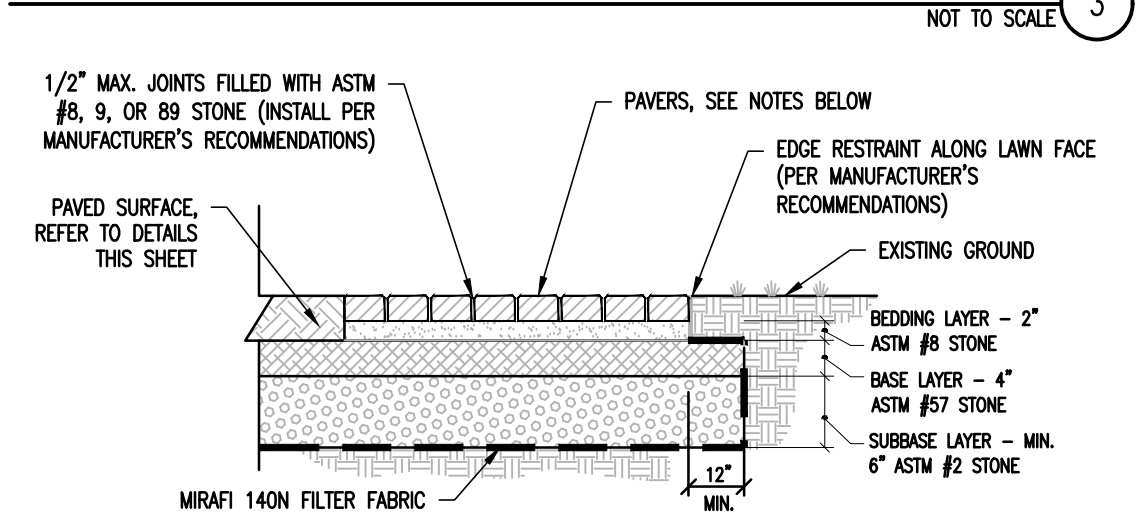
- NOTES:
- GRANITE CURBS SHALL BE INSTALLED IN ACCORDANCE WITH PROJECT AND STATE SPECIFICATIONS.
 - WHERE CURB IS ADJACENT TO ENTRY/EXIT DOOR PADS WITH POST WALL FOUNDATIONS, CURB SHALL BE DOWELED TO PAD WITH 24" LONG #4 DOWELS (CENTERED) AT 1'-6" O.C. (PORTION OF DOWEL IN CURB TO BE GREASED).
 - WHERE CURB IS ADJACENT TO SIDEWALK, BOLLARD OR OTHER HARD FEATURE, BACKSIDE OF CURB SHALL BE SAW CUT. 1/4" EXPANSION MATERIAL (FULL DEPTH OF CURB) SHALL BE INSTALLED BETWEEN FEATURE AND CURB.

GRANITE CURB DETAILS



- NOTES:
- PLACE A TOoled JOINT 1/8" WIDE AND AT LEAST 1/3 OF THE DEPTH, TYPICALLY AT INTERVALS MATCHING THE SIDEWALK WIDTH, OR AS NOTED ON PLANS (NOT TO EXCEED 10'-0").
 - PLACE EXPANSION JOINT AS INDICATED ON PLANS (NOT TO EXCEED 20'-0"). EXPANSION JOINTS SHALL BE DOWELED WITH 24" LONG #4 DOWELS (CENTERED) AT 1'-6" O.C. (ONE END TO BE GREASED).
 - BROOM FINISH WITH SMOOTH TROWELED EDGES. TREAT WITH SILANE-SILOXANE OR APPROVED EQUAL.
 - CAS-IN-PLACE CONCRETE TO BE 4000 PSI, 5X-7% AIR ENTRAINMENT, WITH 6X6-WAD40.0 REINFORCING MESH CENTERED IN SIDEWALK.
 - WHERE SIDEWALK IS ADJACENT TO ENTRY/EXIT DOOR PADS WITH POST WALL FOUNDATIONS, SIDEWALK SHALL BE DOWELED TO PAD WITH 24" LONG #4 DOWELS (CENTERED) AT 1'-6" O.C. (PORTION OF DOWEL IN SIDEWALK TO BE GREASED).
 - WHERE SIDEWALK IS ADJACENT TO CURB, BOLLARD OR OTHER HARD FEATURE, INSTALL 1/2" EXPANSION MATERIAL (FULL DEPTH OF SIDEWALK) BETWEEN FEATURE AND SIDEWALK.

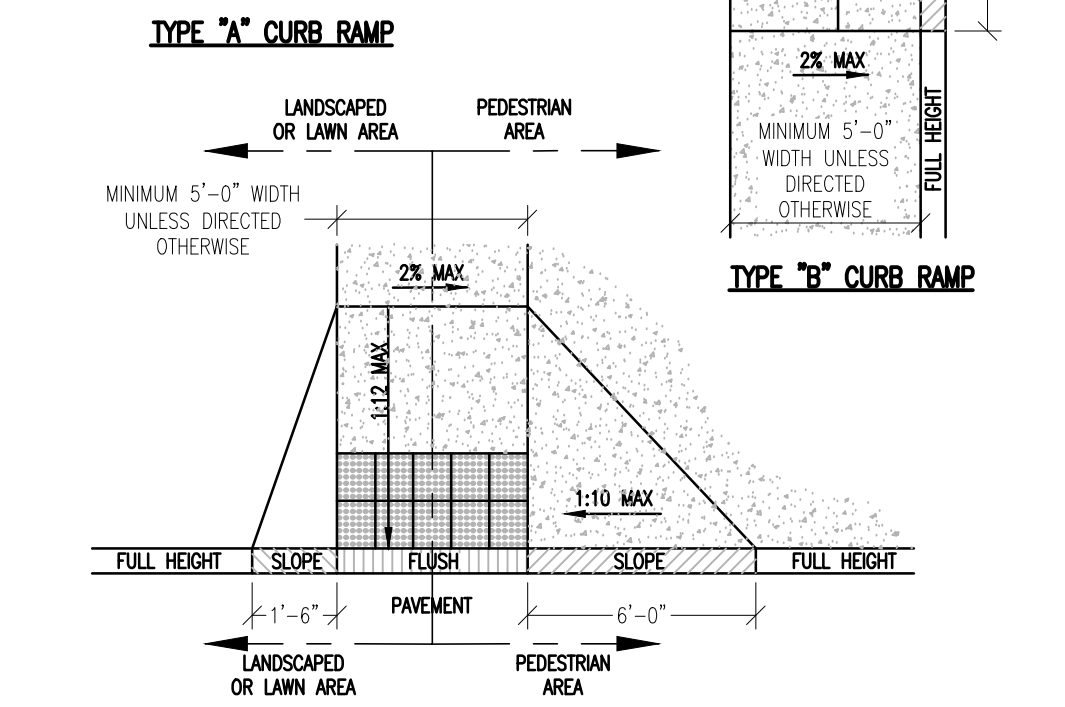
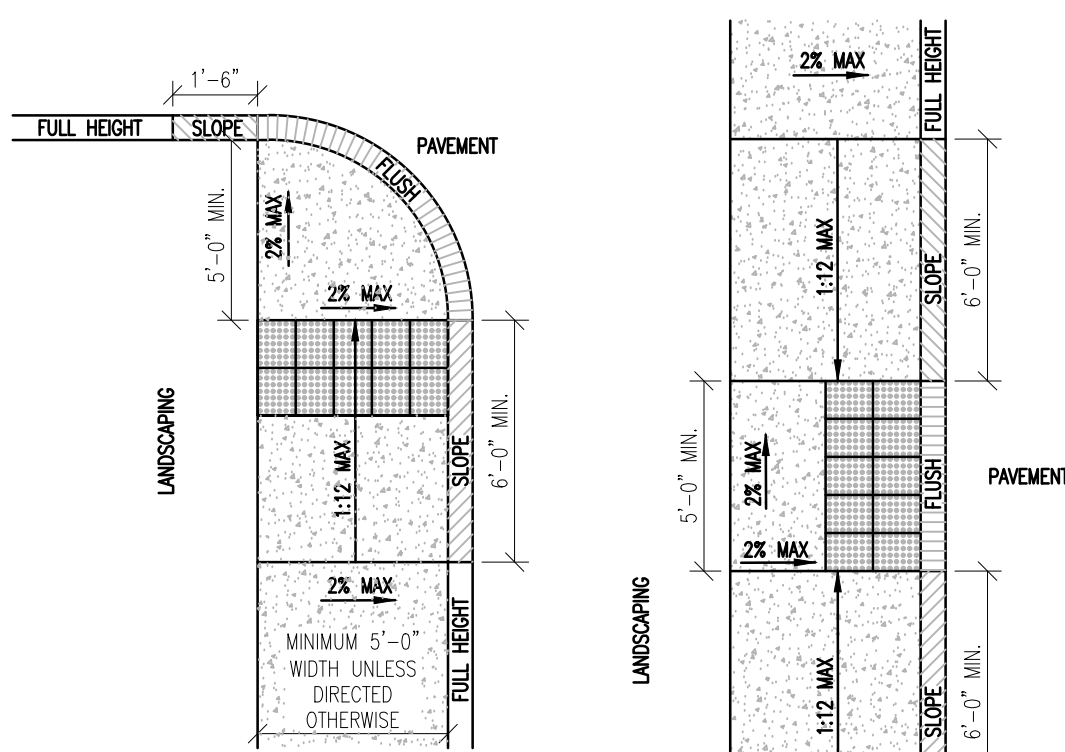
CONCRETE SIDEWALK WITH GRANITE CURB



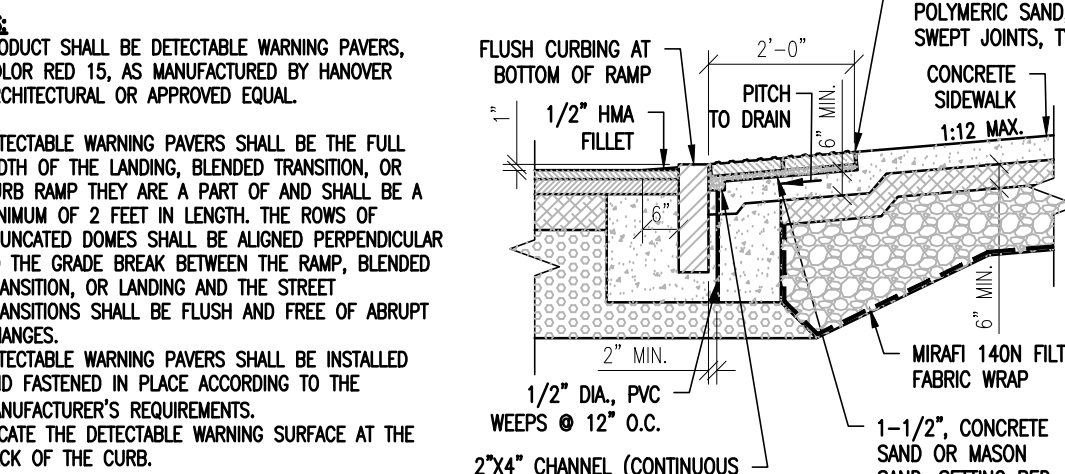
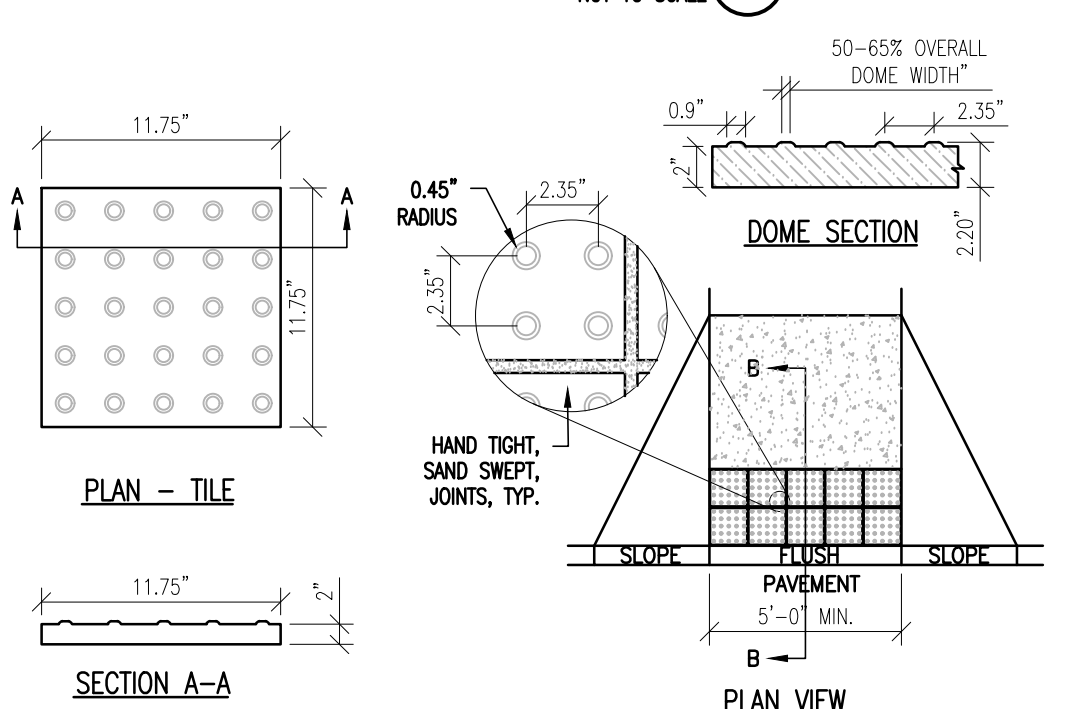
- NOTES:
- PAVERS SHALL BE BELGARD AQUALINE OR APPROVED EQUAL.
 - DEPTH OF SUBGRADE SUBJECT TO SPECIFIC HYDRAULIC AND STRUCTURAL REQUIREMENTS.
 - ASTM #2 STONE MAY BE SUBSTITUTED WITH ASTM 33 OR 4 STONE.

PAVER SIDEWALK DETAIL

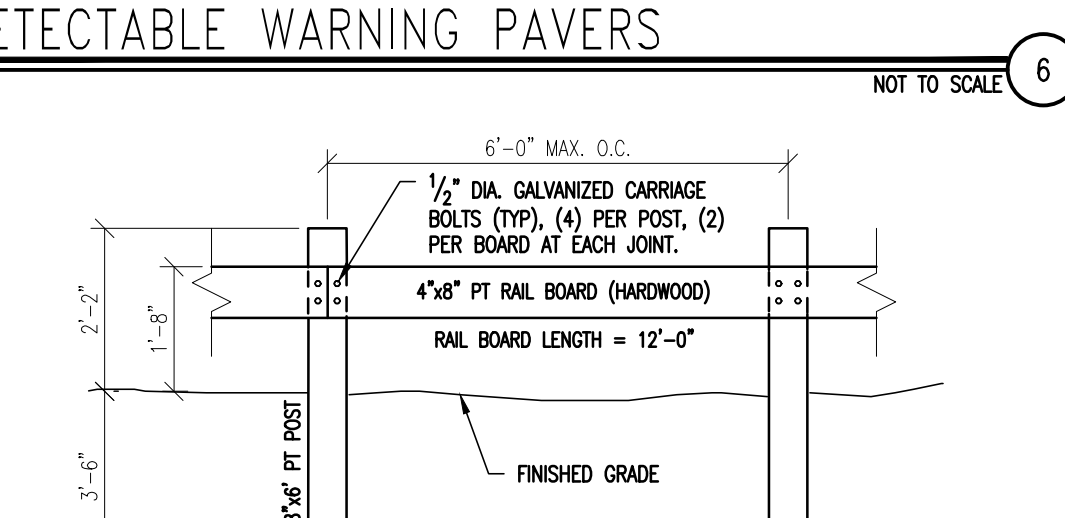
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CURB RAMP DETAILS



DETECTABLE WARNING PAVERS



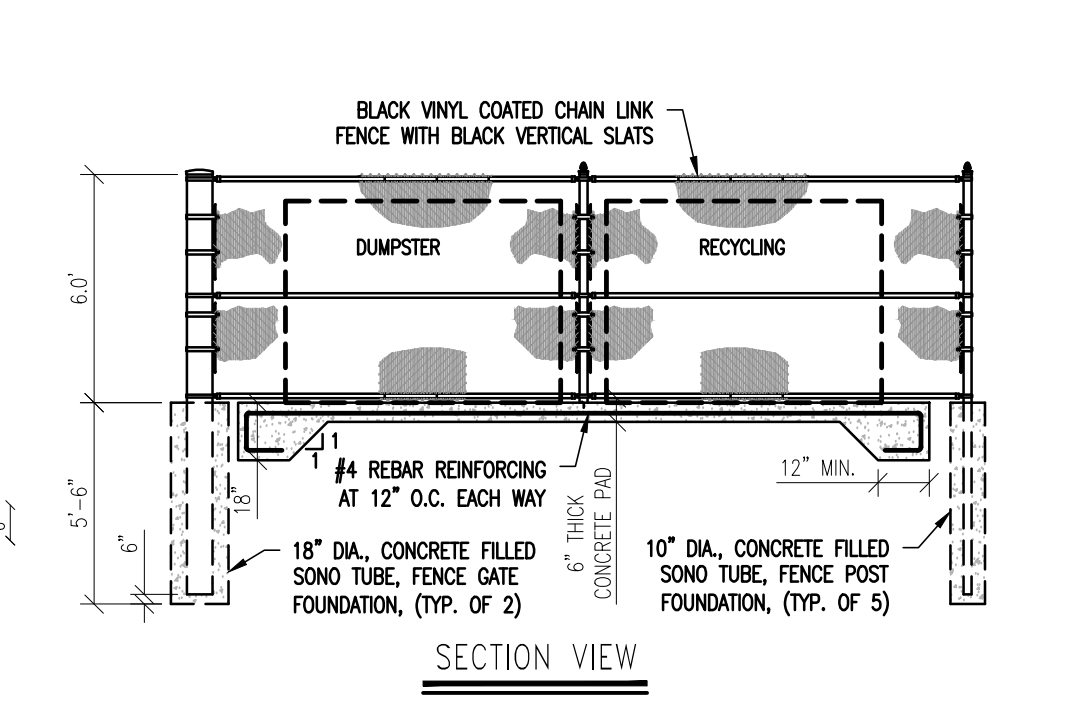
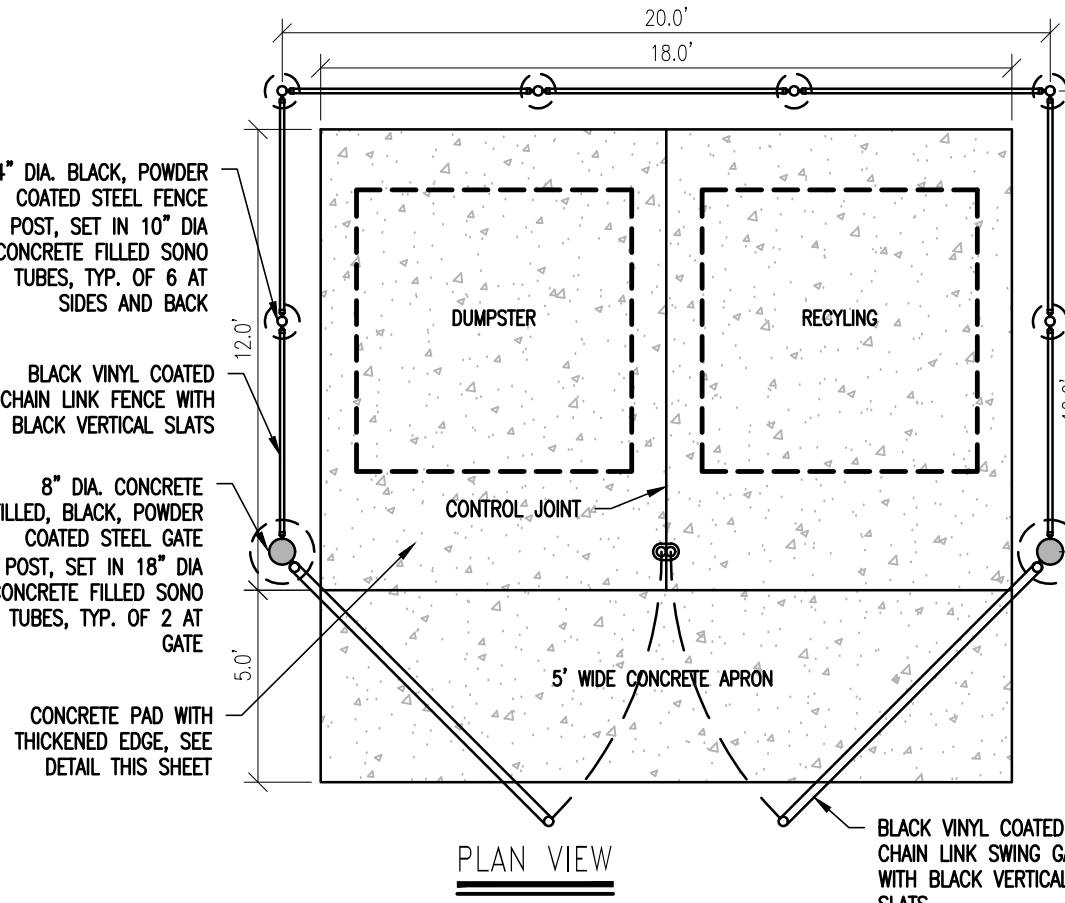
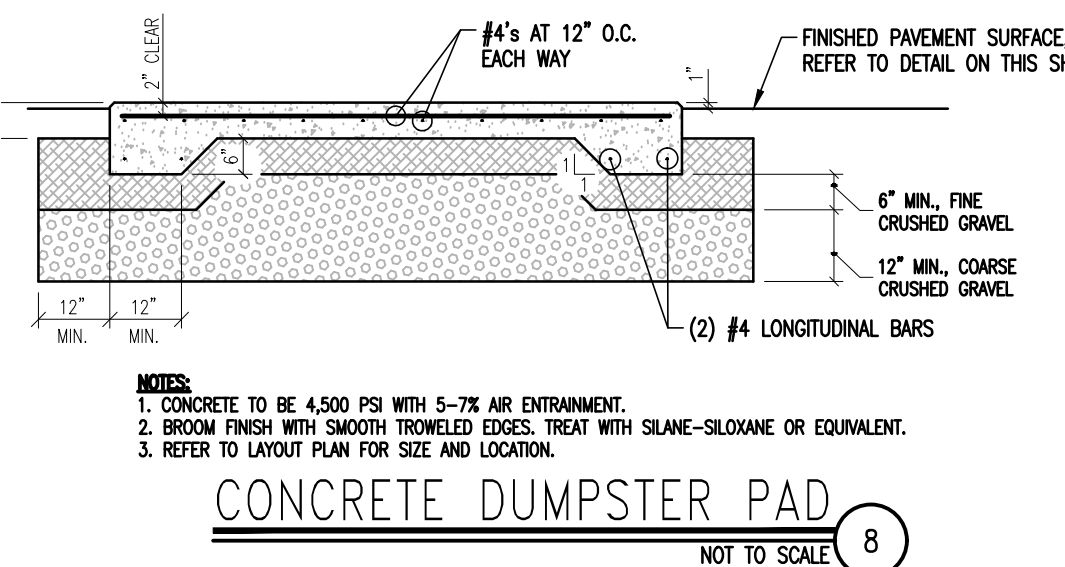
- NOTES:
- WOOD RAIL SHALL BE CONSTRUCTED AS SHOWN ON THE PLANS.
 - GUARDRAIL POSTS AND RAILS SHALL BE MADE OF TIMBER WITH A STRESS GRADE OF 1,200 PSI OR MORE FOR EXTREME FIBER IN BENDING IN ACCORDANCE WITH ASTM D 168. ALL CUTS AND HOLES SHALL BE MADE BEFORE PRESERVATIVE TREATMENT.
 - WOOD RAILS SHALL BE STRAIGHT AND SOUND, FREE FROM LOOSE KNOTS AND OTHER DEFECTS, AND SHALL BE SURFACED ON ALL SIDES. THE ENDS SHALL BE CUT SQUARE OR AS INDICATED. POSTS WITH HOLLOW KNOTS, OPEN OR PLUGGED HOLES, OR SEASON CHECKS EXCEEDING 1/4" IN WIDTH WILL BE REJECTED.
 - ALL WOOD POSTS, BLOCKS AND RAILS SHALL BE TREATED WITH PRESERVATIVE MATERIALS CONFORMING TO THE REQUIREMENTS OF ASTM D 168 AND SHALL CONSIST OF ONE OF THE FOLLOWING:

TREATMENT	MINIMUM NET RETENTION, POUNDS PER CUBIC FOOT
TYPE A PENTACHLOROPHENOL DRY SALTS	0.0
WATER-BORNE PRESERVATIVE	0.40

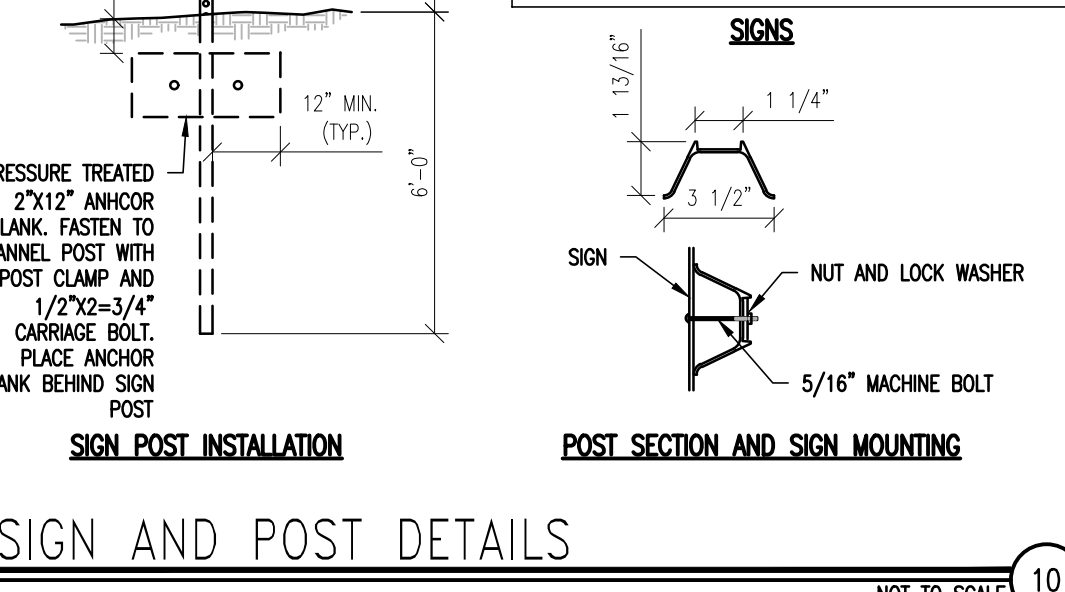
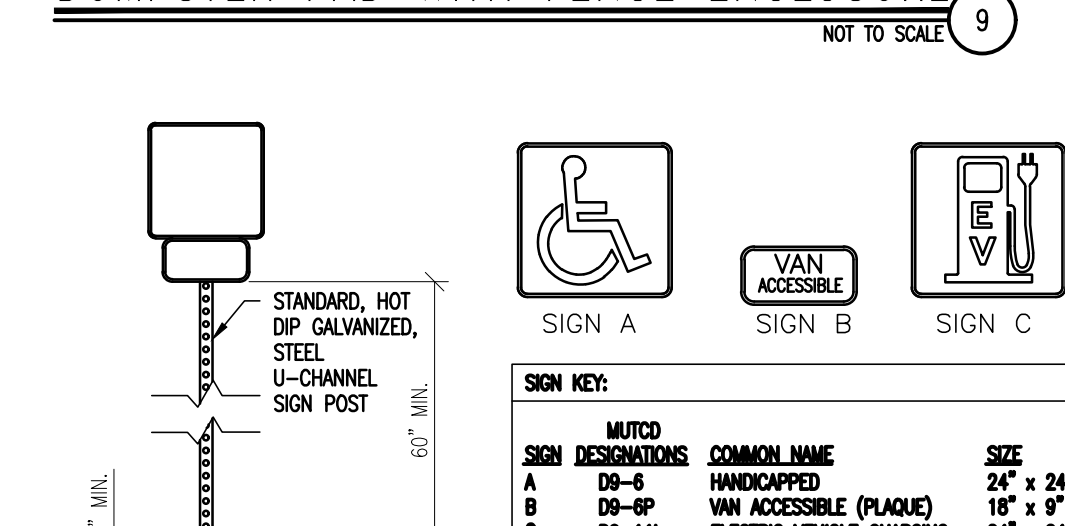
- WOOD SURFACES CUT OR DAMAGED SHALL BE BRUSH TREATED WITH 2 APPLICATIONS OF PRESERVATIVE.
- WOOD POSTS SHALL BE SET PLUMB AT THE REQUIRED LOCATIONS BY EITHER AUGURING, EXCAVATION OR DRIVING. THE BOTTOM OF THE HOLES SHALL BE THOROUGHLY TAMPED TO GRADE. THE FACE OF THE POST NEAREST THE ROAD SHALL PRESENT A VERTICAL LINE FROM TOP TO BOTTOM.
- POST HOLES SHALL BE BACKFILLED WITH ACCEPTABLE MATERIAL PLACED IN LAYERS THOROUGHLY COMPACTED WITH A POWER TAMPER.

WOODEN GUIDE RAIL

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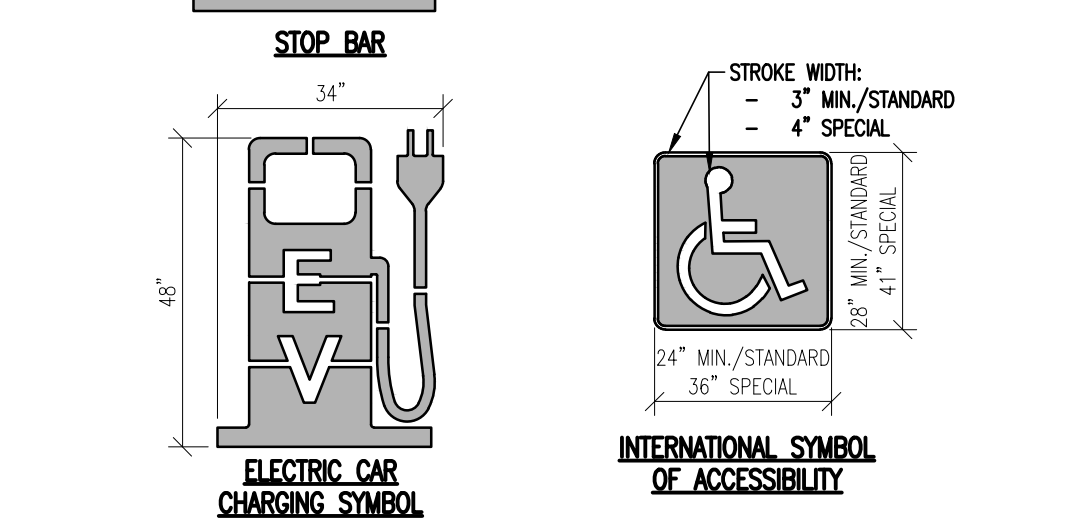
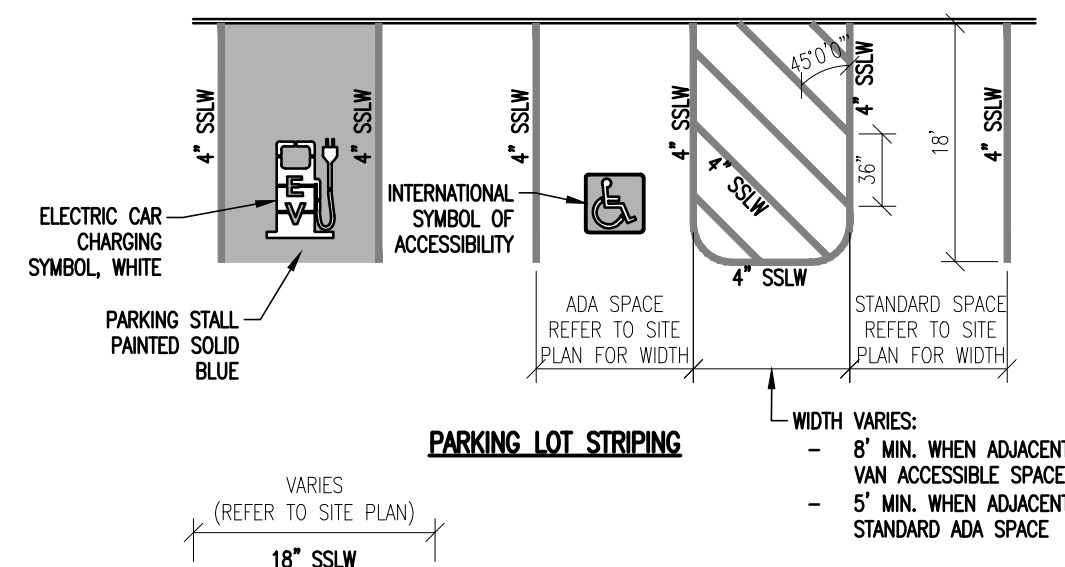


DUMPSTER PAD WITH FENCE ENCLOSURE



SIGN AND POST DETAILS

NOT TO SCALE



PAVEMENT MARKINGS DETAIL

NOT TO SCALE

SITE/EARTHWORK SPECIFICATIONS

- PRIOR TO THE START OF WORK, A PRE-CONSTRUCTION MEETING SHALL BE HELD WITH THE OWNER, CONTRACTOR, AND PROJECT ENGINEER AND TOWN OF VERMONT TO REVIEW PROCEDURES, IDENTIFY RESPONSIBILITIES, FOUR WEEKS NOTICE SHALL BE GIVEN TO THE TOWN PRIOR TO START OF CONSTRUCTION, UNLESS STATED OTHERWISE. ALL MATERIALS AND METHODS SHALL BE IN ACCORDANCE WITH THE MOST RECENT VERSION OF VERMONT AGENCY OF TRANSPORTATION SPECIFICATIONS.
- CLEARING AND GRUBBING - SITE TO BE RESTORED TO PRE-CONSTRUCTION CONDITIONS, INCLUDING DRIVEWAYS, STONE WALLS, AND GRASS AREAS. THE DRIVEWAY SUB-BASE MATERIAL SHALL EXTEND ONE FOOT BEYOND THE EDGES OF PAVING.
- COMPACTION OF ALL MATERIALS SHALL BE PERFORMED USING VIBRATORY ROLLERS AND WATER IN LIFTS OF NO GREATER THAN TWELVE INCHES. COMPACTION SHALL BE PERFORMED UNTIL THE REQUIRED DENSITY IS ACHIEVED. DENSITY SHALL BE DETERMINED BY ASTM D2922 AND SHALL NOT BE LESS THAN THE REQUIRED AMOUNT AS DETERMINED IN ACCORDANCE WITH ASTM D1557.
- COMPACTION TESTING SHALL BE PERFORMED FOR EVERY LAYER OF MATERIAL PLACED AND FOR EVERY 2,500 SQUARE FEET OF AREA. COMPACTION SHALL BE PERFORMED UNTIL THE REQUIRED DENSITY IS ACHIEVED. DENSITY SHALL NOT FALL BELOW 100 PERCENT PRIOR TO THE COMPLETION OF ROLLING. PAVEMENT SHALL NOT BE INSTALLED WHEN THE SUBGRADE IS FROZEN OR THE GRADES ARE INCORRECT.
- PAVEMENT SHALL MEET THE LATEST EDITION OF THE "STANDARD SPECIFICATIONS FOR CONSTRUCTION" AS PUBLISHED BY VTRANS.
- PAVEMENT SHALL NOT BE INSTALLED WHEN THE OUTSIDE AIR TEMPERATURE IS BELOW 40 DEGREES FAHRENHEIT, NOR WHEN THE ROAD SURFACE TEMPERATURE IS BELOW 40 DEGREES FAHRENHEIT. PAVEMENT SHALL NOT FALL BELOW 100 DEGREES FAHRENHEIT PRIOR TO THE COMPLETION OF ROLLING. PAVEMENT SHALL NOT BE INSTALLED WHEN THE SUBGRADE IS FROZEN OR THE GRADES ARE INCORRECT.
- ALL REMAINING DISTURBED AREAS SHALL BE FERTILIZED AND SEEDING IN ACCORDANCE WITH APPLICABLE STATE SPECIFICATIONS FOR EROSION CONTROL.
- THE SEEDING OF 10% OR GREATER SLOPES SHALL REQUIRE THE USE OF EROSION CONTROL MATTING.
- THE COST OF INITIAL INSPECTION AND TESTING SHALL BE PAID BY THE OWNER. SUBSEQUENT TESTING DUE TO FAILURE SHALL BE PAID BY THE CONTRACTOR.
- ALL EARTHWORK MATERIALS SHALL BE OBTAINED FROM APPROVED SOURCES. THEY SHALL CONSIST OF SATISFACTORILY GRADED, FREE DRAINING MATERIAL, FREELY FREE FROM LUMP, CLAY AND ORGANIC MATERIAL. EARTHWORK MATERIALS SHALL MEET THE REQUIREMENTS OF THE FOLLOWING TABLES:

A. SAND BLANKET/BEDDING:	SEIVE DESIGNATION	PERCENT BY WEIGHT PASSING SQUARE MESH SIEVES
	2 INCHES	100
	1-1/2 INCHES	90 - 100
	1/2 INCH	70 - 100
	NO. 4	60 - 100
	NO. 10	0 - 20
	NO. 200	0 - 8
B. 3/4" CRUSHED STONE:	SEIVE DESIGNATION	PERCENT BY WEIGHT PASSING SQUARE MESH SIEVES
	1 INCH	100
	3/4 INCH	90 - 100
	3/8 INCH	20 - 55
	NO. 4	0 - 10
	NO. 6	0 - 5
C. 1-1/2" CRUSHED STONE:	SEIVE DESIGNATION	PERCENT BY WEIGHT PASSING SQUARE MESH SIEVES
	2 INCH	100
	1-1/2 INCH	95 - 100
	3/4 INCH	35 - 70
	3/8 INCH	10 - 30
	NO. 4	0 - 5
D. COARSE CRUSHED GRAVEL:	SEIVE DESIGNATION	PERCENT BY WEIGHT PASSING SQUARE MESH SIEVES
	4 INCHES	100
	NO. 4	25 - 50
	NO. 10	0 - 12
	NO. 200	0 - 6
E. FINE CRUSHED GRAVEL:	SEIVE DESIGNATION	PERCENT BY WEIGHT PASSING SQUARE MESH SIEVES
	2 INCHES	100
	1-1/2 INCHES	90 - 100
	3/4 INCH	30 - 60
	NO. 10	0 - 12
	NO. 200	0 - 6
F. GRANULAR BACKFILL:	SEIVE DESIGNATION	PERCENT BY WEIGHT PASSING SQUARE MESH SIEVES
	3 INCHES	100
	2 1/2 INCHES	90 - 100
	NO. 4	45 - 75
	NO. 10	0 - 12
	NO. 200	0 - 6
G. DRAINAGE AGGREGATE:	SEIVE DESIGNATION	PERCENT BY WEIGHT PASSING SQUARE MESH SIEVES
	1 INCH	100
	3/4 INCH	90 - 100
	3/8 INCH	20 - 55
	NO. 4	60 - 100
	NO. 10	0 - 10
	NO. 200	0 - 5
H. AGGREGATE FOR EROSION PREVENTION & SEDIMENT CONTROL:	SEIVE DESIGNATION	PERCENT BY WEIGHT PASSING SQUARE MESH SIEVES
	6 INCHES	100
	4 INCHES	80 - 100
	3 INCHES	40 - 60
	2 INCHES	0 - 20
I. DENSE GRADED CRUSHED STONE FOR SUBGRADE:	SEIVE DESIGNATION	PERCENT BY WEIGHT PASSING SQUARE MESH SIEVES
	3 1/2 INCHES	100
	3 INCHES	90 - 100
	2 INCHES	75 - 100
	1 INCH	50 - 80
	3/8 INCH	30 - 60
	NO. 4	15 - 40
	NO. 200	0 - 6
J. 2-INCH ROUNDED RIVER STONE:	SEIVE DESIGNATION	PERCENT BY WEIGHT PASSING SQUARE MESH SIEVES
	2 INCHES	100
	1 INCH	85 - 100
	3/4 INCH	65 - 100
	NO. 200	20 - 80
K. TYPE I STONE FOR STONE FILL:	SEIVE DESIGNATION	PERCENT BY WEIGHT PASSING SQUARE MESH SIEVES
	3 INCHES	100
	2 INCHES	85 - 100
	1 INCH	65 - 100
	3/8 INCH	20 - 80
	NO. 4	15 - 40
	NO. 200	0 - 6
L. TYPE II STONE FOR STONE FILL:	SEIVE DESIGNATION	PERCENT BY WEIGHT PASSING SQUARE MESH SIEVES
	3 INCHES	100
	2 INCHES	85 - 100
	1 INCH	65 - 100
	3/8 INCH	20 - 80
	NO. 4	15 - 40
	NO. 200	0 - 6
M. TOPSOIL SHALL MEET THE FOLLOWING REQUIREMENTS UNLESS OTHERWISE SPECIFICALLY STATED IN THE CONTRACT DOCUMENTS:	SEIVE DESIGNATION	PERCENT BY WEIGHT PASSING SQUARE MESH SIEVES
	2 INCHES	100
	1 INCH	85 - 100
	3/4 INCH	65 - 100
	NO. 200	20 - 80

THE CONTRACTOR MAY AMEND TOPSOIL WITH APPROVED MATERIALS AND BY APPROVED METHODS TO MEET THE ABOVE SPECIFICATIONS.

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SITE DETAILS

HOWARD CENTER REDEVELOPMENT
855 PINE STREET/300 FLYNN AVENUE
CITY OF BURLINGTON, CHITTENDEN COUNTY, VERMONT

EV Project #

22488

Drawn By:

JG

Checked By:

KW

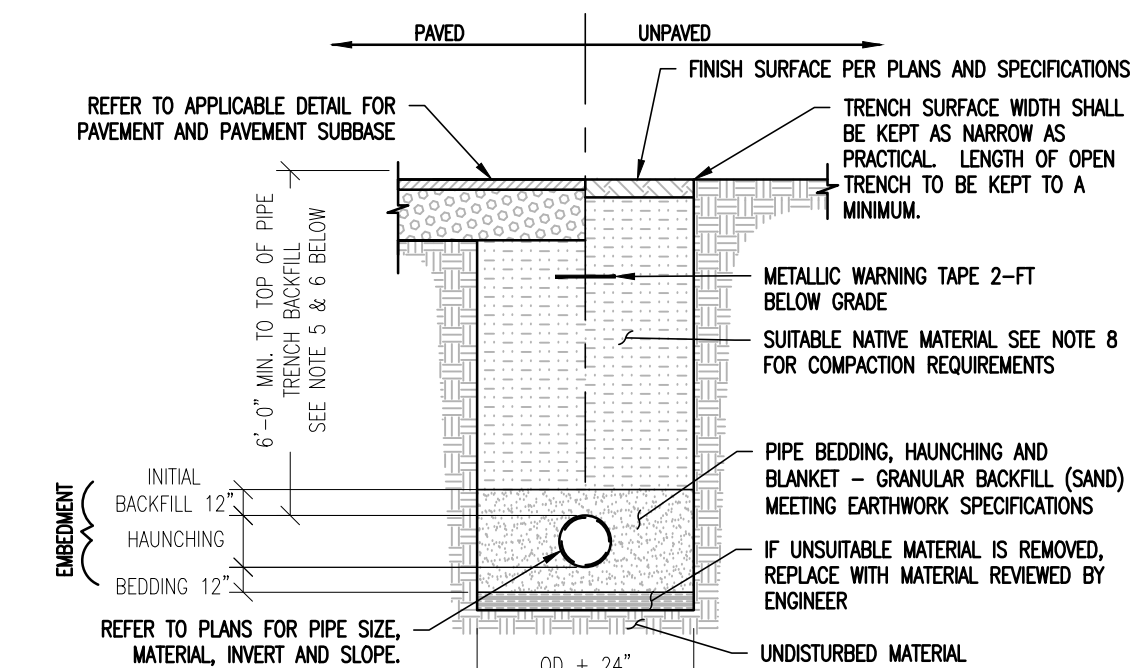
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DESIGN DEVELOPMENT
NOT FOR CONSTRUCTION
08/03/2023

C5.0



- NOTES:**
1. UNLESS OTHERWISE NOTED, ASSUME CLASS "C" SOILS. PERFORM ALL EXCAVATIONS TO OSHA REQUIREMENTS.
 2. BEDDING TO PROVIDE A FIRM, STABLE, CONTINUOUS AND UNIFORM SUPPORT FOR FULL LENGTH OF PIPE.
 3. PROVIDE 6"-0" MINIMUM COVER OVER WATER PIPE. OTHERWISE, REFER TO INSULATION OVER SHALLOW WATER LINE DETAIL.
 4. INSTALL WATER PIPE IN ACCORDANCE WITH ANNA STANDARD C200.
 5. LEDGE, ROCK, BOULDERS AND LARGE STONES SHALL BE REMOVED TO PROVIDE A MINIMUM CLEARANCE OF SIX INCHES BELOW AND ON EACH SIDE OF ALL PIPES.
 6. TRENCH BACKFILL MATERIAL, INCLUDING ROADWAY LOCATIONS, SHALL BE NATURAL MATERIALS EXCAVATED FROM THE TRENCH DURING CONSTRUCTION AND FREE OF UNSUITABLE MATERIALS AS DEFINED IN THE EARTHWORK SPECIFICATIONS INCLUDED ON THESE PLANS.
 7. NO MECHANICAL TAMPERS SHALL BE USED DIRECTLY OVER PIPE TO INSURE PIPE IS NOT DAMAGED.
 8. BACKFILL MATERIALS SHALL BE COMPACTED, IN 12" LAYERS, TO 92% OF MODIFIED PROCTOR (ASTM 1557) TO WITHIN 3 FEET OF FINISHED GRADE. IN AREAS UNDER ROADWAYS, DRIVES, AND PARKING THE UPPER 3 FEET SHALL BE COMPACTED, IN 6" LAYERS, TO 95% MODIFIED PROCTOR (ASTM 1557) AND IN LAWN OR OTHER UNDEVELOPED SPACE THE UPPER 3 FEET SHALL BE COMPACTED TO 92% MODIFIED PROCTOR.

WATER TRENCH DETAIL

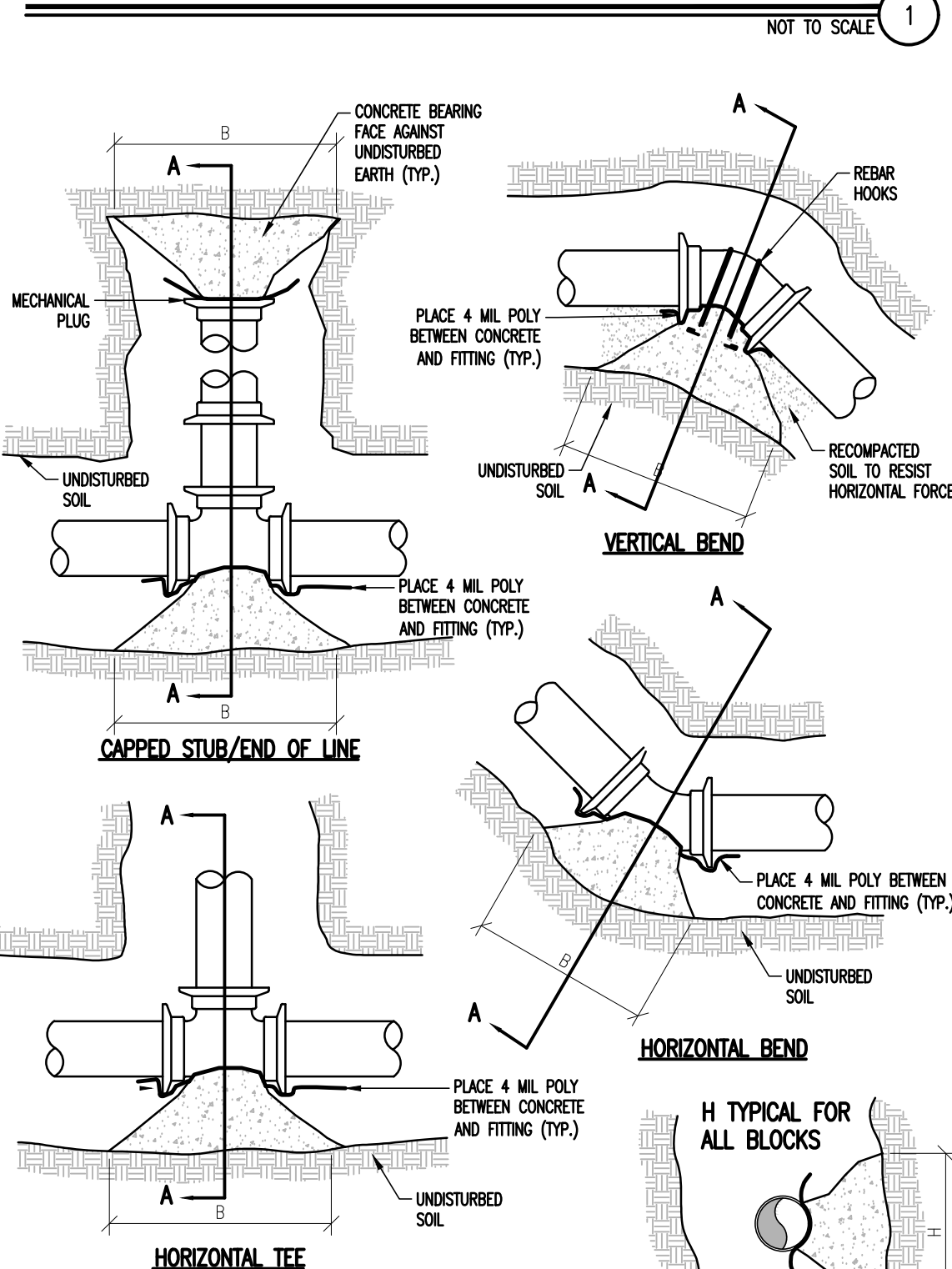


TABLE 2 - THRUST DEVELOPED PER 100psi PRESSURE (lbs force)					
PIPE DIAMETER IN.	VALVES AND DEAD ENDS, TESTS	90° BENDS	45° BENDS	22 1/2° BENDS	11 1/2° BENDS
4	1810	2560	1390	635	320
6	3740	5290	2860	1370	680
8	6430	9100	4920	2320	1170
10	9680	13680	7410	3610	1820
12	13690	19350	10470	5080	2550
14	18380	25990	14100	6100	3080
16	23780	33630	18280	7960	4020

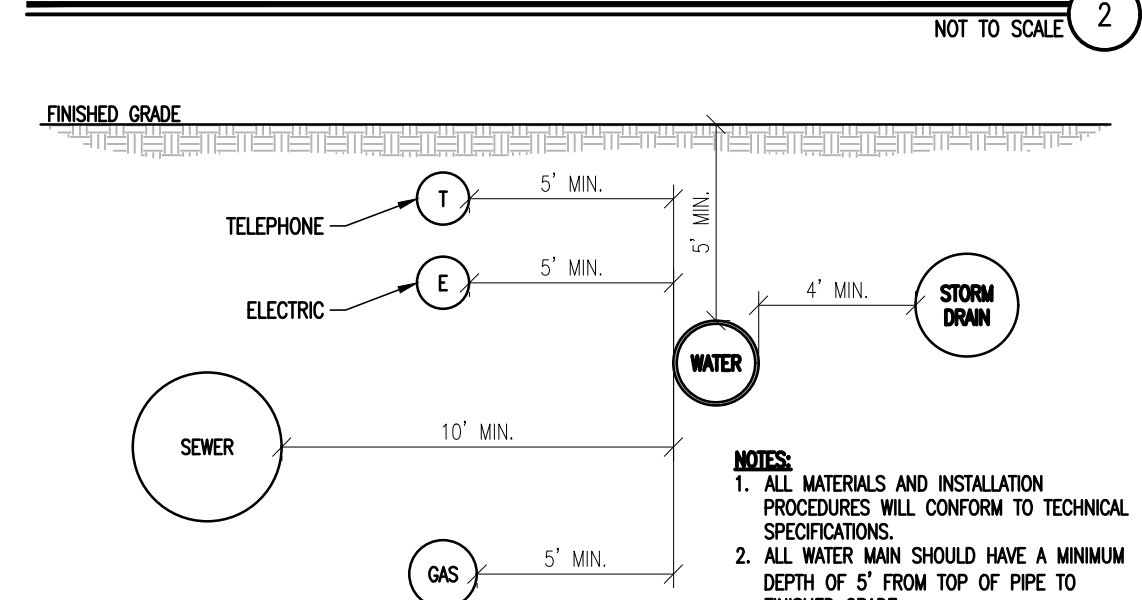
TABLE 1 - BEARING STRENGTH OF UNDISTURBED SOIL	
SOIL TYPE	BEARING STRENGTH
PEAT, ETC.	0 lb/ft²
SOFT CLAY	500 lb/ft²
SAND	1000 lb/ft²
SAND AND GRAVEL	1500 lb/ft²
SAND AND GRAVEL WITH CLAY	2000 lb/ft²
SAND AND GRAVEL CEMENTED WITH CLAY	4000 lb/ft²
HARD PAN	5000 lb/ft²

DETERMINING MINIMUM BEARING FACE AREA:

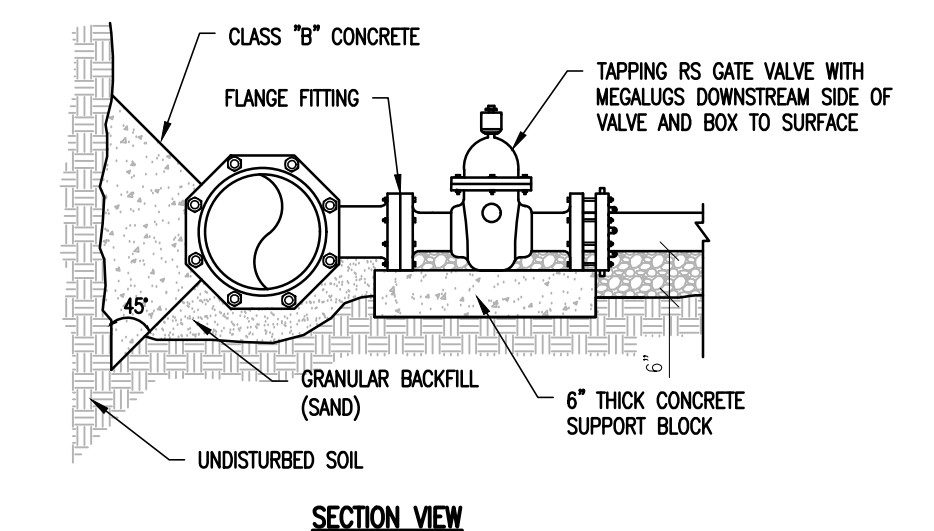
THE AREA (ft²) SHALL BE CALCULATED BY DETERMINING THE TOTAL THRUST GENERATED AT THE FITTING. DIVIDE THE THRUST DEVELOPED (lbs force) (FROM TABLE 2) BY THE BEARING STRENGTH OF THE SOIL (FROM TABLE 1). THE RESULT IS THE AREA OF THE SOIL REQUIRED TO RESIST THE THRUST (A). THE AREA CALCULATED WILL BE FOR THE AREA OF CONCRETE UP AGAINST THE TRENCH WALL (i.e. THE BACK SIDE OF THE BLOCK). USE THE TEST PRESSURE TO DETERMINE THE TOTAL THRUST.

$AREA = \frac{THRUST DEVELOPED (lbs force)}{BEARING STRENGTH OF SOIL}$

TYPICAL BEARING THRUST BLOCK

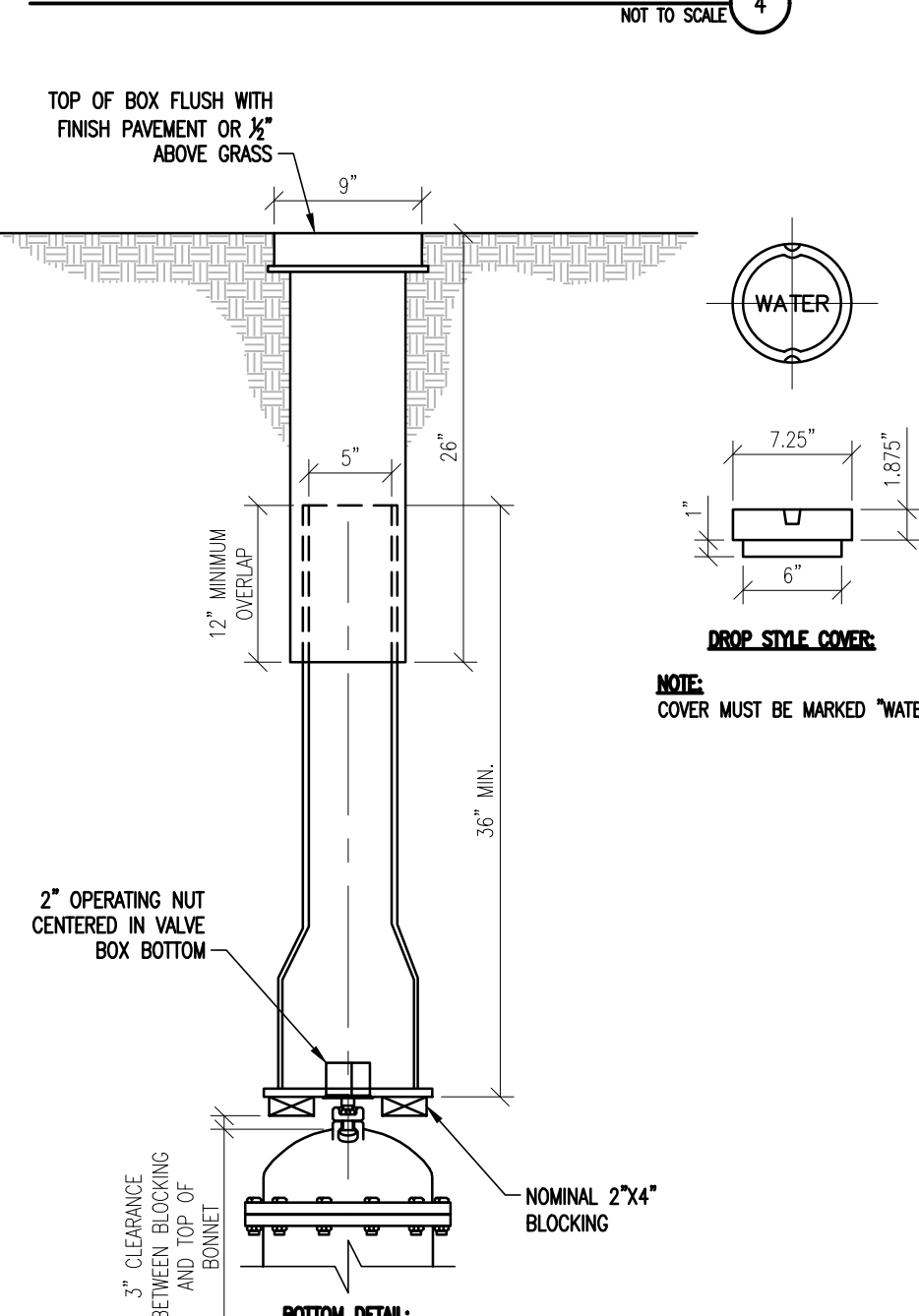


WATER MAIN UTILITY SEPARATIONS



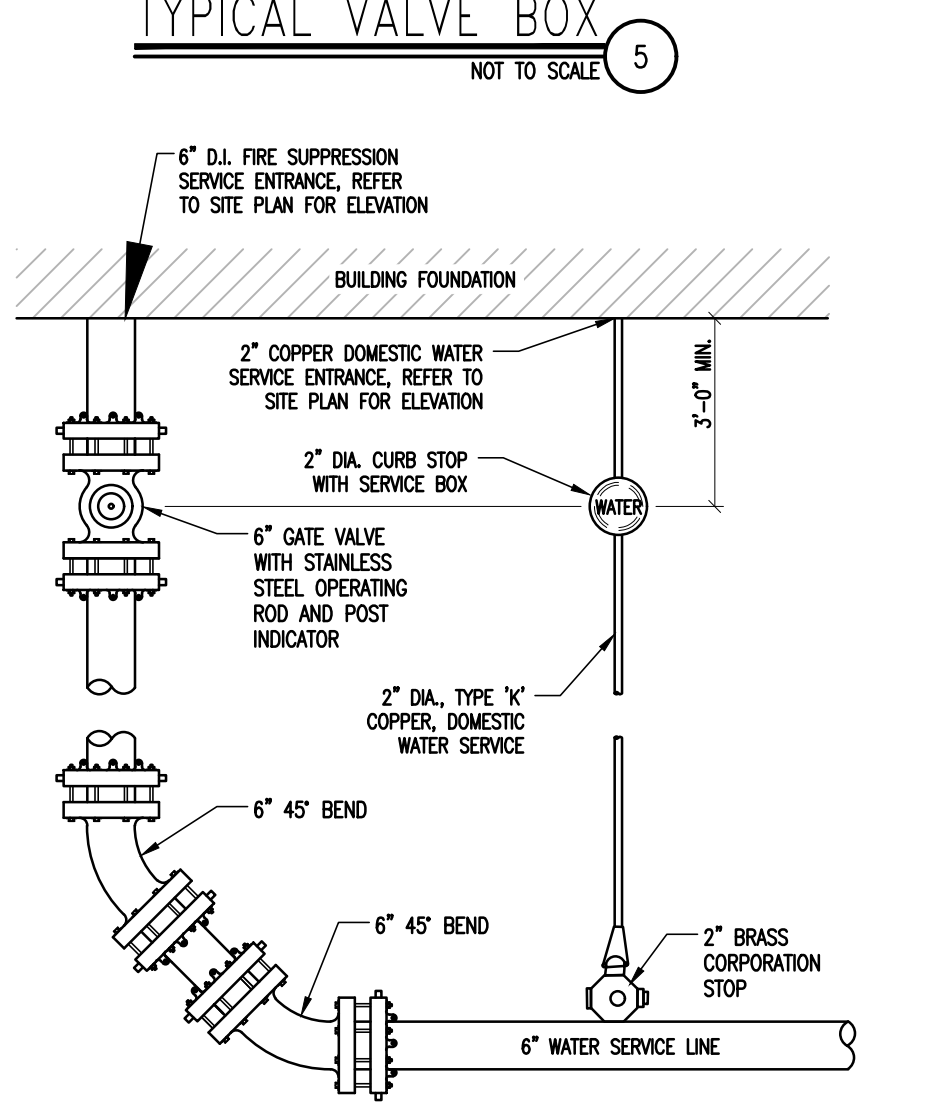
- NOTES:**
1. AREA OF THRUST BLOCK BEARING AGAINST UNDISTURBED SOIL SHALL BE THE SAME AS FOR 1/4" BEND (90°) BEND.
 2. UTILIZE MEGALUG MECHANICAL JOINT RESTRAINT ON M.J. END.
 3. SEE TYPICAL GATE VALVE DETAIL FOR VALVE BOX INFORMATION.
 4. SEE TYPICAL WATER TRENCH DETAIL FOR PIPE BEDDING REQUIREMENTS.

TAPPING SLEEVE AND VALVE DETAIL



- NOTES:**
1. ALL MATERIALS AND INSTALLATION PROCEDURES WILL CONFORM TO TECHNICAL SPECIFICATIONS.
 2. ALL PIPE SHOULD HAVE A MINIMUM DEPTH OF 5.5' FROM TOP OF PIPE TO FINISHED GRADE.

TYPICAL VALVE BOX



WATER SERVICE ENTRANCE

WATER NOTES

- GENERAL:**
1. BEFORE ANY WATER LINE WORK IS COMMENCED, THE CONTRACTOR SHALL NOTIFY THE ENGINEER AND THE TOWN OF BURLINGTON OPEN AT LEAST 48 HOURS IN ADVANCE.
 2. THE CONTRACTOR SHALL COLLECT AND MAINTAIN "AS BUILT" INFORMATION DURING THE INSTALLATION OF THE WATER SYSTEM. "AS BUILT" DRAWINGS SHALL BE PREPARED BY THE CONTRACTOR UPON COMPLETION OF THE WATER SYSTEM.
- WATER MAINS:**
1. PERFORM FLUSHING, PRESSURE AND LEAKAGE TESTING ACCORDING TO ANNA C200 AND NFPA 24 (LATEST REVISION) ON EACH PIPE LINE.
 2. THE ENGINEER SHALL BE GIVEN AT LEAST 72 HOURS NOTICE BEFORE THE TEST IS CONDUCTED. ALL TESTING MUST BE WITNESSED BY THE ENGINEER.
 3. SPECIFIED TEST PRESSURE IS A MINIMUM OF 200 PSI OR 1.5X THE WORKING PRESSURE, WHICHEVER IS GREATER. THE PRESSURE DURING TEST SHALL NOT VARY BY MORE THAN 5 PSI.
- EXISTING UTILITIES:**
1. LOCATION OF UTILITY INSTALLATIONS AND UNDERGROUND STRUCTURES ARE SHOWN AS APPROXIMATE ON THE CONTRACT DOCUMENTS.
 2. ALL UTILITIES SHALL BE LOCATED BY THE CONTRACTOR PRIOR TO BEGINNING CONSTRUCTION.
 3. EXISTING UTILITIES SHALL BE PROTECTED AND SUPPORTED DURING CONSTRUCTION.
 4. ALL WATER, GAS, CABLE, TELEPHONE, ELECTRIC, SEWER, AND OTHER UTILITIES FOUND TO INTERFERE WITH THE PROPOSED CONSTRUCTION SHALL BE RELOCATED IN A MANNER ACCEPTABLE TO THE ENGINEER.
- PIPE BEDDING:**
1. SAND BEDDING MEETING REQUIREMENTS OF EARTHWORK SPECIFICATIONS.
 2. SAND BLANKET MEETING REQUIREMENTS OF EARTHWORK SPECIFICATIONS.
- PIPE TRENCH BACKFILL:**
1. MEET EARTHWORK SPECIFICATIONS FOR PLACEMENT AND COMPACTION.
- DUCTILE IRON PIPE (UNION):**
1. D.I. PIPE CONFORM TO ANNA/ANSI C115.
 2. LAMINIS AND LINING REPAIR TO ANNA/ANSI C104.
 3. JOINTS CONFORM TO ANNA/ANSI C111 AND C115.
 4. FITTINGS CONFORM TO ANNA/ANSI C110, C153, C105.
 5. KEEP INSIDE OF PIPE CLEAN AND FREE OF DEBRIS.
 6. REJECT ANY PIPE WHICH IS DROPPED DURING HANDLING.
 7. MECHANICAL JOINT GLANDS SHALL BE "WASH-LUG" BETWEEN GLANDS.
 8. CAST IRON FITTINGS: ANSI A21.10, 350 PSI PRESSURE RATING.
 9. DUCTILE IRON FITTINGS: ANSI A21.10, 350 PSI PRESSURE RATING.
 10. JOINTS: MECHANICAL, PUSH-ON AND FLANGED:
 - A. RUBBER GASKET JOINT: ANSI A21.11
 - B. GASKETS:
 - A. MECHANICAL AND PUSH-ON JOINTS: ANSI A21.11
 - B. FLANGED JOINT: 1/4" THICK RING OR FULL FACE RUBBER, ANSI A21.15.
 - C. MECHANICAL JOINT: ANSI A21.11
 - D. FLANGED JOINT: ANSI A21.15
 11. LAMINIS:
 - A. INTERIOR - CEMENT LINED-DOUBLE THICKNESS WITH BITUMINOUS SEAL.
 - B. EXTERIOR - BITUMINOUS COATING APPROX. 1 MIL THICK, ANSI A21.51, AND ANSI A21.10.
 - C. FLANGE MACHINED FACE COATING: ANSI A21.15
 12. LAYING PIPE:
 - A. PIPE SHALL BE LAID WITH BELL ENDS FACING IN THE DIRECTION OF LAYING.
 - B. WHERE PIPE IS LAID ON A SLOPE OF 5% OR MORE, THE LAYING SHALL START AT THE LOW END AND PROCEED UPHILL, WITH THE BELL ENDS UPWARD.
 - C. A WATERTIGHT PLUG SHALL BE PLACED IN THE OPEN ENDS OF INSTALLED PIPE WHEN PIPE LAYING IS NOT IN PROGRESS.
 - D. MAX. PERMISSIBLE DEFLECTION IS 75% OF ANNA SPEC. C200.
 13. SERRATED SILICON BRONZE WEDGES:
 - A. D.I. PIPE SIZE 3"-12" = 2 PER JOINT.
 - B. D.I. PIPE SIZE >12" = 4 PER JOINT.
- CHLORINATION OF DOMESTIC WATER LINES:**
1. THE CONTRACTOR SHALL NOTIFY THE ENGINEER AT LEAST 72 HOURS IN ADVANCE OF BEGINNING ANY DISINFECTION OF WATER MAINS.
 2. CONTRACTOR SHALL BE RESPONSIBLE FOR BACTERIOLOGICAL TESTING AS REQUIRED BY THIS SPECIFICATION AND REFERENCE STANDARDS MENTIONED.
 3. DISINFECT ALL NEW PIPELINE SYSTEMS IN ACCORDANCE WITH ANNA C261, INCLUDING:
 - A. METHOD OF CHLORINE APPLICATION. USE CONTINUOUS FEED METHOD OR SLUG METHOD. (TABLET METHOD IS NOT ACCEPTABLE).
 - B. FORM OF CHLORINE UTILIZED.
 - C. FINAL FLUSHING.
 - D. BACTERIOLOGICAL TESTING.
 - E. REPEITION OF PROCEDURE.
 4. BASIC DISINFECTION PROCEDURE CONSISTS OF:
 - A. PREVENTING CONTAMINATING MATERIALS FROM ENTERING THE WATER LINE DURING CONSTRUCTION OR REPAIR.
 - B. REMOVING BY FLUSHING OR OTHER MEANS, THOSE MATERIALS THAT MAY HAVE ENTERED THE WATER LINE.
 - C. CHLORINATING ANY RESIDUAL CONTAMINATION THAT MAY REMAIN, AND FLUSHING THE CHLORINATED WATER.
 - D. DETERMINING THE BACTERIOLOGICAL QUALITY BY LABORATORY TEST AFTER DISINFECTION.
 5. DISINFECTION PROCEDURE:
 - A. CLOSE THE SERVICE VALVES AND FILL THE WATER LINE WITH CHLORINATED WATER.
 - B. LEAVE THE CHLORINATED WATER IN THE WATER LINE FOR AT LEAST 24-HOURS.
 - C. AT THE END OF THIS PERIOD THE CHLORINATED WATER SHALL BE SAMPLED AND HAVE A FREE CHLORINE RESIDUAL OF AT LEAST 10 mg/L. IF NOT, THE PROCEDURE SHALL BE REPEATED UNTIL THE RESIDUAL REQUIREMENT IS MET.
 - D. NEUTRALIZE/FLUSH THE WATER LINE, ASSURING NOT OFFENSIVE ODOR EXISTS DUE TO CHLORINE REACTIONS OR EXCESS CHLORINE RESIDUAL.
 - E. FLUSHING VELOCITY SHALL NOT BE LESS THAN 2.5 FT/SEC.
 - F. REPEAT DISINFECTION PROCESS ON LINES THAT MAY HAVE BECOME CONTAMINATED AND ALL LINES IN WHICH COFORM BACTERIA WERE FOUND.
- GATE VALVES:**
1. RESILIENT SEAT GATE VALVES BY AMERICAN FLOW CONTROL (AFC), SERIES 2500, (HARTFORD, VT).
 2. DUCTILE IRON BODY GATE VALVES TO MEET ANNA C515 AND SHALL BE EPOXY COATED (FUSION BONDED) INSIDE AND OUT.
 3. STEM CONSTRUCTION: NON-RISING.
 4. STEM SEALS: DOUBLE O-RING.
 5. GATE: DUCTILE IRON RUBBER ENCAPSULATED WEDGE.
 6. BONNET HARDWARE: STAINLESS STEEL.
 7. OUTLET CONNECTION: STANDARD MECHANICAL JOINT.
 8. OPERATING: OPEN COUNTERCLOCKWISE.
- TAPPING SLEEVES AND VALVES:**
1. TAPPING VALVES:
 - A. TAPPING VALVES TO MEET ANNA/ANNA C515, STANDARD FOR RESILIENT SEATED GATE VALVES.
 - B. VALVES SHALL HAVE A MINIMUM WORKING PRESSURE OF 250 PSI.
 - C. VALVES SHALL OPEN COUNTERCLOCKWISE.
 - D. INLET FLANGES SHALL BE CLASS 125, ANSI B16.1, OR ANSI/ANNA C110/A21.10.
 - E. OUTLET CONNECTION: STANDARD MECHANICAL JOINT.
 - F. STEM SEALS: O RING.
 - G. STEM CONSTRUCTION: NON-RISING.
 - H. SEATING: PARALLEL SEAT.
 - I. END CONNECTIONS: MECHANICAL ON RUN, FLANGED ON BRANCH.
 2. TAPPING SLEEVES:
 - A. ANNA C515, LATEST REVISION.
 - B. ANNA C207, CLASS D, MAX. WORKING PRESSURE OF 150 PSI.
 - C. SLEEVES: SPLIT SLEEVES OF CAST IRON OR DUCTILE IRON.
 - D. MECHANICAL JOINT ENDS WITH END AND GASKET SEALS.
 - E. PROVIDE A 1/2" NPT TEST PLUG OR OTHER PROVISION FOR AIR TESTING THE VALVE AND SLEEVE AT MAXIMUM WORKING PRESSURE.
 - F. BOLTS AND NUTS, MECHANICAL JOINTS: HIGH STRENGTH CAST IRON OR HIGH STRENGTH LOW ALLOY STEEL, ANNA/ANNA C111/A21.11-30.
 - G. BOLTS AND NUTS, FLANGED JOINTS: HIGH STRENGTH, LOW CARBON STEEL CONFORMING TO ANNA/ANNA C110/A21.10-37, APPENDIX A.
 - H. COAT ALL NUTS AND BOLTS WITH A RUST RESISTANT LUBRICANT.
 - I. ALL BOLTS AND NUTS USED WITH PIPE SLEEVES SHALL BE BRUSH COATED HEAVILY AFTER FINAL TIGHTENING WITH BITUMASTIC COLD-APPLIED MATERIAL TO THOROUGHLY COVER ALL EXPOSED SURFACES OF BOLTS AND NUTS.
- VALVE BOXES:**
1. ACCEPTABLE MANUFACTURERS: WHEELER, CLOW, OR EQUAL.
 2. CLOW F-2452 SLIDING TYPE, TWO PIECE, OR EQUAL.
 3. 5/8 INCH SHIRT.
 4. SIZE 66A-A (40-60 INCH OVERALL LENGTH).
 5. CAST IRON.
 6. CLOW F-2440 LIDS OR EQUAL.
 7. THE WORD "WATER" TO BE CAST INTO TOP OF COVERS, AND ARROW SHOWING DIRECTION OF OPENING.
 8. IF DEPTH FROM GRADE TO TOP OF VALVE OPERATING NUT IS GREATER THAN 6'-0", A VALVE STEM RISER MADE OF HIGH STRENGTH STEEL SHALL BE PROVIDED. DEPTH FROM VALVE STEM RISER NUT TO GRADE WILL BE 4 TO 6 FEET.
- CONCRETE:**
1. CLASS B5 CONCRETE SHALL HAVE:
 - A. MIN. COMPRESSIVE STRENGTH OF 4000 PSI AT 28 DAYS
 - B. AIR ENTRAINMENT OF .45 TO .6% BY VOLUME.
 - C. MINIMUM CEMENT CONTENT FOR 4000 PSI CONCRETE IS 564 LBS PER CUBIC YARD.
 - D. SLUMP OF 3 TO 5 INCHES.
 2. CONCRETE SHALL NOT BE PLACED WHEN AMBIENT TEMPERATURE IS BELOW 40 DEGREES FAHRENHEIT OR MORE THAN 90 DEGREES FAHRENHEIT.
 3. CONCRETE SHALL NOT BE DROPPED MORE THAN SIX FEET INSIDE A FORM.
 4. MAINTAIN TEMPERATURE OF CONCRETE SURFACE AT MINIMUM 50 DEGREES FAHRENHEIT FOR 72 HOURS AFTER PLACING CONCRETE. PREHEAT ALL ENCLOSURES FOR A MINIMUM OF 2 HOURS TO PROVIDE A MIN. SURFACE TEMPERATURE OF 45 DEGREES FAHRENHEIT.
 5. ALLOW TO SET AND CURE ALL THRUST BLOCKS, CONCRETE SUPPORTS, AND ANCHORS A MINIMUM OF 24 HOURS BEFORE BACKFILLING.
 6. COMPLETELY CURE AND SET CONCRETE BEFORE ANY HYDROSTATIC OR LEAKAGE TESTING OF PIPELINE SYSTEMS.
 7. NONSHRINK GROUT SHALL BE HALCO TRADEMARK, AS MANUFACTURED BY LEHN & FINK INDUSTRIAL PRODUCTS.
 8. DO NOT PLACE ANY MORTAR OR GROUT WHEN AMBIENT TEMPERATURE IS BELOW 40 DEGREES FAHRENHEIT.
 9. MORTAR FOR MANHOLES SHALL CONSIST OF THE FOLLOWING:
 - A. CEMENT-TYPE II, ASTM C150.
 - B. HYDRATED LIME-TYPE A, ASTM C207.
 - C. SAND- ASTM C 33, FINE AGGREGATES FOR CONCRETE.
 - D. WATER-CLEAN, SUITABLE FOR DRINKING.
 10. MIX (BY VOLUME): 1 PART CEMENT, 1/2 PART LIME, 4 1/2 PARTS SAND.

Stamp

Date

Description

No.

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Sheet Title

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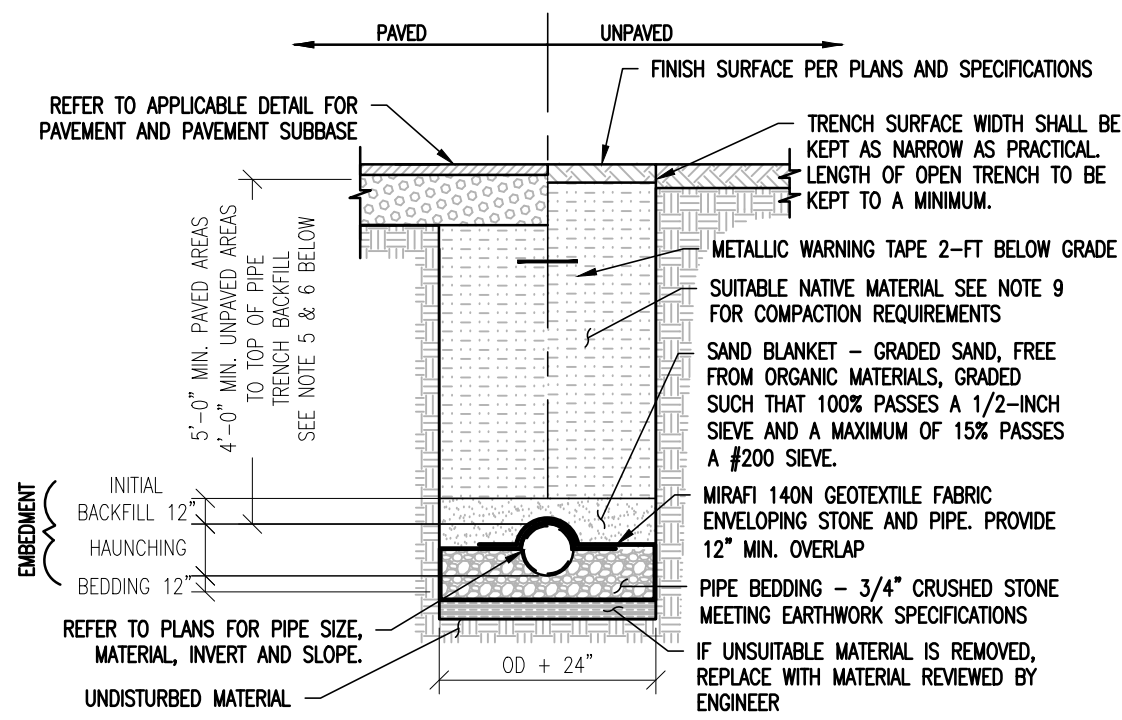
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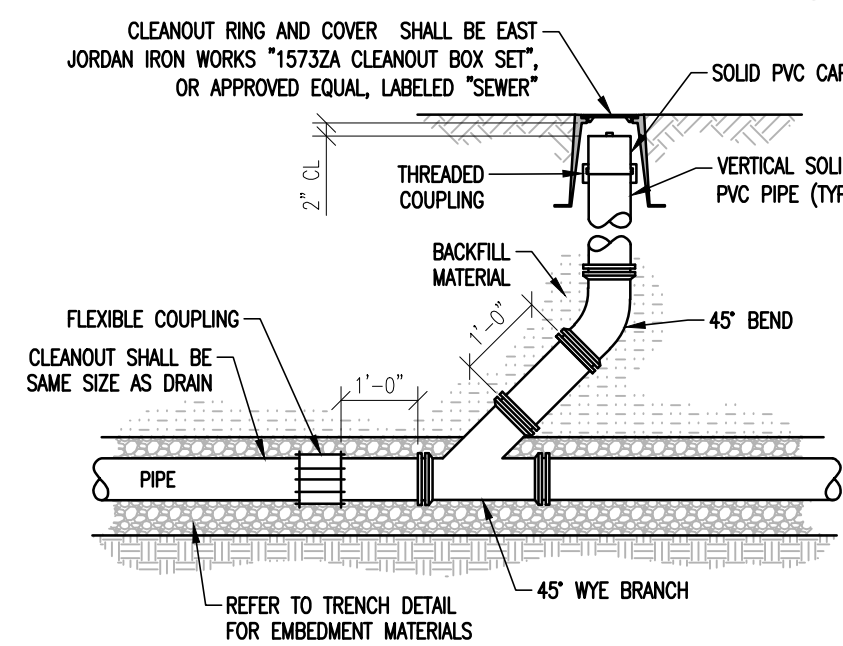
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- NOTES:**
1. UNLESS OTHERWISE NOTED, ASSUME CLASS "C" SOILS. PERFORM ALL EXCAVATIONS TO OSHA REQUIREMENTS.
 2. BEDDING TO PROVIDE A FIRM, STABLE, CONTINUOUS AND UNIFORM SUPPORT FOR THE FULL LENGTH OF PIPE.
 3. FOR SEWER LINES THE MINIMUM DEPTH TO THE TOP OF THE PIPE SHALL BE 5'-0" IN PAVED AREAS AND 4'-0" IN UNPAVED AREAS. SHALLOWER DEPTHS REQUIRE APPROVAL FROM THE ENGINEER. REFER TO INSULATION OVER SHALLOW SEWER LINE DETAIL.
 4. LEDGE, ROCK, BOLLERS AND LARGE STONES SHALL BE REMOVED TO PROVIDE A MINIMUM CLEARANCE OF SIX INCHES BELOW AND ON EACH SIDE OF ALL PIPES.
 5. TRENCH BACKFILL MATERIAL, INCLUDING ROADWAY LOCATIONS, SHALL BE NATURAL MATERIALS EXCAVATED FROM THE TRENCH DURING CONSTRUCTION AND FREE OF UNSUITABLE MATERIALS AS DEFINED IN THE EARTHWORK SPECIFICATIONS INCLUDED ON THESE PLANS.
 6. WHEN APPLICABLE INSTALL PIPE WITH BELL ENDS DOWN SLOPE. PREVENT SEDIMENT FROM ENTERING NEW SEWER SYSTEM DURING CONSTRUCTION.
 7. ALLOWABLE TRENCH WIDTH AT A PLANE 12 INCHES ABOVE THE PIPE SHALL BE NO MORE THAN 36 INCHES FOR SEWER PIPE LESS THAN 15 INCHES IN DIAMETER.
 8. NO MECHANICAL TAMPERS SHALL BE USED DIRECTLY OVER PIPE TO INSURE PIPE IS NOT DAMAGED.
 9. BACKFILL MATERIALS SHALL BE COMPACTED, IN 12" LAYERS, TO 92% OF MODIFIED PROCTOR (ASTM 1557) TO WITHIN 3 FEET OF FINISHED GRADE. IN AREAS UNDER ROADWAYS, DRIVES, AND PARKING THE UPPER 3 FEET SHALL BE COMPACTED, IN 6" LAYERS, TO 92% MODIFIED PROCTOR (ASTM 1557) AND IN LAWN OR OTHER UNDEVELOPED SPACE THE UPPER 3 FEET SHALL BE COMPACTED TO 92% MODIFIED PROCTOR.

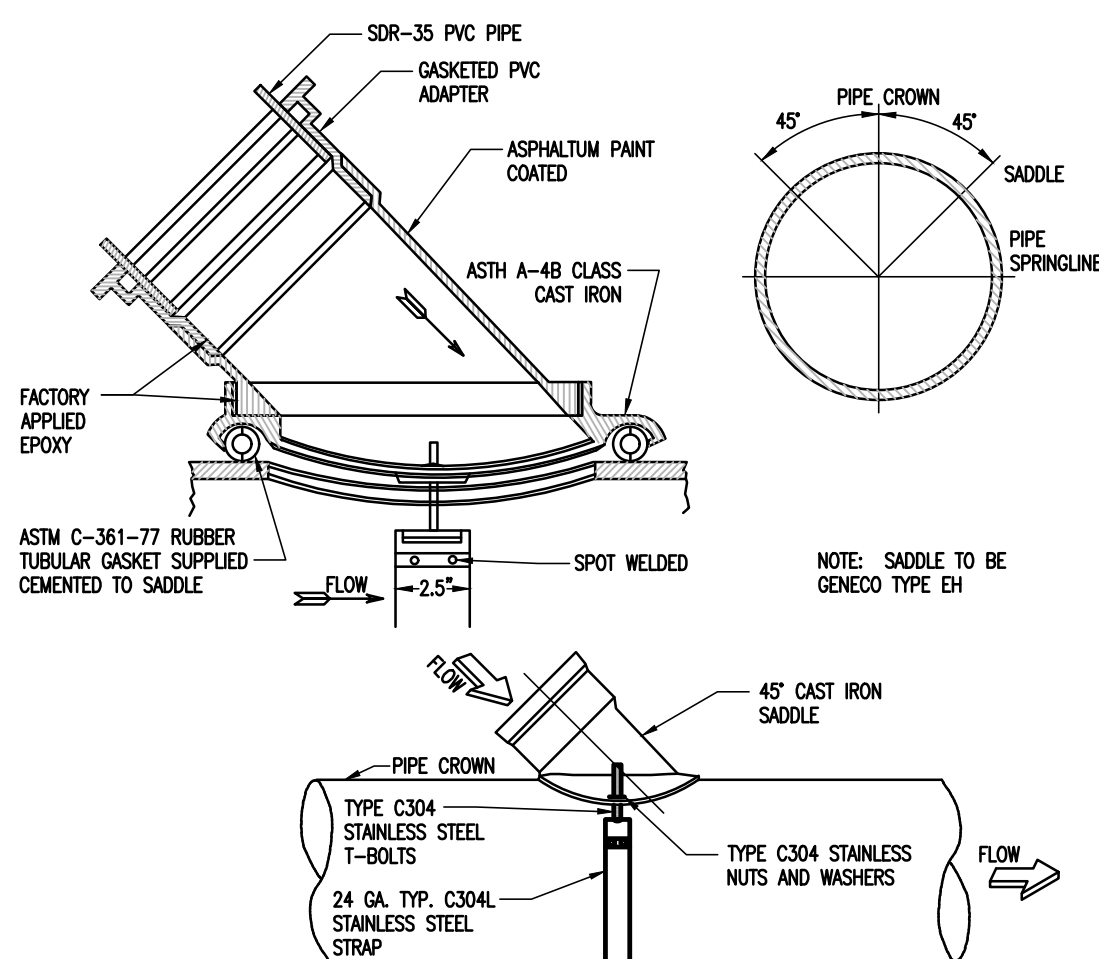
GRAVITY SEWER TRENCH DETAIL

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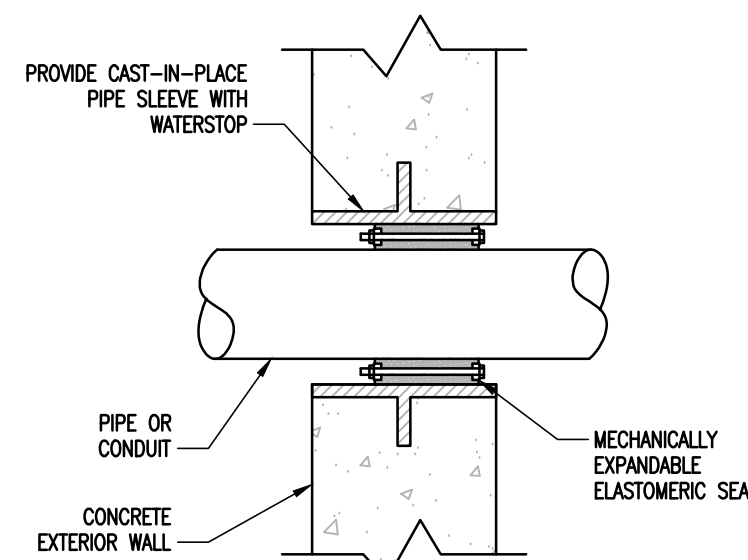
SEWER CLEANOUT DETAIL

NOT TO SCALE 2



SEWER SADDLE DETAIL

NOT TO SCALE 3



EXTERIOR PIPE PENETRATION DETAIL (BELOW GRADE)

NOT TO SCALE 4

SANITARY SEWER NOTES

- GENERAL:**
1. BEFORE ANY SEWER WORK IS COMMENCED, THE CONTRACTOR SHALL NOTIFY THE ENGINEER AND THE CITY OF BURLINGTON DPW AT LEAST 48 HOURS IN ADVANCE.
 2. THE CONTRACTOR SHALL COLLECT AND MAINTAIN "AS BUILT" INFORMATION DURING THE INSTALLATION OF THE SEWER SYSTEM. AS BUILT DRAWINGS SHALL BE PREPARED BY THE CONTRACTOR UPON COMPLETION OF THE SEWER SYSTEM.
 3. CONTRACTOR SHALL CONFORM TO ALL APPLICABLE REQUIREMENTS DETAILED IN THE LATEST EDITION OF THE VERMONT DEPARTMENT OF ENVIRONMENTAL CONSERVATION ENVIRONMENTAL PROTECTION RULES CHAPTER 1, WASTEWATER SYSTEM AND POTABLE WATER SUPPLY RULES. CONTRACTOR IS RESPONSIBLE FOR READING AND FOLLOWING THE COMPLETE EDITION PROVIDED BY THE STATE.

SANITARY SEWERS

- A. MATERIALS:** THE BUILDING SEWER SHALL BE CONSTRUCTED IN A MANNER WHICH WILL PREVENT LEAKING, BREAKING OR CLOGGING. ACCEPTABLE MATERIALS FOR THE SEWER ARE RUBBER-RING-JOINTED PVC GRAVITY SEWER PIPE SDR35 ASTM D3034.
- B. SIZING:** SLOPE VELOCITY MINIMUM BUILDING SEWER SIZE IS 4-INCHES UNLESS SHOWN ON THE PLAN AND A MINIMUM SLOPE IS 0.02 FOOT PER FOOT. ALL GRAVITY SEWER LINES SHALL BE INSTALLED WITH NOT LESS THAN THE SLOPES SHOWN BELOW.
- | PIPE SIZE (INCHES) | SLOPE (FEET/100-FEET) |
|--------------------|-----------------------|
| 4-INCHES | 0.02 |
| 6-INCHES | 0.015 |
| 8-INCHES | 0.01 |
- C. CLEANOUTS:** CLEANOUTS SHALL BE PROVIDED AT EACH HORIZONTAL CHANGE IN DIRECTION OF THE BUILDING SEWER GREATER THAN 45 DEGREES AND WHERE INDICATED ON THE DESIGN DRAWINGS. BUILDING SEWER CHANGES IN DIRECTION WHICH EXCEED 45 DEGREES SHOULD BE MADE WITH TWO 45 DEGREE ELBS OR LONG SWEEP FITTINGS. MANHOLES ARE ACCEPTABLE IN LIEU OF CLEANOUTS, WHERE BUILDING SEWERS ARE TO BE INSTALLED AT A DEPTH OF LESS THAN 3 FEET UNDER DRAINWAYS, EXTRA HEAVY CAST IRON PIPE SHALL BE USED.
- D. TRENCHING:** LEDGE, ROCK, BOLLERS AND LARGE STONES SHALL BE REMOVED TO PROVIDE A MINIMUM CLEARANCE OF SIX INCHES BELOW AND ON EACH SIDE OF ALL PIPES.
- E. BEDDING:** SEE TRENCH DETAILS THIS DRAWING FOR MATERIALS. TRENCH BACKFILL SHALL BE OF A SUITABLE NATIVE MATERIAL FREE FROM DEBRIS, FROZEN MATERIAL, LARGE CLOSOS OR STONES, ORGANIC MATTER, OR OTHER UNSTABLE MATERIALS.
- F. CHANGES IN PIPE SIZE:** WHEN A SMALLER SEWER JOINS A LARGER ONE, THE INVERT OF THE LARGER SEWER SHALL BE LOWERED SUFFICIENTLY TO MAINTAIN THE SAME ENERGY GRADIENT.
- G. MATERIAL:** PVC SDR 35, ASTM D3034, WITH PUSH ON GASKETED JOINTS. GASKETS SHALL CONFORM TO ASTM D3012. SEWER JOINTS SHALL BE CONSTRUCTED TO MINIMIZE INFILTRATION AND TO PREVENT THE ENTRANCE OF ROOTS INTO THE SYSTEM.
- F. LEAKAGE TESTS:** UPON COMPLETION OF SEWER SERVICE CONSTRUCTION, THE SEWER LINE SHALL BE TESTED IN ACCORDANCE WITH THE STATE OF VERMONT SPECIFICATIONS (DPR-CHAPTER 1, APPENDIX "A").

LEAKAGE TESTS FOR GRAVITY SEWER LINES:

1. PERFORM A PRESSURIZED AIR TEST ON THE GRAVITY LINE IN ACCORDANCE WITH THE VERMONT ENVIRONMENTAL PROTECTION RULES ON EACH SECTION OF THE GRAVITY SEWER. THE ENGINEER SHALL BE GIVEN 72 HOURS NOTICE BEFORE THE TEST IS CONDUCTED. TEST MUST BE WITNESSED BY THE ENGINEER.
2. FLUID AID OPENINGS IN THE TEST SECTION ADD AIR UNTIL THE INTERNAL PRESSURE OF THE LINE IS RAISED TO APPROXIMATELY 4.0 POUNDS/SQUARE INCH (PSI) GREATER THAN THE AVERAGE PRESSURE OF ANY GROUND WATER. AFTER THIS PRESSURE IS REACHED, ALLOW THE PRESSURE TO STABILIZE. THE PRESSURE WILL NORMALLY DROP AS THE AIR TEMPERATURE STABILIZES. THIS USUALLY TAKES 2 TO 5 MINUTES DEPENDING ON THE PIPE SIZE. THE PRESSURE MAY BE REDUCED TO 3.5 PSI BEFORE STARTING THE TEST.
3. WHEN THE PRESSURE HAS STABILIZED AND IS AT OR ABOVE THE STARTING TEST PRESSURE OF 5.0 PSI ABOVE THE PIPE START THE TEST. IF THE PRESSURE DROPS MORE THAN 1.0 PSI DURING THE TEST TIME, THE LINE IS PRESUMED TO HAVE FAILED THE TEST. IF A 1.0 PSI DROP DOES NOT OCCUR WITHIN THE TEST TIME, THE LINE HAS PASSED THE TEST. THE TEST TIME SHALL BE DETERMINED FROM THE FOLLOWING TABLE. IF THE SECTION OF LINE TO BE TESTED INCLUDES MORE THAN ONE PIPE SIZE, CALCULATE THE TEST TIME FOR EACH SIZE AND ADD THE TEST TIMES TO ARRIVE AT THE TOTAL TEST TIME FOR THE SECTION.

PIPE SIZE (IN)	T (TIME) (MIN./100FT)
3	0.2
4	0.3
6	0.7
8	1.2
10	1.5
12	1.8

- G. INSTALLATION:** PIPE SHALL BE LAID WITH BELL ENDS FACING UPGRADE AND LAYING SHALL START AT THE DOWNSLOPE END.
- H. WATER/SEWER SEPARATION:** SEWERS SHALL BE LAID FLAT AT LEAST TEN FEET HORIZONTALLY FROM ANY EXISTING OR PROPOSED WATER LINE. THE DISTANCE SHALL BE MEASURED EDGE TO EDGE. SEE TYPICAL SEWER/WATER SEPARATION DETAIL.

- 1. WHERE IMPOSSIBLE OR IMPRACTICAL TO MAINTAIN THE TEN FOOT SEWER/WATER PIPE HORIZONTAL SEPARATION (DUE TO LEDGE, BOLLERS OR OTHER UNUSUAL CONDITIONS) THE WATER LINE MAY BE IN A SEPARATE TRENCH OR ON AN EARTHEN SELF IN THE SEWER TRENCH PROVIDED THAT THE BOTTOM OF THE WATER LINE IS AT LEAST 18-INCHES ABOVE THE TOP OF THE SEWER. WHEREVER IMPOSSIBLE OF IMPRACTICAL TO MAINTAIN THE 18-INCH VERTICAL SEPARATION, THE SEWER LINE SHALL BE CONSTRUCTED USING PRESSURE PIPE TO NORMAL WATER LINE STANDARDS AND PRESSURE TESTED TO 50-PSI FOR 15-MINUTES PRIOR TO BACKFILLING.**
- 2. CROSSINGS:** SEWER CROSSING WATER MAINS SHALL BE LAID BENEATH THE WATER MAIN WITH AT LEAST 18-INCHES VERTICAL CLEARANCE BETWEEN THE OUTSIDE OF THE SEWER AND THE OUTSIDE OF THE WATER MAIN. WHEN IT IS IMPOSSIBLE TO MAINTAIN THE 18-INCH VERTICAL SEPARATION:
- a. THE CROSSING SHALL BE ARRANGED SO THAT ONE FULL LENGTH OF SEWER IS CENTERED ABOVE OR BELOW THE WATER LINE WITH SEWER JOINTS AS FAR AWAY AS POSSIBLE FROM WATER JOINTS.
 - b. THE SEWER PIPE MUST BE CONSTRUCTED TO WATER MAIN STANDARDS FOR A MINIMUM DISTANCE OF 20-Feet EITHER SIDE OF THE CROSSING OR A TOTAL OF THREE PIPE LENGTHS, WHICHEVER IS GREATER.
 - c. THE SECTION CONSTRUCTED TO WATER MAIN STANDARDS MUST BE PRESSURE TESTED TO MAINTAIN 50-PSI FOR 15-MINUTES WITHOUT LEAKAGE PRIOR TO BACKFILLING BEYOND 1-FOOT ABOVE THE PIPE TO ASSURE WATER TIGHTNESS.
 - d. WHERE A WATER MAIN CROSSES UNDER A SEWER, ADEQUATE STRUCTURAL SUPPORT SHALL BE PROVIDED FOR THE SEWER TO PREVENT DAMAGE TO THE WATER MAIN.

MANHOLES

1. DIAMETER: THE MINIMUM DIAMETER OF MANHOLES SHALL BE 48-INCHES; LARGE DIAMETERS ARE PREFERRED FOR CONNECTION TO LARGE DIAMETER SEWERS. A MINIMUM ACCESS DIAMETER OF 24-INCHES SHALL BE PROVIDED.
2. FLOW CHANNEL: FLOW CHANNELS SHALL BE PROVIDED IN THE BASE OF ALL MANHOLES AND THE FLOW CHANNEL THROUGH MANHOLES SHOULD BE MADE TO CONFORM IN SHAPE AND SLOPE TO THAT OF THE SEWER.
3. MANHOLES SHALL BE OF THE PRE-CAST CONCRETE OR POUR-IN-PLACE CONCRETE TYPE. MANHOLES SHALL BE WATERPROOFED ON THE EXTERIOR.
4. INLET AND OUTLET PIPES SHALL BE JOINTED TO THE MANHOLE WITH A RUBBER-GASKETED FLEXIBLE WATERTIGHT CONNECTION THAT ALLOWS DIFFERENTIAL SETTLEMENT OF THE PIPE AND MANHOLE WALL TO TAKE PLACE.
5. ALL MANHOLES SHALL BE TESTED FOR LEAKAGE. LEAKAGE TESTING OF GRAVITY SEWERS UTILIZING THE WATER TESTING PROCEDURES TAKES INTO ACCOUNT THE LEAKAGE FROM ONE MANHOLE IN THE TEST SECTION. OTHERWISE, MANHOLES SHALL BE TESTED FOR LEAKAGE IN ACCORDANCE WITH THE FOLLOWING PROCEDURE:
 - a. AFTER THE MANHOLE HAS BEEN ASSEMBLED IN PLACE, ALL LIFTING HOLES AND EXTERIOR JOINTS SHALL BE FILLED WITH AND POINTED WITH AN APPROVED NON-SHRINKING MORTAR. ALL PIPES AND OTHER OPENINGS INTO THE MANHOLE SHALL BE SUITABLY PLUGGED AND THE PLUGS PLACED TO PREVENT BLOWOUT.
 - b. EACH MANHOLE SHALL BE CHECK FOR INFILTRATION BY FILING WITH WATER TO THE TOP OF THE CONE SECTION. A STABILIZED PERIOD OF ONE HOUR SHALL BE PROVIDED 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 SIX HOURS BEGIN. 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 A 24-HOUR RATE AND THE LEAKAGE DETERMINED ON THE BASIS OF DEPTH. THE LEAKAGE FOR EACH MANHOLE SHALL NOT EXCEED ONE GALLON PER VERTICAL FOOT FOR A 24-HOUR PERIOD FOR EXPLORATION AND THERE SHALL BE NO VISIBLE INFILTRATION. IF AN AIR TEST IS PERFORMED ON THE MANHOLE INSTEAD OF THE WATER TEST, THE MANHOLE SHALL REMAIN UN-BLOWOUTED DOWN TO THE SEWER LINE INVERTS DURING THE AIR TEST.

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SANITARY SEWER DETAILS

EV Project #

22488

Drawn By:

JG

Checked By:

KW

Scale:

Date:

08/03/2023

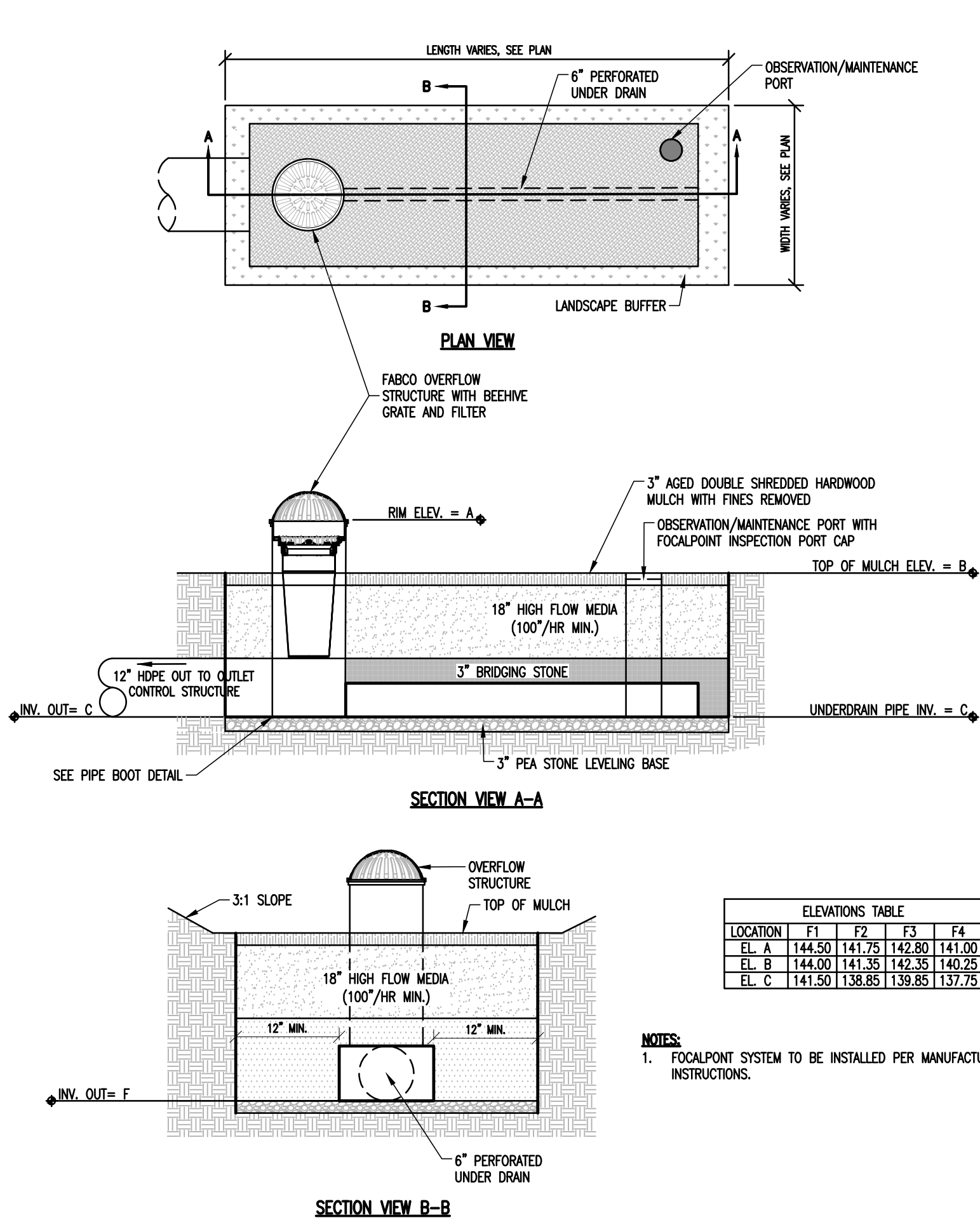
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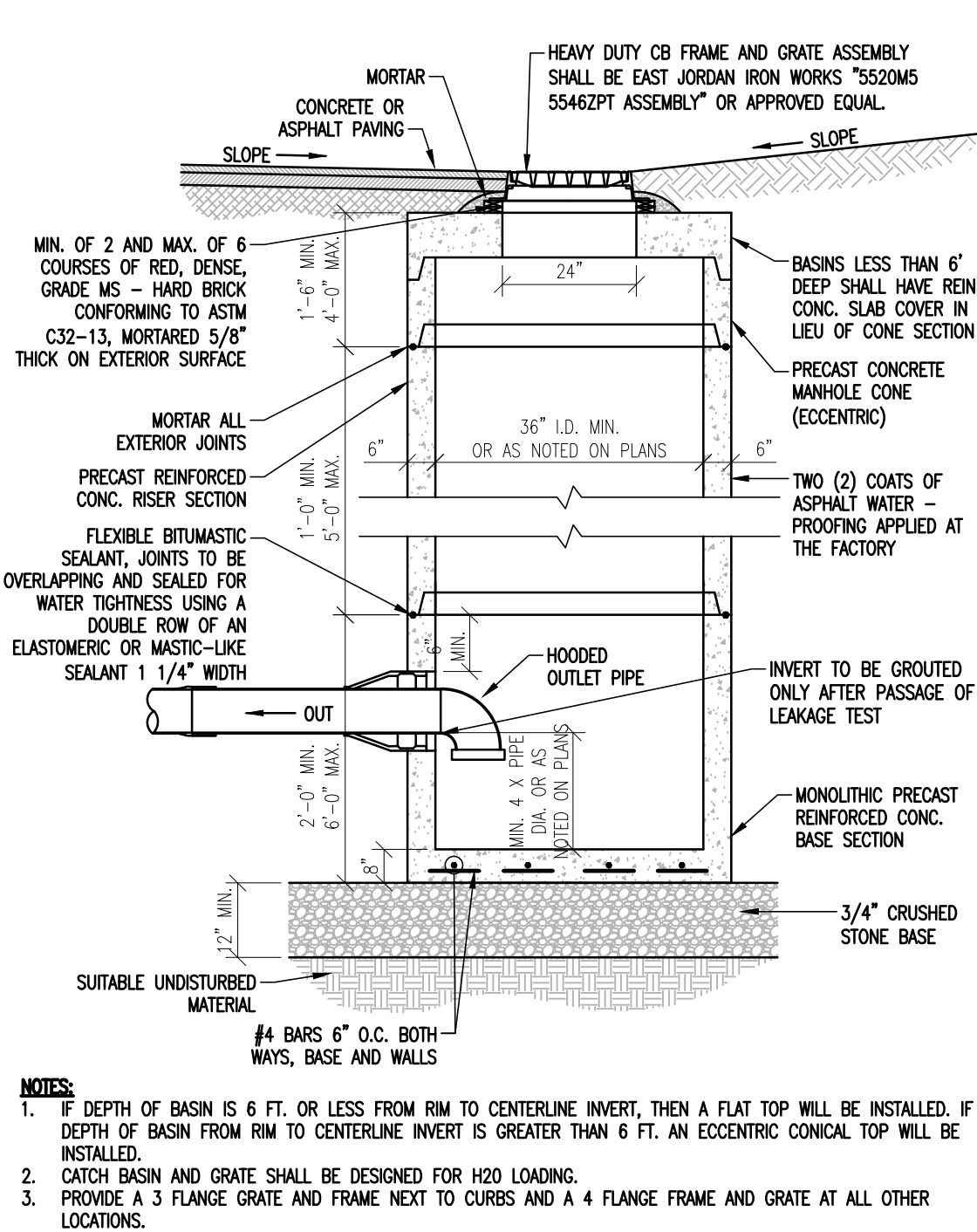
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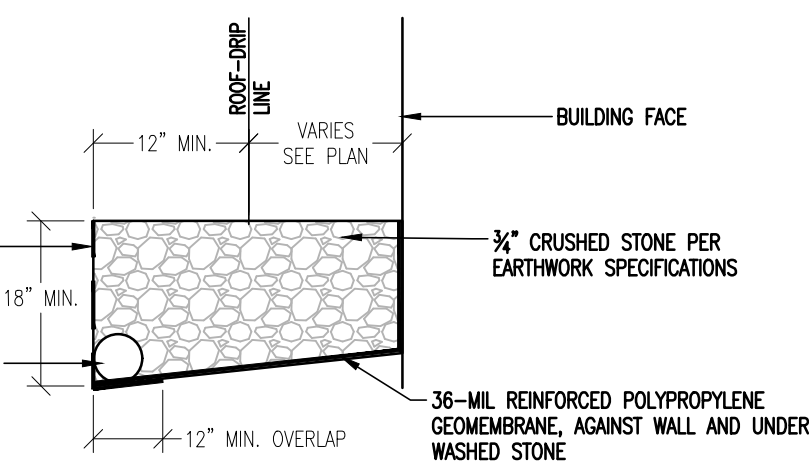
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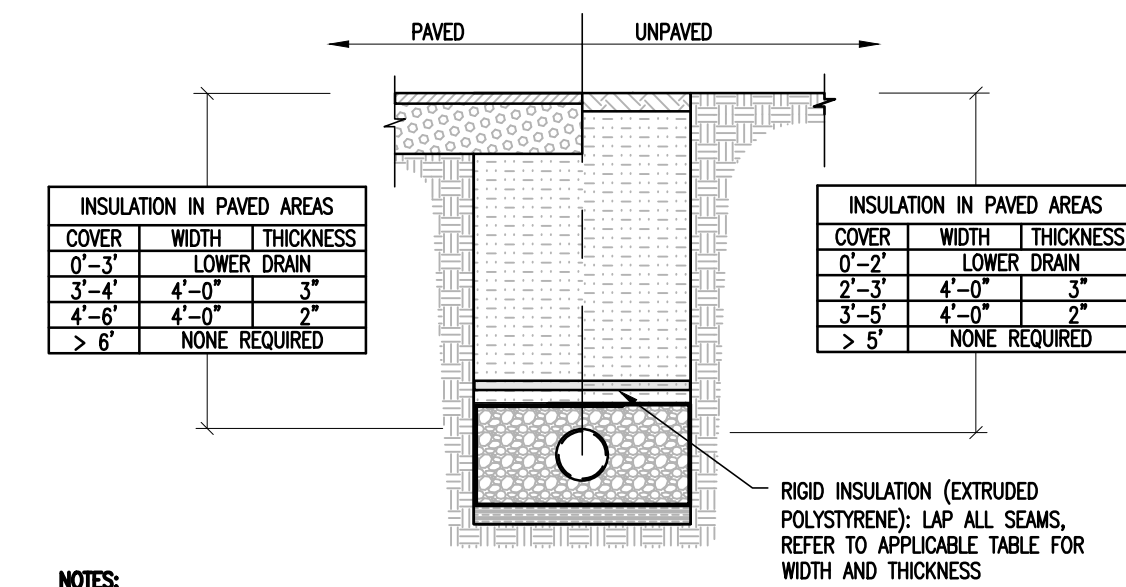
FOCALPOINT STORMWATER SYSTEM



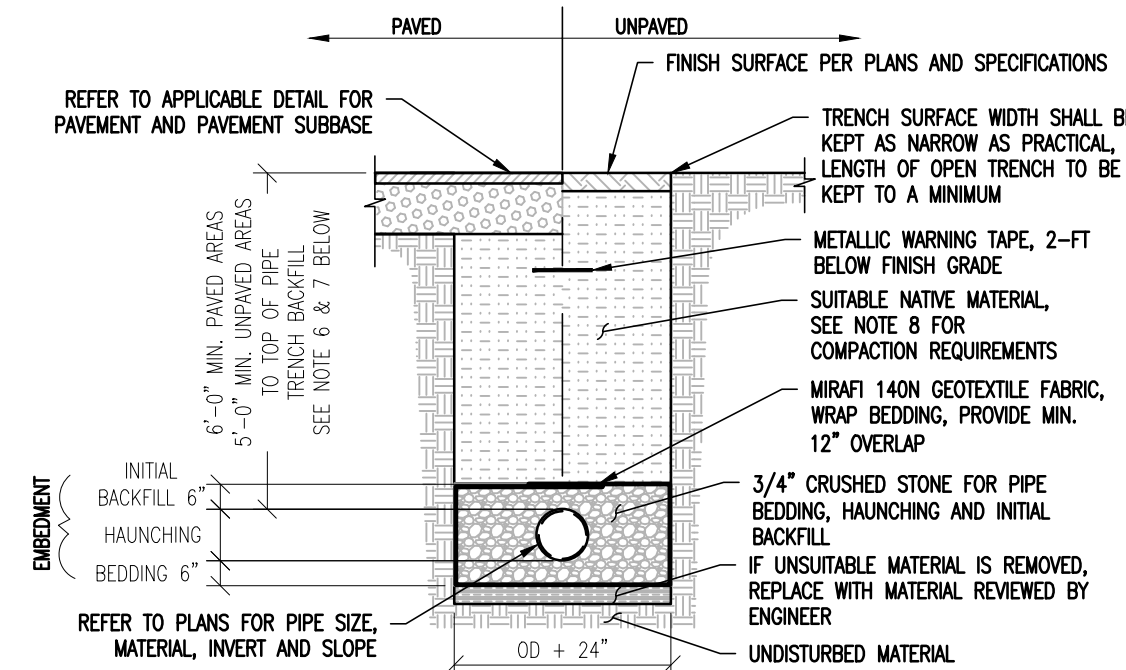
DEEP SUMP CATCH BASIN DETAIL



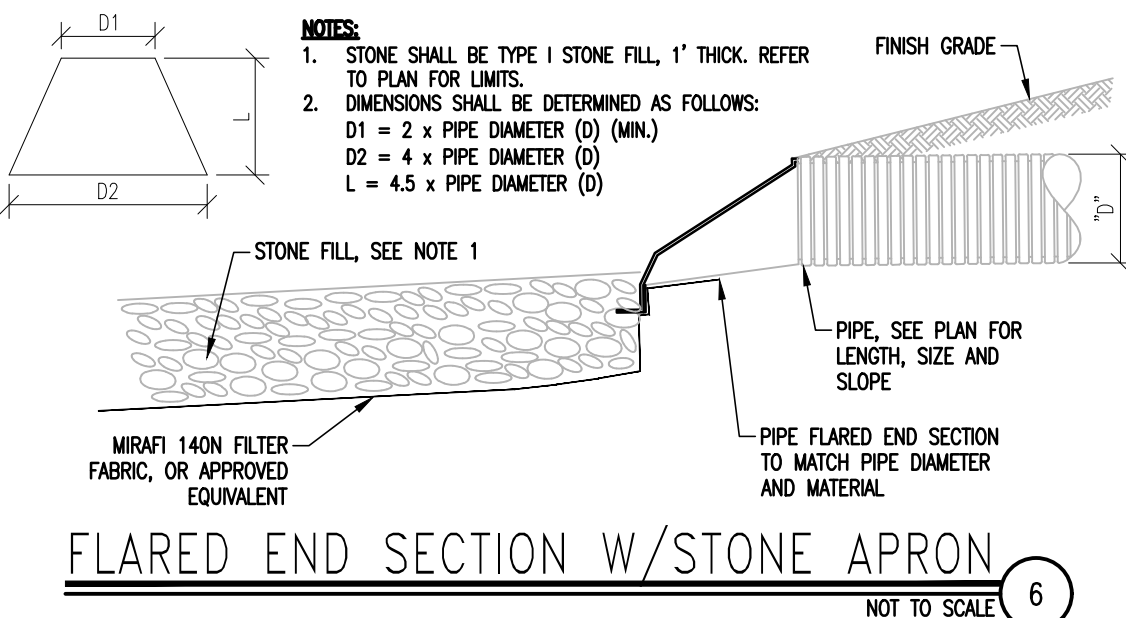
TYPICAL DRIP EDGE



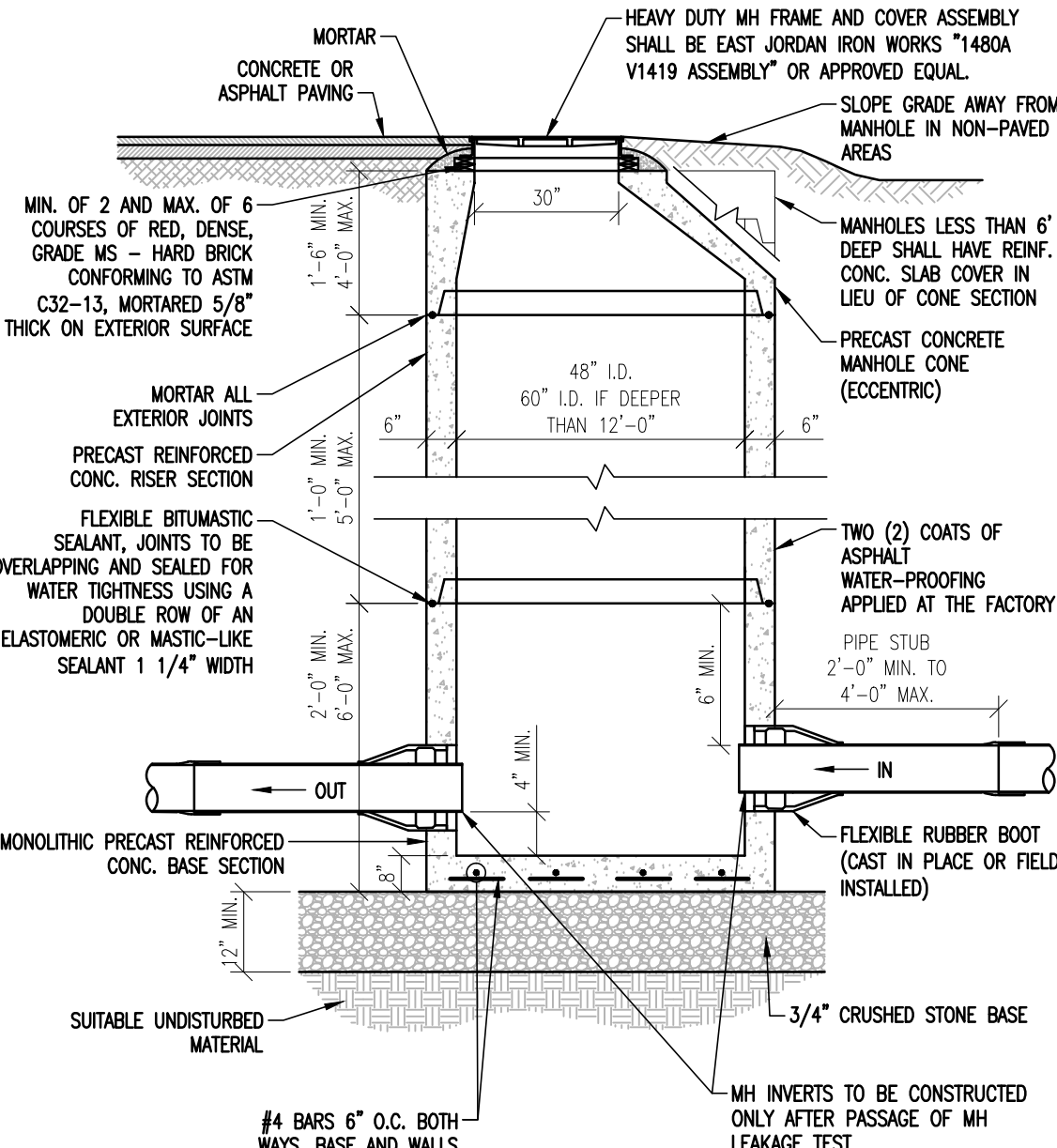
INSULATION OVER SHALLOW DRAIN DETAIL



TYPICAL STORM DRAIN TRENCH DETAIL



FLARED END SECTION W/STONE APRON

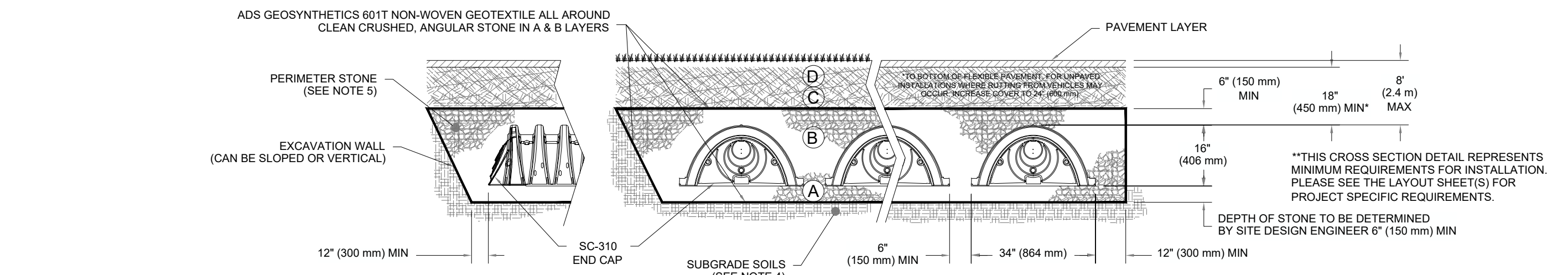


DRAINAGE MANHOLE DETAIL

ACCEPTABLE FILL MATERIALS: STORMTECH SC-310 CHAMBER SYSTEMS

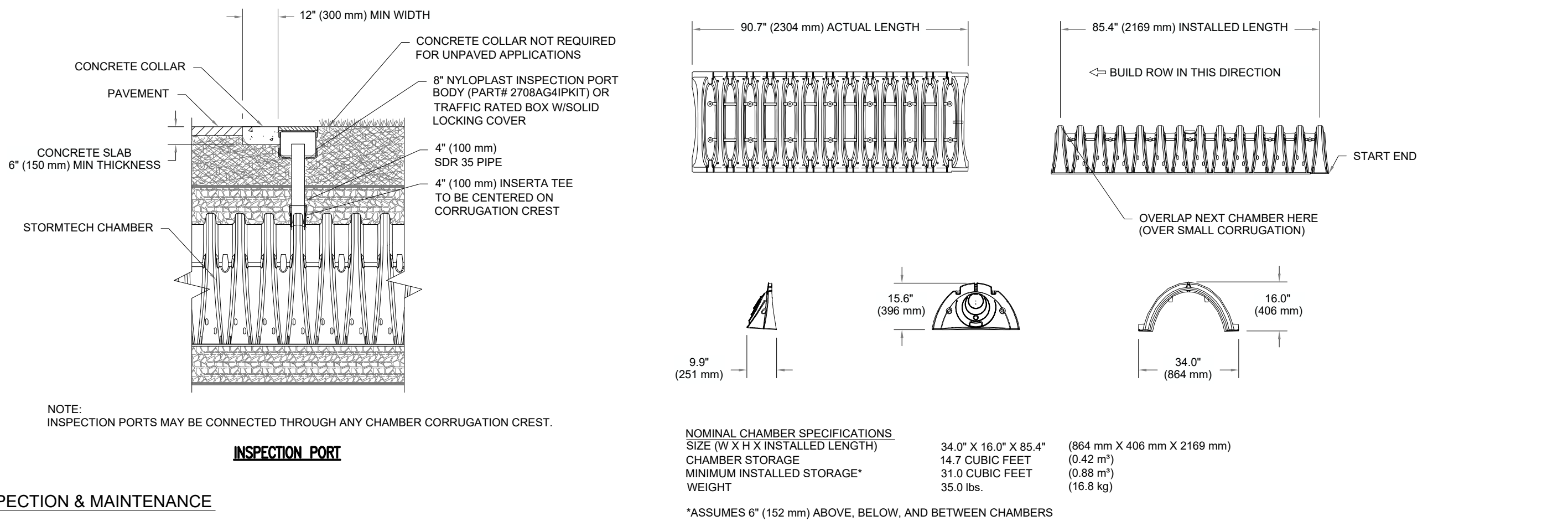
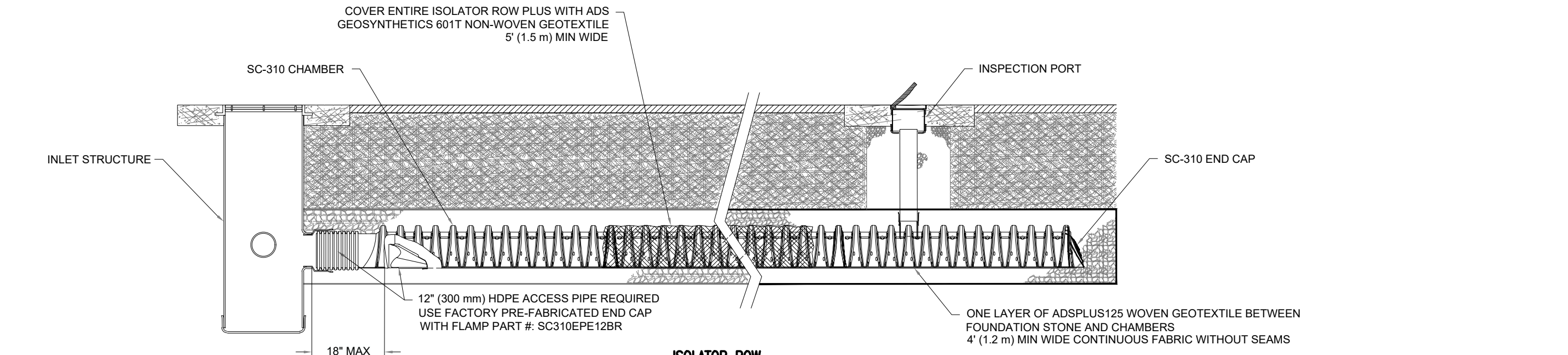
MATERIAL LOCATION	DESCRIPTION	AASHTO MATERIAL CLASSIFICATIONS	COMPACTION / DENSITY REQUIREMENT
D	FINAL FILL: FILL MATERIAL FOR LAYER 'D' STARTS FROM THE TOP OF THE 'C' LAYER TO THE BOTTOM OF FLEXIBLE PAVEMENT OR UNPAVED FINISHED GRADE ABOVE. NOTE THAT PAVEMENT SUBBASE MAY BE PART OF THE 'D' LAYER.	ANY SOIL/ROCK MATERIALS, NATIVE SOILS, OR PER ENGINEER'S PLANS. CHECK PLANS FOR PAVEMENT SUBGRADE REQUIREMENTS.	N/A
C	INITIAL FILL: FILL MATERIAL FOR LAYER 'C' STARTS FROM THE TOP OF THE EMBEDMENT STONE ('B' LAYER) TO 18" (450 mm) ABOVE THE TOP OF THE CHAMBER. NOTE THAT PAVEMENT SUBBASE MAY BE A PART OF THE 'C' LAYER.	GRANULAR WELL-GRADED SOIL/AGGREGATE MIXTURES, <35% FINES OR PROCESSED AGGREGATE. MOST PAVEMENT SUBBASE MATERIALS CAN BE USED IN LIEU OF THIS LAYER.	AASHTO M145* A-1, A-2-4, A-3 OR AASHTO M43* 3, 357, 4, 467, 5, 56, 57, 6, 67, 68, 7, 78, 8, 89, 9, 10
B	EMBEDMENT STONE: FILL SURROUNDING THE CHAMBERS FROM THE FOUNDATION STONE ('A' LAYER) TO THE 'C' LAYER ABOVE.	CLEAN, CRUSHED, ANGULAR STONE	AASHTO M43* 3, 357, 4, 467, 5, 56, 57
A	FOUNDATION STONE: FILL BELOW CHAMBERS FROM THE SUBGRADE UP TO THE FOOT (BOTTOM) OF THE CHAMBER.	CLEAN, CRUSHED, ANGULAR STONE	AASHTO M43* 3, 357, 4, 467, 5, 56, 57

PLEASE NOTE:
1. THE LISTED AASHTO DESIGNATIONS ARE FOR GRADATIONS ONLY. THE STONE MUST ALSO BE CLEAN, CRUSHED, ANGULAR. FOR EXAMPLE, A SPECIFICATION FOR #4 STONE WOULD STATE: "CLEAN, CRUSHED, ANGULAR NO. 4 (AASHTO M43) STONE".
2. STORMTECH COMPACTION REQUIREMENTS ARE MET FOR 'A' LOCATION MATERIALS WHEN PLACED AND COMPACTED IN 6" (150 mm) (MAX) LIFTS USING TWO FULL COVERAGES WITH A VIBRATORY COMPACTOR.
3. WHERE INFILTRATION SURFACES MAY BE COMPROMISED BY COMPACTION, FOR STANDARD DESIGN LOAD CONDITIONS, A FLAT SURFACE MAY BE ACHIEVED BY RAKING OR DRAGGING WITHOUT COMPACTION EQUIPMENT. FOR SPECIAL LOAD DESIGNS, CONTACT STORMTECH FOR COMPACTION REQUIREMENTS.
4. ONCE LAYER 'C' IS PLACED, ANY SOIL/MATERIAL CAN BE PLACED IN LAYER 'D' UP TO THE FINISHED GRADE. MOST PAVEMENT SUBBASE SOILS CAN BE USED TO REPLACE THE MATERIAL REQUIREMENTS OF LAYER 'C' OR 'D' AT THE SITE DESIGN ENGINEER'S DISCRETION.



NOTES:

- CHAMBERS SHALL MEET THE REQUIREMENTS OF ASTM F2922 (POLETHYLENE) OR ASTM F2418 (POLYPROPYLENE), "STANDARD SPECIFICATION FOR CORRUGATED WALL STORMWATER COLLECTION CHAMBERS".
- SC-310 CHAMBERS SHALL BE DESIGNED IN ACCORDANCE WITH ASTM F2927 "STANDARD PRACTICE FOR STRUCTURAL DESIGN OF THERMOPLASTIC CORRUGATED WALL STORMWATER COLLECTION CHAMBERS".
- THE SITE DESIGN ENGINEER IS RESPONSIBLE FOR ASSESSING THE BEARING RESISTANCE (ALLOWABLE BEARING CAPACITY) OF THE SUBGRADE SOILS AND THE DEPTH OF FOUNDATION STONE WITH CONSIDERATION FOR THE RANGE OF EXPECTED SOIL MOISTURE CONDITIONS.
- PERIMETER STONE MUST BE EXTENDED HORIZONTALLY TO THE EXCAVATION WALL FOR BOTH VERTICAL AND SLOPED EXCAVATION WALLS.
- REQUIREMENTS FOR HANDLING AND INSTALLATION:
 - TO MAINTAIN THE WIDTH OF CHAMBERS DURING SHIPPING AND HANDLING, CHAMBERS SHALL HAVE INTEGRAL, INTERLOCKING STACKING LUGS.
 - TO ENSURE A SECURE JOINT DURING INSTALLATION AND BACKFILL, THE HEIGHT OF THE CHAMBER JOINT SHALL NOT BE LESS THAN 2".
 - TO ENSURE THE INTEGRITY OF THE ARCH SHAPE DURING INSTALLATION, a) THE ARCH STIFFNESS CONSTANT AS DEFINED IN SECTION 6.2.8 OF ASTM F2922 SHALL BE GREATER THAN OR EQUAL TO 400 LB/SQFT (75 AND b) TO RESIST CHAMBER DEFORMATION DURING INSTALLATION AT ELEVATED TEMPERATURES (ABOVE 75° F / 23° C), CHAMBERS SHALL BE PRODUCED FROM REFLECTIVE GOLD OR YELLOW COLORS.



INSPECTION PORT

INSPECTION & MAINTENANCE

- STEP 1) INSPECT ISOLATOR ROW PLUS FOR SEDIMENT
- A. INSPECTION PORTS
- A.1. USING A FLASHLIGHT AND STADIA ROD, MEASURE DEPTH OF SEDIMENT AND RECORD ON LOG
- A.2. LOWER A CAMERA INTO ISOLATOR ROW PLUS FOR VISUAL INSPECTION OF SEDIMENT LEVELS (OPTIONAL)
- A.3. IF SEDIMENT IS AT, OR ABOVE, 3" (80 mm) PROCEED TO STEP 2; IF NOT, PROCEED TO STEP 3.
- B. ALL ISOLATOR PLUS ROWS
- B.1. REMOVE COVER FROM STRUCTURE AT UPSTREAM END OF ISOLATOR ROW PLUS
- B.2. ONLY AFTER DOWN THE ISOLATOR ROW PLUS THROUGH OUTLET PIPE (MIRRORS ON POLES OR CAMERAS MAY BE USED TO AVOID A CONFINED SPACE ENTRY) IF FOLLOW OSHA REGULATIONS FOR CONFINED SPACE ENTRY IF ENTERING MANHOLE
- B.3. IF SEDIMENT IS AT, OR ABOVE, 3" (80 mm) PROCEED TO STEP 2; IF NOT, PROCEED TO STEP 3.
- STEP 2) CLEAN OUT ISOLATOR ROW PLUS USING THE JETVAC PROCESS
- A. A FIXED CULVERT CLEANING NOZZLE WITH REAR FACING SPREAD OF 45° (1.1 m) OR MORE IS PREFERRED
- B. APPLY MULTIPLE PASSES OF JETVAC UNTIL BACKFLUSH WATER IS CLEAN
- C. VACUUM STRUCTURE SUMP AS REQUIRED
- STEP 3) REPLACE ALL COVERS, GRATES, FILTERS, AND LIDS; RECORD OBSERVATIONS AND ACTIONS.
- STEP 4) INSPECT AND CLEAN BASINS AND MANHOLES UPSTREAM OF THE STORMTECH SYSTEM.

STORMTECH CHAMBER SYSTEM DETAILS

DESIGN DEVELOPMENT
NOT FOR CONSTRUCTION
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STORMWATER DETAILS

HOWARD CENTER REDEVELOPMENT
855 PINE STREET/300 FLYNN AVENUE
CITY OF BURLINGTON, CHITTENDEN COUNTY, VERMONT

Project Title:

EV Project #

22488

Drawn By:

JG

Checked By:

KW

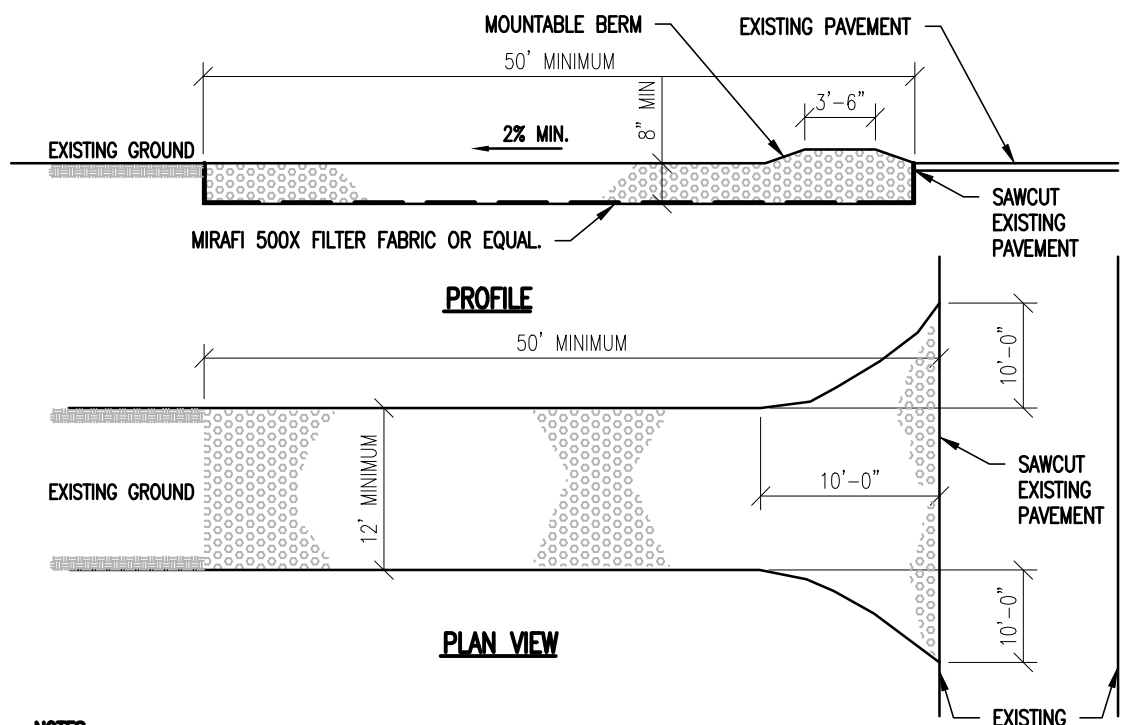
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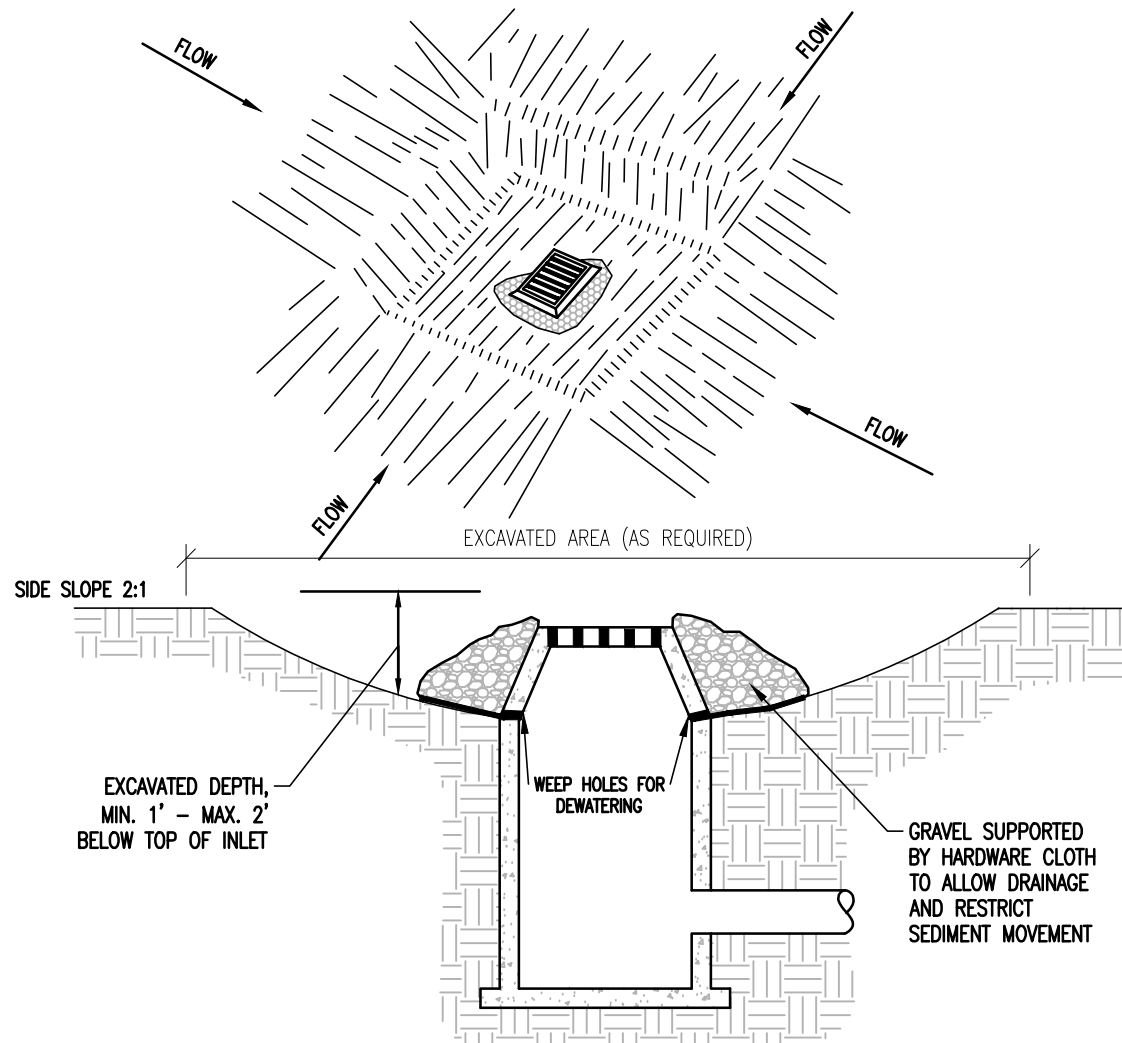
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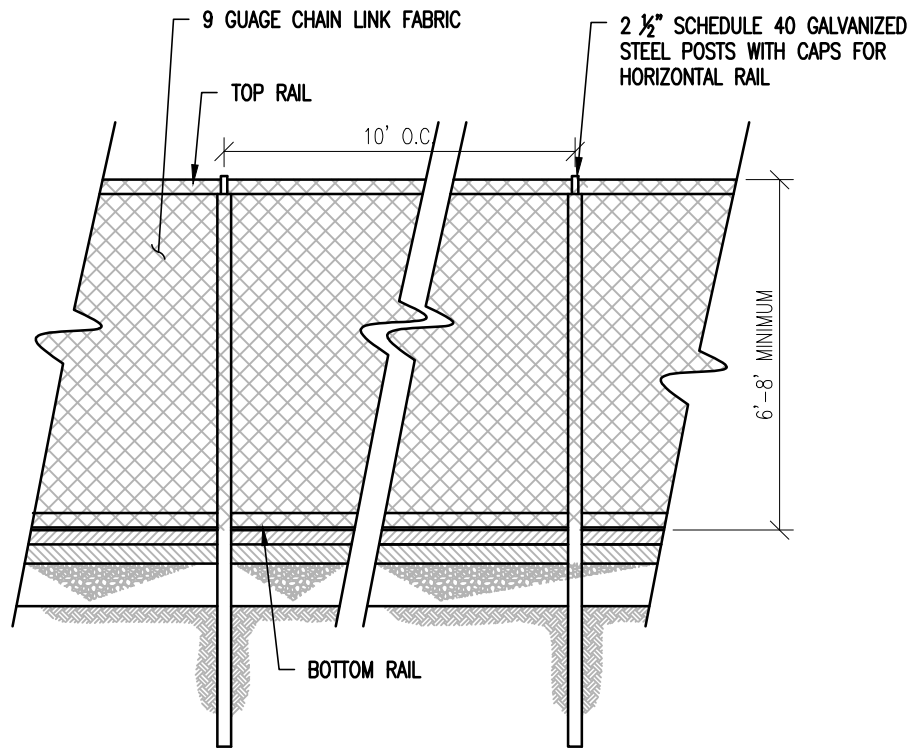
- NOTES:**
1. STONE SHALL BE AGGREGATE FOR EROSION PREVENTION & SEDIMENT CONTROL MEETING REQUIREMENTS OF PAVEMENT EARTHWORK SPECIFICATIONS.
 2. ALL SURFACE WATER FLOWING OR DIVERTED TOWARD CONSTRUCTION ENTRANCE SHALL BE PIPED BEAENEATH THE ENTRANCE.
 3. THE ENTRANCE SHALL BE MAINTAINED IN A CONDITION WHICH WILL PREVENT TRACKING OR FLOWING OF SEDIMENT ONTO PUBLIC RIGHT-OF-WAYS. THIS MAY REQUIRE PERIODIC TOP DRESSING WITH ADDITIONAL STONE AS CONDITIONS DEMAND. REPAIR AND/OR CLEAN OUT ANY MEASURES USED TO TRAP SEDIMENT. WHEN WASHING IS REQUIRED, IT SHALL BE DONE ON AN AREA STABILIZED WITH STONE WHICH DRAINS INTO AN APPROVED SEDIMENT TRAPPING DEVICE.
 4. TRACKING ONTO PUBLIC RIGHT-OF-WAYS SHALL NOT BE ALLOWED. ALL SEDIMENT SPILLED, DROPPED, OR WASHED ONTO PUBLIC RIGHT-OF-WAYS MUST BE REMOVED IMMEDIATELY AND ANY WASH WATER MUST BE CONTAINED AND PROPERLY DISPOSED OF.
 5. PERIODIC INSPECTION AND NEEDED MAINTENANCE SHALL BE PROVIDED AFTER EACH RAIN.

STABILIZED CONSTRUCTION ENTRANCE DETAIL 1

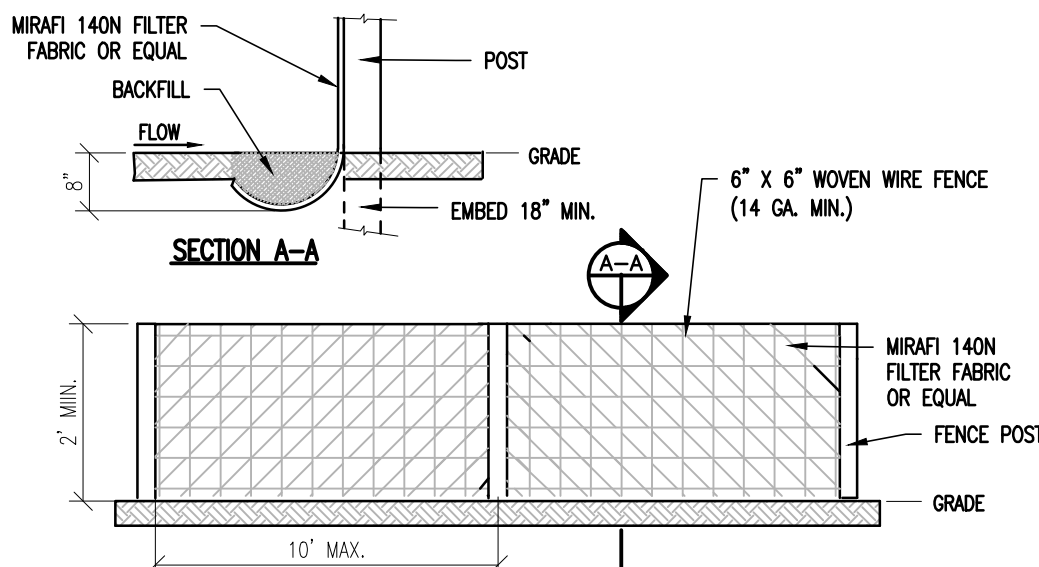


- NOTES:**
1. CLEAR THE AREA OF ALL DEBRIS THAT WILL HINDER EXCAVATION.
 2. GRADE APPROACH TO THE INLET UNIFORMLY AROUND THE BASIN.
 3. WEEP HOLES SHALL BE PROTECTED BY GRAVEL.
 4. UPON STABILIZATION OF CONTRIBUTING DRAINAGE AREA, SEAL WEEP HOLES, FILL BASIN WITH STABLE SOIL TO FINAL GRADE, COMPACT IT PROPERLY AND STABILIZE WITH PERMANENT SEEDING.

INLET PROTECTION DETAIL 5

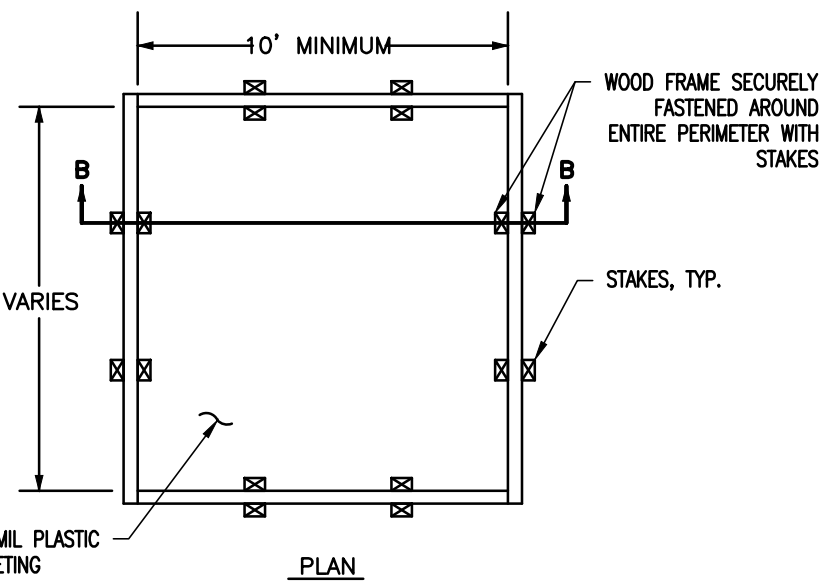
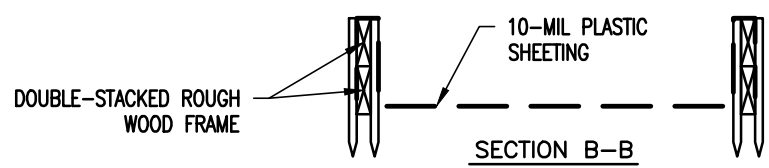


CONSTRUCTION FENCE DETAIL 2



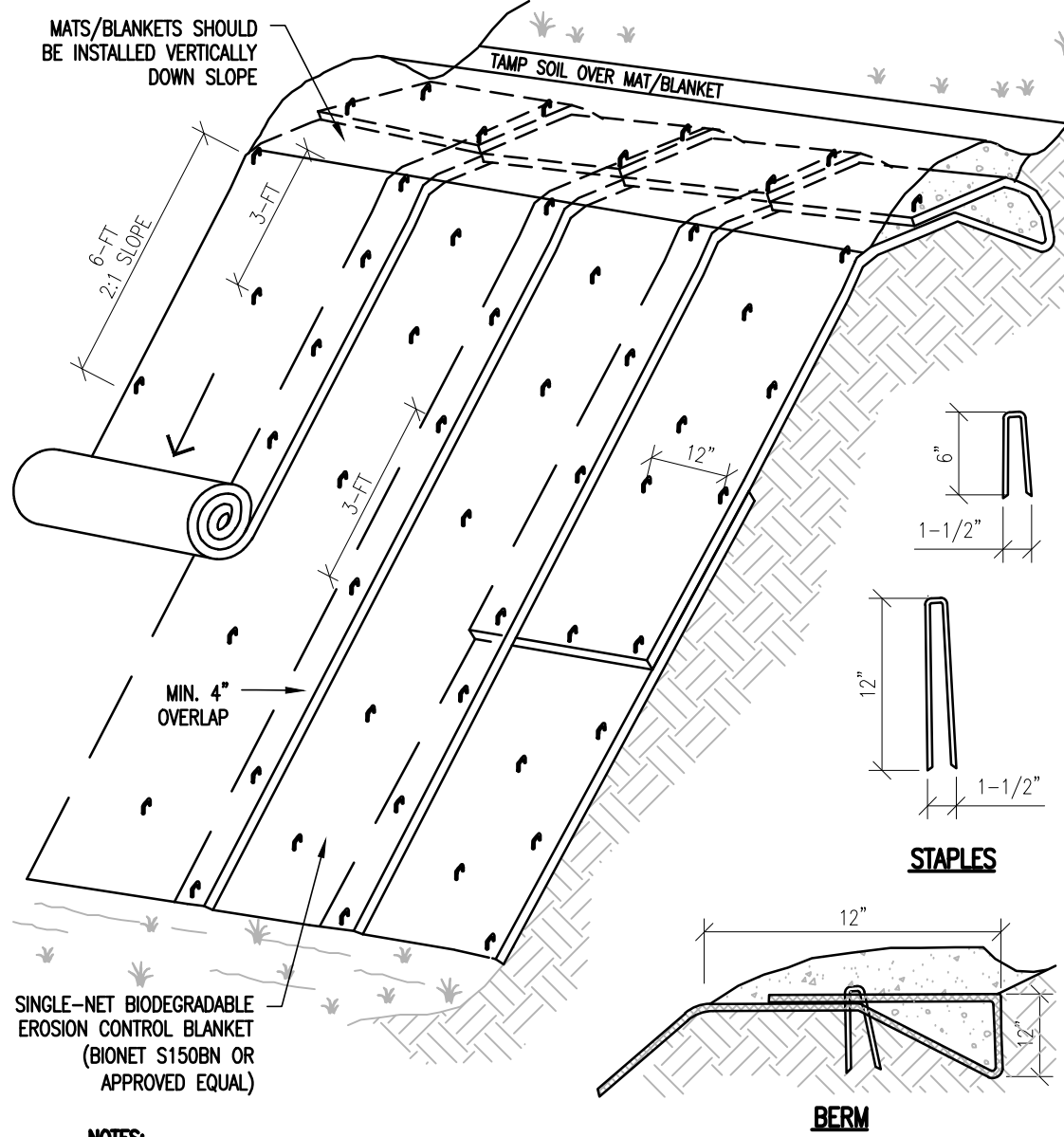
- NOTES:**
1. PREFABRICATED SILT FENCE SHALL BE ENVIROFENCE BY MIRAFI OR APPROVED EQUAL.
 2. SILT FENCE MAY BE CONSTRUCTED IN PLACE PER THIS DETAIL.
A. WOVEN WIRE FENCE TO BE FASTENED SECURELY TO FENCE POSTS WITH WIRE TIES OR STAPLES.
B. FILTER FABRIC TO BE FASTENED SECURELY TO WOVEN WIRE FENCE WITH TIES SPACED EVERY 24" AT TOP AND MID SECTION.
C. WHERE TWO SECTIONS OF FILTER CLOTH ADJOIN EACH OTHER, THEY SHALL BE OVERLAPPED BY 6", FOLDED AND STAPLED.
 3. INSPECTION SHALL BE FREQUENT (MINIMUM ONCE A WEEK AND AFTER EVERY RAINFALL). MAINTENANCE SHALL BE PERFORMED AS NEEDED, AND SEDIMENT REMOVED WHEN "BULGES" DEVELOP IN SILT FENCE OR WHEN THE SEDIMENT REACHES HALF THE FABRIC HEIGHT.

SILT FENCE DETAIL 3



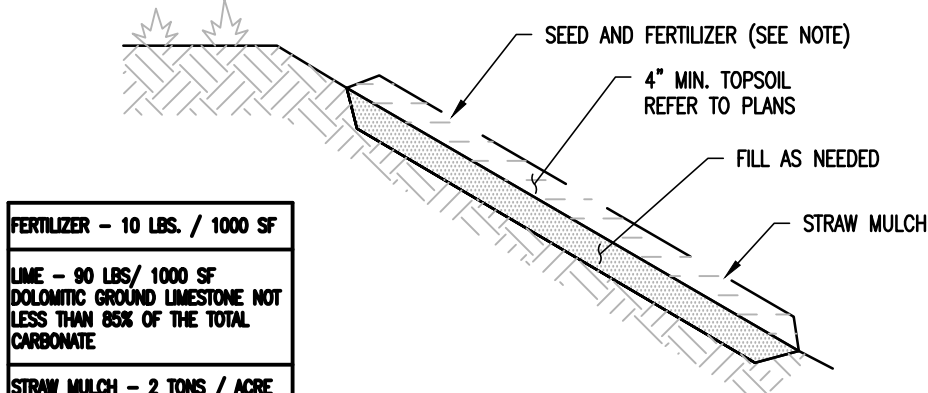
- NOTES:**
1. FRAME MAY BE REINFORCED WITH HAY BALES AS NEEDED.
 2. REPLACE PLASTIC LINING AS NEEDED IF TEARS OR HOLES APPEAR IN THE COURSE OF CLEANING OR REMOVING HARDENED SOLIDS.

CONCRETE WASHOUT DETAIL 4



- NOTES:**
1. SLOPE SURFACE SHALL BE FREE OF ROCKS, CLODS, STICKS AND GRASS. MATS / BLANKETS SHALL HAVE GOOD SOIL CONTACT.
 2. APPLY PERMANENT SEEDING BEFORE PLACING BLANKETS.
 3. LAY BLANKETS LOOSELY AND STAKE OR STAPLE TO MAINTAIN DIRECT CONTACT WITH THE SOIL. DO NOT STRETCH.

EROSION CONTROL BLANKET 6



FERTILIZER - 10 LBS. / 1000 SF

LIME - 90 LBS. / 1000 SF

DOLOMITIC GROUND LIMESTONE NOT LESS THAN 80% OF THE TOTAL CHROMITE

STRAW MULCH - 2 TONS / ACRE

- NOTES:**
1. SEEDING AND MULCHING OF DISTURBED AREAS SHALL TAKE PLACE WITHIN 48 HOURS OF FINAL GRADING.
MULCH: HAY SHALL NOT BE USED. STRAW MULCH SHALL BE APPLIED AT A RATE OF 90-1,000 LBS./1,000 SF. MULCH SHALL NOT BE PLACED ON SLOPES STEEPER THAN 3:1. SEED IMPREGNATED EROSION CONTROL NETTING SHALL BE USED IN ITS PLACE.
 2. SEED: SEEDING SHALL OCCUR AFTER APRIL 15 AND PRIOR TO SEPTEMBER 15TH IN ORDER TO ESTABLISH SUFFICIENT COVER PRIOR TO GROUND FREEZING. SEED SHALL BE IN ACCORDANCE WITH SEED SPECIFICATION ON THIS SHEET. COVER SEED WITH 1 INCH SOIL UNLESS A HYDROSEEDER IS USED.
 3. MULCH ANCHORING: SHALL BE ACCOMPLISHED BY DEGRADABLE MULCH NETTING. USE WHEN SLOPES ARE GREATER THAN 10%.

URBAN MIX GRASS SEED (FOR USE IN GRASSED LAWN AREAS AROUND BUILDINGS AND PARKING)

% BY WEIGHT	LBS. LIME SEED BY ACRE	TYPE OF SEED
37.5	45	CREeping RED FESCUE
31.3	37.5	KENTUCKY BLUEGRASS
31.3	37.5	WINTER HARDY, PERENNIAL RYE
100	120 LBS. LIME SEED / ACRE	

CONSERVATION MIX GRASS SEED (FOR USE IN ALL OTHER AREAS)

% BY WEIGHT	LBS. LIME SEED BY ACRE	TYPE OF SEED
35	77	CREeping RED FESCUE
20	44	KENTUCKY BLUEGRASS
15	33	CUTLER PERENNIAL RYE
15	33	ANNUAL RYE GRASS
10	22	TALL FESCUE
55	11	WHITE CLOVER
100	220 LBS. LIME SEED / ACRE	

SEEDED AND MULCHED AREAS DETAIL 7

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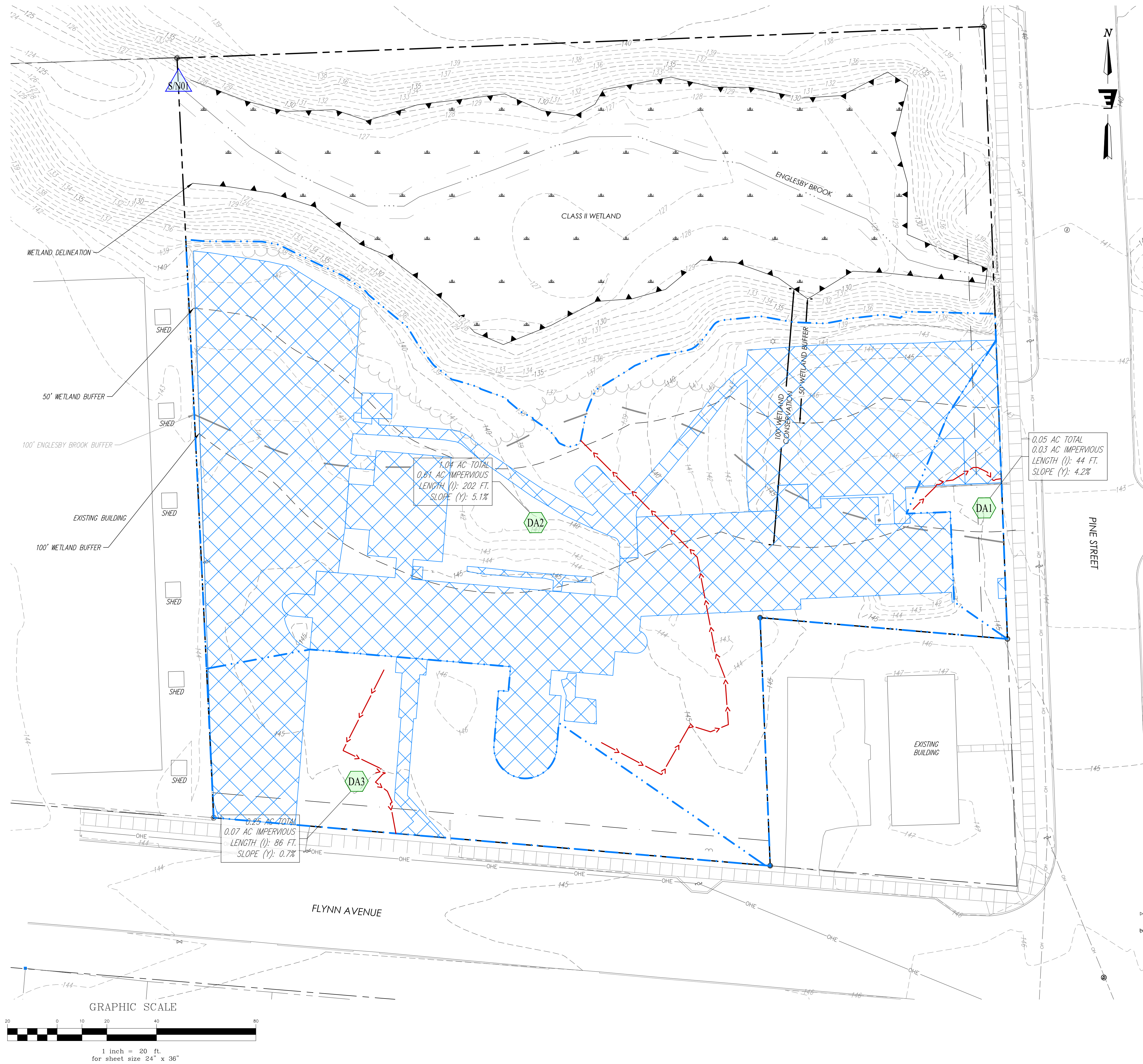
EPSC DETAILS

HOWARD CENTER REDEVELOPMENT
855 PINE STREET/300 FLYNN AVENUE
CITY OF BURLINGTON, CHITTENDEN COUNTY, VERMONT

EV Project # 22488
Drawn By: JG
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LEGEND

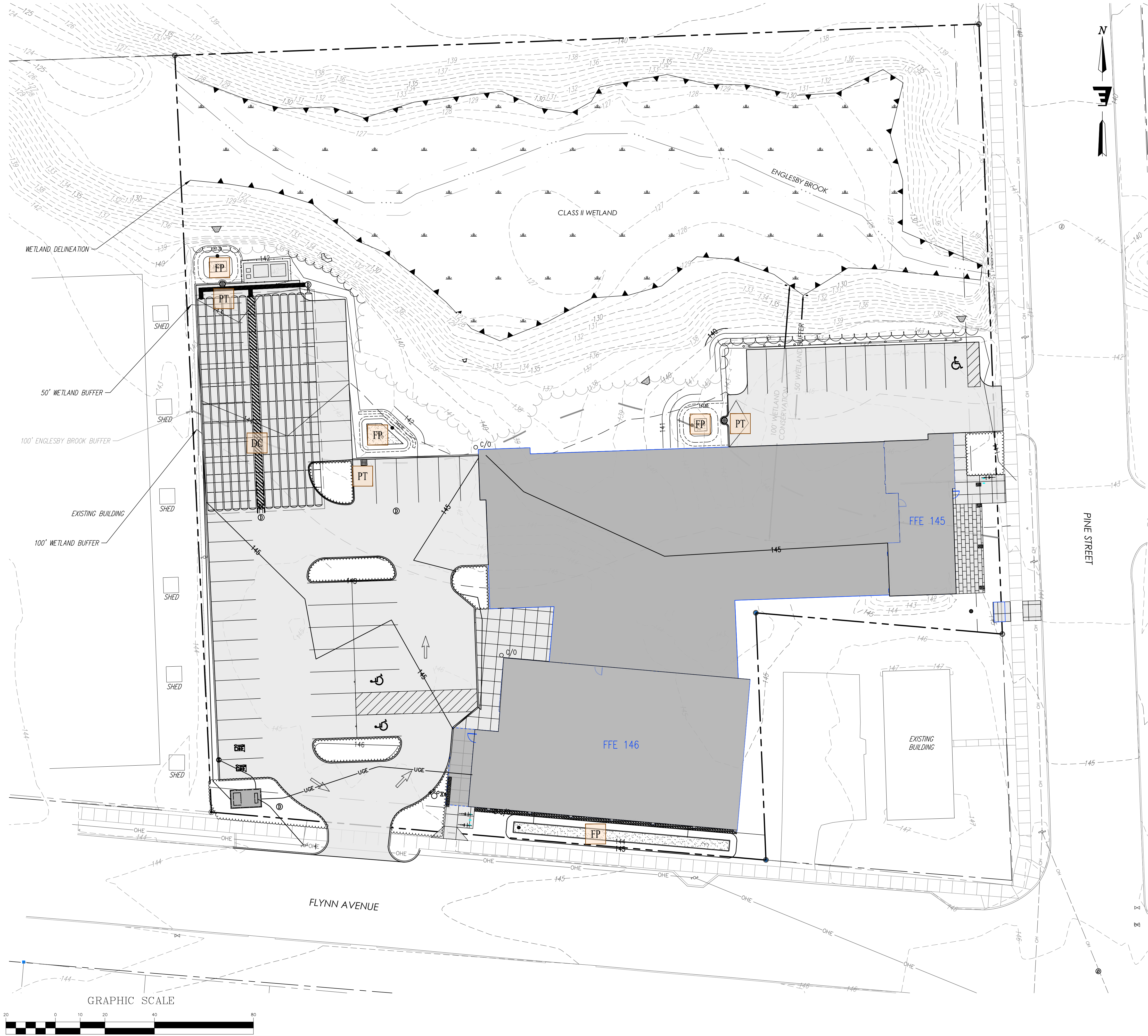
	EXISTING IMPERVIOUS AREA - 0.71 AC
	SUB-DRAINAGE AREA
	TIME OF CONCENTRATION
	POINT OF INTEREST

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EXISTING DRAINAGE PLAN Sheet Title: EV Project # Drawn By: Checked By: Scale: Date:		Project Title: HOWARD CENTER REDEVELOPMENT 855 PINE STREET/300 FLYNN AVENUE CITY OF BURLINGTON, CHITTENDEN COUNTY, VERMONT 22488 JG KW 1" = 20' 08/03/2023	
SW1			



- SUB-DRAINAGE AREA
- TIME OF CONCENTRATION
- POINT OF INTEREST
- STORMWATER TREATMENT PRACTICE
- IMPERVIOUS AREAS:
 - TREATED NEW - 0.33 AC
 - TREATED REDEVELOPED - 0.62 AC
 - UNTREATED NEW - 0.04 AC
 - UNTREATED REDEVELOPED - 0.02 AC

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LEGEND & NOTES

- PT** RAIN GUARDIAN OR DEEP SUMP CATCH BASIN PRE-TREATMENT:
- STRUCTURES SHALL BE INSPECTED TWICE ANNUALLY, WITH INSPECTIONS RECOMMENDED QUARTERLY.
 - STRUCTURES SHALL BE CLEANED ANNUALLY (BY USE OF VACUUM TRUCK OR "CLAM-SHELL") AND WHEN INSPECTION INDICATES SEDIMENT ACCUMULATION DEPTH IS APPROACHING HALF THE DEPTH TO THE LOWEST OUTLET.
 - REPLACE DAMAGED HOODS WHEN PRESENT ON INLET PIPES.
 - ALL FLOATING DEBRIS SHALL BE REMOVED AND DISPOSED OF IN AN ACCEPTABLE MANNER.
 - REMOVE FLOATING HYDROCARBONS IMMEDIATELY WHENEVER DETECTED BY INSPECTION.
- FP** FOCAL POINT BIOFILTRATION SYSTEM:
- DURING THE FIRST SIX MONTHS AFTER INSTALLATION, THE SYSTEM AREA SHALL BE INSPECTED AFTER RAIN EVENTS OF AT LEAST ONE INCH TO ENSURE PROPER FUNCTIONING.
 - DURING THE FIRST GROWING SEASON (APRIL THROUGH OCTOBER), ENSURE VEGETATION IS PROPERLY ESTABLISHED (INCLUDING RE-SEEDING BARE OR ERODING AREAS, REGULAR WATERING DEPENDING ON RAINFALL AMOUNTS, AND REMOVAL OF WEEDS AND INVASIVE SPECIES).
 - AFTER THE FIRST GROWING SEASON, THE SYSTEM AREA SHALL BE INSPECTED ANNUALLY.
 - CHECK INLET FOR EXCESSIVE SEDIMENT OR TRASH ACCUMULATION AND REMOVE AS NECESSARY.
 - CHECK MULCH AREA FOR TRASH AND SEDIMENT ACCUMULATION. SEDIMENT SHALL BE REMOVED ONCE ACCUMULATION REACHES ONE INCH.
 - IF PONDING IS NOTED ON THE SURFACE OF THE FILTER BED, THE TOP 3-INCHES OF MATERIAL SHALL BE REMOVED AND REPLACED. REMOVED SEDIMENTS SHALL BE DISPOSED OF IN AN ACCEPTABLE MANNER.
 - PRUNE VEGETATION AND REPLACE PLANTS THAT ARE EXCESSIVELY GROWN (STEMS OVER 2" IN DIAMETER).
 - USE OF HERBICIDES IS NOT RECOMMENDED.
 - FILTER AREA SHALL NOT BE USED AS SNOW STORAGE DURING THE WINTER MONTHS.
- DC** DETENTION / INFILTRATION CHAMBERS:
- SYSTEMS SHALL BE INSPECTED AFTER THE INITIAL TWO STORM EVENTS TO ENSURE PROPER FUNCTION AND THAT NO EROSION OR SOUR IS OCCURRING.
 - SYSTEMS SHALL BE INSPECTED AT LEAST ONCE ANNUALLY, AND FOLLOWING STORM EVENTS EXCEEDING 1-INCH OF RAINFALL IN A 24-HOUR PERIOD, WITH MAINTENANCE AND REHABILITATION CONDUCTED AS WARRANTED BY SUCH INSPECTION.
 - ACCUMULATED SEDIMENT SHALL BE REMOVED WHEN DEPTH APPROACHES OR EXCEEDS 3 INCHES.
 - DISPOSAL OF SEDIMENTS AND OTHER WASTES SHALL BE IN CONFORMANCE WITH APPLICABLE LOCAL, STATE AND FEDERAL LAWS.
- (FOLLOW ALL MANUFACTURER RECOMMENDATIONS FOR OPERATIONS OF MAINTENANCE)

Stamp	
Date	
Description	
No.	

ENGINEERING VENTURES PC

208 Flynn Avenue, Suite 2A, Burlington, VT 05401 • 802-863-6225
85 Mechanic Street, Suite E2-3, Lebanon, NH 03766 • 603-442-9333
414 Union Street, Schenectady, NY 12305 • 518-630-9614
www.engineeringventures.com

DUNCAN WISNIEWSKI
ARCHITECTURE

255 SOUTH CHAMPLAIN STREET
BURLINGTON, VT 05401
(802) 864-6693

OPERATIONS & MAINTENANCE PLAN

HOWARD CENTER REDEVELOPMENT
855 PINE STREET/300 FLYNN AVENUE
CITY OF BURLINGTON, CHITTENDEN COUNTY, VERMONT

EV Project #	22488
Drawn By:	JG
Checked By:	KW
Scale:	1" = 20'
Date:	08/03/2023

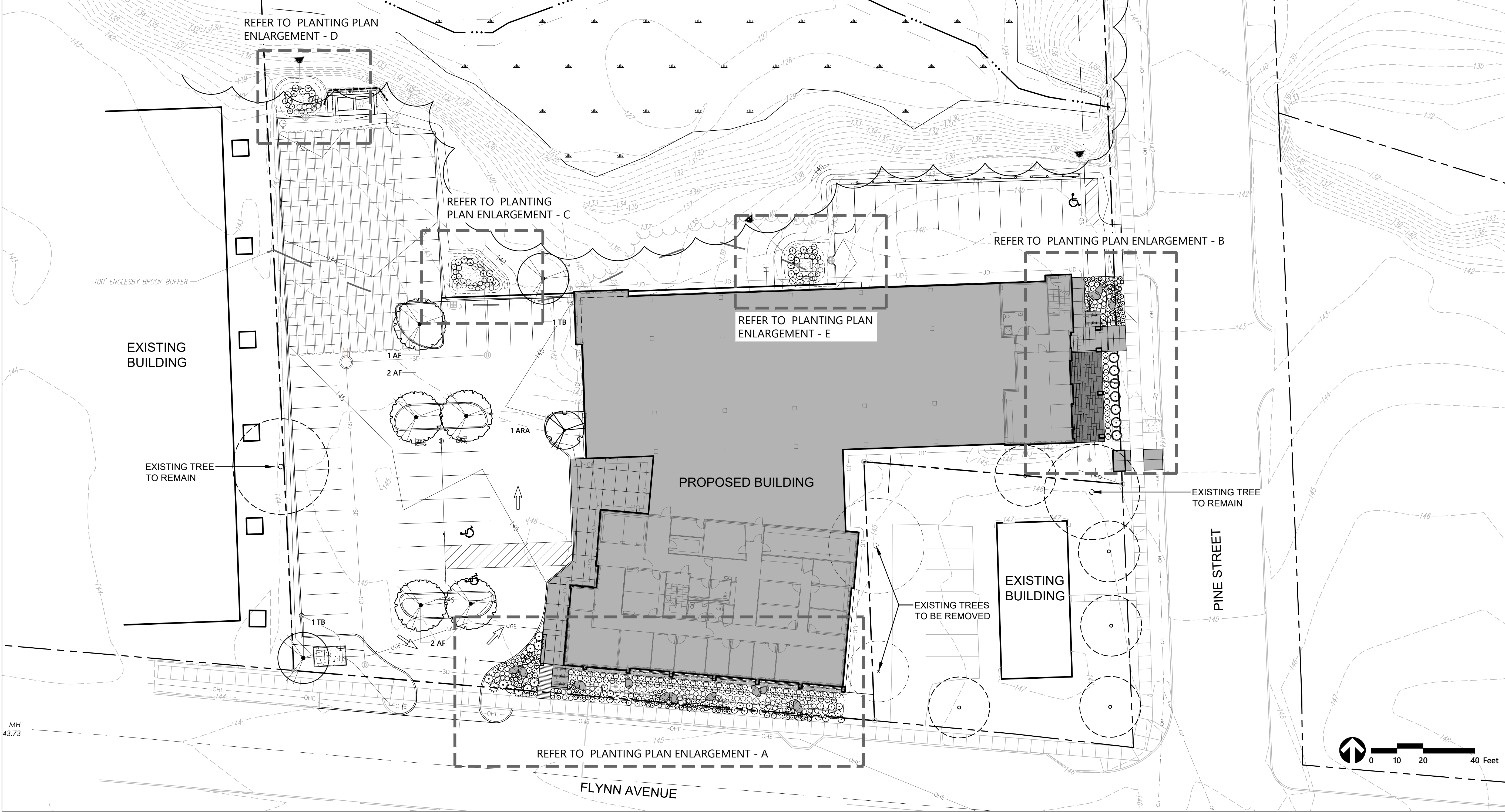


Designed by mkw	Checked by mkw
Issued for	Date 8/3/2023
Permit Application	

Not For Construction

Drawing Title

Landscape Layout Plan



**Howard Center
Redevelopment Project**
855 Pine Street/300 Flynn Avenue
Burlington, Vermont

No.	Revision	Date	Appr'd.

Designed by	Checked by
mkw	mkw

Issued for
Permit Application
8/3/2023

Not For Construction

Drawing Title
Planting Plan

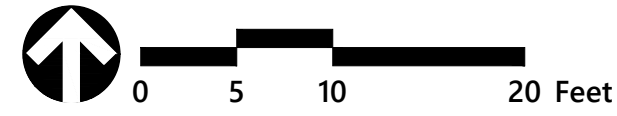
Drawing Number

L2.00

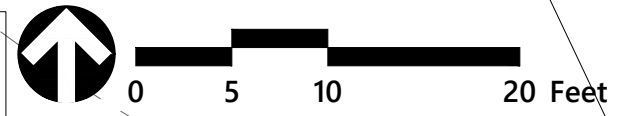
PLANT SCHEDULE

DECIDUOUS TREES	QTY	BOTANICAL NAME	COMMON NAME	SIZE
ARA	1	Acer rubrum 'Armstrong'	Armstrong Red Maple	2 1/2 - 3" CAL.
AF	5	Acer x freemanii 'Sienna'	Sienna Glen Maple	2 1/2 - 3" CAL.
TB	2	Tilia americana 'Baillyard'	Frontyard® American Linden	2 1/2 - 3" CAL/ B&B
SHRUBS	QTY	BOTANICAL NAME	COMMON NAME	SIZE
CSK	51	Cornus sericea 'Kelsey'	Kelsey Dogwood	18 - 24" SPD
JP2	10	Juniperus horizontalis 'Plumosa Compacta'	Creeping Juniper	18 - 24" SPD
MD	7	Microbiota decussata	Russian Cypress	18 - 24" SPD
ORNAMENTAL GRASSES	QTY	BOTANICAL NAME	COMMON NAME	SIZE
CA	123	Calamagrostis x acutiflora 'Karl Foerster'	Karl Foerster Feather Reed Grass	2 GAL.
PVS	61	Panicum virgatum 'Shenandoah'	Shenandoah Switch Grass	2 GAL.
SS3	33	Schizachyrium scoparium 'Standing Ovation'	Standing Ovation Little Bluestem	2 GAL.
SH	32	Sporobolus heterolepis	Prairie Dropseed	2 GAL.
PERENNIALS	QTY	BOTANICAL NAME	COMMON NAME	SIZE
CC3	12	Chrysanthemum coccineum 'Robinson's Pink'	Robinson's Pink Painted Daisy	1 GAL., 18" o.c.
NF	17	Nepeta x faassenii	Catmint	1 GAL., 24" o.c.
RM	41	Rudbeckia hirta 'Marmalade'	Marmalade Black-eyed Susan	1 GAL., 24" o.c.
SV	19	Salvia nemorosa 'Pink Profusion'	Pink Profusion Meadow Sage	1 GAL.
SA	61	Sedum x 'Autumn Joy'	Autumn Joy Sedum	1 GAL.

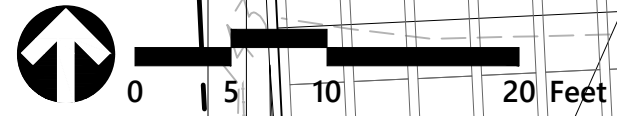
- Notes:
- CONTRACTOR IS RESPONSIBLE TO VERIFY ALL PLANT QUANTITIES FOUND IN THE PLANTING PLANS. IF ANY DISCREPANCIES ARE FOUND, LANDSCAPE ARCHITECT SHOULD BE NOTIFIED IMMEDIATELY.
 - FINAL LAYOUT AND PLACEMENT OF ALL PLANT MATERIAL TO BE APPROVED BY THE LANDSCAPE ARCHITECT.
 - CONTRACTOR IS RESPONSIBLE TO SEED ALL DISTURBED AREAS ACCORDING TO THE SPECIFICATIONS AND LAWN DETAIL.
 - REFER TO PLANT MATERIAL INSTALLATION DETAILS AND SPECIFICATIONS.
 - IF THE LANDSCAPE CONTRACTOR PROPOSES A SUBSTITUTE PLANT SPECIES, ALL SUBSTITUTES NEED TO BE APPROVED BY THE LANDSCAPE ARCHITECT IN WRITING PRIOR TO ORDERING.



PLANTING PLAN ENLARGEMENT - A



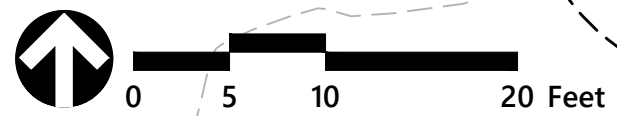
PLANTING PLAN ENLARGEMENT - C



PLANTING PLAN ENLARGEMENT - D



PLANTING PLAN ENLARGEMENT - E



PLANTING PLAN ENLARGEMENT - B

<u>DECIDUOUS TREES</u>		<u>BOTANICAL NAME</u>	<u>COMMON NAME</u>	<u>SIZE</u>
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- Notes:
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**Howard Center
Redevelopment Project**
855 Pine Street/300 Flynn Avenue
Burlington, Vermont

No.	Revision	Date	Appvd.

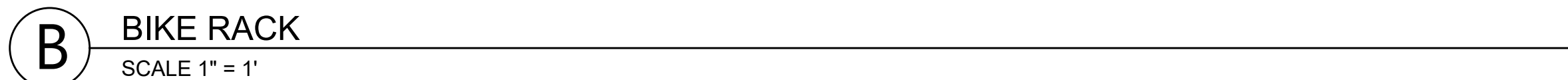
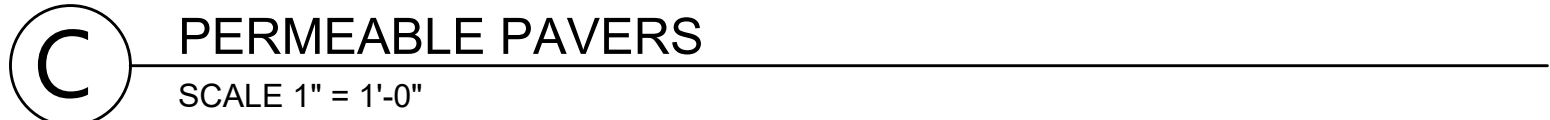
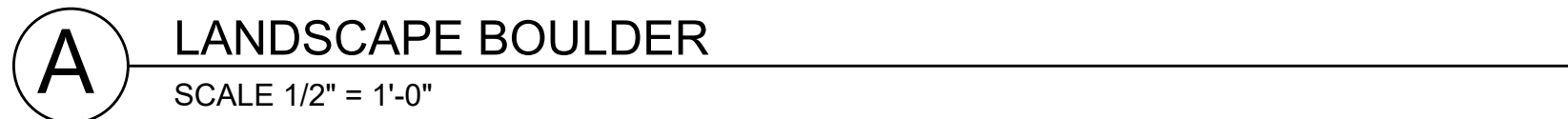
Designed by **mkw** Checked by **mkw**

Permit Application 8/3/2023

Not For Construction

Planting Plan Enlargements

L2.01



Drawing Number

Project Number
58887.00



No.	Revision	Date	Appvd.
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Designed by	Checked by
mkw	mkw

Permit Application 8/3/2023

Not For Construction

Drawing Title

Drawing Number

L4.00

LIGHT FIXTURE AND POLE SPECIFICATIONS

Fixture A Manufacturer: Brownlee Fixture: Penny-OD LED Engine: 16w L Series LED Color Temperature: 3,000k Mounting: Ceiling Mounted	Fixture D Manufacturer: Eureka Fixture: Luz 10094 LED Engine: 1w LED Color Temperature: 3,000k Color: Black Texture Mounting: Wall - 1.5ft
Fixture B Manufacturer: Eureka Fixture: Cliff - 3419 LED Engine: HO Color Temperature: 3,000k Color: Black Texture Mounting: Wall - 8-10ft	Fixture E Manufacturer: Beacon Lighting Fixture: VPL LED Engine: 160L-100 Color Temperature: 3,000k Distribution: Type 3 Configuration: Single Finish: Black Matte Textured Pole Height: 22'
Fixture C Manufacturer: Equinox 3411 Fixture: Eureka LED Engine: 2xLED2 - Narrow Color Temperature: 3,000k Color: Black Texture Mounting: Wall - 8-10ft	Fixture F Manufacturer: Beacon Lighting Fixture: VPL LED Engine: 160L-100 Color Temperature: 3,000k Distribution: Type 3 Configuration: Twin Finish: Black Matte Textured Pole Height: 22'



STATISTICAL AREA SUMMARY

Grid Type: Horizontal Illuminance at finish grade.
Grid Units: Footcandles

Statistical Area		Avg	Max	Min	Avg/Min	Max/Min
1	Parking Lot - A	1.55	3.50	0.10	15.50	35.00
2	Parking Lot - B	1.93	3.10	0.90	2.14	3.44

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.



40 IDX Dr
Building 100 Suite 200
South Burlington, VT 05403
802.497.6100

BEACON
LIGHTING LUMINAIRE

VIPER Area/Site
VIPER LUMINAIRE

DATE: | LOCATION:

TYPE: | PROJECT:

CATALOG #:

Light Fixtures E and F

MICROSTRIKE OPTICS

STRIKE

IP65

DALI

DALI

DALI

CONTROL TECHNOLOGY

WISCAPE

10-DAY QUICK SHIP PROGRAM

QSA

FEATURES

- Low profile LED invertebrate luminaire with a variety of E5 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 Lighting Controls™, 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 arise
- Field interchangeable mounting provides additional flexibility after the fixture has shipped

INSTALLATION (CONTINUED)

- Knockout arm filler option available for 2-3/8" OD holes
- For products with EPA less than 1' mounted to a pole greater than 20ft, a vibration damper is recommended

ELECTRICAL

- Universal 120-277 VAC or 347-480 VAC input voltage, 50/60 Hz
- Ambient operating temperature -40°C to 40°C
- Drivers have greater than 90% power factor and less than 20% THD
- LED drivers have output power over voltage, over current protection and short circuit protection with auto recovery
- Field replaceable surge protection device provides 20kA protection meeting ANSI IEEE C62.41.2 Category C High and Surge Location Category C3. Automatically isolates faulted off-line for protection when device is compromised
- Dual Driver option provides 2 drivers within luminaire but only one set of leads exiting the luminaire, where Dual Power Feed provides two drivers which can be wired independently as two sets of leads are extended from the luminaire. Both options cannot be combined

CONTROLS

- Photo control, occupancy sensor, programmable controls, and 2-pin wireless controls available for complete on/off and dimming control
- Photo control brand or sales representative when combining control and electrical options as some combinations may not operate as anticipated depending on your application
- 7-pin ANSI C136.4-2019 photocell with photocell option available for wireless photocell or wireless control modules (control accessories sold separately)

CONTROLS (CONTINUED)

- 0-10V Dimming Drivers are standard and dimming leads are extended out of the connection to the dimming leads. Must specify 1' wiring leads are to be greater than the 6' standard
- NX Lighting Controls™ available with in fixture wireless control module. Features dimming and occupancy sensor. Also available in 7-pin configuration
- WiSCAPE™ available with in fixture wireless control module. Features dimming and occupancy sensor. Also available in 7-pin configuration

CERTIFICATIONS

- ULC Lighting Consortium (ULC) Qualified with UL Type 1000 Qualified configurations. Not all product variations listed in this document are ULC qualified. Refer to <http://www.designlights.org> for the most up-to-date list
- Listed to UL1598 and CSA C22.2 2250.0-14 for wet locations and 40°C ambient temperatures
- 1.5 G rated for ANSI C136.31 high vibration applications
- Fixture is IP65 rated
- Meets ICA recommendations using 3K CCT configuration at 0 degrees of tilt
- This product qualifies as a "designated quality construction material" per 92-225-11 Buy American Construction Materials under Trade Agreements effective 04/23/2020.

WARRANTY

- 3 year warranty

KEY DATA	
Lumen Range	8,000-80,000
Wattage Range	36-500
Efficacy Range (LPW)	92-155
Weight (lbs. (kg))	13.7-30.9 (6.2-13.9)

BEACON
LIGHTING LUMINAIRE

VIPER Area/Site
VIPER LUMINAIRE

MICROSTRIKE OPTICS - ORDERING GUIDE

CATALOG #

DATE: | LOCATION:

TYPE: | PROJECT:

CATALOG #:

Example: VF-2-320L-H5-3K7-2-R-UNV-A3-BLT

VP	Series	Optic Platform	Size	Light Engine	CCT/CR	Distribution	Optic Rotation	Voltage
VP	VP	Micro Strike	1' Size 1	160L-36" 1600 lumens 160L-66" 7500 lumens 160L-75 10000 lumens 160L-100 12500 lumens 160L-110 16000 lumens 160L-135 18000 lumens 160L-140 22500 lumens 160L-145 25000 lumens 160L-150 27000 lumens 160L-155 30000 lumens 160L-160 32000 lumens 160L-165 35000 lumens 160L-170 38000 lumens 160L-175 40000 lumens 160L-180 42000 lumens 160L-185 44000 lumens 160L-190 46000 lumens 160L-195 48000 lumens 160L-200 50000 lumens 160L-205 52000 lumens 160L-210 54000 lumens 160L-215 56000 lumens 160L-220 58000 lumens 160L-225 60000 lumens 160L-230 62000 lumens 160L-235 64000 lumens 160L-240 66000 lumens 160L-245 68000 lumens 160L-250 70000 lumens 160L-255 72000 lumens 160L-260 74000 lumens 160L-265 76000 lumens 160L-270 78000 lumens 160L-275 80000 lumens 160L-280 82000 lumens 160L-285 84000 lumens 160L-290 86000 lumens 160L-295 88000 lumens 160L-300 90000 lumens 160L-305 92000 lumens 160L-310 94000 lumens 160L-315 96000 lumens 160L-320 98000 lumens 160L-325 100000 lumens 160L-330 102000 lumens 160L-335 104000 lumens 160L-340 106000 lumens 160L-345 108000 lumens 160L-350 110000 lumens 160L-355 112000 lumens 160L-360 114000 lumens 160L-365 116000 lumens 160L-370 118000 lumens 160L-375 120000 lumens 160L-380 122000 lumens 160L-385 124000 lumens 160L-390 126000 lumens 160L-395 128000 lumens 160L-400 130000 lumens 160L-405 132000 lumens 160L-410 134000 lumens 160L-415 136000 lumens 160L-420 138000 lumens 160L-425 140000 lumens 160L-430 142000 lumens 160L-435 144000 lumens 160L-440 146000 lumens 160L-445 148000 lumens 160L-450 150000 lumens 160L-455 152000 lumens 160L-460 154000 lumens 160L-465 156000 lumens 160L-470 158000 lumens 160L-475 160000 lumens 160L-480 162000 lumens 160L-485 164000 lumens 160L-490 166000 lumens 160L-495 168000 lumens 160L-500 170000 lumens 160L-505 172000 lumens 160L-510 174000 lumens 160L-515 176000 lumens 160L-520 178000 lumens 160L-525 180000 lumens 160L-530 182000 lumens 160L-535 184000 lumens 160L-540 186000 lumens 160L-545 188000 lumens 160L-550 190000 lumens 160L-555 192000 lumens 160L-560 194000 lumens 160L-565 196000 lumens 160L-570 198000 lumens 160L-575 200000 lumens 160L-580 202000 lumens 160L-585 204000 lumens 160L-590 206000 lumens 160L-595 208000 lumens 160L-600 210000 lumens 160L-605 212000 lumens 160L-610 214000 lumens 160L-615 216000 lumens 160L-620 218000 lumens 160L-625 220000 lumens 160L-630 222000 lumens 160L-635 224000 lumens 160L-640 226000 lumens 160L-645 228000 lumens 160L-650 230000 lumens 160L-655 232000 lumens 160L-660 234000 lumens 160L-665 236000 lumens 160L-670 238000 lumens 160L-675 240000 lumens 160L-680 242000 lumens 160L-685 244000 lumens 160L-690 246000 lumens 160L-695 248000 lumens 160L-700 250000 lumens 160L-705 252000 lumens 160L-710 254000 lumens 160L-715 256000 lumens 160L-720 258000 lumens 160L-725 260000 lumens 160L-730 262000 lumens 160L-735 264000 lumens 160L-740 266000 lumens 160L-745 268000 lumens 160L-750 270000 lumens 160L-755 272000 lumens 160L-760 274000 lumens 160L-765 276000 lumens 160L-770 278000 lumens 160L-775 280000 lumens 160L-780 282000 lumens 160L-785 284000 lumens 160L-790 286000 lumens 160L-795 288000 lumens 160L-800 290000 lumens 160L-805 292000 lumens 160L-810 294000 lumens 160L-815 296000 lumens 160L-820 298000 lumens 160L-825 300000 lumens 160L-830 302000 lumens 160L-835 304000 lumens 160L-840 306000 lumens 160L-845 308000 lumens 160L-850 310000 lumens 160L-855 312000 lumens 160L-860 314000 lumens 160L-865 316000 lumens 160L-870 318000 lumens 160L-875 320000 lumens 160L-880 322000 lumens 160L-885 324000 lumens 160L-890 326000 lumens 160L-895 328000 lumens 160L-900 330000 lumens 160L-905 332000 lumens 160L-910 334000 lumens 160L-915 336000 lumens 160L-920 338000 lumens 160L-925 340000 lumens 160L-930 342000 lumens 160L-935 344000 lumens 160L-940 346000 lumens 160L-945 348000 lumens 160L-950 350000 lumens 160L-955 352000 lumens 160L-960 354000 lumens 160L-965 356000 lumens 160L-970 358000 lumens 160L-975 360000 lumens 160L-980 362000 lumens 160L-985 364000 lumens 160L-990 366000 lumens 160L-995 368000 lumens 160L-1000 370000 lumens 160L-1005 372000 lumens 160L-1010 374000 lumens 160L-1015 376000 lumens 160L-1020 378000 lumens 160L-1025 380000 lumens 160L-1030 382000 lumens 160L-1035 384000 lumens 160L-1040 386000 lumens 160L-1045 388000 lumens 160L-1050 390000 lumens 160L-1055 392000 lumens 160L-1060 394000 lumens 160L-1065 396000 lumens 160L-1070 398000 lumens 160L-1075 400000 lumens 160L-1080 402000 lumens 160L-1085 404000 lumens 160L-1090 406000 lumens 160L-1095 408000 lumens 160L-1100 410000 lumens 160L-1105 412000 lumens 160L-1110 414000 lumens 160L-1115 416000 lumens 160L-1120 418000 lumens 160L-1125 420000 lumens 160L-1130 422000 lumens 160L-1135 424000 lumens 160L-1140 426000 lumens 160L-1145 428000 lumens 160L-1150 430000 lumens 160L-1155 432000 lumens 160L-1160 434000 lumens 160L-1165 436000 lumens 160L-1170 438000 lumens 160L-1175 440000 lumens 160L-1180 442000 lumens 160L-1185 444000 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Gilman & Briggs Environmental

1 Conti Circle #5, Barre, VT 05641

Ph: 802-479-7480; team@gbevt.com

MEMORANDUM

To: Kevin Worden, PE
From: Art Gilman
Date: 9 March 2022
Re: The Howard Center, Englesby Ravine

The Howard Center proposes redevelopment of its facility at 300 Flynn Avenue in Burlington. Englesby Brook, a stream that drains ca. 1 sq. mile of generally urban land, flows through the northern portion of the property in a deep ravine, entering via a culvert under Pine Street, and exiting at the northwest corner of the property. A Class Two, significant wetland occupies the floor of the ravine, extending only very slightly upslope in a couple of areas.

This reach of Englesby Brook is shown on the City of Burlington “Potential Natural Community Types” map (2021) and, indeed, most of the length of Englesby Brook is shown on that map, with various natural community types along its length. For this reason, when I delineated the wetland on 9 September 2022, I also took note of the natural community within Englesby Ravine, and offer the following insight.

First, the Ravine is flat-bottomed as is evident by inspecting the topographic layer on the Existing Conditions plan (Sheet C1-01), and the side-slopes are relatively steep. Thus, the wetland area occupies the full extent of the floor of the Ravine but extends only minimally upslope. The stream itself occupies a very shallow channel through the alluvial soil and, on the date of my visit, had some dry channels in addition to the wetted main channel. That is, the stream course evidently meanders across the whole area over time, and there is evidence of seasonal flooding.

Of note is that the entire wetland is shaded by full-canopy trees, both within the wetland and especially, at its edge. The tree community includes two maples: box elder (*Acer negundo*) and silver maple (*A. saccharinum*), as well as green ash (*Fraxinus pennsylvanica*) and at least one large crack willow (*Salix fragilis*). The shade limits the growth of potential invasive shrubs such as Asian honeysuckles (*Lonicera morrowii* and *L. tatarica*), glossy buckthorn (*Frangula alnus*), etc, which often form streamside thickets in Chittenden County; neither of these are present in the area. Within the wetland there are common native herbs including white grass (*Leersia virginica*), fowl manna grass (*Glyceria striata*), jewelweed (*Impatiens capensis*), fringed loosestrife (*Lysimachia ciliata*), marsh blue violet (*Viola cucullata*), and jumpseed (*Persicaria virginiana*).

The slopes are occupied by box elder and white ash (*Fraxinus americana*), striped maple (*Acer pensylvanicum*) and others, with a limited shrub layer and not many ground-layer plants (again, due to shade and likely to dryness on the well-drained slope).

Most of the plants observed were native to Vermont. Although there are other non-native species present, e.g., multiflora rose (*Rosa multiflora*) and ivy-leaved maple (*Acer campestre*) the only plants listed on the

Vermont's list of non-native invasive plants are one thicket of Japanese knotweed (now known as *Reynoutria cuspidata*), on the slope near the northwest end of the parking lot, and the annual weedy garlic mustard (*Alliaria petiolaris*) on the slope in the same section. Therefore, although in generally good condition given its location, history of impacts, and known water quality problems, this area is hardly pristine. As part of a wetland system connecting the southern part of the City of Burlington between the Lake, Crescent Woods, and the open land of the Burlington Country Club, it assumes some importance. <https://enjoyburlington.com/crescent-woods/>

I did not observe any evidence of animal activity during my work, but I note that a local website with waypoints along Englesby Brook, noted tracks of raccoon, which is a common urban animal. It may provide a feeding source and shelter for that and other such species. <https://www.uvm.edu/place/burlingtongeographic/focalplaces/englesbybrook.php>

The proposed Project is well designed, with better water quality infrastructure than currently exists and very minor intrusion into the wetland's statutory buffer zone—and that only in a mowed lawn area. Notably, there will be no tree removal. The relatively good condition of the wetland in the ravine is maintained, in my estimation by the shade from the tree canopy, which suppresses growth of invasive shrubs, this feature of the project is important. I recommend that, not just during the redevelopment project, but going forward long-term, the Howard Center should prioritize tree growth where it now exists, e.g., retaining the trees now there, replanting any that might die, and adding others as appropriate.

I suggest also controlling the spread of Japanese knotweed from its existing location. This species is notoriously difficult to eradicate but, given that it is already somewhat suppressed by the shade, it can probably be prevented from spreading. The garlic mustard, an annual species, has less impact in this location—it does not appear to be suppressing growth of native plants.



Photo 1: A broad, seasonal flow channel along the bottom of the ravine; the main flow at present is in a different channel.



Photo 2. Looking west. On the left is the slope up toward the Howard Center, at upper right is a large crack willow tree. In the foreground is evidence of seasonal flow and seasonal ponding from Englesby Brook.



Photo 3. Englesby Brook, slightly downstream of the Pine Street culvert. The channel is well-defined, through alluvium. The plant with 5-parted leaves in the foreground is Virginia creeper, a native vine that often climbs trees but sometimes makes a ground-cover.

Howard Center Redevelopment Project, 300 Flynn Ave. & 855 Pine St. **Stormwater General Permit 3-9050 Narrative**

1. Introduction

Engineering Ventures, PC are writing on behalf of Howard Center to apply for a State Stormwater Discharge Permit pursuant to General Permit 3-9050. This project requires a permit as it includes the redevelopment of impervious surfaces greater than one-half acre.

2. Project Description

The proposed project consists of the demolition of an existing office building and the construction of a new, larger one on some of the same footprint. Two existing parking lots will be reconstructed and a covered parking garage added. The purpose of this project is to create a centralized location for Howard Center's social services. Site balancing is proposed so that some of the redeveloped area will be treated as new to meet the requisite standards.

3. Existing Condition

This project is located in the south end of Burlington, Vermont at the junction of Pine Street and Flynn Avenue. The southern portion of the existing site is developed with the above-mentioned building and parking lots. The northern portion of the site slopes steeply down to a class II wetland which surrounds Engelsby Brook. This undeveloped area is mapped as Munson and Belgrade silt loams, 12 to 25 percent slopes, and described as hydrologic soil group C/D. The developed part of the site has no available digital data on the USDA soil survey. Test pits, borings, and infiltration tests were conducted by John Turner Consulting (see attached report). The testing concluded that the soils in the developed area consist of silty sand with some gravel to approximately ten feet below grade and are underlain by lean clay or bedrock. Infiltration tests concluded no capacity in the majority of the project area, with the exception of IT-1 which provided a rate of ~10 in/hr.

The southern half of the Flynn Avenue parking lot flows towards the street and enters the city of Burlington conveyance system which discharges to Engelsby Brook just west of the project parcel (SN03). The eastern half of the Pine Street parking area flows towards the street and enters the city's conveyance system. This area discharges to a detention pond south of Electric Avenue which overflows to Lake Champlain (SN02). The remainder of the site, including the building's roof, via overland flow or closed pipe, discharges directly into the wetland (SN01). The contributing area to Engelsby Brook is considered a stormwater impaired watershed and is subject to a flow restoration plan which was published in 2017. The project area was noted as a potential location for a proposed dry detention basin as part of the plan.

Existing Land Use (Acres)					
	A	B	C	D	Total
Grass	0.000	0.000	0.000	0.000	0.000
Meadow	0.000	0.000	0.000	0.000	0.000
Woods	0.000	0.000	0.000	0.620	0.620
Existing Impervious	0.000	0.000	0.000	0.719	0.719
Impervious previously authorized under 2002 VSMM					0.000
Total Pre Site Area					1.339

4. Proposed Stormwater System:

This project proposes dense development on the exiting disturbed area with as little impact to the natural area (i.e. wetland buffer) as practicable. The runoff from the parking lots and building roof are proposed to be treated in high-rate filters (Focal Point system) before discharging into below-grade detention/infiltration tanks. The tanks are sized to detain the channel protection volume and have a controlled outlet to mitigate the ten-year storm. A conservative infiltration rate of 0.2 inches/hour was used in the design as the bedrock profile under the proposed system is not fully known.

The water quality treatment standard is calculated based on the entire site, however, not all areas of the site are routed to treatment. Smaller portions of the parking lots will continue to discharge to SN02 (0.04 acres post versus 0.05 acres pre) and SN03 (0.06 acres post versus 0.25 acres pre). Downgrade areas of lawn and wetland buffer (0.23 acres) will also bypass the treatment system but discharge to the same receiving body (SN01).

Proposed Land Use (Acres)					
	A	B	C	D	Total
Grass	0.000	0.000	0.000	0.132	0.132
Meadow	0.000	0.000	0.000	0.000	0.000
Woods	0.000	0.000	0.000	0.196	0.196
New Impervious	0.000	0.000	0.000	0.371	0.371
Existing to Treat	0.000	0.000	0.000	0.000	0.000
Existing Impervious Not for Permit Coverage					0.000
Redeveloped Impervious					0.640
Impervious previously authorized under 2002 VSMM					0.000
Total Site Area					1.339

$$WQ_{VT} = \frac{P * R_V * A}{12 \frac{in}{ft}} \rightarrow WQ_{VT} = 0.0602 \text{ acre} - \text{feet} \quad \text{Equation 2 - 2}$$

where:

WQ_{VT} = total water quality treatment volume required (acre – feet)

P = 1 inch across Vermont

R_V = volumetric runoff coefficient $\rightarrow R_V = 0.05 + 0.009I \rightarrow R_V = 0.730$

I = site imperviousness $\rightarrow I_N = \frac{0.371 \text{ ac}}{1.339 \text{ ac}} * 100\% \rightarrow I = 27.7\%$ $I_R = \frac{0.641 \text{ ac}}{1.339 \text{ ac}} * 100\% \rightarrow I = 47.9\%$

A = site area (acres) $\rightarrow A = 1.339 \text{ acres}$

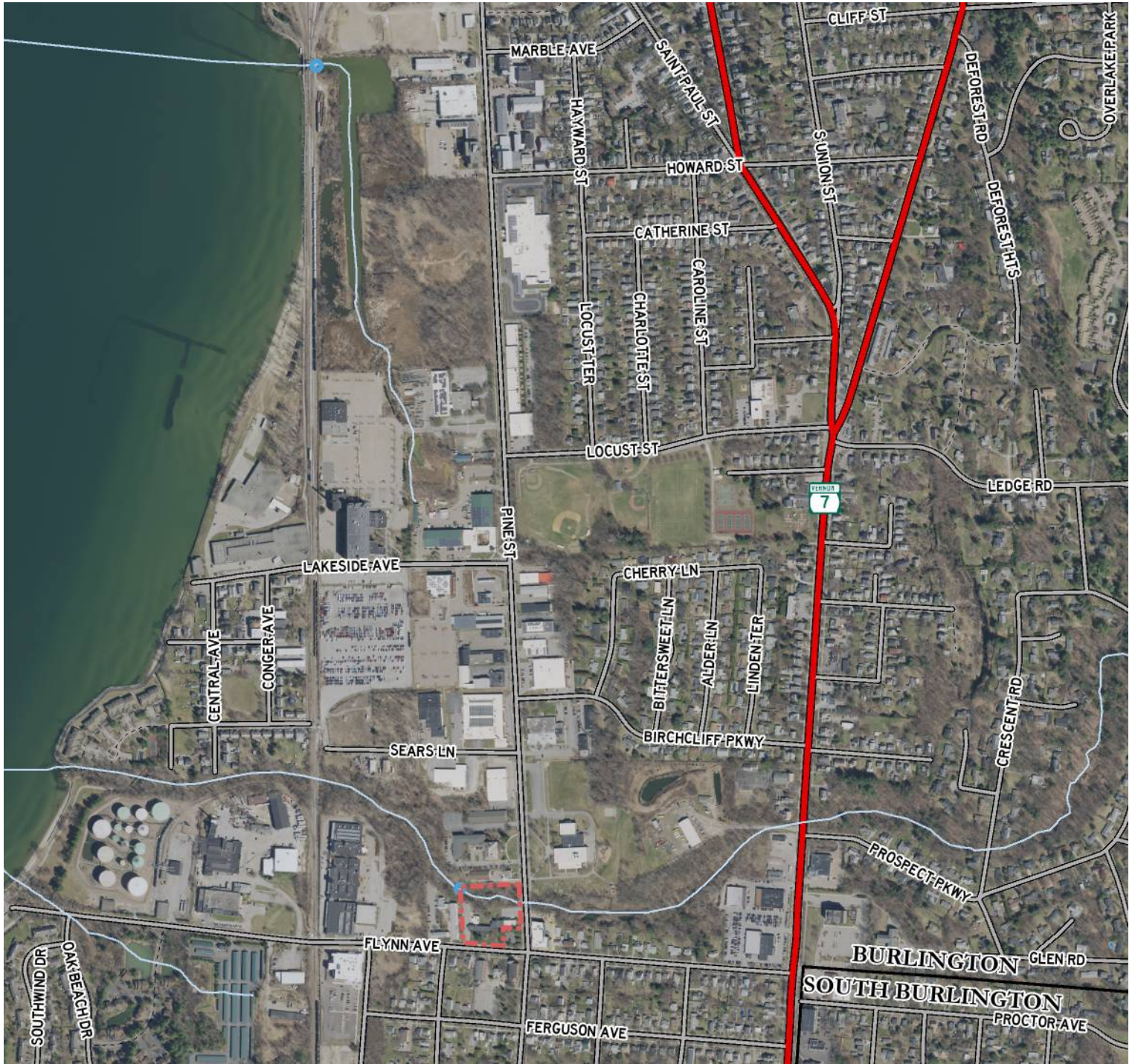
- a) Description of Impervious Area: 0.952 acres including rooftop, asphalt and concrete pavement

Proposed Treated Land Use (Acres)					
	A	B	C	D	Total
Grass	0.000	0.000	0.000	0.029	0.029
Meadow	0.000	0.000	0.000	0.000	0.000
Woods	0.000	0.000	0.000	0.000	0.000
New Impervious	0.000	0.000	0.000	0.331	0.331
Existing to Treat	0.000	0.000	0.000	0.000	0.000
Redeveloped Impervious					0.621
Total Site Area					0.981

- b) Receiving Body: SN01 - Unnamed wetland tributary to Engelsby Brook
- c) Fish Habitat Designation for Receiving Water: Warm
- d) Description of compliance with each of the treatment standards in the 2017 VSMM including the treatment practices or waivers used to meet each of the following standards:
- i) The Post-Construction Soil Depth and Quality Standard: Met by any of the four methods cited in the 2017 VSMM (all four are listed on the plans with final decision left to the contractor)
 - ii) The Groundwater Recharge Standard: Waived due to HSG D soils
 - iii) The Water Quality Treatment Standard: SN01 - Met via high-rate filters (Focal Point system, tier 1)
 - iv) Channel Protection Standard: SN01 - Met via detention/infiltration chambers
 - v) Overbank Flood Protection Standard: SN01 - Met via detention/infiltration chambers
 - vi) Extreme Flood Protection Standard (Q_{P100}): A waiver is sought as proposed impervious is less than 10-acres

The following items are included for review:

- Location Map
- Soil Map
- Geotechnical Report



LEGEND

NOTES

Map created using ANR's Natural Resources Atlas

1: 10,000

July 11, 2023



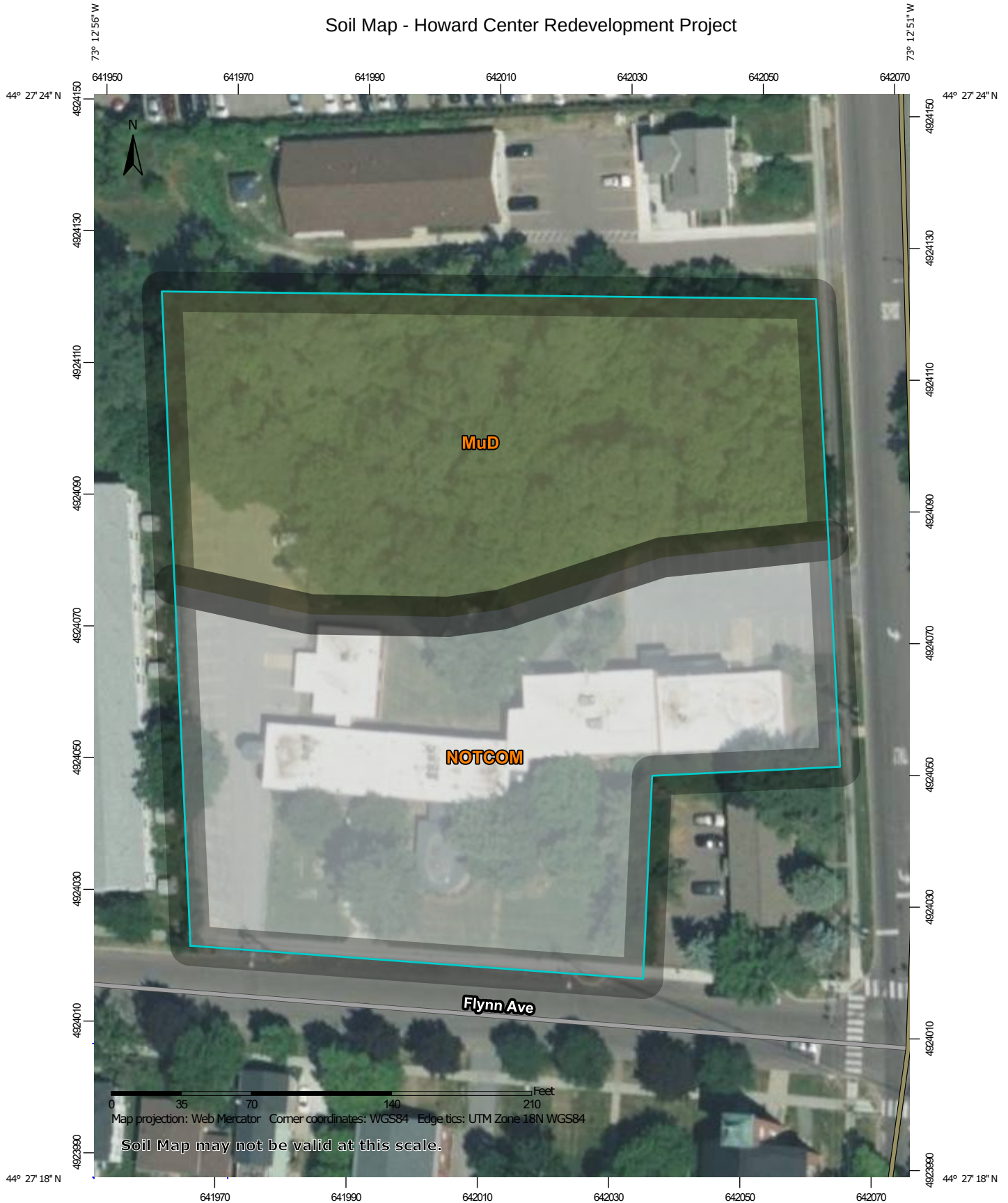
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WGS_1984_Web_Mercator_Auxiliary_Sphere
© Vermont Agency of Natural Resources

1" = 833 Ft. 1cm = 100 Meters
THIS MAP IS NOT TO BE USED FOR NAVIGATION

DISCLAIMER: This map is for general reference only. Data layers that appear on this map may or may not be accurate, current, or otherwise reliable. ANR and the State of Vermont make no representations of any kind, including but not limited to, the warranties of merchantability, or fitness for a particular use, nor are any such warranties to be implied with respect to the data on this map.

Soil Map - Howard Center Redevelopment Project



Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
MuD	Munson and Belgrade silt loams, 12 to 25 percent slopes	C/D	1.1	47.8%
NOTCOM	No Digital Data Available		1.2	52.2%
Totals for Area of Interest			2.3	100.0%



GEOTECHNICAL INVESTIGATION REPORT

HOWARD CENTER REDEVELOPMENT PROJECT

300 Flynn Avenue
Burlington, VT 05401

Prepared for:

Howard Center
Burlington, VT 05401

Prepared by:

John Turner Consulting, Inc.
12 Gregory Drive, Unit 7
South Burlington, VT 05403

JTC Project No. 22-04-138

February 7, 2023



Quentyn Guglielmo
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Vice President of Engineering
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February 7, 2023

Sandy McGuire - CFO
Howard Center
208 Flynn Avenue, Suite 3J
Burlington, VT 05401
P: 802-488-6900
E: sandym@howardcenter.org

**RE: Geotechnical Investigation Report
Howard Center Redevelopment Project
300 Flynn Avenue
Burlington, VT 05401**

Dear Ms. McGuire:

In accordance with our proposal and authorization to proceed, John Turner Consulting, Inc. (JTC) has performed a geotechnical investigation for the above captioned project. Presented herein and attached are the results of the site subsurface investigation, and our recommendations regarding the design and construction of the foundation, and other geotechnical related concerns or issues.

This submission completes our services under the approved contract. We appreciate the opportunity to assist you on this venture and we look forward to working with you on this project through its completion. Please do not hesitate to contact us if you have any questions or require additional information.

Sincerely,
JOHN TURNER CONSULTING, INC.



Stephen C. Lanne, PE
Vice President of Engineering
19 Dover Street
Dover, NH 03820
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Ph: (413) 222-1675

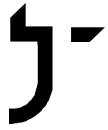
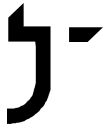


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1.0 INTRODUCTION

John Turner Consulting, Inc. (JTC) is pleased to present this *Geotechnical Investigation Report* for the proposed redevelopment of the medical building located at 300 Flynn Road in Burlington, Vermont. JTC conducted geotechnical explorations, laboratory testing, and engineering evaluations in general accordance with our proposed scope of services submitted on November 11, 2022.

The purpose of the geotechnical investigation was to obtain information on the subsurface conditions at the site and to provide geotechnical engineering recommendations to support the planning, design, and construction of the proposed development. Geotechnical explorations and laboratory testing services were performed in December of 2022, and January of 2023. The contents of this report are subject to the attached *Limitations*.

2.0 PROJECT INFORMATION

The following subsections provide general descriptions of the site, the regional geologic setting, and the proposed development.

2.1 Site Description

The property is currently developed with an approximately 21,000 square foot (s.f.) building, with associated parking lots, driveways, and landscaped areas. The site is bounded by Pine Street to the east, Flynn Avenue to the south, and other commercial properties to the north and west. The north side of the site slopes downward towards a creek.

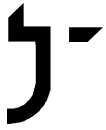
2.2 Regional Geologic Setting

JTC's review of the surficial geologic maps of the area, as well the previous geotechnical investigations of the area, indicate soils at the site most likely consist of fill over glaciolacustrine deposits mainly consisting of silts and clays, all underlain by glacial till and bedrock.

2.3 Proposed Development

JTC understands that the proposed development involves the demolition of the current structure and the construction of a new, 51,000 square feet (s.f.), three story building, with associated driveways and parking lots. Ground level, under building parking is proposed below portions of the proposed building, and part of the south end of the building will have a basement. Proposed site plans show grading will include moderate cuts and fills, i.e, up to about 6 feet or so, to achieve design grades

Preliminary site-specific structural loading was provided by the structural engineer. As such, JTC has used the following structural loading conditions:



- Column loads will be on the order of 220 kips or less; and
- Live loads applied to the floor slab-on-grade will be on the order of 150 pounds per square foot (psf) or less.

3.0 GEOTECHNICAL EXPLORATIONS

3.1 Soil Borings

JTC subcontracted Soil Exploration Corp to perform five (5) geotechnical test borings, designated as B-1 through B-5 (including B-2A), one (1) ledge probe designated as P-1, and six (6) infiltration tests, designated as IT-1 through IT-6, via a truck-mounted drill rig. JTC directed the drilling, testing, and sampling activities and logged the subsurface conditions encountered at each boring location.

The exploration locations were selected in relation to the existing site features and proposed development, and under the constraints of drill rig access and utility conflicts. Subsequently, the relative location of each boring was established via measurements from existing site features and scaling the dimensions onto the provided plan(s). The attached *Exploration Location Plan* depicts the approximate exploration locations.

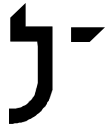
The explorations were advanced to depths ranging from 5.0 feet to 38.0 feet below the ground surface (bgs) utilizing 4¼-inch inner-diameter hollow stem augers (HSAs). As the explorations were advanced, standard penetration tests (SPTs) were conducted at regular intervals and soil samples were obtained via 2-inch outside-diameter split-spoon samplers driven by a 140-pound automatic hammer. SPTs were performed in general accordance with ASTM D1586, Standard Test Method for Penetration Test and Split-Barrel Sampling of Soils. Soil samples were sealed in moisture-tight containers and returned to JTC's office for further review, classification, and/or geotechnical laboratory testing. The explorations were backfilled with soil cuttings upon completion of drilling.

Detailed records of the drilling, testing, and sampling performed, and the soil, bedrock, and groundwater conditions observed at each test boring location are provided on the attached *Exploration Logs*.

3.2 Infiltration Tests

Infiltration testing was performed in general accordance with local standards. The testing procedure at each location was performed as follows:

- A borehole was advanced to the infiltration depth using hollow stem augers and a 3.5-inch diameter Schedule 40 polyvinyl chloride (PVC) casing was placed inside the hollow stem auger and seated into the soils at the bottom of the hole. The auger was then removed and the annulus between the pipe and the borehole was backfilled with



bentonite chips for approximately 2 feet, and then soil cuttings for the remaining depth of the hole;

- An approximately 2-inch thick layer of drainage gravel was placed at the bottom of the casing to protect the soil from scouring and sedimentation;
- The casing was filled with water to about 2 feet above the bottom of the boring to pre-soak for approximately 24 hours; After the 24-hour soaking period, JTC performed infiltration testing at the prepared locations.

The testing procedure consisted of:

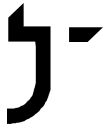
- Filling the pipe with water to a depth of 2 feet above the bottom of the casing;
- Taking regular water level measurements over the following hour;
- Refilling the water after each hour and repeating the process for a total of four cycles, if necessary.

3.2.1 Infiltration Testing Results

The infiltration testing results are summarized in the following table:

Table 1 – Summary of Infiltration Testing Results							
Infiltration Test #	Location	Soil Type	Measured Infiltration Rate (in/hr)				Average Measured Rate (in/hr)
			Round 1	Round 2	Round 3	Round 4	
IT-1	IT-1	SM	12	8	11	10	10.3
IT-2	IT-2	CL	0	0	0	0	0
IT-3	IT-3	SM	0	0	0	0	0
IT-4	IT-4	CL	0	0	-	-	0
IT-5	IT-5	CL	0	0	-	-	0
IT-6	IT-6	CL	0	0	-	-	0

No factors of safety have been applied to the measured rates presented in the table. JTC recommends applying a minimum safety factor of 2 to the measured rates for design purposes. The infiltration test logs are provided in the attached *Exploration Logs*.



4.0 GEOTECHNICAL LABORATORY TESTING

JTC selected representative soil samples for geotechnical laboratory testing. The following tests were performed:

- 3 Moisture content determinations
- 3 Particle-size analyses
- 2 Hydrometer analyses
- 2 Atterberg Limits determinations
- 2 Shelby Tube Logs and Testing
- 1 One-dimensional Consolidation test

Geotechnical laboratory testing was performed in general accordance with ASTM procedures. Test results are provided on the attached *Geotechnical Laboratory Testing Reports*.

5.0 SUBSURFACE CONDITIONS

The following subsections describe the site soil, bedrock, and groundwater conditions encountered, based on results of the geotechnical explorations and laboratory testing. Detailed descriptions of the conditions observed at each test boring are provided on the attached *Test Boring Logs*.

5.1 Soils

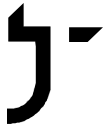
The overburden soils encountered at the test boring locations appear to be consistent with those described by the published geologic data. The primary soil strata are briefly described in the paragraphs below.

5.1.1 Surface Materials

Surface materials encountered at B-1 consisted primarily of man-placed organic mulch, approximately 0.4 feet thick, while the materials encountered at the surface of the remaining borings was interpreted as Topsoil and was about 0.25 feet to 1 foot thick. The Topsoil at B-2 was composed primarily of brown Silty Sand (SM) with organics, while the Topsoil at B-3 through B-5 consisted primarily of Sandy Lean Clay (CL) with organics. These soils exhibited varying relative density ranging from loose to stiff based on SPT N-Values.

5.1.2 Existing Fill

Soils interpreted as Fill were encountered underlying the Surface Materials at B-1, to depths of about 10 feet bgs. The existing Fill materials consisted primarily of brown, Silty Sand (SM) with trace gravel. These soils exhibited varying relative density ranging from loose to medium dense based on SPT N-Values.



5.1.3 Glaciolacustrine Deposits

Native soils interpreted to be Glaciolacustrine Deposits were encountered underlying the surficial materials at B-2 through B-5, and below the Fill materials at B-1. The Glaciolacustrine Deposits consisted primarily of brown to grey, Lean Clay (CL) with varying amounts of silt and sand. Based on SPT N-Values, these soils were typically considered to be medium stiff to stiff in the upper portion of the layer, then soft to very soft in the lower portion of the layer.

5.2 Bedrock

Practical refusal to further penetration of the augers was encountered at all exploration locations except B-5. The approximate depth to practical refusal and the estimated refusal material are tabulated below.

Exploration #	Refusal Type and Depth (feet bgs)	Estimated Refusal Material
B-1	Auger Refusal – 35.0	Bedrock
B-2	Auger Refusal – 5.0	Bedrock
B-2A	Auger Refusal – 5.0	Bedrock
B-3	Auger Refusal – 38.0	Bedrock
B-4	Auger Refusal – 30.0	Bedrock
B-5	Auger Refusal – (N/A)	(N/A)
P-1	Auger Refusal – 4.5	Bedrock

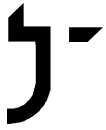
5.3 Groundwater

Groundwater was encountered at B-1 at a depth of approximately 25 feet bgs, and at B-3 through B-5 at a depth of approximately 15 feet bgs at the time of drilling. However, short-term (i.e., during drilling, upon completion of drilling, and/or a few hours after drilling) water levels observed in test borings performed in silty soils should be considered approximate.

JTC estimates that this investigation occurred during a period of seasonally low ground water. Site groundwater levels should be expected to fluctuate seasonally and in response to precipitation events, tides, construction activity, site use, and adjacent site use. In addition, water can become temporarily perched above relatively low permeability soils and/or the bedrock surface.

6.0 GEOTECHNICAL ANALYSIS & RECOMMENDATIONS

The evaluation of the site and the proposed development was based on the subsurface conditions encountered at the exploration locations, results of geotechnical laboratory testing, provided site plans/grading, and provided structural loading conditions, as described herein.

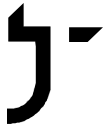


The Existing Fill and Glaciolacustrine Deposits are considered unsuitable for direct support of shallow foundations and slabs-on-grade. The Existing Fill is generally loose, indicating the materials were not placed under controlled, engineered conditions. The lower, soft Glaciolacustrine Deposits would consolidate under the proposed loading, making them unsuitable for the direct support of shallow foundations. Settlement analysis of these soils indicate estimated settlement exceeding 2.0 inches. In addition, the likely presence of Bedrock at foundation level within portions of the proposed buildings will lead to dramatically differing bearing conditions that would likely result in undesirable differential settlement if foundations were bearing on both Bedrock and Glaciolacustrine Deposits.

In order to provide a more uniform bearing condition, JTC recommends that ground improvements, e.g., installation of Aggregate Piers/Rigid Inclusions, be implemented to provide suitable bearing and stiffness to minimize post-construction settlement of shallow foundations.

The Aggregate Pier/Rigid Inclusion method is a common ground improvement method. In general, Aggregate Pier/Rigid Inclusion foundation elements would be constructed by drilling (or displacing) 18-inch to 30-inch diameter cavities through the Existing Fill and Glaciolacustrine Deposits, terminating in the underlying Bedrock. The cavities are then backfilled with crushed stone that is densified with impact and/or vibratory compaction. The densification process pushes the crushed stone radially outward into the sidewalls of the cavities, thereby increasing the lateral stresses in the matrix soil surrounding the Aggregate Pier elements. The end product is the formation of very stiff aggregate elements that are extremely efficient in providing foundation support and reducing foundation settlement. Aggregate Piers are sometimes grouted (via Portland cement) where soft and/or organic soils are present. In some cases, the cavities are backfilled with concrete instead of crushed stone. The grouted and/or concrete elements are even stiffer than the traditional Aggregate Pier and are commonly referred to as Rigid Inclusions. Aggregate Piers and/or Rigid Inclusions are typically designed and constructed by a specialty design-build firm and/or Geo-Contractor. Some products include patented/licensed technology. The design of Aggregate Piers/Rigid Inclusions and/or equivalent should be completed by a Professional Engineer licensed in Vermont. The design should be provided as a Technical Submittal.

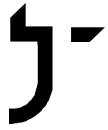
Subsequent to ground improvement, JTC believes that the proposed building can be supported upon shallow foundations bearing on Bedrock, *Structural Fill* or Crushed Stone, or the design-build Ground Improvement surface, provided that the geotechnical design and construction recommendations presented herein are satisfied. Additionally, due to the limitations to access caused by the existing building, the extent of the shallow bedrock and thickness of the clay could not be adequately mapped. JTC recommends further boring explorations of the site be conducted once the building is demolished, to accurately map the subsurface conditions. This will allow for a more accurate and efficient ground improvement and traditional foundation design.



6.1 Site Preparation and Grading

Site preparation and grading should be performed in accordance with the following procedures:

- A geotechnical engineer should directly observe site preparation and grading activities;
- The site soils contain substantial proportions of fine sand, silt and clay, and may degrade and/or become unworkable when subjected to construction traffic or other disturbance during wet conditions. As such, site preparations, grading, and earthworks should be performed during a dry season if possible. The Contractor shall be aware of these conditions and must take precautions to minimize subgrade disturbance. Such precautions may include diverting storm run-off away from construction areas, reducing traffic in sensitive areas, minimizing the extent of exposed subgrade if inclement weather is forecast, backfilling excavations and footings as soon as practicable, grading (and compacting) exposed subgrades to promote surface water run-off, and maintaining an effective dewatering program, as necessary. Over-excavation to remove degraded or unworkable subgrade soils should be anticipated and budgeted (cost and schedule);
- Any existing buildings, structures, and/or associated foundations (including footings, foundation walls, slabs-on-grade, and/or basements) should be completely removed from within proposed building areas and replaced/backfilled with properly placed and compacted *Structural Fill*. Any existing structures within paved areas should be removed to a depth of at least 3 feet below the pavement section. Slabs or other large portions of concrete left in place should be periodically broken to prevent ponding water;
- Any existing subsurface utilities and underground utility structures should be completely removed from the footprint of the proposed buildings and replaced/backfilled with properly placed and compacted *Structural Fill*. Any existing subsurface utilities in proposed pavement areas should be removed and/or appropriately abandoned in place to prevent transmitting water, as approved by the on-site geotechnical engineer;
- The site should be cleared and stripped of any existing trees/vegetation and asphalt-concrete pavement not designated to remain; Topsoil, rootmat, forest mat; loamy/organic-laden Subsoil; and any otherwise unsuitable materials;
- Bedrock may impact excavation/construction of shallow foundations and site utilities, depending on the final design grading. Based on the depth to refusal on presumed bedrock, the planned partial basements, and our expectation of some cutting to achieve finished grade, we expect bedrock removal may be required for foundation construction in some areas. A variety of removal methods should be anticipated and budgeted for, including mechanical excavation, ripping, hoe-ram, and pneumatic jackhammering (in the case of small or confined areas);
- Following clearing, stripping, removal of any unsuitable soil, and/or cutting, the exposed subgrade soils should be proof-rolled with successive passes aligned perpendicularly. Within the building pad, the exposed subgrade should be proof-rolled and subject to vibratory densification via at least 8 passes using a large (10-ton) smooth-drum roller and a crisscross pattern. Proof-rolling/densification should not be performed if/when the



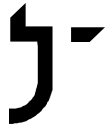
exposed subgrade soils are wet (i.e., due to presence of groundwater, stormwater, perched water, etc.) because this may result in soil pumping and instability. Therefore, the proof-rolling efforts, including the number of passes and whether to employ static or vibratory methods, should be directed by the on-site geotechnical engineer;

- Any loose, soft, wet, and/or otherwise unsuitable soils (typically evidenced by rutting, pumping, and/or deflection of the subgrade) should be over-excavated to expose suitable soils, or other remedial measures should be taken, as approved by the on-site geotechnical engineer; and
- The resulting excavation should then be backfilled with properly placed and compacted *Structural Fill*.
- Where Bedrock is encountered at or above design foundation level, Bedrock should be removed to a depth of at least 24 inches below the bottom of foundation. Loose rock material and high spots should be removed to provide a fairly uniform bearing surface;
- *Structural Fill* should be used for subgrade fill within the building pad. The placement of *Structural Fill* materials to achieve design subgrades in the building pad should not begin until the exposed soil or bedrock surface has been directly observed and approved by the on-site geotechnical engineer;
- *Common Fill* is acceptable for subgrade fill in parking and driveway areas. The placement of *Common Fill* materials to achieve design subgrades in pavement areas should not begin until the exposed subgrade soils have been directly observed and approved by the on-site geotechnical engineer; and
- *Structural Fill* and *Common Fill* materials and placement and compaction requirements are provided in the attached Specifications.

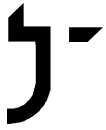
6.2 Shallow Foundations and Foundation Walls

Based on the subsurface conditions encountered at the exploration locations and our current understanding and assumptions relative to the proposed development, the following foundation design recommendations are provided. The recommendations for shallow foundations assume that the recommended ground improvements, i.e., Aggregate Piers/Rigid Inclusions, will be completed:

- The Existing Fill and Glaciolacustrine Deposits are not suitable for direct support of shallow foundations in their current condition;
- The buildings may be supported on a system of continuous and/or isolated shallow spread footings bearing on improved existing soils and/or *Structural Fill* built-up from Bedrock subgrades. We expect Bedrock will exist at foundation level in some areas. In order to provide a more uniform and elastic response to foundation loading, foundations should not bear directly on Bedrock. A minimum 24-inch thick cushion layer of *Structural Fill* should be placed below foundations bearing on Bedrock to help reduce effects of differential settlement;



- Following ground improvements, shallow foundations may be designed using an allowable bearing pressure as determined by the design-build submittal. Since we expect foundations to bear on both bedrock and ground improvement subgrades, the extents of which may not be completely clear until the time of construction, we recommend the foundation design proceed using an allowable bearing pressure of 4,000 psf. Design bearing pressures may be increased by one-third ($\frac{1}{3}$) when considering seismic and or transient wind loading conditions;
- Continuous wall footings should have a minimum width of 3 feet. Isolated column footings should have a minimum width of 5 feet;
- Exterior footings should be founded at least 5 feet below the lowest adjacent grade to provide adequate frost protection. Interior footings in heated portions of the building should be founded at least 2 feet below FFE to develop adequate bearing capacity; and
 - If shallow competent Bedrock is encountered during excavations for exterior footings, the footings can be founded at a minimum depth of 2 feet below the adjacent grade, atop at least 24 inches of *Structural Fill* (cushion layer) placed on clean competent Bedrock, provided that the condition of the Bedrock is inspected by the on-site geotechnical engineer;
 - If weathered Bedrock is encountered during excavations for exterior footings, the footings should be founded at least 5 feet below final grade, as described herein.
- For footings founded on clean competent Bedrock (and the recommended *Structural Fill* cushion layer), total post-construction settlements should be minimal. We recommend the design-build ground improvement submittal consider stiffness of the system, in addition to strength, in order to limit the potential for differential settlement;
- A foundation drain system should be installed around the perimeter of the proposed building at the exterior toe of the exterior footings. Foundation drains should consist of 4-inch diameter PVC-SDR35 perforated pipe encased in at least 10 inches of $\frac{3}{4}$ -inch stone protected with a filter fabric such as Mirafi 140N or equal. The drains should be graded to positively drain to a suitable discharge point away from the proposed structure. Drains should not be connected to surface or roof drain discharge points. Clean-outs should be located at bends and no greater than 150 feet on-center. It is recommended that a backflow preventer be installed at the outlet of the drains to reduce the impact of potential surcharges;
- A waterproofing specialist should design a comprehensive waterproofing system for the basement area of the proposed building. JTC recommends that the waterproofing design consider the potential for perched water conditions, above and within the low permeability Glaciolacustrine Deposits. Typical, waterproofing systems include any or all of the following:
 - Utilization of waterstops at construction joints in below grade walls, footings, slabs, and other intersections/cold joints where a waterproof system is required.

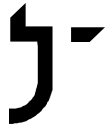


The waterstops prevent the passage of water across these construction joints.

- Application of multiple perpendicular coats of asphalt-modified polyurethane (or equivalent) to the exterior of the entire foundation;
 - Installation of rubberized asphaltic membrane sheets/rolls to the exterior of the entire foundation; and
 - Installation of bentonite waterproofing panels (bentonite clay sandwiched between cardboard panels). The highly expansive clay forms an impenetrable barrier once water contacts the panels.
- Recommended lateral earth pressures and friction factors for unbalanced/basement walls are provided in *Appendix C*.

Recommendations for shallow foundation subgrade preparation and construction are provided as follows:

- A geotechnical engineer or his/her representative should directly observe foundation subgrade preparation activities;
- If shallow and/or perched groundwater is encountered, it must be continuously maintained at least 2 feet below the bottom of excavation and subsequent construction grade until the backfilling is complete;
- The subgrade soils will be sensitive to moisture and will readily disturb or soften if exposed to wet conditions during construction activities. Therefore, the final foot, at a minimum, of excavation for foundations should be performed using a smooth-edged cutting bucket (no teeth) to minimize subgrade disturbance. Furthermore, if wet conditions are present or anticipated due to groundwater seepage, perched groundwater, and/or precipitation/stormwater, the foundation subgrade should be protected with a 6-inch (minimum) thick layer of $\frac{3}{4}$ -inch minus crushed stone encased in a geotextile fabric (e.g., Mirafi 140N or equal). The fabric and crushed stone shall be placed immediately upon exposure of the foundation subgrade soils and densified with a plate compactor until exhibiting stable conditions. The purpose of the crushed stone is to protect the subgrade soils from disturbance, facilitate construction dewatering (if necessary), and provide a dry/stable subgrade upon which to progress construction.
- Foundation subgrades should be proof-rolled using a large smooth-drum roller with successive perpendicular passes.
- Where Bedrock subgrade is encountered in some areas of the proposed building;
 - The exposed Bedrock must be scraped clean of soil and any loose/weathered rock or severely fractured rock should be removed;
 - The footing subgrade should be approximately level. Bedrock surfaces that exceed 6H:1V in slope should be step-serrated or suitably benched;
 - Smooth surfaces should be roughened or serrated; and
 - A minimum 24-inch thick lift of *Structural Fill* should be placed between the footing

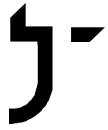


- and the bedrock surface to provide a more uniform and elastic bearing subgrade. The purpose of the crushed stone (i.e., cushion base) is to minimize differential settlements.
- Prior to setting forms and placing reinforcing steel, a geotechnical engineer should directly observe footing subgrades;
 - Footing subgrades should be level or suitably benched and free of standing water and/or debris;
 - Loose, soft, wet, frozen, or otherwise unsuitable soils should either be re-compacted or over-excavated to a suitable subgrade, as approved by the on-site geotechnical engineer; and
 - Over-excavations should be backfilled with properly placed and compacted *Structural Fill* as approved by the on-site geotechnical engineer.
 - Foundation subgrade soils should be protected against physical disturbance, precipitation, and/or frost throughout construction. Surface water run-on/run-off should be diverted away from open foundation excavations. The Contractor shall ultimately be responsible for the means and methods to protect the foundation subgrade during construction;
 - Interior footings, piers, and/or walls and the interior side of balanced perimeter foundation walls should be backfilled with *Clean Granular Fill* and/or 3-inch minus material meeting the requirements of *Structural Fill*, as described in the attached *Tables*;
 - Exterior footings and exterior side of balanced perimeter foundation walls should be backfilled with non-frost-susceptible fill in order to mitigate potential adverse effects of frost. Exterior footing and foundation wall backfill should consist of well-graded, free-draining, granular soil conforming to the requirements of *Clean Granular Fill*, as described in the attached *Tables*;
 - Backfill for footings and foundation walls should be placed in uniform horizontal lifts having a maximum loose lift thickness of 8 inches and compacted to 95 percent of its modified proctor maximum dry density (MPMDD; per ASTM D1557). Thinner lifts may be required in order to achieve the required compaction criteria; and
 - To minimize the potential for foundation wall damage during the backfill and compaction activities, it is recommended that foundation wall backfill be placed in a manner that maintains a balanced fill height on both sides of the wall (except for unbalanced walls).

6.3 Floor Slab-On-Grade

Design recommendations for the floor slab-on-grade are provided as follows:

- The slab area should be improved with a design-build aggregate pier or rigid inclusion solution. The floor slab-on-grade should be underlain by a base course layer consisting of a minimum 12-inch thick layer of *Clean Granular Fill* placed over improved soils or *Structural Fill*, to provide a capillary break and a stable working surface;



- A modulus of vertical subgrade reaction, k_{vi} , of 200 pounds per cubic inch (pci) should be available for structural design of floor slabs-on-grade, provided that the subgrade is prepared as recommended;
- The floor slab should be isolated structurally from foundation walls and columns/piers to allow for differential movement; and
- The requirement for under slab drainage and a moisture/vapor barrier beneath floor slabs-on-grade should be evaluated by the architect and/or the structural engineer, based on the building's specific interior usage requirements.

Additional recommendations for slab-on-grade subgrade preparation and construction are provided as follows:

- A geotechnical engineer should directly observe the subgrade soils prior to the placement of fill within the slab area;
- The subgrade should be level and free of standing water and/or debris;
- Loose, soft, wet, frozen, or otherwise unsuitable soils should either be re-compacted or over-excavated to a suitable subgrade, as approved by the on-site geotechnical engineer; and
- Over-excavations should be backfilled with properly placed and compacted *Structural Fill*.

6.4 Seismic Considerations

Based on site class definitions of the American Society of Civil Engineers (ASCE) Standard 7-10, Minimum Design Loads for Buildings and Other Structures and the conditions encountered at the test boring locations, the site is classified as:

Site Class D: Stiff Soil.

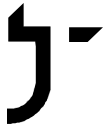
Liquefaction refers to the loss of strength in saturated cohesionless soils due to the buildup of pore water pressures during cyclic or seismic loading. Based on the conditions encountered at the test boring locations, the site is not considered to be susceptible to liquefaction.

6.5 Re-Use of Site Soils

The excavated materials encountered at the site are not expected to be suitable for re-use as *Structural Fill*, *Clean Granular Fill*, or *Common Fill* due to high fines content. These soils may be re-used in areas to be landscaped, subject to conformance with the project specifications.

6.6 Construction Monitoring and Quality Control Testing

A qualified geotechnical engineer or representative should be retained to review the site preparation and grading activities and foundation subgrade preparations, at a minimum. Similarly, quality control testing, including in-place field density and moisture tests, should be performed to confirm that the specified compaction is achieved. It is recommended that JTC be



retained to provide earthwork construction monitoring and quality control testing services.

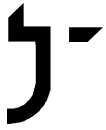
Quality control testing recommendations are provided as follows:

- The Geotechnical Engineer should be on-site full time to monitor the installation of the Ground Improvement system;
- During site grading and foundation subgrade preparation, 3 field density tests should be performed for every 5,000 square feet (per lift) of *Structural Fill* placement, at a minimum. At least 3 tests should be performed on each lift of material even if the lift is less than 5,000 square feet;
- During foundation wall backfilling, 3 field density tests should be performed for every 100 linear feet (per lift) of fill placement, at a minimum. At least 3 tests should be performed on each lift of material even if the lift is less than 100 linear feet;
- During placement and compaction of *Clean Granular Fill* as the base course below the floor slab-on-grade and sidewalks, 3 field density tests should be performed for every 5,000 square feet of placement. At least 3 tests should be performed on each lift of material even if the lift is less than 5,000 square feet;
- During backfilling of utility trenches, at least 1 test should be conducted on *Structural Fill* per 50 linear feet (per lift) of trench; and
- During site grading and pavement subgrade preparation, 3 field density tests should be performed for every 5,000 square feet (per lift) of *Common Fill*, at a minimum. At least 3 tests should be performed on each lift even if the lift is less than 5,000 square feet.

6.7 Additional Considerations

Additional design recommendations are provided as follows:

- Exterior concrete sidewalks should be underlain by at least 12 inches of *Clean Granular Fill*. The thickness of the *Clean Granular Fill* should be increased to no less than 18 inches for exterior concrete slabs located adjacent to exterior doorways and ramps to provide additional frost protection at building entry/exit points;
- Roof drains or similar features should be provided to collect roof run-off and prevent ponding near the building. Roof drains and other stormwater controls should not discharge to foundation drains;
- The exterior ground surface adjacent to the building should be sloped away from the building to provide for positive drainage. Similarly, the final surface materials adjacent to the building should be relatively impermeable to reduce the volume of precipitation infiltrating into the subsurface proximate to building foundations. Such impermeable materials include cement concrete, bituminous concrete, and/or vegetated silty/clayey topsoil; and
- Permanent fill or cut slopes should have a maximum slope of 2.5H:1V (horizontal to vertical) or flatter for dry conditions. Permanent fill or cut slopes should be no steeper



than 3H:1V for wet/submerged conditions (e.g., stormwater basin) unless a properly designed surface slope stabilization system (e.g. rip rap, geosynthetics) is provided.

Additional construction considerations/recommendations are provided as follows:

- Safe temporary excavation and/or fill slopes are the responsibility of the Contractor. Excavations should be conducted in accordance with local, state, and federal (OSHA) requirements, at a minimum. If an excavation cannot be properly sloped or benched due to space limitations, adjacent structures, and/or seepage, the Contractor should install an engineered shoring system to support the temporary excavation;
- Subgrade conditions will be influenced by excavation methods, precipitation, stormwater management, groundwater control(s), and/or construction activities. Most of the site soils are poorly-drained, moisture-sensitive, and considered susceptible to disturbance when exposed to wet conditions and construction activities. As such, the Contractor should be aware of these conditions and must take precautions to minimize subgrade disturbance. Such precautions may include diverting storm run-off away from construction areas, reducing traffic in sensitive areas, minimizing the extent of exposed subgrade if inclement weather is forecast, backfilling excavations and footings as soon as practicable, and maintaining an effective dewatering program, as necessary;
- Proper groundwater control and stormwater management are necessary to maintain site stability. Groundwater should be removed in advance and continuously maintained at least 2 feet below the working construction grade until earthworks and/or backfilling are complete;
- If groundwater seepage and/or wet soils due to shallow groundwater are observed, a $\frac{3}{4}$ -inch minus crushed stone base should be placed atop the exposed subgrade soils. The stone should be immediately placed atop the undisturbed subgrade and then tamped with a plate compactor until exhibiting stable conditions. The stone should be protected, as required, with a geotextile filter fabric such as Mirafi 140N or equal. The purpose of the stone base is to protect the wet subgrade, facilitate dewatering, and provide a dry/stable base upon which to progress construction; and
- All slopes should be protected from erosion during (and after) construction.

7.0 CLOSING

We trust the contents of this report are responsive to your needs at this time. Should you have any questions or require additional assistance, please do not hesitate to contact our office.

APPENDIX A: LIMITATIONS

Explorations

1. The analyses and recommendations presented in this report are based in part upon the data obtained from widely-spaced subsurface explorations. Subsurface conditions between exploration locations may vary from those encountered at the exploration locations. The nature and extent of variations between explorations may not become evident until construction. If variations appear, it will be necessary to re-evaluate the recommendations of this report.
2. The generalized soil profile described in the text is intended to convey trends in subsurface conditions. The boundaries between strata are approximate and idealized and have been developed by interpretation of widely-spaced explorations and samples; actual strata transitions are probably more gradual. For specific information, refer to the individual test pit and/or boring logs.
3. Water level readings have been made in the test pits and/or test borings under conditions stated on the logs. These data have been reviewed and interpretations have been made in the text of this report. However, it must be noted that fluctuations in the level of the groundwater may occur due to variations in rainfall, temperature, and other factors differing from the time the measurements were made.

Review

4. It is recommended that John Turner Consulting, Inc. be given the opportunity to review final design drawings and specifications to evaluate the appropriate implementation of the geotechnical engineering recommendations provided herein.
5. In the event that any changes in the nature, design, or location of the proposed areas are planned, the conclusions and recommendations contained in this report shall not be considered valid unless the changes are reviewed, and conclusions of the report modified or verified in writing by John Turner Consulting, Inc.

Construction

6. It is recommended that John Turner Consulting, Inc. be retained to provide geotechnical engineering services during the installation phases of the work. This is to observe compliance with the design concepts, specifications, and recommendations and to allow design changes in the event that subsurface conditions differ from those anticipated prior to the start of construction.

Use of Report

7. This report has been prepared for the exclusive use of the addressee for the noted project. All considerations are based on the available information and is in accordance with generally accepted soil and foundation engineering practices. No other warranty, expressed or implied, is made.
8. This report has been prepared for this project by John Turner Consulting, Inc. This report was completed for preliminary design purposes and may be limited in its scope to complete an accurate bid. Contractors wishing a copy of the report may secure it with the understanding that its scope is limited to preliminary geotechnical design considerations.

APPENDIX B: RECOMMENDED SOIL GRADATION & COMPACTION SPECIFICATIONS

TABLE 1: Structural Fill

SIEVE SIZE	PERCENT PASSING BY WEIGHT
5-inch	100
¾-inch	60 - 100
No. 4	20 - 80
No. 200	0 - 10

NOTES:

1. For use as structural load support below foundations and within the building pad. Structural Fill placed beneath building foundations should include the Footing Zone of Influence which is defined as that area extending laterally one foot from the edge of the footing then outward and downward at a 1:1.5 (H:V) splay.
2. ¾-inch crushed stone may be used in wet conditions.
3. Structural Fill should be free of construction and demolition debris, frozen soil, organic soil, peat, stumps, brush, trash, and refuse;
4. Structural Fill should not be placed on soft, saturated, or frozen subgrade soils;
5. Structural Fill should be placed in lifts not exceeding 12 inches for heavy vibratory rollers and 8 inches for vibratory plate compactors.
6. Place and compact within $\pm 3\%$ of optimum moisture content.
7. Compact to at least 95% relative compaction per ASTM D1557.
8. The adequacy of the compaction efforts should be verified by field density testing.

TABLE 2: Clean Granular Fill

SIEVE SIZE	PERCENT PASSING BY WEIGHT
3-inch	100
¾-inch	60 – 90
No. 4	20 – 70
No. 200	2 – 8

NOTES:

1. Should consist of crushed stone beneath the concrete pad, as approved by on-site geotechnical engineer.
2. For minimum 9-inch base below the floor slab-on-grade.
3. For minimum 12-inch base for exterior concrete slabs exposed to frost.
4. For minimum 18-inch base at exterior ramps, aprons, and loading bays adjacent to entrances/exit ways.
5. For use as footing and foundation wall backfill.
6. For use as backfill behind unbalanced foundation/retaining walls.
7. Place in lifts not exceeding 12 inches for heavy vibratory rollers and 8 inches for vibratory plate compactors.
8. Place and compact within $\pm 3\%$ of optimum moisture content.
9. Compact to at least 95% relative compaction per ASTM D1557.
10. Compact to at least 95% relative compaction per ASTM D1557 when placed as foundation wall backfill in conjunction with a bond break.
11. The adequacy of the compaction efforts should be verified by field density testing.

TABLE 3: Common Fill

SIEVE SIZE	PERCENT PASSING BY WEIGHT
6-inch	100
¾-inch	60 – 100
No. 4	20 – 85
No. 200	0 – 25

NOTES:

1. For use as common/subgrade fill in parking areas and roadway embankments.
2. For use as foundation wall backfill if used in conjunction with a bond break and sized/screened to 3-inch minus.
3. Place in lifts not exceeding 12 inches.
4. Maximum stone size should not exceed ½ the actual lift thickness.
5. Compact to at least 92% relative compaction per ASTM D1557 when placed as subgrade fill in parking areas or roadway embankments.
6. Compact to at least 95% relative compaction per ASTM D1557 when placed as foundation wall backfill in conjunction with a bond break.
7. The adequacy of the compaction efforts should be verified by field density testing.

APPENDIX C: RECOMMENDED DESIGN PARAMETERS FOR UNBALANCED WALLS

Lateral earth pressures for the structural design and stability analysis of unbalanced foundation walls (basement walls, retaining walls, etc.) are provided herein. The following table outlines the recommended lateral earth pressure coefficients and equivalent fluid weights:

WALL CONDITION	LATERAL TRANSLATION (Δ/H)	EARTH PRESSURE COEFFICIENT (K)
restrained	0	$K_o = 0.50$
no restraint	0.002	$K_a = 0.31$
no restraint	0.02	$K_p = 3.25$
seismic	n/a	K_{eq}

where: Δ = movement at top of wall by rotation or lateral translation
 H = height of wall

The recommended lateral earth parameters are based upon and/or assume:

1. Rankine earth pressure theory;
2. Retaining wall backfilled with *Clean Granular Fill* (Table 1);
3. Unit weight of backfill less than 135 pcf;
4. No hydrostatic pressures;
5. Surcharge loading; The proposed basement wall should be designed to support the surcharge loading from the proposed building. Parking areas and roadway will be proximally located to the proposed foundation walls, and where applicable, the walls should be designed with a minimum surcharge load of 250 psf in accordance with the *AASHTO Standard Specification for Highway Bridges*;
6. A level backfill in front and behind of wall;
7. Dynamic/compaction stresses limited to 200 psf/foot;
8. The top 2 feet of soils in front of exterior retaining walls should not be considered for passive resistance;
9. Seismic loading shall be applied as required by the *IBC*;
10. Use of only small plate compactors within 3 feet of the top of wall.

The lateral resistance of retaining walls should also accommodate any surcharge loads. Uniformly distributed loads should be superimposed along the face of the wall at a magnitude equal to the surcharge pressure multiplied by the appropriate earth pressure coefficient. Surcharge loads should be considered where they are located within a horizontal distance equivalent to 1 times the height of the wall. Any anticipated point or line loads situated behind the wall should be evaluated in accordance with linear elastic theory.

For frost protection and proper drainage, it is recommended that *Clean Granular Fill* be placed

directly behind unbalanced walls. The ground surface immediately adjacent to the unbalanced wall should be sloped away from the building to allow for positive drainage. It is also recommended that the final surface materials adjacent to the wall be relatively impermeable to reduce the volume of precipitation infiltrating into the subgrade. Such impermeable materials include cement concrete, bituminous concrete, and/or vegetated silty/clayey topsoil.

Retaining walls (including basement walls) should be provided with adequate footing drains per the International Building Code. The perimeter foundation drain should be located at least 4 inches above the bottom of footing elevation and six inches outward from the edge of footing. The drains should not encroach within the Footing Zone of Influence, which is defined as that area extending laterally one foot from the edge of footing then outward and downward at a 1H:1.5V splay. Furthermore, the invert elevation of the drain should be at least 12 inches below the underside of the adjacent floor slab. The drains should consist of minimum 4-inch diameter perforated PVC-SDR 35 drain pipe encased within 12 inches of $\frac{3}{4}$ -inch stone and wrapped with a filter fabric such as Mirafi 140N or equal. If unbalanced walls cannot be drained to alleviate hydrostatic forces, then the lateral earth pressure should be increased to include full hydrostatic pressures.

Any footing and under-slab drains may discharge via gravity to a storm drain line not subject to surcharge. The Civil Engineer should review the discharge of the drains. The drains should be provided with permanent clean-outs at convenient locations to facilitate access to all sections of the system. Roof gutters and other storm collection should not be discharged to the footing/under-slab drains. Any recharge systems, infiltrators, and/or dry wells shall be kept away from the unbalanced/retaining walls to prevent hydrostatic surcharge.

The following interface friction angle(s), ϕ , and associated friction factors ($=\tan \phi$) are recommended for sliding resistance/overturning:

Condition	Interface Friction Angle	Friction Factor
Mass concrete (base of wall) on crushed gravel/stone	30	0.57
Mass concrete (base of wall) on Glacial Deposits	22	0.40
Formed concrete (wall) against Clean Granular Fill	22	0.40

APPENDIX D: CONCEPT PLAN & EXPLORATION LOCATION PLAN



SITE SCHEDULE

- C1

AREAS TO BE RE-GRADED AND PAVED, APPLY MARKINGS AS SHOWN, TYP., INCLUSIVE OF MIRAFI 500X GEOTEXTILE, 18" COARSE CRUSHED GRAVEL & 6" FINE CRUSHED GRAVEL

C2

4" THICK CONCRETE SIDEWALK, TYP., INCLUSIVE OF MIRAFI 500X GEOTEXTILE, 24" COARSE CRUSHED GRAVEL & 6" FINE CRUSHED GRAVEL

C3

CONNECT 2" TYPE "K" COPPER WATER SERVICE LINE FROM EX. PIPE TO PROP. BLDG, INCLUSIVE OF GATE VALVE PER BURLINGTON DPW STANDARD

C3A

ADD ALT. - WET TAP AT MAIN IN FLYNN AVE., 6" D.I. SERVICE LINE TO PROP. BLDG. & GATE VALVE PER BURLINGTON DPW STANDARD

C4

CONNECT 6" PVC SANITARY SEWER SERVICE LINE FROM PROP. BLDG. TO EX. MAIN IN FLYNN AVE., INCLUSIVE OF CLEANOUT WITH BACKFLOW PREVENTER AS SHOWN

C5

WOOD GUIDERAIL, TYP.

C6

PRECAST CONCRETE BLOCK RETAINING WALL, MAX. HEIGHT 5'

C7

BOULDER OR PRECAST CONCRETE BLOCK RETAINING WALL, MAX. HEIGHT 3'

C8

FOCAL POINT STORMWATER TREATMENT SYSTEM INCLUDING RAIN GUARDIAN TURRET & NYLOPLAST OUTLET DRAIN, TYP.
- A.

25 SF TREATMENT AREA AT EL. 143.0
- B.

75 SF TREATMENT AREA AT EL. 142.0
- C.

75 SF TREATMENT AREA AT EL. 142.0
- D.

275 SF TREATMENT AREA AT EL. 144.0
- C9

(143) ADS SC-310 STORMTECH CHAMBERS BELOW PARKING
- C10

18" HDPE OUTLET PIPE FROM C9 INCLUDING FLARED END SECTION
- C11

4' I.D. MANHOLE PROVIDING CONNECTION FROM C8A TO C9
- C12

CONCRETE PAD SURROUNDED BY PRIVACY FENCE WITH LOCKING GATE SIZED FOR (2) REFUSE DUMPSTERS
- C13

TRANSFORMER ON CONCRETE PAD SURROUNDED BY BOLLARDS, COORDINATE WITH MEP
- C14

6" PERF. PVC FOOTING DRAIN AROUND BASEMENT LEVEL, DISCHARGE TO DAYLIGHT
- C14A

ADD ALT. - 6" PERF. FOOTING DRAIN AROUND FIRST FLOOR LEVEL, DISCHARGE TO DAYLIGHT
- C15

ELECTRIC VEHICLE CHARGING STATION WITH (2) CHARGE PORTS

Stamp

Date

Description

No.

ENGINEERING VENTURES PC

DUNCAN WISNIEWSKI
 ARCHITECTURE
 255 SOUTH CHAMPLAIN STREET
 BURLINGTON, VT 05401
 (802) 864-6693

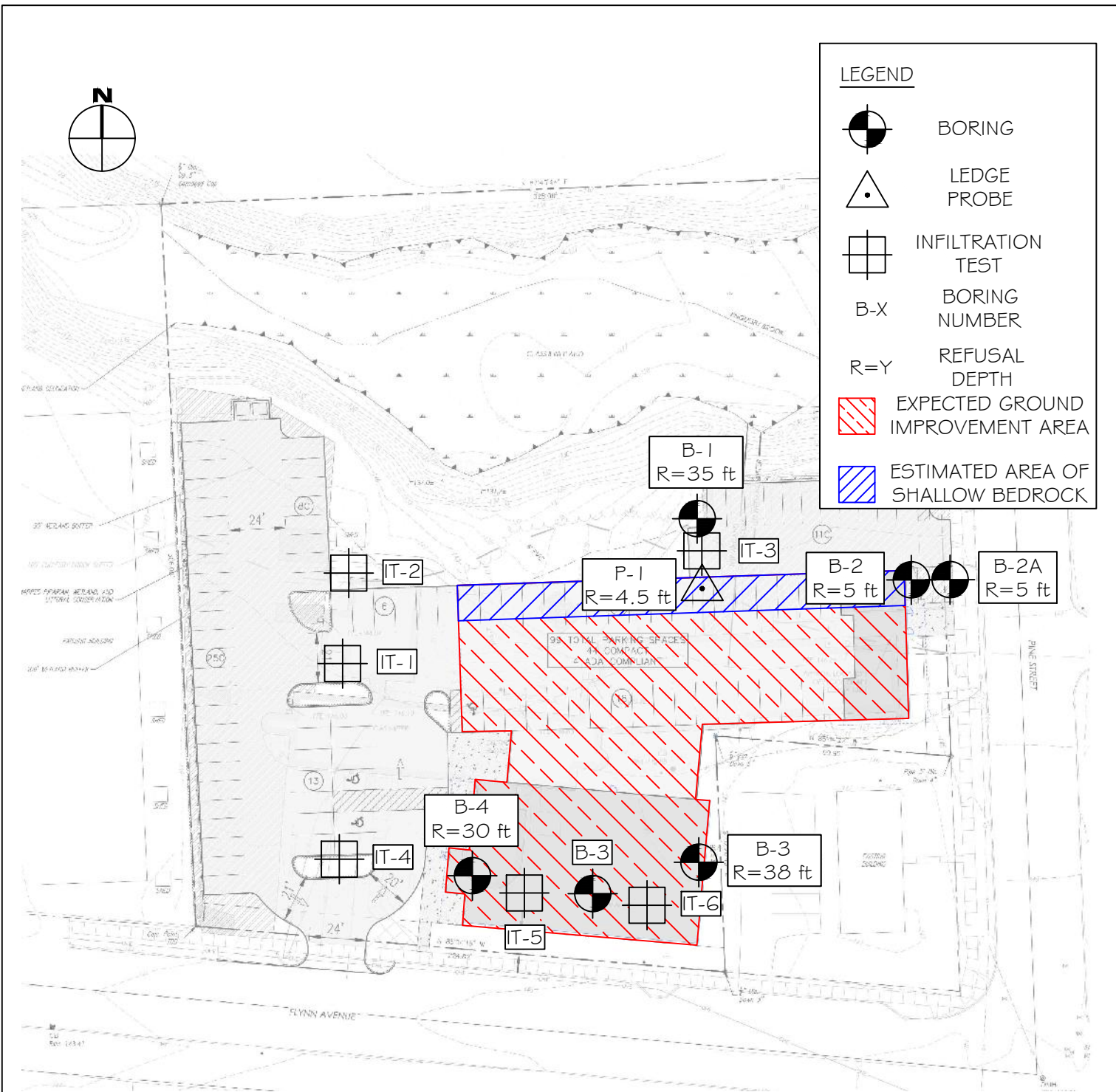
SITE UTILITY AND LAYOUT PLAN

HOWARD CENTER REDEVELOPMENT
 855 PINE STREET/300 FLYNN AVENUE
 CITY OF BURLINGTON, CHITTENDEN COUNTY, VERMONT

EV Project #
 Drawn By:
 Checked By:
 Scale:
 Date:

22488
 JG
 KW
 1" = 20'
 12/09/2022

C2.0



Notes:

- 1. Explorations were performed on December 12 and 13, 2022 under the direction of JTC.
- 2. Exploration locations should be considered approximate.
- 3. Refer to the Exploration Logs for the subsurface conditions encountered at each exploration location.
- 4. Basemap source: "Concept Site Plan #1", prepared by Engineering Ventures, sheet #5K-1, dated October 21, 2022
- 5. Drawing Scale: 1 inch = 60 feet

DATE: 02/06/23	DRAWING NAME:		DRAWING #: 1
JOB # 22-04-138	EXPLORATION LOCATION PLAN		
DRAFT: TM	PROJECT: HOWARD HEALTH CENTER RENOVATIONS		
DESIGN: QG	BURLINGTON, VERMONT		
REVIEW: SL	CLIENT: HOWARD HEALTH CENTER		
REVISIONS:	BURLINGTON, VERMONT		

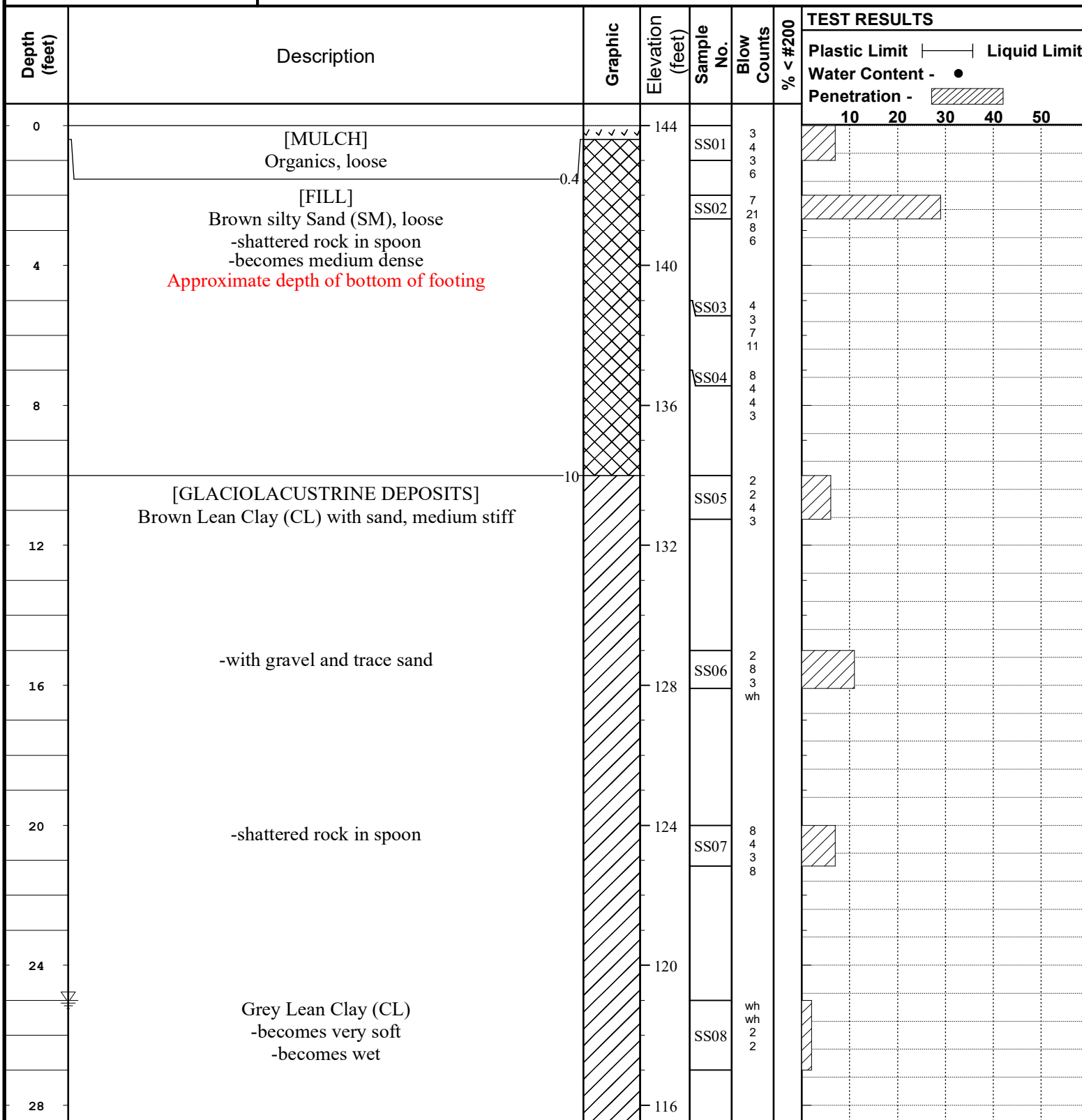
APPENDIX E: EXPLORATION LOGS & KEY TO SYMBOLS AND DESCRIPTIONS



LOG OF BORING No. B-1

PROJECT: Howard Center Redevelopment Project PROJECT NO.: 22-04-138
CLIENT: Howard Center
PROJECT LOCATION: 300 Flynn Avenue, Burlington, Vermont
LOCATION: Howard Center ELEVATION: 144
DRILLER: Soil-X LOGGED BY: Q. Guglielmo
DRILLING METHOD: B-57 Truck Mounted Drilling Rig DATE: 12/12/22 & 12/13/22
DEPTH TO - WATER> INITIAL: 25 AFTER 24 HOURS: 25

This information pertains only to this boring and should not be interpreted as being indicative of the site.





LOG OF BORING No. B-1

PROJECT: Howard Center Redevelopment Project PROJECT NO.: 22-04-138
CLIENT: Howard Center
PROJECT LOCATION: 300 Flynn Avenue, Burlington, Vermont
LOCATION: Howard Center ELEVATION: 144
DRILLER: Soil-X LOGGED BY: Q. Guglielmo
DRILLING METHOD: B-57 Truck Mounted Drilling Rig DATE: 12/12/22 & 12/13/22
DEPTH TO - WATER> INITIAL: 25 AFTER 24 HOURS: 25

This information pertains only to this boring and should not be interpreted as being indicative of the site.

Depth (feet)	Description	Graphic	Elevation (feet)	Sample No.	Blow Counts	% < #200	TEST RESULTS																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																
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LOG OF BORING No. B-2

PROJECT: Howard Center Redevelopment Project PROJECT NO.: 22-04-138
CLIENT: Howard Center
PROJECT LOCATION: 300 Flynn Avenue, Burlington, Vermont
LOCATION: Howard Center ELEVATION: 144
DRILLER: Soil-X LOGGED BY: Q. Guglielmo
DRILLING METHOD: B-57 Truck Mounted Drilling Rig DATE: 12/12/22 & 12/13/22
DEPTH TO - WATER> INITIAL: ≅ AFTER 24 HOURS: ≅

This information pertains only to this boring and should not be interpreted as being indicative of the site.

Depth (feet)	Description	Graphic	Elevation (feet)	Sample No.	Blow Counts	% < #200	TEST RESULTS				
							Plastic Limit	—	Liquid Limit	Water Content	Penetration
0	[TOPSOIL] Dark brown silty Sand (SM) with organics, loose		144	SS01	2 2 3 4						
	[GLACIOLACUSTRINE DEPOSITS] Brown Lean Clay (CL), medium stiff -becomes stiff				2 7 6 8						
4	Approximate depth of bottom of footing		140								
	Auger Refusal Boring terminated at 5 ft.			SS03	25/0						
8			136								
12			132								
16			128								
20			124								
24			120								
28			116								



LOG OF BORING No. B-2A

PROJECT: Howard Center Redevelopment Project PROJECT NO.: 22-04-138
CLIENT: Howard Center
PROJECT LOCATION: 300 Flynn Avenue, Burlington, Vermont
LOCATION: Howard Center ELEVATION: 144
DRILLER: Soil-X LOGGED BY: Q. Guglielmo
DRILLING METHOD: B-57 Truck Mounted Drilling Rig DATE: 12/12/22 & 12/13/22
DEPTH TO - WATER> INITIAL: ≡ AFTER 24 HOURS: ≡

This information pertains only to this boring and should not be interpreted as being indicative of the site.

Depth (feet)	Description	Graphic	Elevation (feet)	Sample No.	Blow Counts	% < #200	TEST RESULTS						
							Plastic Limit		Liquid Limit		Water Content		Penetration - 
							10	20	30	40	50		
0	Augered directly to 5 feet Approximate depth of bottom of footing Auger Refusal Boring terminated at 5 ft.		144										
4													
8			136										
12			132										
16			128										
20			124										
24			120										
28			116										

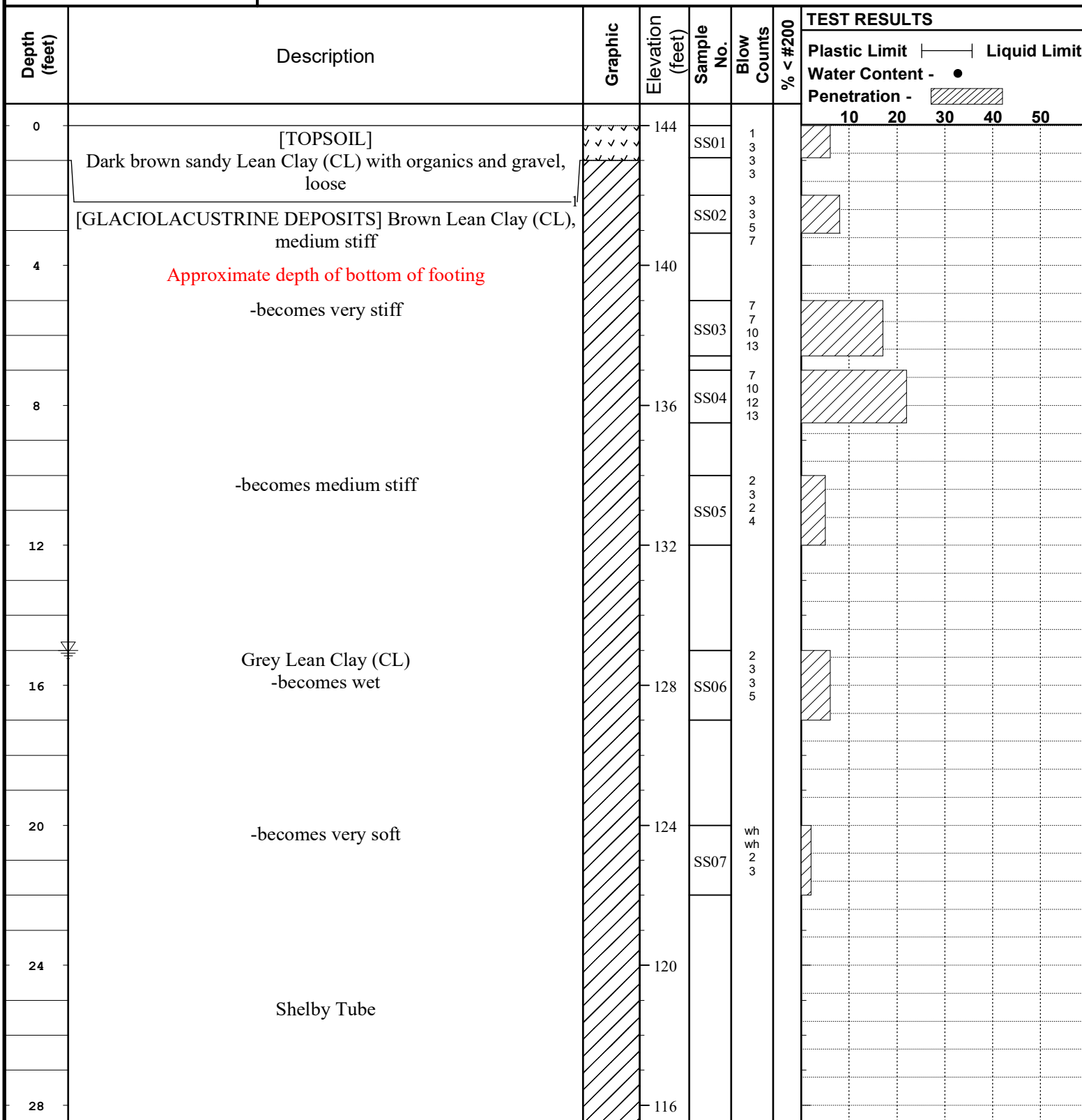
7 feet east of B-2



LOG OF BORING No. B-3

PROJECT: Howard Center Redevelopment Project PROJECT NO.: 22-04-138
CLIENT: Howard Center
PROJECT LOCATION: 300 Flynn Avenue, Burlington, Vermont
LOCATION: Howard Center ELEVATION: 144
DRILLER: Soil-X LOGGED BY: Q. Guglielmo
DRILLING METHOD: B-57 Truck Mounted Drilling Rig DATE: 12/12/22 & 12/13/22
DEPTH TO - WATER> INITIAL: 15 AFTER 24 HOURS: 15

This information pertains only to this boring and should not be interpreted as being indicative of the site.





LOG OF BORING No. B-3

PROJECT: Howard Center Redevelopment Project PROJECT NO.: 22-04-138

CLIENT: Howard Center

PROJECT LOCATION: 300 Flynn Avenue, Burlington, Vermont

LOCATION: Howard Center ELEVATION: 144

DRILLER: Soil-X LOGGED BY: Q. Guglielmo

DRILLING METHOD: B-57 Truck Mounted Drilling Rig DATE: 12/12/22 & 12/13/22

DEPTH TO - WATER> INITIAL: 15 AFTER 24 HOURS: 15

This information pertains only to this boring and should not be interpreted as being indicative of the site.

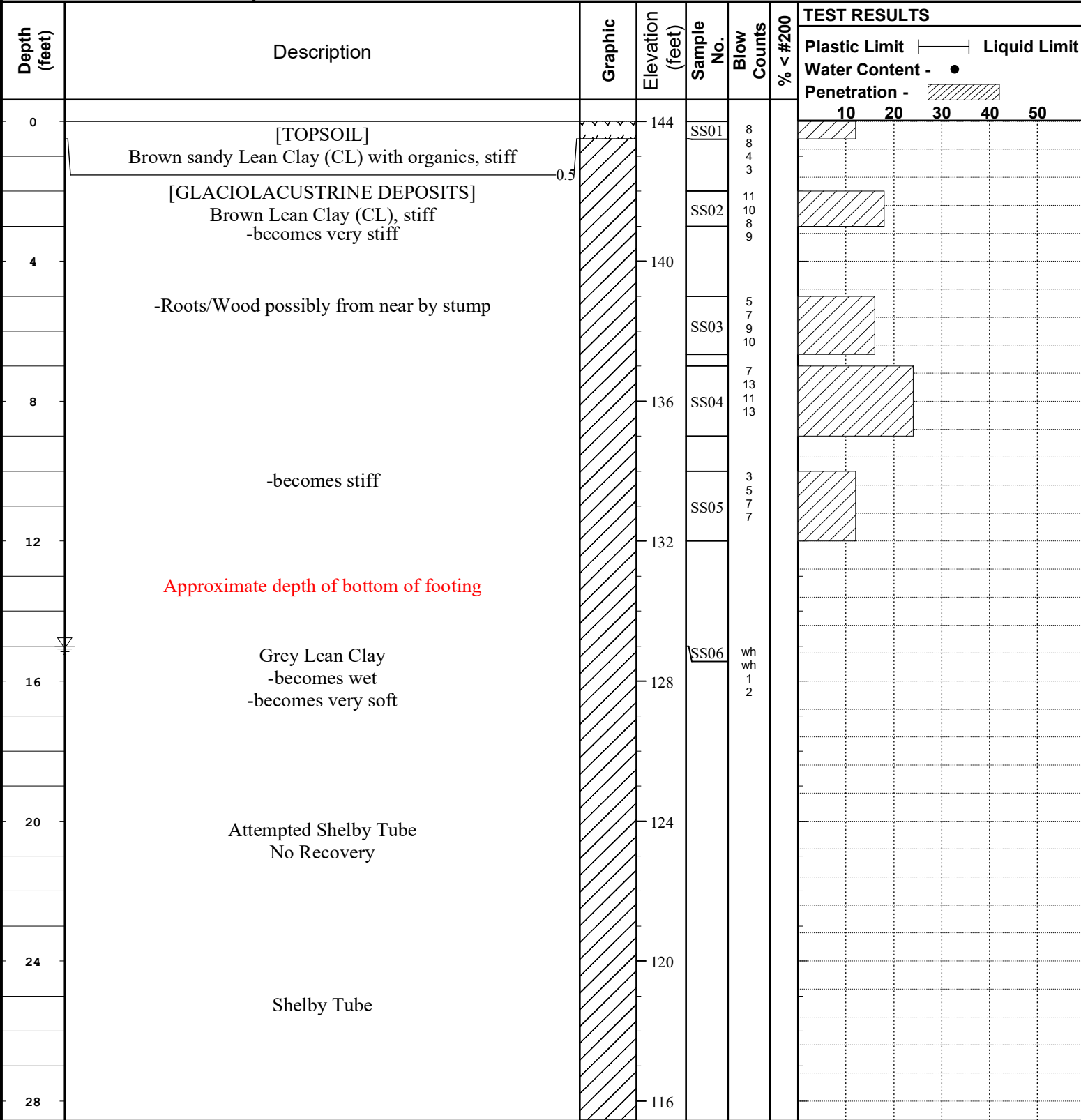
Depth (feet)	Description	Graphic	Elevation (feet)	Sample No.	Blow Counts	% < #200	TEST RESULTS																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																	
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LOG OF BORING
No. B-4

PROJECT: Howard Center Redevelopment Project PROJECT NO.: 22-04-138
CLIENT: Howard Center
PROJECT LOCATION: 300 Flynn Avenue, Burlington, Vermont
LOCATION: Howard Center ELEVATION: 144
DRILLER: Soil-X LOGGED BY: Q. Guglielmo
DRILLING METHOD: B-57 Truck Mounted Drilling Rig DATE: 12/12/22 & 12/13/22
DEPTH TO - WATER> INITIAL: 15 AFTER 24 HOURS: 15

This information pertains only to this boring and should not be interpreted as being indicative of the site.





LOG OF BORING No. B-4

PROJECT: Howard Center Redevelopment Project PROJECT NO.: 22-04-138
CLIENT: Howard Center
PROJECT LOCATION: 300 Flynn Avenue, Burlington, Vermont
LOCATION: Howard Center ELEVATION: 144
DRILLER: Soil-X LOGGED BY: Q. Guglielmo
DRILLING METHOD: B-57 Truck Mounted Drilling Rig DATE: 12/12/22 & 12/13/22
DEPTH TO - WATER> INITIAL: 15 AFTER 24 HOURS: 15

This information pertains only to this boring and should not be interpreted as being indicative of the site.

Depth (feet)	Description	Graphic	Elevation (feet)	Sample No.	Blow Counts	% < #200	TEST RESULTS				
							Plastic Limit	Liquid Limit		Water Content	
							Penetration -				
							10	20	30	40	50
											
	Auger Refusal			SS07	25/0						
	Boring terminated at 30 ft.										
32			112								
36			108								
40			104								
44			100								
48			96								
52			92								
56			88								



LOG OF BORING No. B-5

PROJECT: Howard Center Redevelopment Project

PROJECT NO.: 22-04-138

CLIENT: Howard Center

PROJECT LOCATION: 300 Flynn Avenue, Burlington, Vermont

LOCATION: Howard Center

ELEVATION: 144

DRILLER: Soil-X

LOGGED BY: Q. Guglielmo

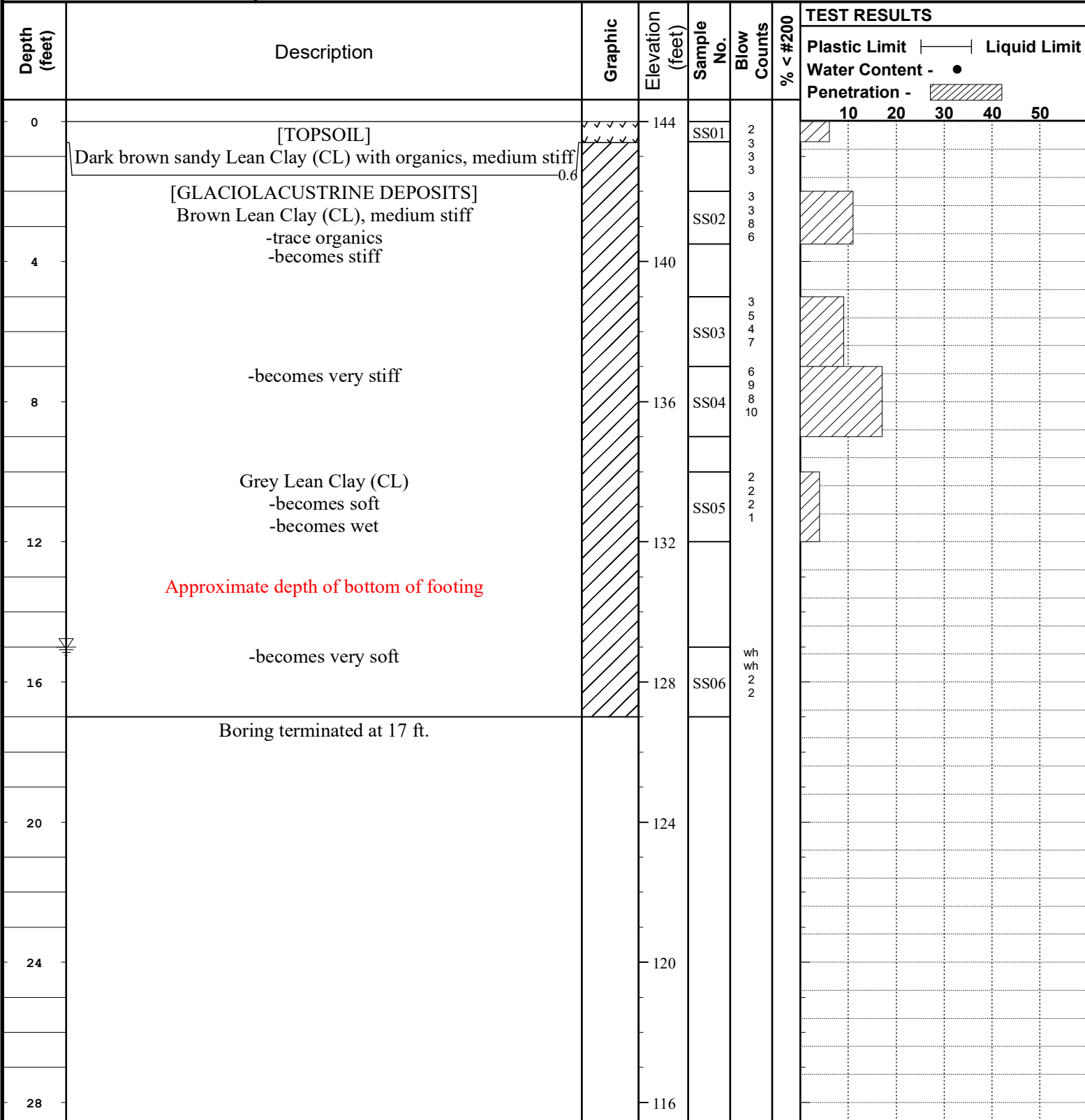
DRILLING METHOD: B-57 Truck Mounted Drilling Rig

DATE: 12/12/22 & 12/13/22

DEPTH TO - WATER> INITIAL: 15

AFTER 24 HOURS: 15

This information pertains only to this boring and should not be interpreted as being indicative of the site.





LOG OF BORING No. P-1

PROJECT: Howard Center Redevelopment Project PROJECT NO.: 22-04-138
CLIENT: Howard Center
PROJECT LOCATION: 300 Flynn Avenue, Burlington, Vermont
LOCATION: Howard Center ELEVATION: 144
DRILLER: Soil-X LOGGED BY: Q. Guglielmo
DRILLING METHOD: B-57 Truck Mounted Drilling Rig DATE: 12/12/22 & 12/13/22
DEPTH TO - WATER> INITIAL: ≡ AFTER 24 HOURS: ≡

This information pertains only to this boring and should not be interpreted as being indicative of the site.

Depth (feet)	Description	Graphic	Elevation (feet)	Sample No.	Blow Counts	% < #200	TEST RESULTS				
							Plastic Limit	—	Liquid Limit	Water Content	•
							Penetration	-			
0	Augered directly to 4.5 feet		144				10	20	30	40	50
4	Approximate depth of bottom of footing Auger Refusal Boring terminated at 4.5 ft.		140								
8			136								
12			132								
16			128								
20			124								
24			120								
28			116								

MAJOR DIVISIONS			SYMBOLS	TYPICAL NAMES
COARSE-GRAINED SOILS OVER 50% > No.200 SIEVE SIZE	GRAVELS MORE THAN 1/2 OF COARSE FRACTION > No.4 SIEVE SIZE	CLEAN GRAVELS WITH LESS THAN 5% FINES	GW	Well-graded gravels or gravel-sand mixtures, little or no fines
			GP	Poorly graded gravels or gravel-sand mixtures, little or no fines
		GRAVELS WITH OVER 15% FINES	GM	Silty gravels, gravel-sand mixtures
			GC	Clayey gravels, gravel-sand-clay mixtures
	SANDS MORE THAN 1/2 OF COARSE FRACTION < No.4 SIEVE SIZE	CLEAN SANDS WITH LESS THAN 5% FINES	SW	Well-graded sand or gravelly sands, little or no fines
			SP	Poorly graded sands or gravelly sands, little or no fines
		SANDS WITH OVER 15% FINES	SM	Silty sand, sand-silt mixtures
				SC
FINE-GRAINED SOILS OVER 50% < No.200 SIEVE SIZE	SILTS & CLAYS LIQUID LIMIT 50% OR LESS		ML	Inorganic silts and very fine sands, rock flour, silty or clayey fine sands or clayey silts with slight plasticity
			CL	Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays
			OL	Organic silts and organic silty clays of low plasticity
	SILTS & CLAYS LIQUID LIMIT GREATER THAN 50%		MH	Inorganic silts, micaceous or diatomaceous fine sandy or silty soils, elastic silts
			CH	Inorganic clays of high plasticity, fat clays
			OH	Organic clays of medium to high plasticity, organic silty clays, organic silts
			HIGHLY ORGANIC SOILS	


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KEY TO SYMBOLS AND DESCRIPTIONS

	Shelby Tube		Auger Cuttings
	Standard Split Spoon Sample		3" Split Spoon Sample
	Rock Core		Dynamic Cone Penetrometer
	Vane Shear		Bulk/Grab Sample
	Geoprobe Sample		Sonic or Vibro-Core Sample
	Water Table (at time of drilling)		Water Table (after 24 hours)

TYPICAL SYMBOLS

SOIL MOISTURE MODIFIERS

Term	Description
Dry	Absence of moisture; dusty, dry to touch
Moist	Damp but no visible water
Wet	Visible free water

The descriptor "damp" should not be used (use "moist").
 The descriptor "saturated" should not be used (use "wet").

	Recessed Cover
	Set in Concrete
	Top of Well,
	Recessed Pipe
	Covered Riser
	Capped Riser w/ Locking Cover
	Pipe Riser
	Concrete Seal
	Gravel Backfill
	Assorted Cuttings
	Bentonite Slurry
	Bentonite Pellets
	Silica Sand, blank PVC
	Slotted Pipe w/ Sand
	Endcap on Pipe Packed in Sand
	Silica Sand, No Pipe (End Plug)

WELL SYMBOLS

CLASSIFICATION	RANGE OF GRAIN SIZES		RELATIVE DENSITY/CONSISTENCY					PERCENT OR PORTIONS OF SOIL	
	U.S. Standard Sieve Size	Grain Size in Millimeters	Gravel, Sand, and Silt (nonplastic)		Silt (plastic) and Clay			Term	Description
BOULDERS	Above 12"	Above 305	N-Value	Relative Density	N-Value	Su	Consistency	Parting:	> 1/16 in.
COBBLES	12" to 3"	305 to 76.2	0 - 4	Very Loose	0 - 2	0 - 250	Very Soft	Seam:	0.5 in. to 1/16 in.
GRAVEL coarse fine	3" to No. 4 3" to 3/4" 3/4" to No. 4	76.2 to 4.75 76.2 to 19.1 19.1 to 4.75	5 - 10	Loose	3 - 4	251 - 500	Soft	Layer:	12 in. to 0.5 in.
			11-30	Medium Dense	5 - 8	501 - 1000	Medium Stiff	Stratum:	> 12 in.
			31 - 50	Dense	9 - 15	1001 - 2000	Stiff	Pocket:	Small erratic deposit
SAND coarse medium fine	No. 4 to No. 200 No. 4 to No. 10 No. 10 to No. 40 No. 40 to No. 200	4.75 to 0.075 4.75 to 2.00 2.00 to 0.425 0.425 to 0.075	51 +	Very Dense	16 - 30	2001 - 4000	Very Stiff	Lens:	Lenticular deposit
					31 +	4001+	Hard	Occasional:	One or less per foot of thickness
			Standard Penetration Testing (SPT) N ₆₀ based on blows per 12 inches. WR = Weight of Rods; WH = Weight of Hammer					Frequent	More than one per foot of thickness
SILT & CLAY	Below No. 200	Below 0.075						Varved	Alternating seams or layers of silt and/or clay and sometimes f. sand

REFERENCE: UNIFIED SOIL CLASSIFICATION SYSTEM - ASTM D2488-93

INFILTRATION TEST LOGS

John Turner Consulting, Inc.	Site Location: 300 Flynn Avenue, Burlington, VT
-------------------------------------	--

IT-1	Depth to Water (in)				Depth to Gravel (in): 57	
	15 min	30 min	45 min	60 min	Total Drop (in)	Drop/Hour (in/hr)
Trial 1	45	50	55	57	12	12
Trial 2	45	48	50	53	8	8
Trial 3	40	44	49	51	11	11
Trial 4	40	44	48	50	10	10

IT-2	Depth to Water (in)				Depth to Gravel (in): 49	
	15 min	30 min	45 min	60 min	Total Drop (in)	Drop/Hour (in/hr)
Trial 1	28	28	28	28	0	0
Trial 2	28	28	28	28	0	0
Trial 3	28	28	28	28	0	0
Trial 4	28	28	28	28	0	0

IT-3	Depth to Water (in)				Depth to Gravel (in): 56	
	15 min	30 min	45 min	60 min	Total Drop (in)	Drop/Hour (in/hr)
Trial 1	36	36	36	36	0	0
Trial 2	36	36	36	36	0	0
Trial 3	36	36	36	36	0	0
Trial 4	36	36	36	36	0	0

IT-4	Depth to Water (in)				Depth to Gravel (in): 55	
	15 min	30 min	45 min	60 min	Total Drop (in)	Drop/Hour (in/hr)
Trial 1	31	31	31	31	0	0
Trial 2	31	31	31	31	0	0
Trial 3	-	-	-	-	-	-
Trial 4	-	-	-	-	-	-

IT-5	Depth to Water (in)				Depth to Gravel (in): 55	
	15 min	30 min	45 min	60 min	Total Drop (in)	Drop/Hour (in/hr)
Trial 1	35	35	35	35	0	0
Trial 2	35	35	35	35	0	0
Trial 3	-	-	-	-	-	-
Trial 4	-	-	-	-	-	-

INFILTRATION TEST LOGS

John Turner Consulting, Inc.	Site Location: 300 Flynn Avenue, Burlington, VT
-------------------------------------	--

IT-6	Depth to Water (in)				Depth to Gravel (in): 52	
	15 min	30 min	45 min	60 min	Total Drop (in)	Drop/Hour (in/hr)
Trial 1	32	32	32	32	0	0
Trial 2	32	32	32	32	0	0
Trial 3	-	-	-	-	-	-
Trial 4	-	-	-	-	-	-

APPENDIX F: GEOTECHNICAL LABORATORY TESTING REPORTS

Grain size distribution plot for JTC Structural Fill. The y-axis is 'PERCENT FINER' (0-100) and the x-axis is 'GRAIN SIZE - mm.' (log scale, 100 to 0.001). The plot shows a solid line with data points and a dashed line representing the JTC Structural Fill specification. A shaded area between the lines indicates the required gradation range. Key sieve sizes are marked at the top: 6 in., 3 in., 2 in., 1 1/2 in., 1 in., 3/4 in., 1/2 in., 3/8 in., #4, #10, #20, #30, #40, #60, #100, #140, #200.

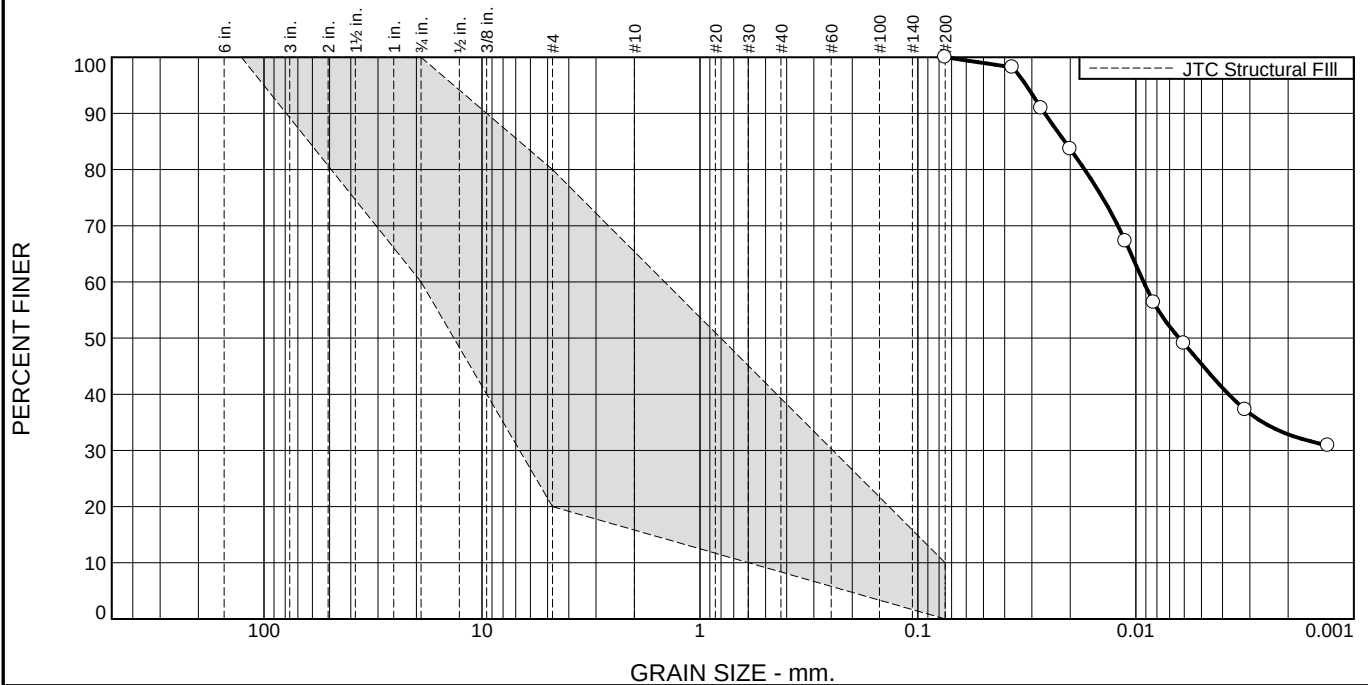
Test Results (ASTM C 136 & ASTM C 117)			
Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
1"	100.0		
3/4"	93.9	60.0 - 100.0	
1/2"	92.8		
3/8"	91.7		
#4	90.7	20.0 - 80.0	X
#10	85.8		
0.0489 mm.	32.9		
0.0352 mm.	27.7		
0.0254 mm.	22.5		
0.0133 mm.	18.1		
0.0095 mm.	14.7		
0.0068 mm.	12.1		
0.0034 mm.	8.6		
0.0014 mm.	3.4		

Title: Lab manager



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Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.0	0.0	0.0	54.6	45.4

Test Results (ASTM C 136 & ASTM C 117)			
Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#200	100.0	0.0 - 10.0	X
0.0368 mm.	98.2		
0.0272 mm.	90.9		
0.0200 mm.	83.6		
0.0112 mm.	67.3		
0.0083 mm.	56.3		
0.0060 mm.	49.1		
0.0031 mm.	37.2		
0.0013 mm.	30.9		

* JTC Structural Fill

Material Description

Lean Clay

Atterberg Limits (ASTM D 4318)

PL= 17 LL= 28 PI= 11

Classification

USCS (D 2487)= CL AASHTO (M 145)= A-6(10)

Coefficients

D₉₀= 0.0262 D₈₅= 0.0212 D₆₀= 0.0092
D₅₀= 0.0063 D₃₀= D₁₅=
D₁₀= C_u= C_c=

Remarks

Moisture: 27.4%

Date Received: 12/13/22 **Date Tested:** 12/21

Tested By: AA

Checked By: Adam Allen

Title: Lab Manager

Location: B-3 SS06
Sample Number: VT22-242

Date Sampled: 12/13/22

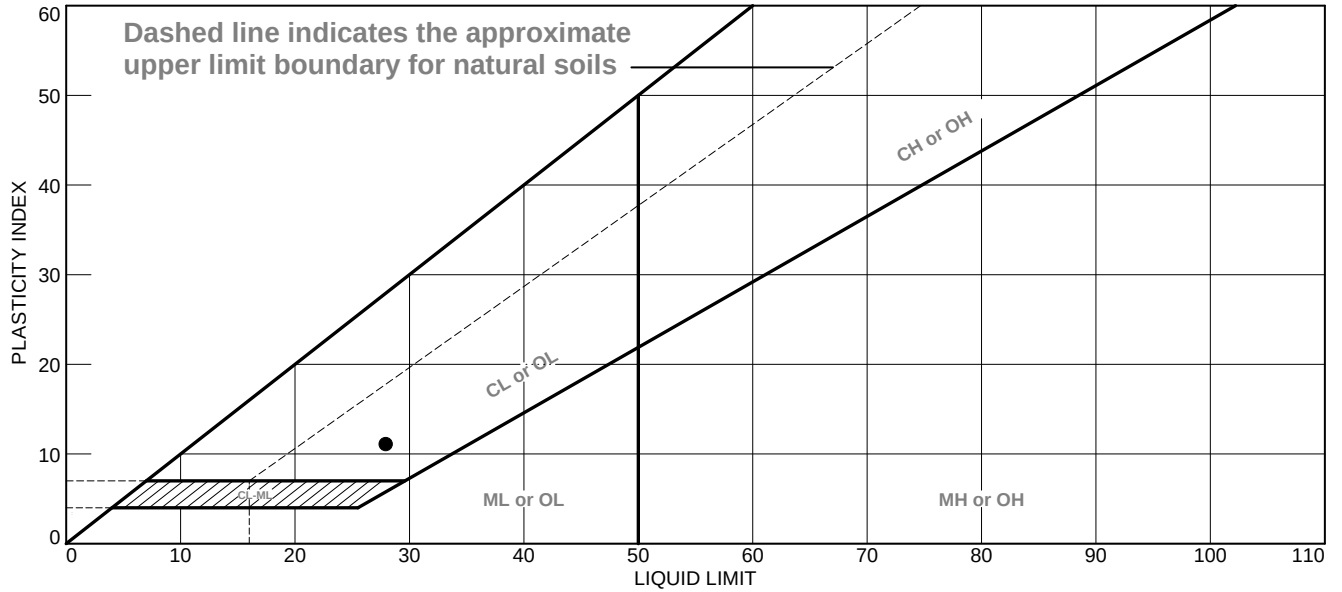


Client: Howard Center
Project: Howard Center Redevelopment Project

Project No: 22-04-138

Figure 001

LIQUID AND PLASTIC LIMITS TEST REPORT



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	Lean Clay	28	17	11	100	100	CL

Project No. 22-04-138 **Client:** Howard Center

Project: Howard Center Redevelopment Project

Location: B-3 SS06

Sample Number: VT22-242

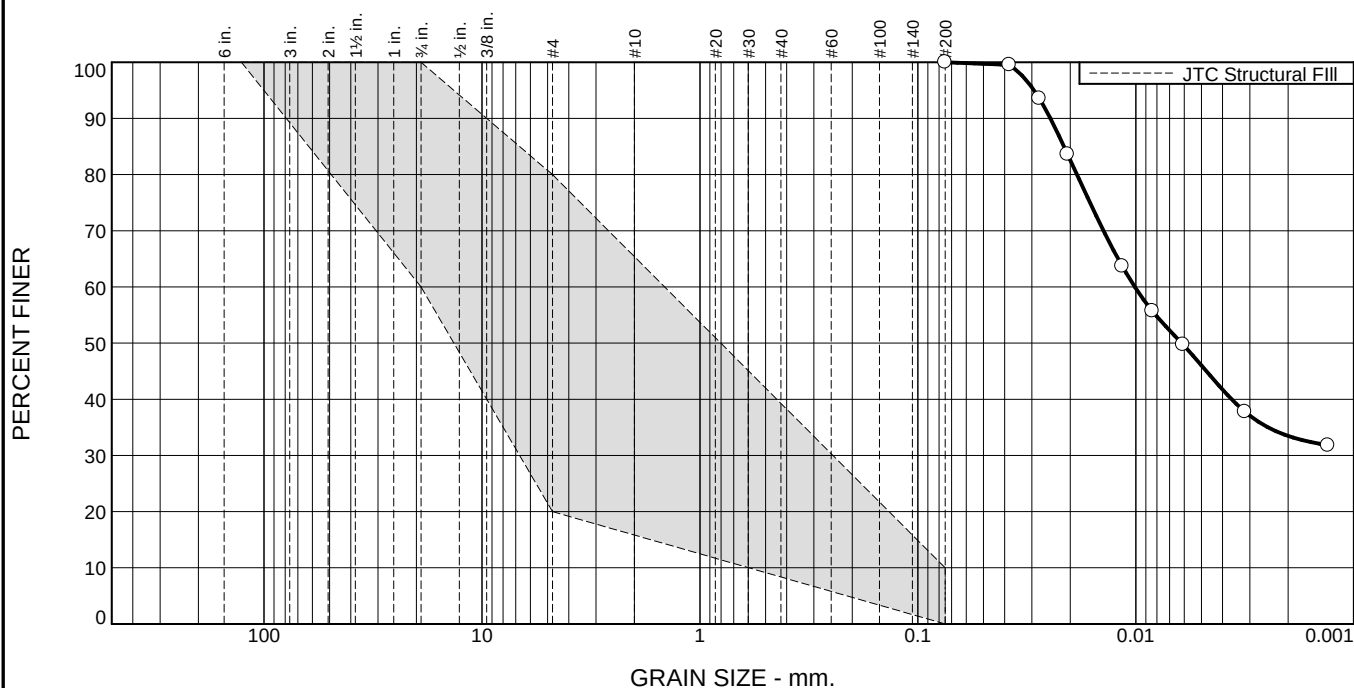
Remarks:



Figure 001B

Tested By: AA **Checked By:** Adam Allen

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.0	0.0	0.0	54.0	46.0

Test Results (ASTM C 136 & ASTM C 117)			
Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#200	100.0	0.0 - 10.0	X
0.0380 mm.	99.5		
0.0277 mm.	93.6		
0.0206 mm.	83.6		
0.0115 mm.	63.7		
0.0084 mm.	55.7		
0.0061 mm.	49.7		
0.0032 mm.	37.8		
0.0013 mm.	31.8		

* JTC Structural Fill

Material Description

Silt

Atterberg Limits (ASTM D 4318)

PL= 24 LL= 31 PI= 7

Classification

USCS (D 2487)= ML AASHTO (M 145)= A-4(8)

Coefficients

D₉₀= 0.0247 D₈₅= 0.0214 D₆₀= 0.0101
D₅₀= 0.0062 D₃₀= C_u= D₁₅= C_c=

Remarks

Moisture: 26.5%

Date Received: 12/13/22 **Date Tested:** 12/21/22

Tested By: AA

Checked By: Adam Allen

Title: Lab manager

Location: B-5 SS04
Sample Number: VT22-243

Date Sampled: 12/13/22

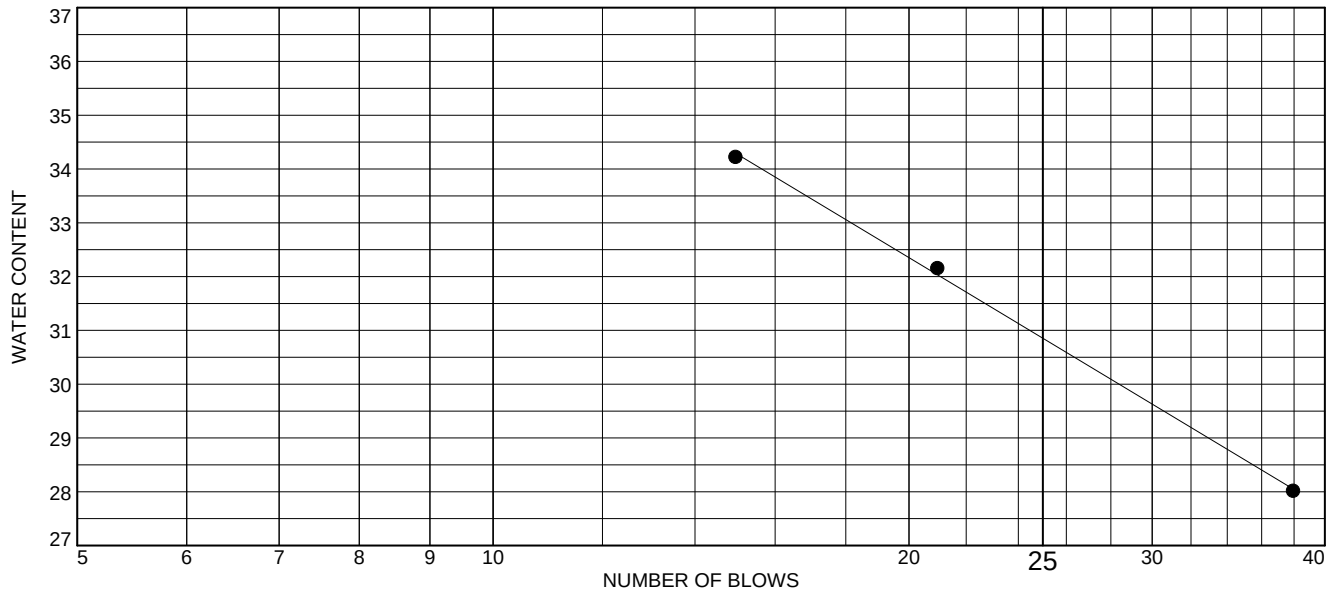
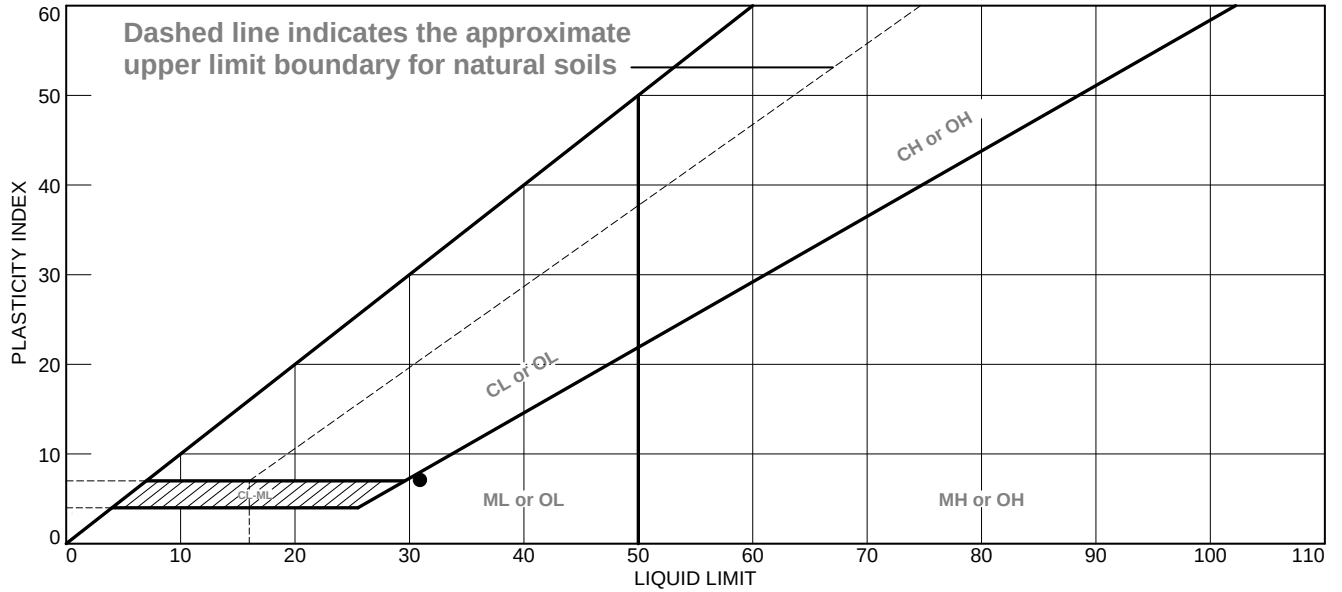


Client: Howard Center
Project: Howard Center Redevelopment Project

Project No: 22-04-138

Figure 002

LIQUID AND PLASTIC LIMITS TEST REPORT



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	Silt	31	24	7	100.0	100.0	ML

Project No. 22-04-138 **Client:** Howard Center

Project: Howard Center Redevelopment Project

Location: B-5 SS04

Sample Number: VT22-243



Remarks:

Figure 002B

Tested By: AA



Client: John Turner Consulting, Inc
 Project Name: Howard Center
 Project Location: Burlington, VA

GTX #: 316555
 Test Date: 12/13/22

Tested By: MD
 Checked By: ank

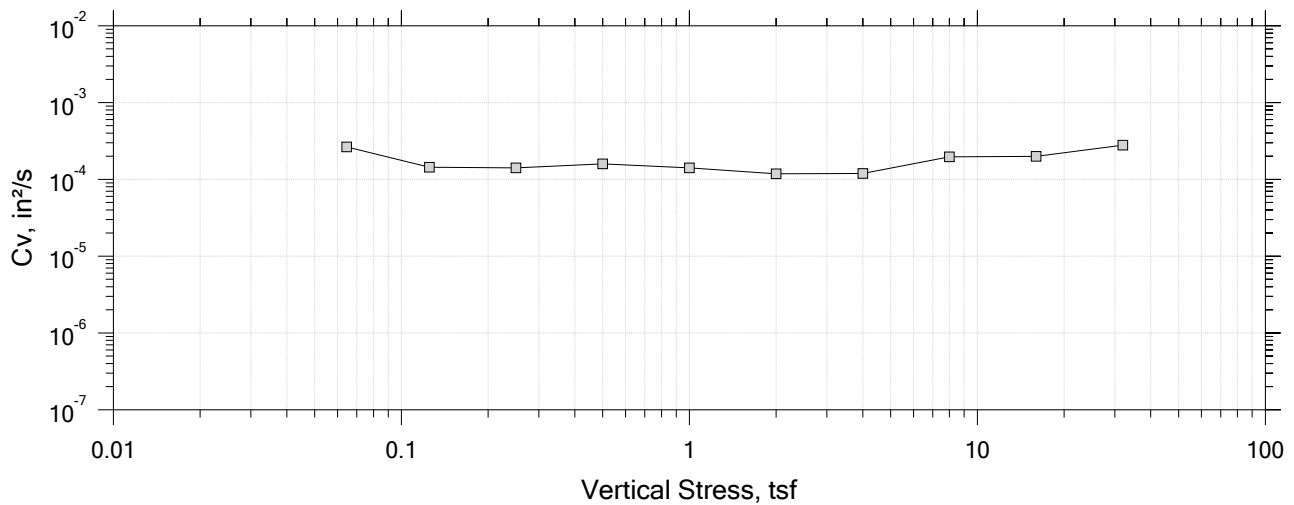
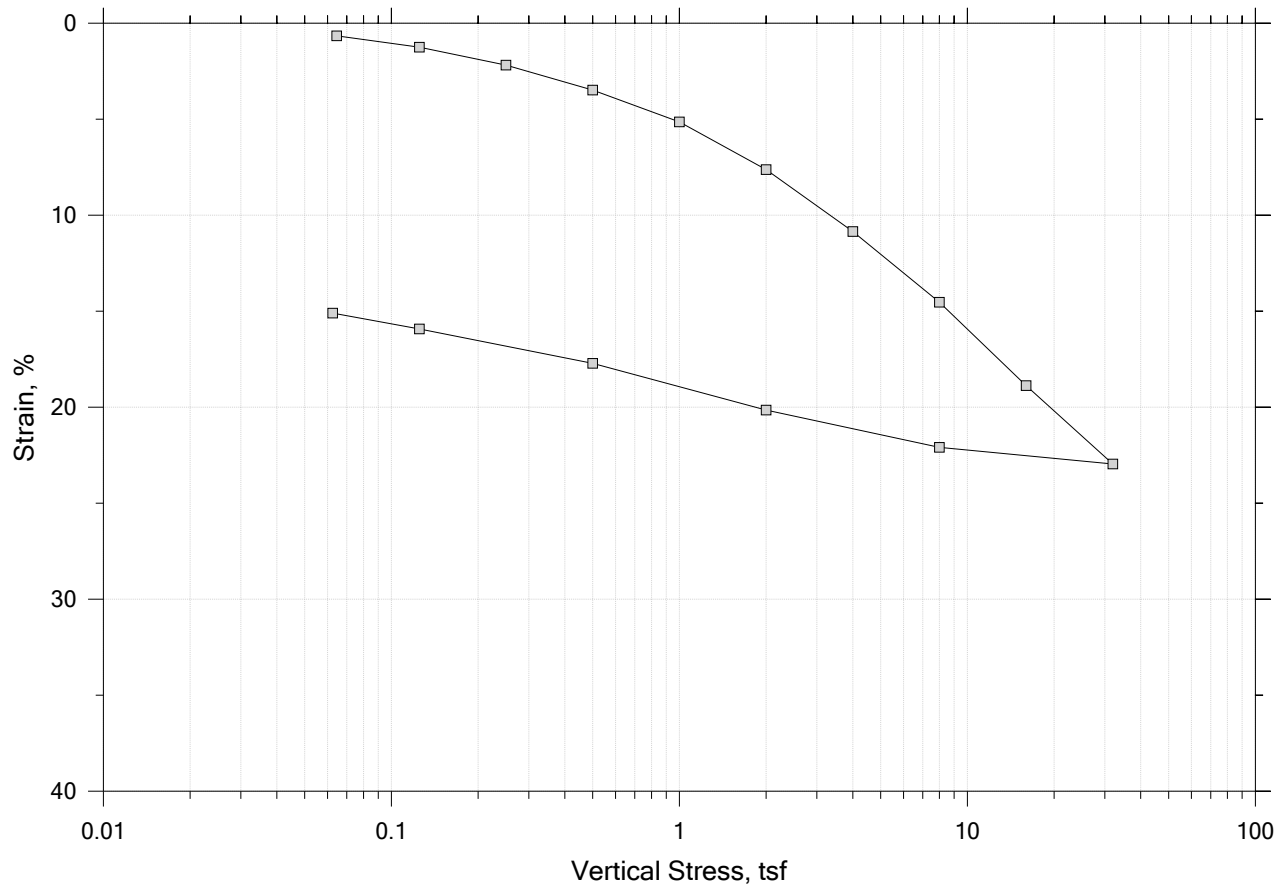
**Tube Handling with
 Moisture Content (ASTM D2216), Density of Soil (ASTM D7263),
 Hand-Held Torvane, & Visual Description**

Boring ID	Sample ID	Depth, ft	Section	Visual Description	Bulk Density, lb/ft ³	Moisture Content, %	Dry Density, lb/ft ³	Hand Held Torvane Readings, tsf			
								1	2	3	Average
B-3	---	25-27	Top	Moist,brown clay with sand	110.7	41.6	78.2	0.40	0.35	0.30	0.35
			Middle	Moist,brown clay with sand	120.3	29.6	92.8	0.32	0.35	0.35	0.34
			Bottom	Moist,brown clay with sand	120.6	26.9	95.0	0.90	1.13	0.60	0.88
B-4	---	25-27	Top	Moist, brown clay	104.0	46.7	70.9	0.40	0.30	0.38	0.36
			Middle	Moist, brown clay	106.5	45.6	73.1	0.31	0.37	0.35	0.34
			Bottom	Moist, brown clay	108.4	41.8	76	0.30	0.30	0.30	0.30

Notes: Density determined on undisturbed tube samples provided to GeoTesting Express in Shelby tubes
 Moisture content determined by ASTM D2216 at 110° C

One-Dimensional Consolidation by ASTM D2435 - Method B

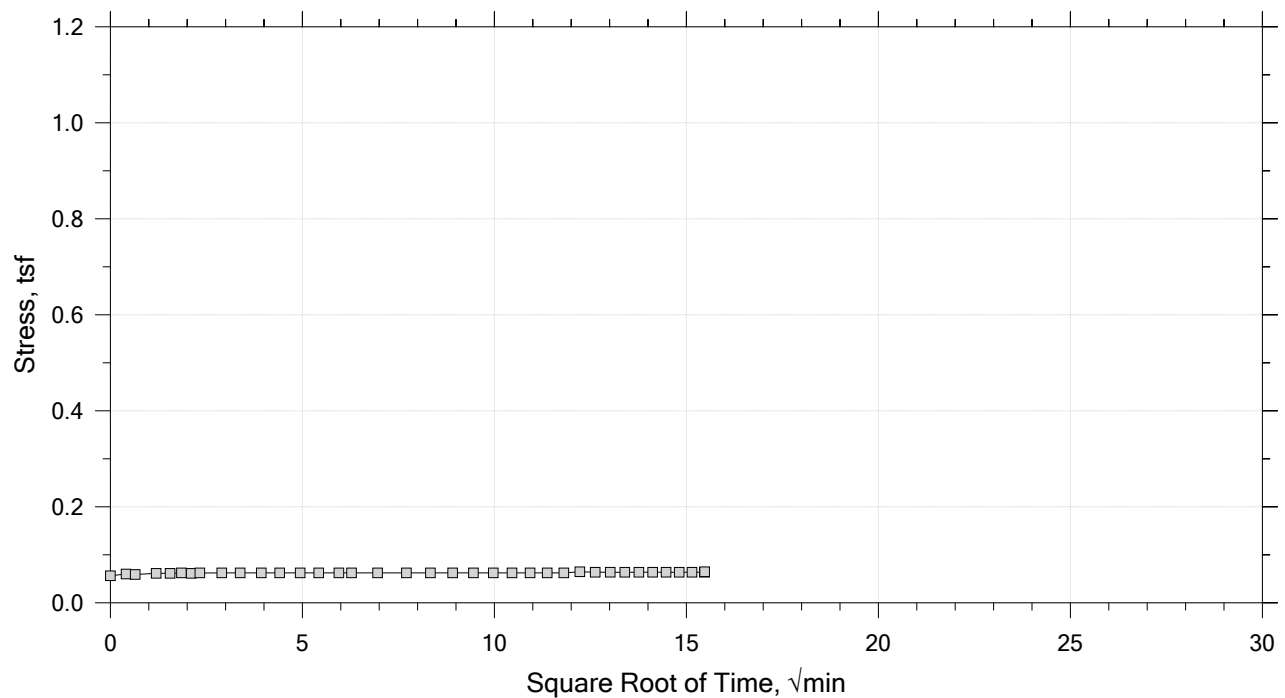
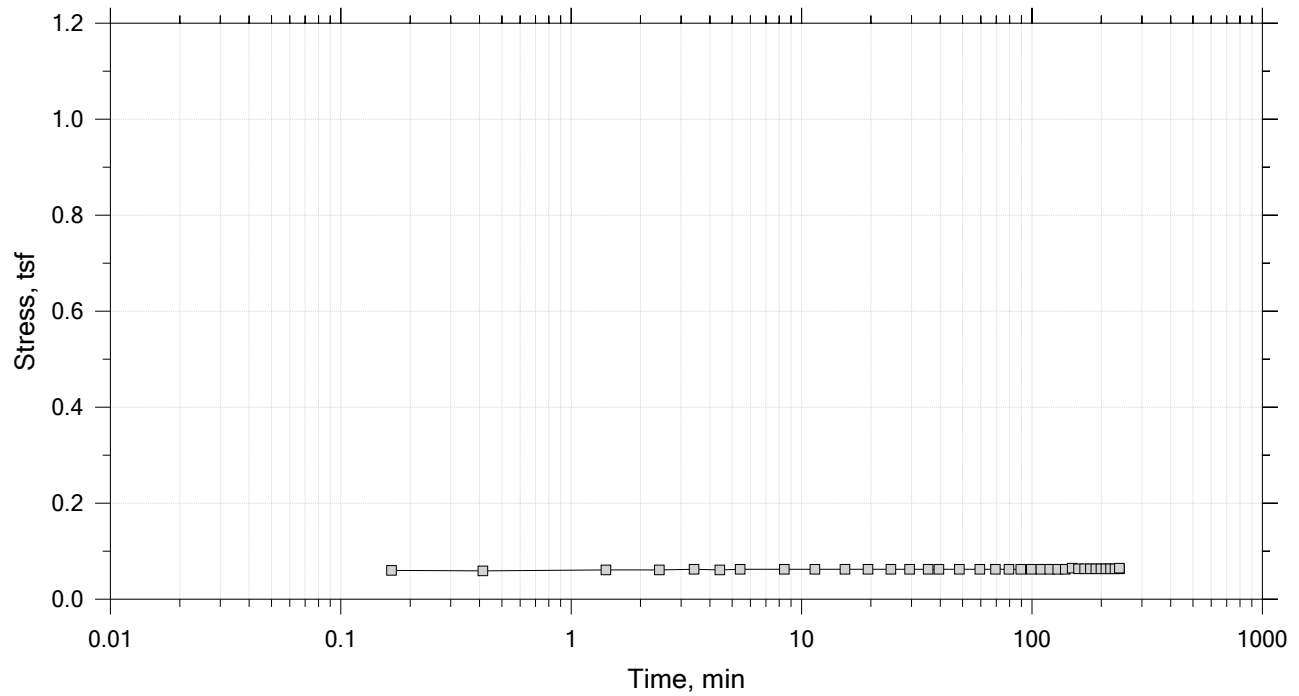
Summary Report



	Project: Howard Center	Location: Burlington, VT	Project No.: GTX-316555
	Boring No.: ---	Tested By: md	Checked By: anm
	Sample No.: B-3	Test Date: 12/28/22	Depth: 25-27 ft
	Test No.: IP-1	Sample Type: intact	Elevation: ---
	Description: Moist, brown clay with sand		
	Remarks: System LTIII-H, Swell Pressure = 0.0646 tsf		
	Displacement at End of Increment		

One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 1 of 15
Constant Volume Step
Stress: 0.0646 tsf



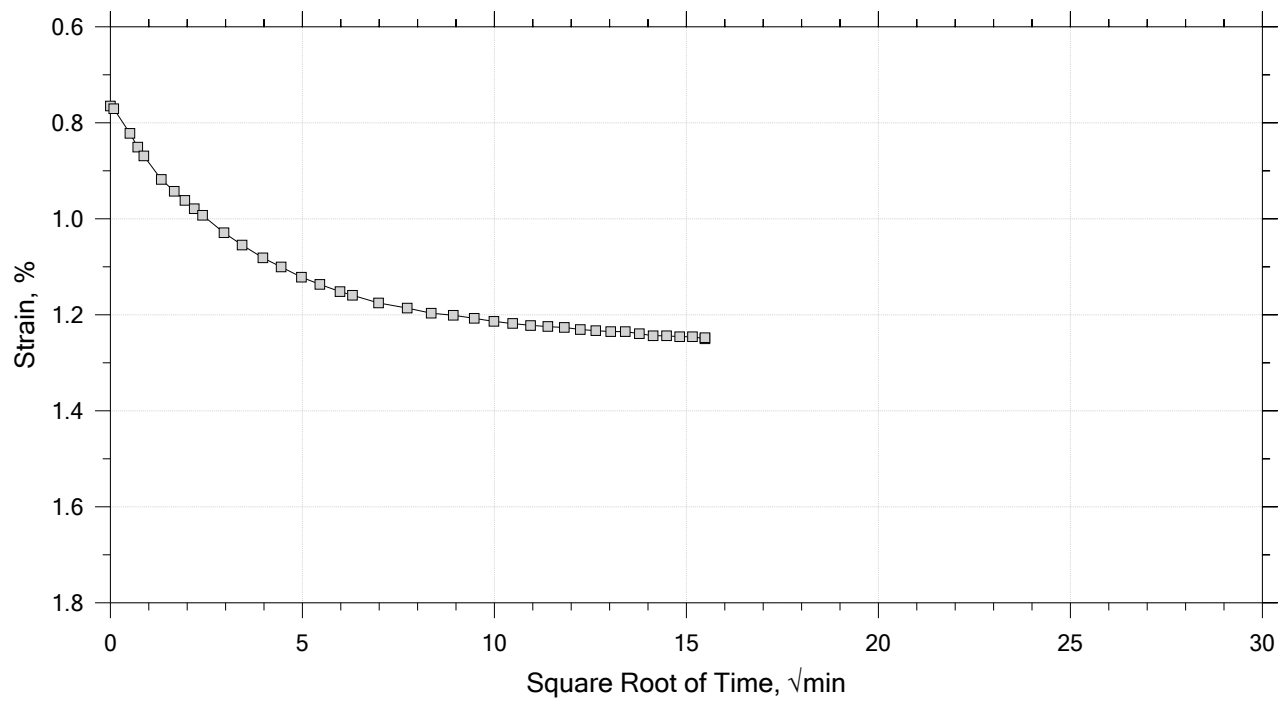
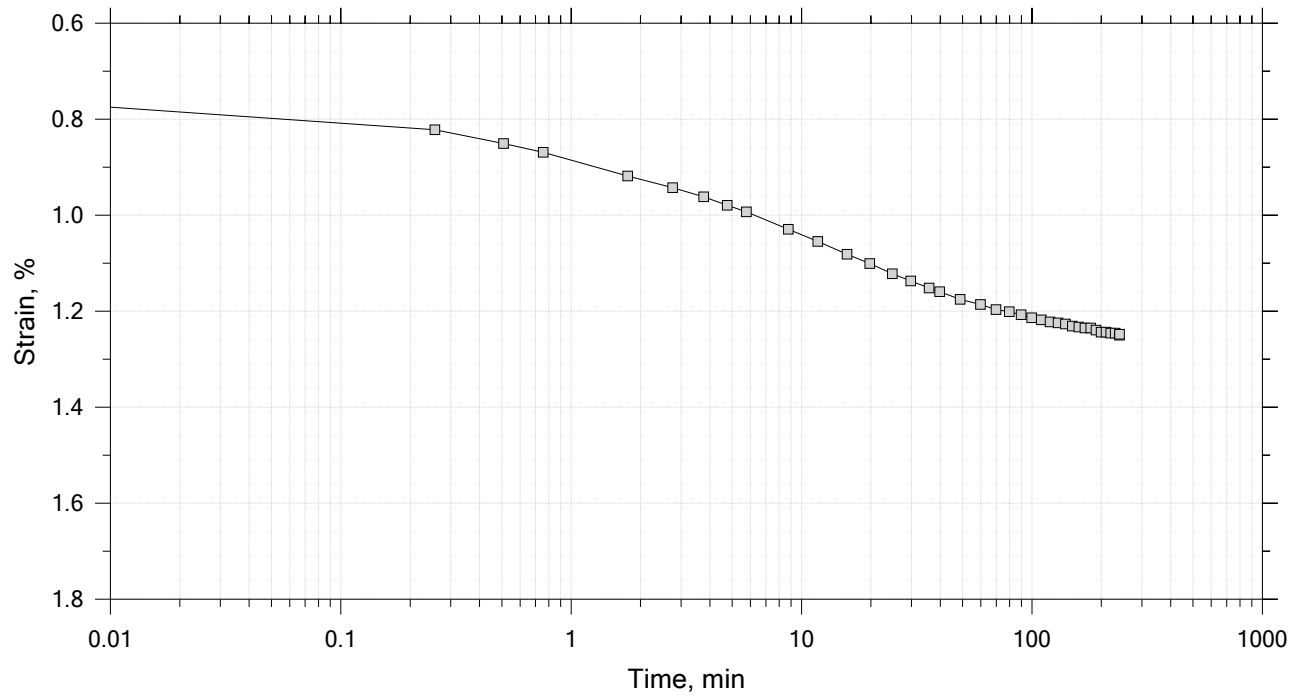
	Project: Howard Center	Location: Burlington, VT	Project No.: GTX-316555
	Boring No.: ---	Tested By: md	Checked By: anm
	Sample No.: B-3	Test Date: 12/28/22	Depth: 25-27 ft
	Test No.: IP-1	Sample Type: intact	Elevation: ---
	Description: Moist, brown clay with sand		
	Remarks: System LTIII-H, Swell Pressure = 0.0646 tsf		

One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 2 of 15

Constant Load Step

Stress: 0.125 tsf



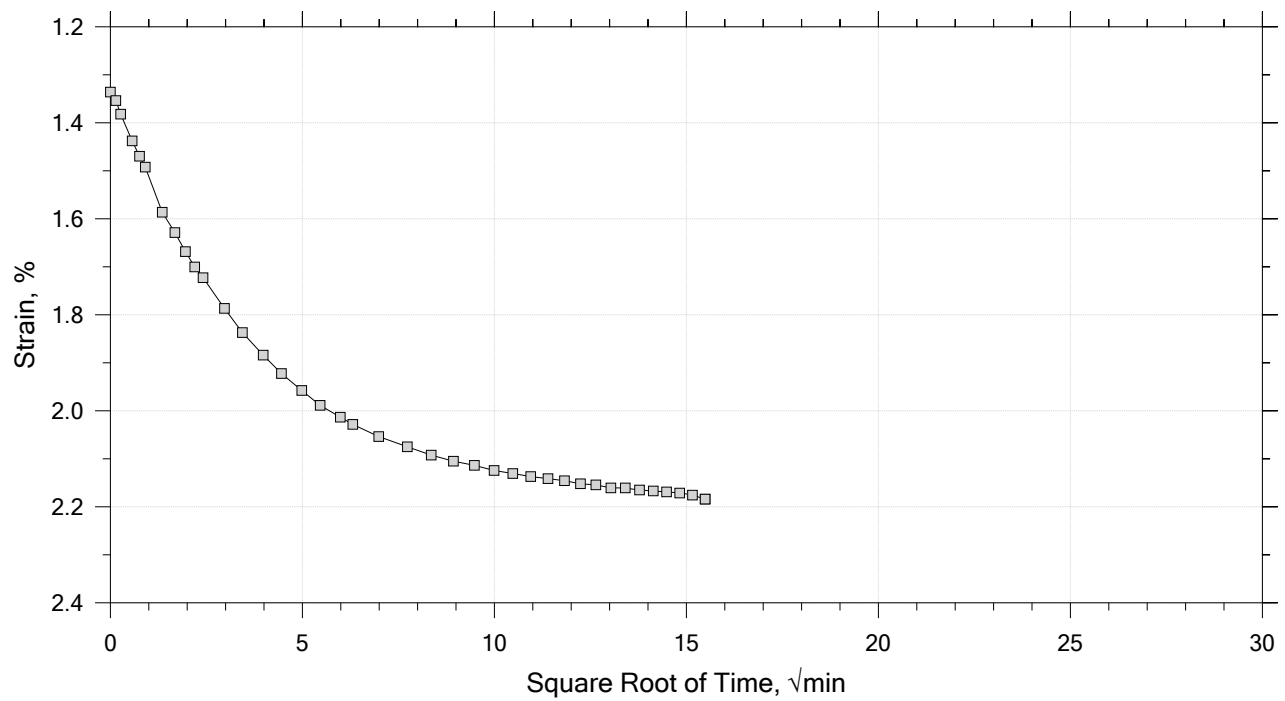
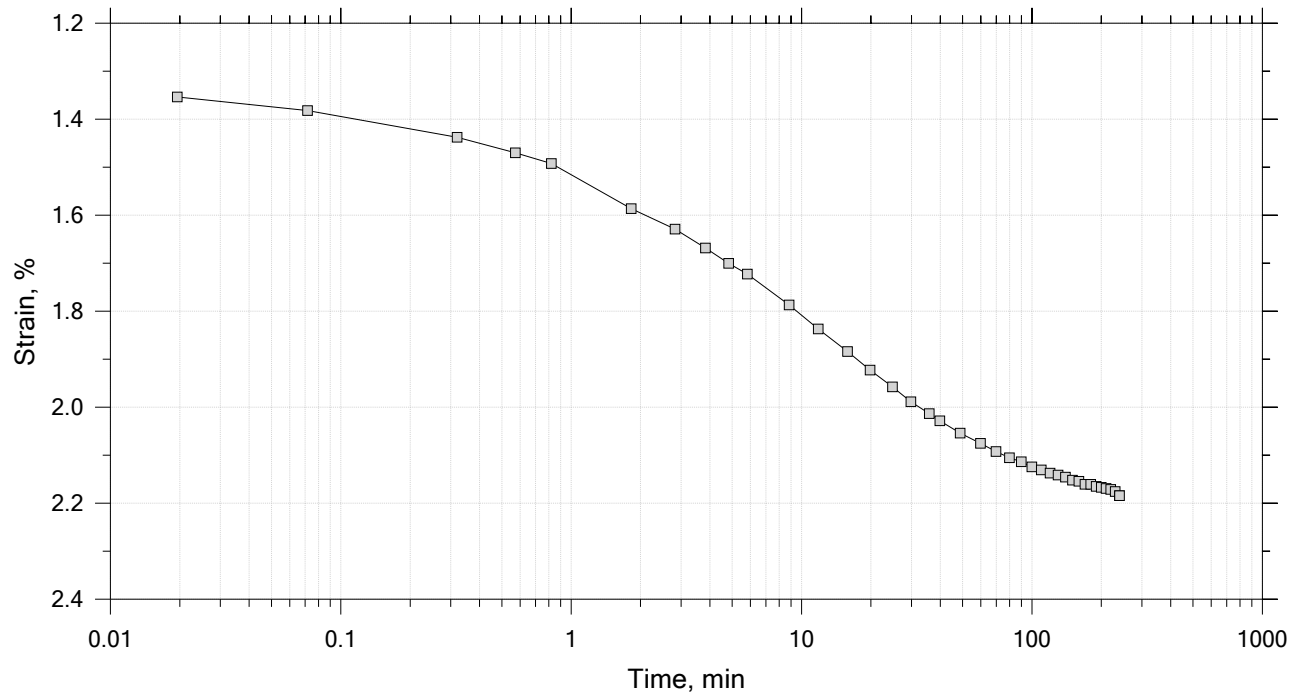
	Project: Howard Center	Location: Burlington, VT	Project No.: GTX-316555
	Boring No.: ---	Tested By: md	Checked By: anm
	Sample No.: B-3	Test Date: 12/28/22	Depth: 25-27 ft
	Test No.: IP-1	Sample Type: intact	Elevation: ---
	Description: Moist, brown clay with sand		
	Remarks: System LTIII-H, Swell Pressure = 0.0646 tsf		

One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 3 of 15

Constant Load Step

Stress: 0.25 tsf



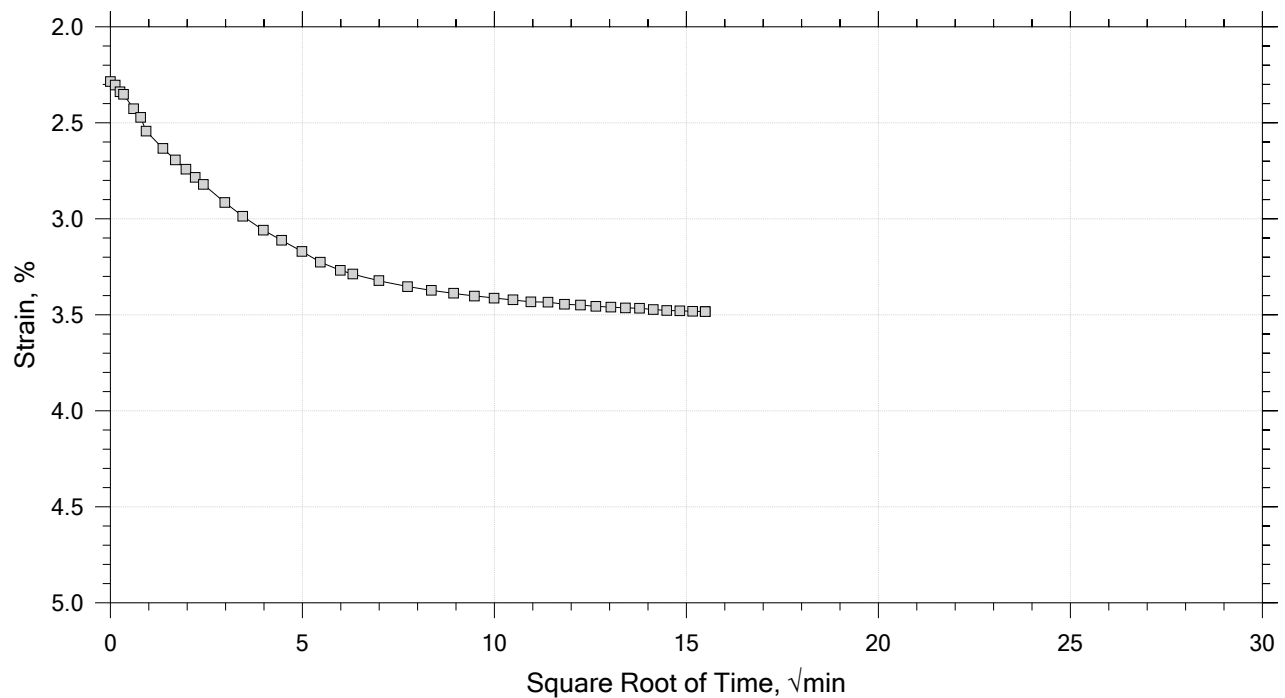
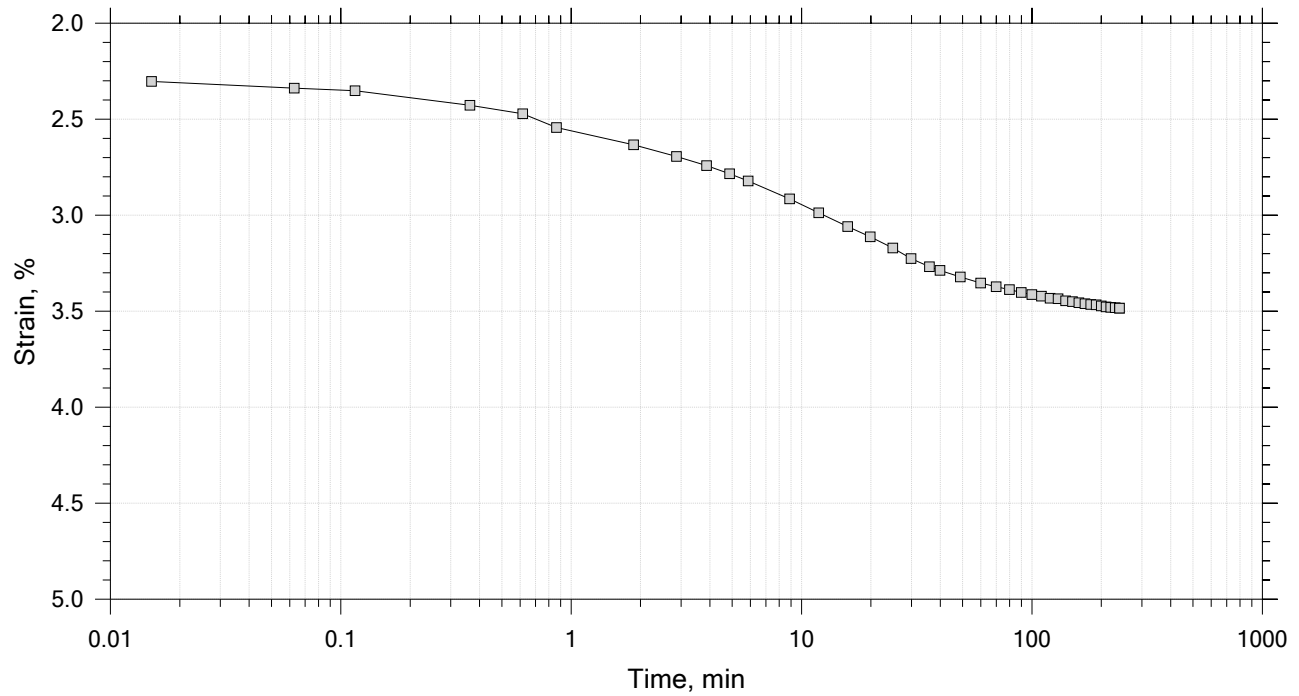
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	Boring No.: ---	Tested By: md	Checked By: anm
	Sample No.: B-3	Test Date: 12/28/22	Depth: 25-27 ft
	Test No.: IP-1	Sample Type: intact	Elevation: ---
	Description: Moist, brown clay with sand		
	Remarks: System LTIII-H, Swell Pressure = 0.0646 tsf		

One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 4 of 15

Constant Load Step

Stress: 0.5 tsf



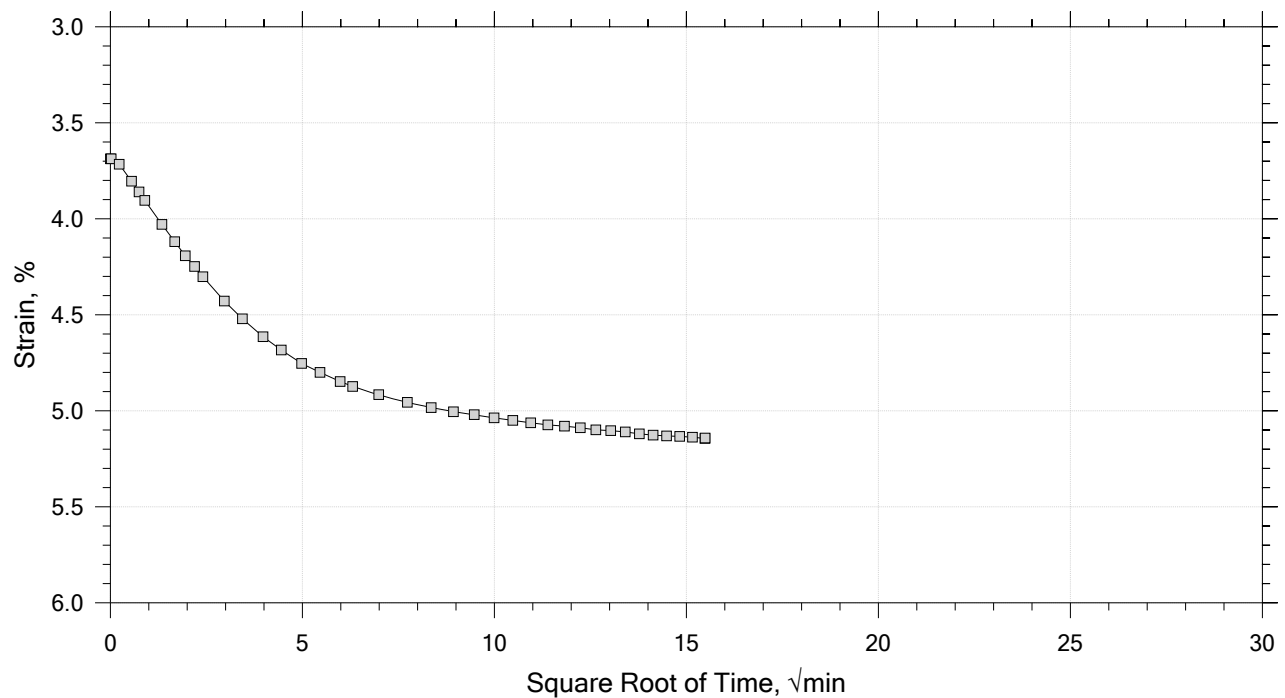
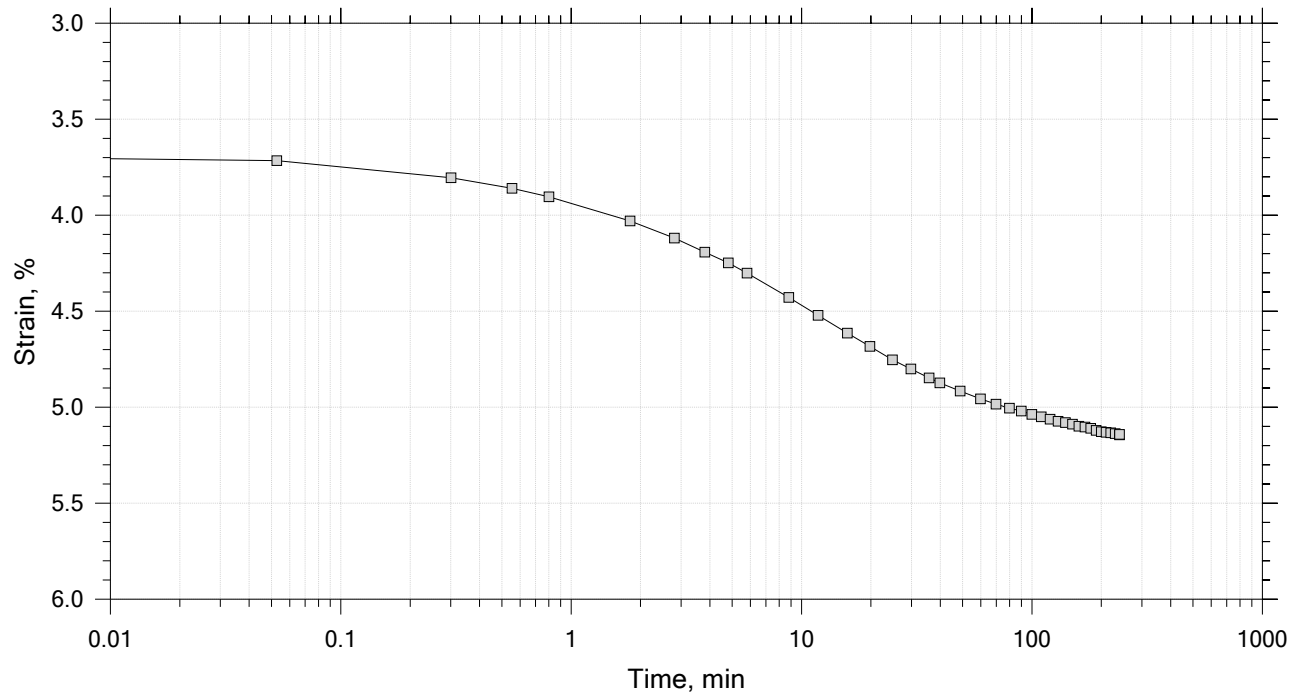
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	Boring No.: ---	Tested By: md	Checked By: anm
	Sample No.: B-3	Test Date: 12/28/22	Depth: 25-27 ft
	Test No.: IP-1	Sample Type: intact	Elevation: ---
	Description: Moist, brown clay with sand		
	Remarks: System LTIII-H, Swell Pressure = 0.0646 tsf		

One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 5 of 15

Constant Load Step

Stress: 1 tsf



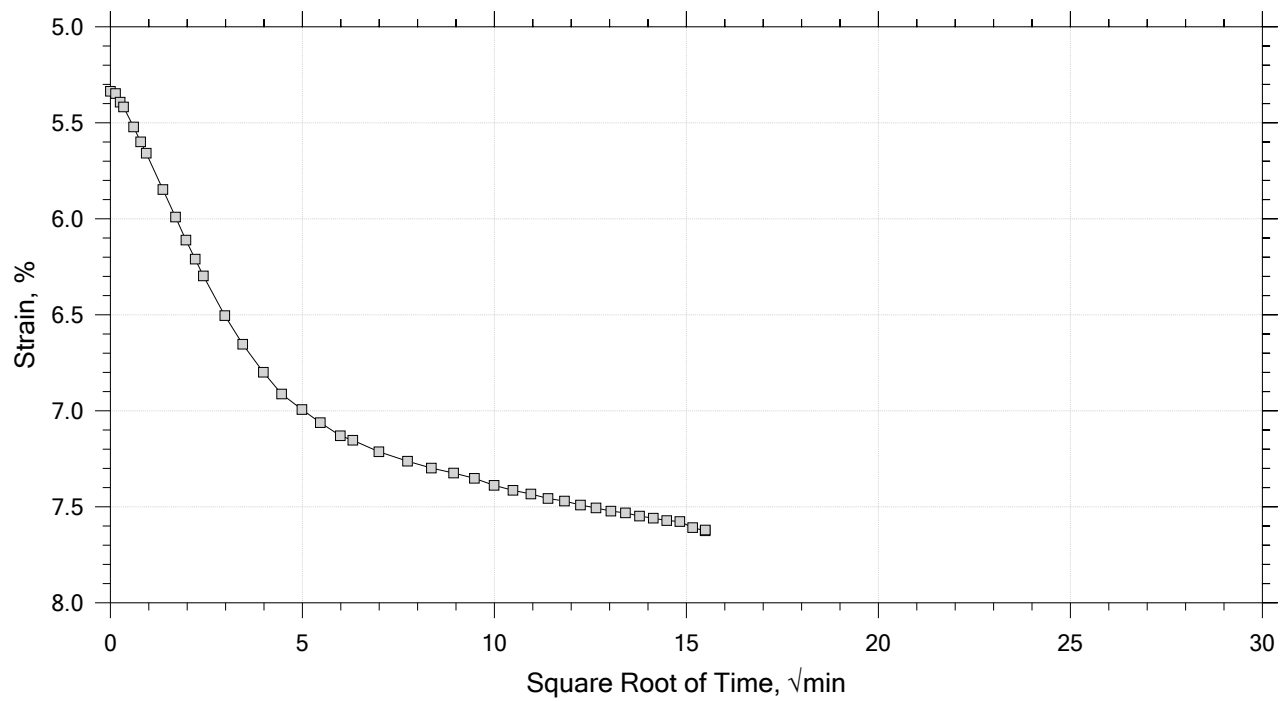
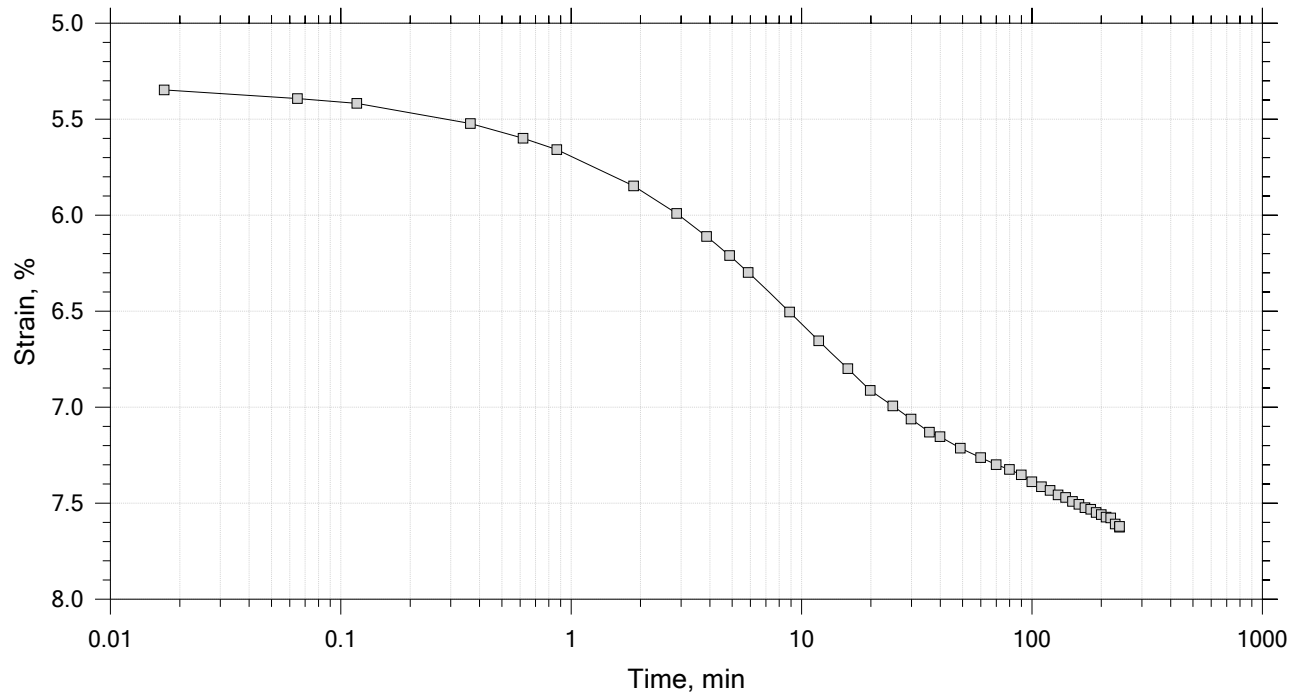
	Project: Howard Center	Location: Burlington, VT	Project No.: GTX-316555
	Boring No.: ---	Tested By: md	Checked By: anm
	Sample No.: B-3	Test Date: 12/28/22	Depth: 25-27 ft
	Test No.: IP-1	Sample Type: intact	Elevation: ---
	Description: Moist, brown clay with sand		
	Remarks: System LTIII-H, Swell Pressure = 0.0646 tsf		

One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 6 of 15

Constant Load Step

Stress: 2 tsf



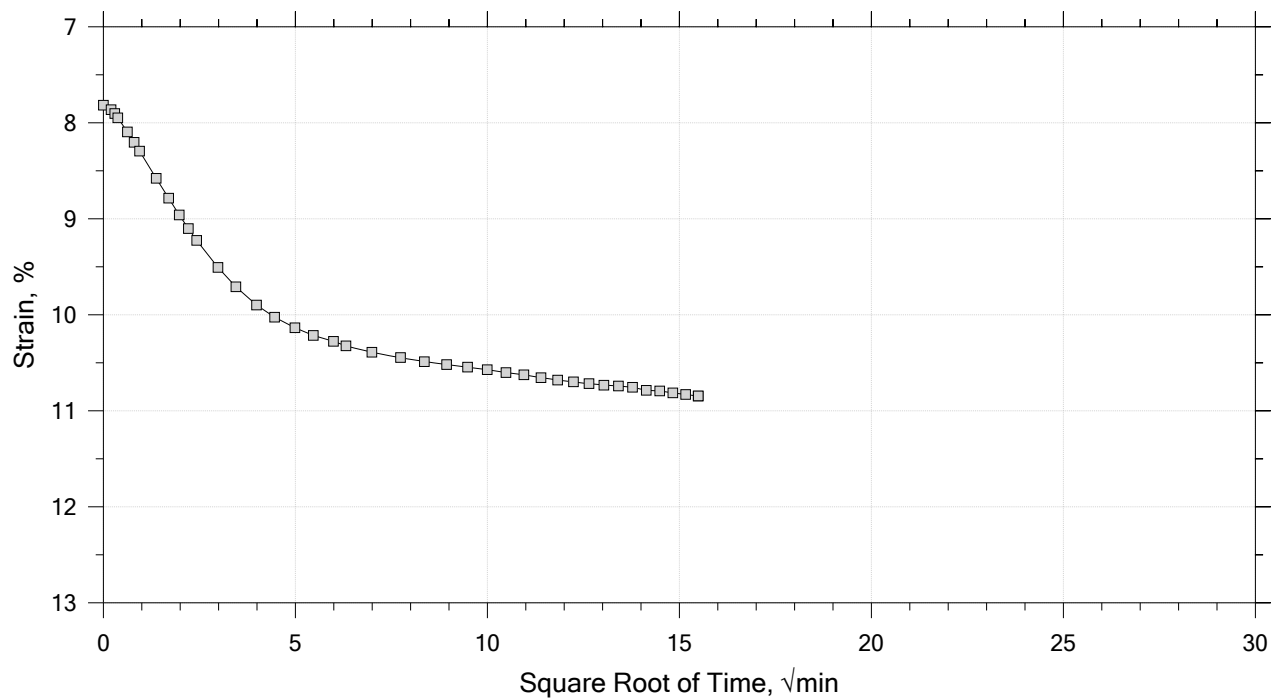
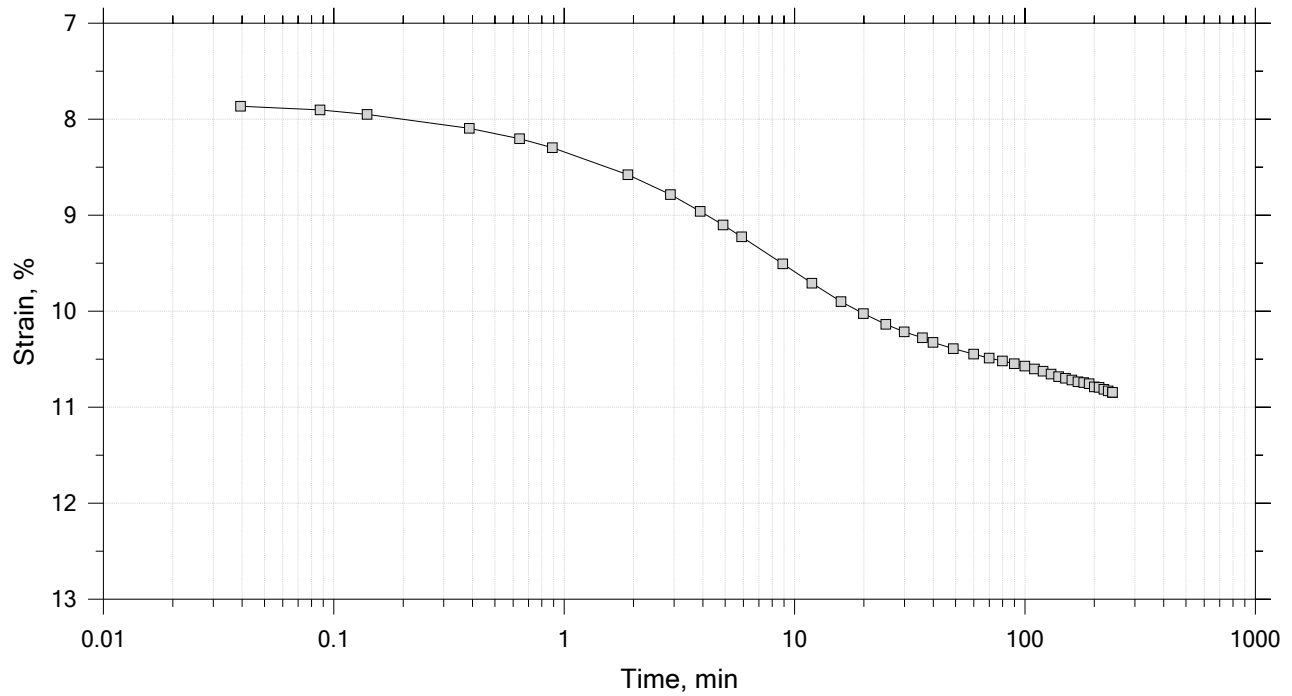
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	Boring No.: ---	Tested By: md	Checked By: anm
	Sample No.: B-3	Test Date: 12/28/22	Depth: 25-27 ft
	Test No.: IP-1	Sample Type: intact	Elevation: ---
	Description: Moist, brown clay with sand		
	Remarks: System LTIII-H, Swell Pressure = 0.0646 tsf		

One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 7 of 15

Constant Load Step

Stress: 4 tsf



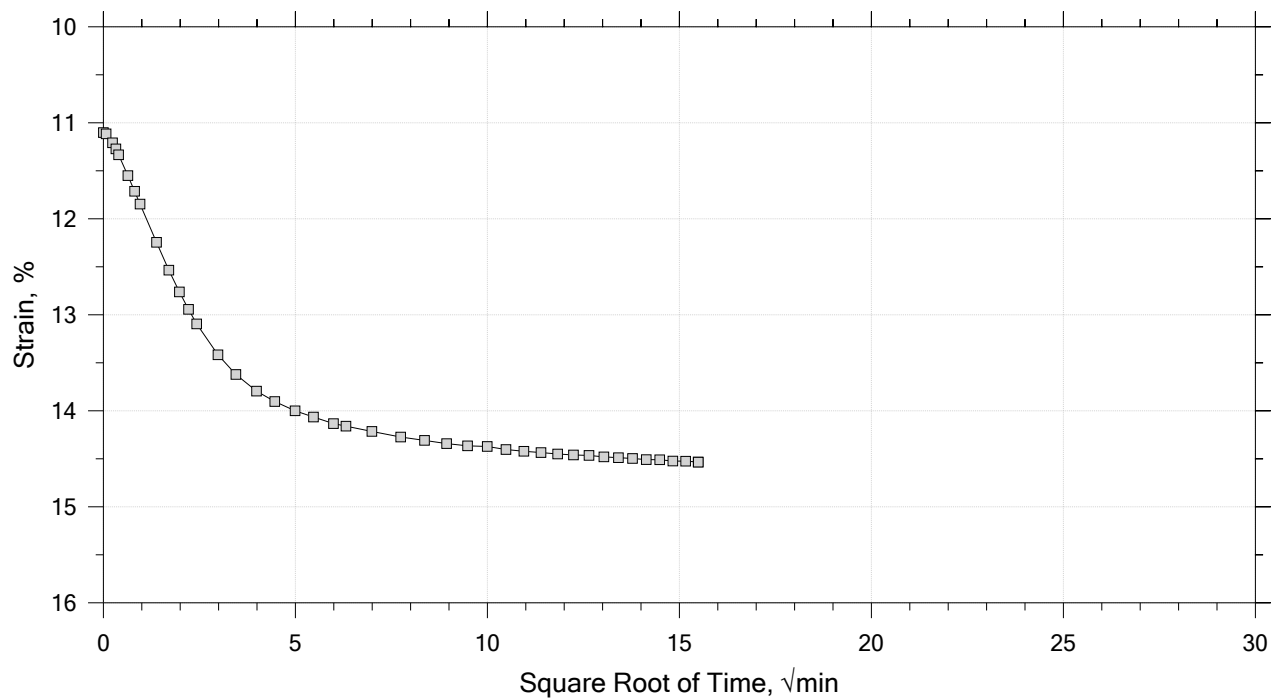
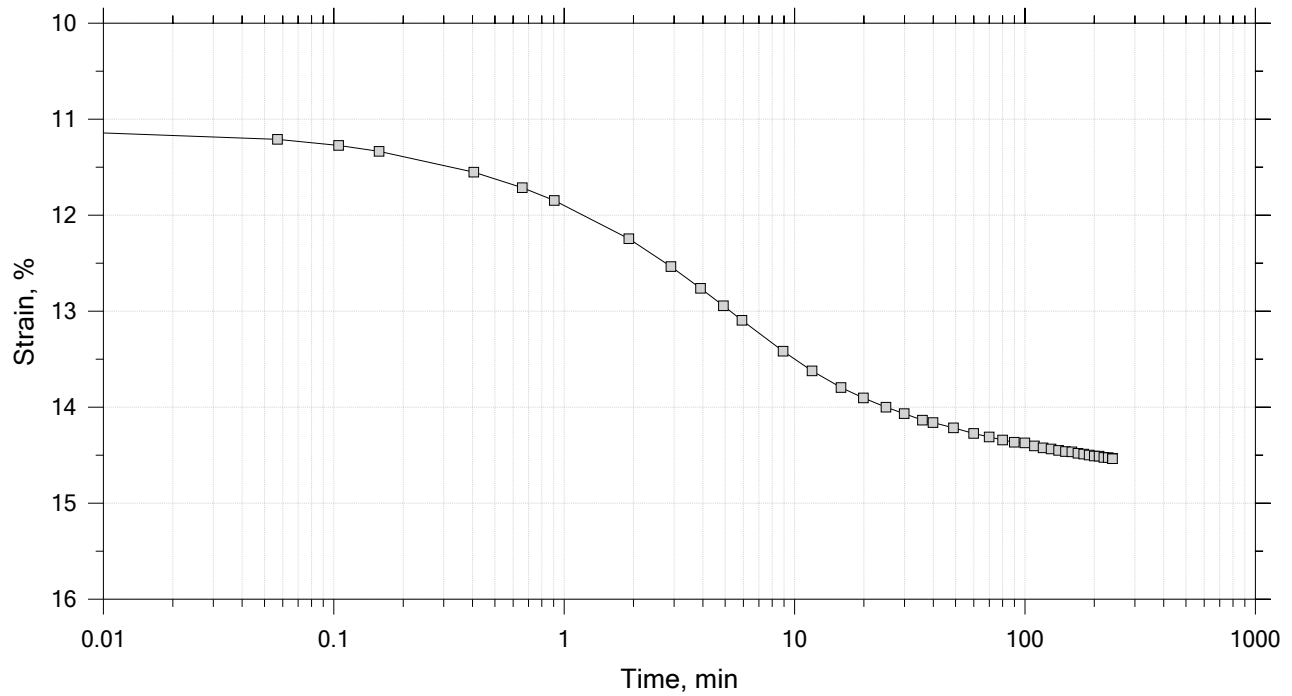
	Project: Howard Center	Location: Burlington, VT	Project No.: GTX-316555
	Boring No.: ---	Tested By: md	Checked By: anm
	Sample No.: B-3	Test Date: 12/28/22	Depth: 25-27 ft
	Test No.: IP-1	Sample Type: intact	Elevation: ---
	Description: Moist, brown clay with sand		
	Remarks: System LTIII-H, Swell Pressure = 0.0646 tsf		

One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 8 of 15

Constant Load Step

Stress: 8 tsf



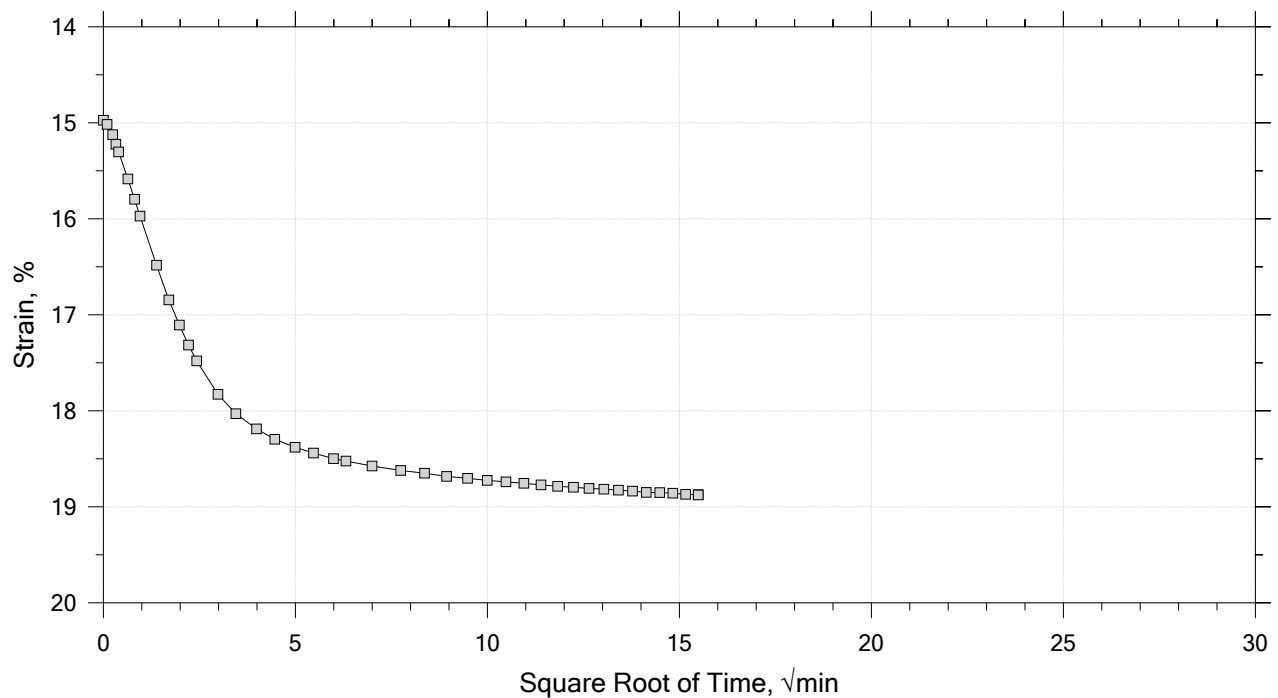
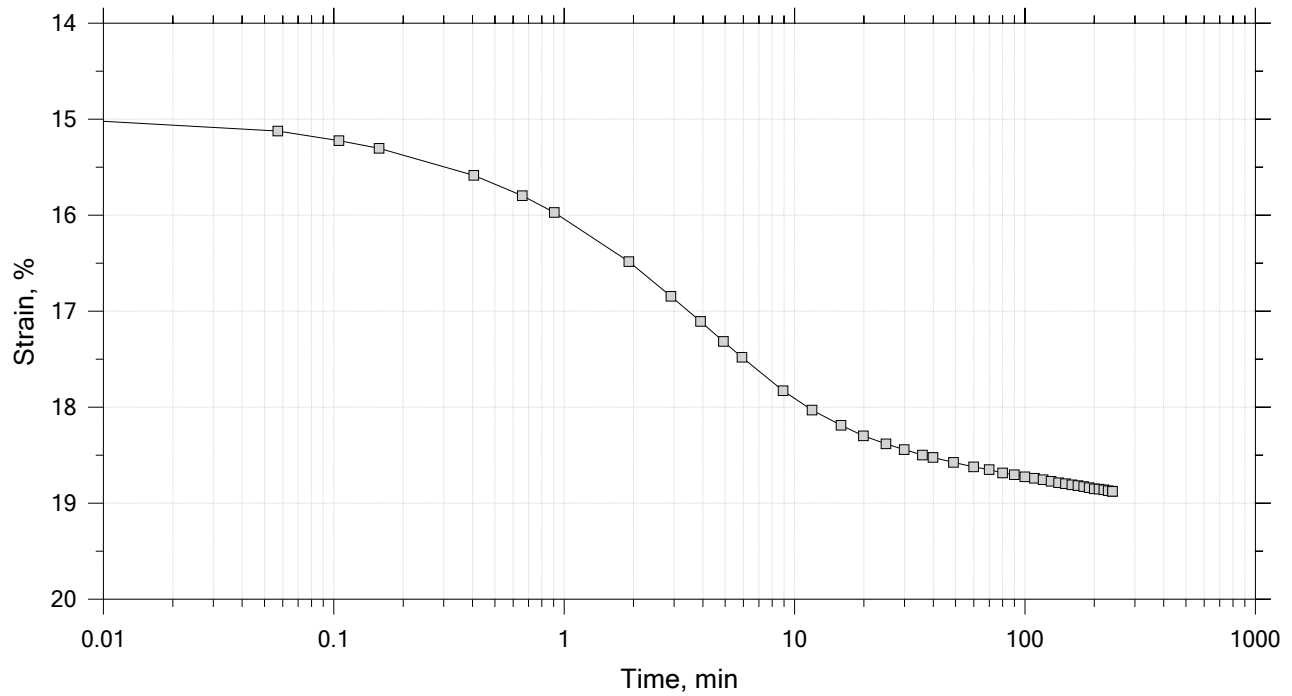
	Project: Howard Center	Location: Burlington, VT	Project No.: GTX-316555
	Boring No.: ---	Tested By: md	Checked By: anm
	Sample No.: B-3	Test Date: 12/28/22	Depth: 25-27 ft
	Test No.: IP-1	Sample Type: intact	Elevation: ---
	Description: Moist, brown clay with sand		
	Remarks: System LTIII-H, Swell Pressure = 0.0646 tsf		

One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 9 of 15

Constant Load Step

Stress: 16 tsf



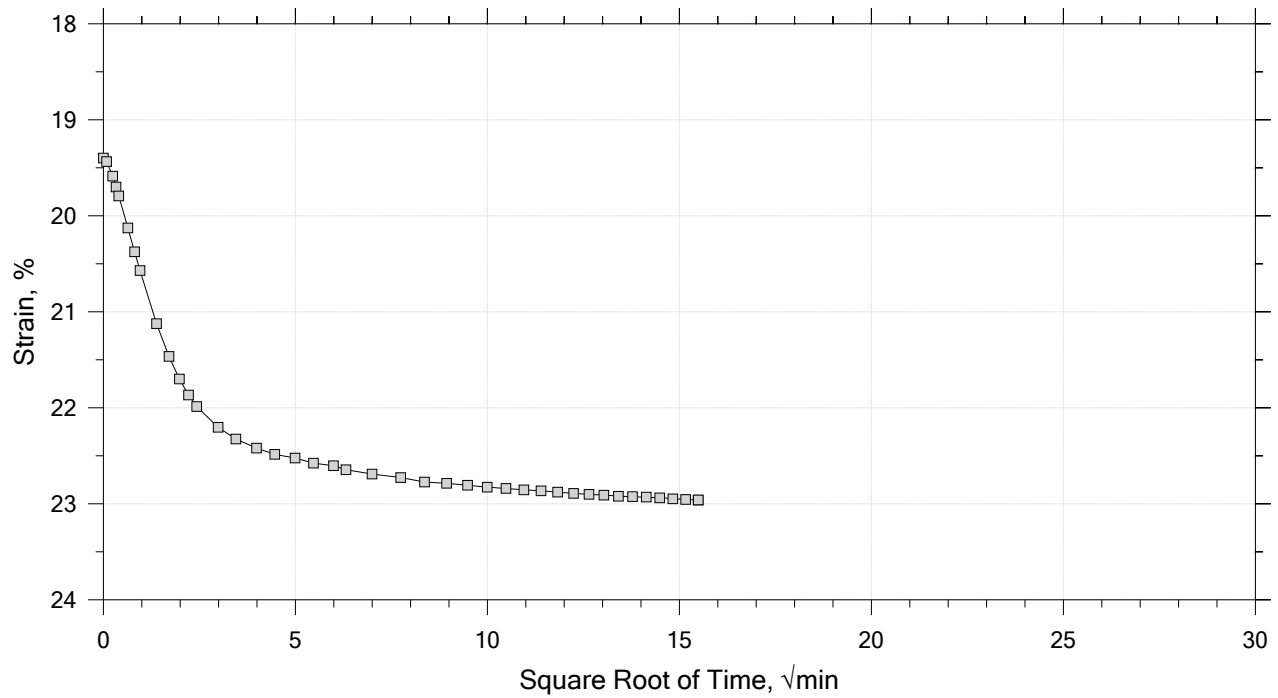
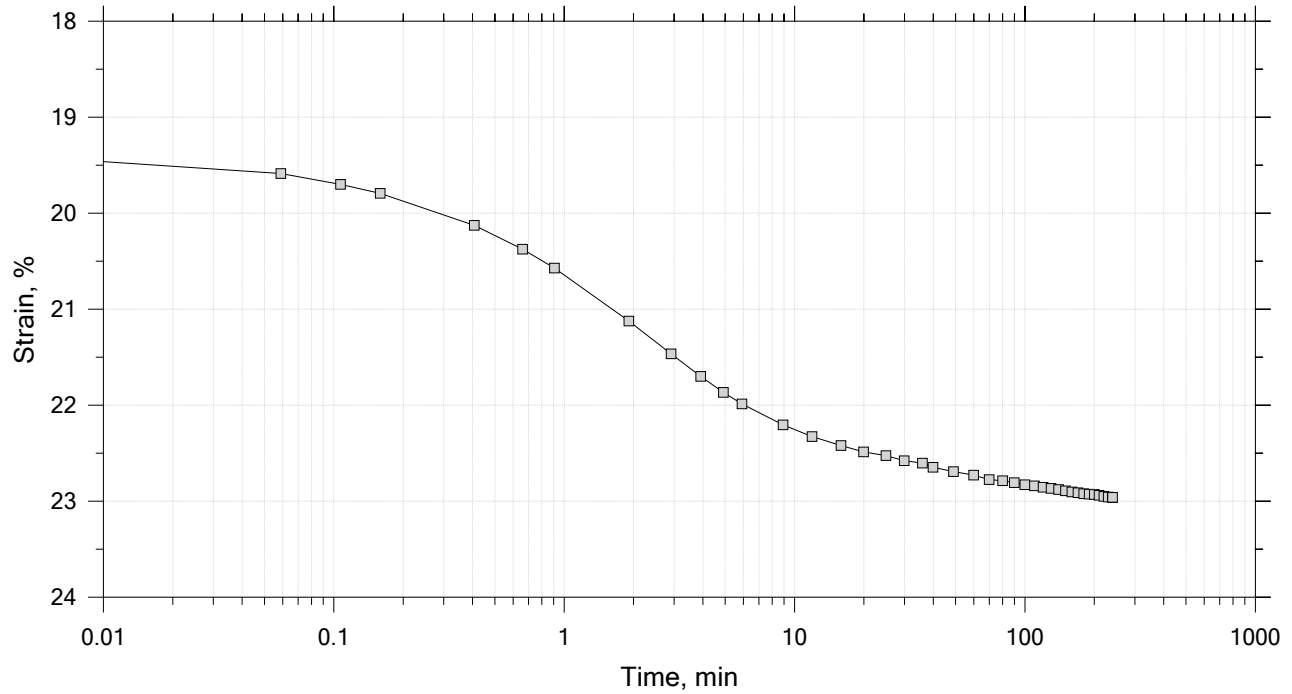
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	Boring No.: ---	Tested By: md	Checked By: anm
	Sample No.: B-3	Test Date: 12/28/22	Depth: 25-27 ft
	Test No.: IP-1	Sample Type: intact	Elevation: ---
	Description: Moist, brown clay with sand		
	Remarks: System LTIII-H, Swell Pressure = 0.0646 tsf		

One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 10 of 15

Constant Load Step

Stress: 32 tsf



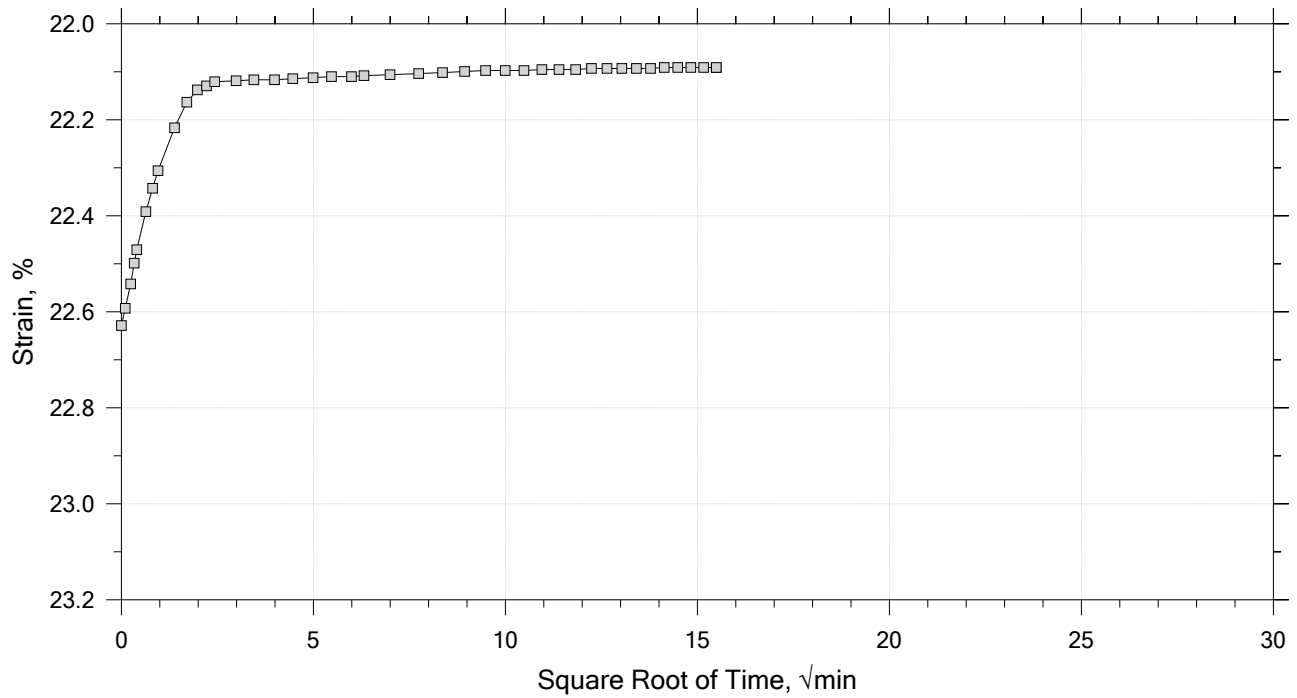
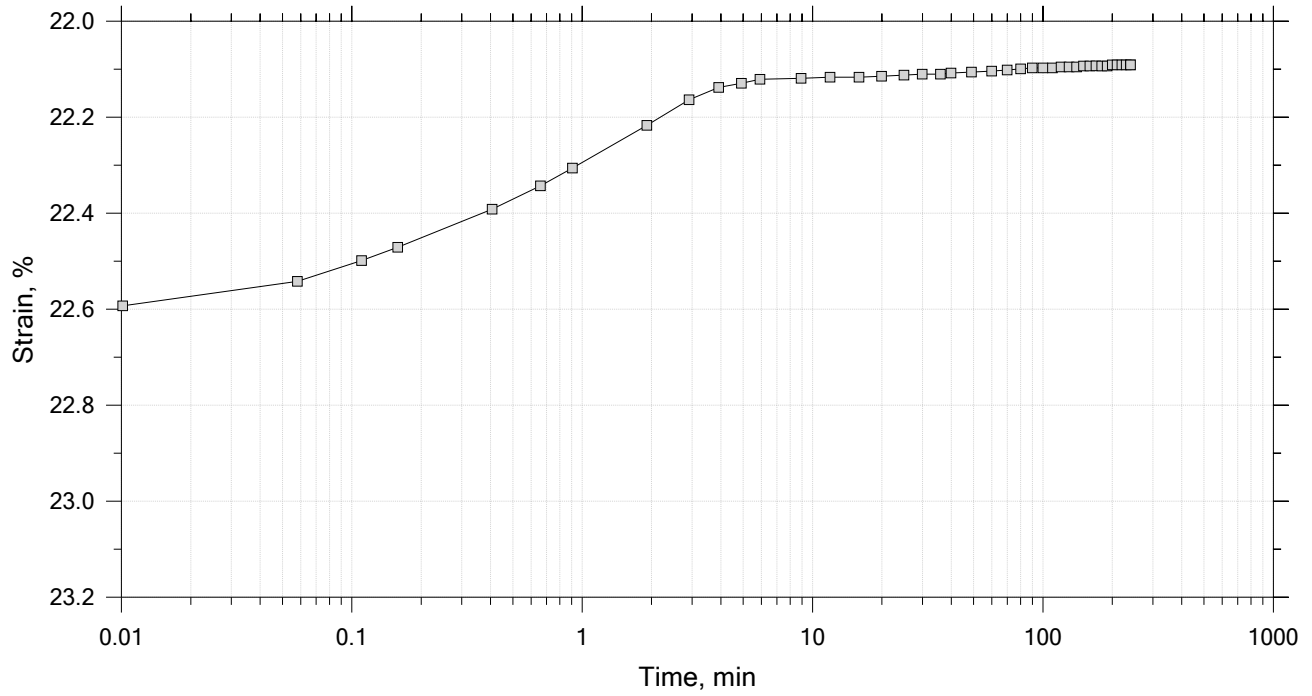
	Project: Howard Center	Location: Burlington, VT	Project No.: GTX-316555
	Boring No.: ---	Tested By: md	Checked By: anm
	Sample No.: B-3	Test Date: 12/28/22	Depth: 25-27 ft
	Test No.: IP-1	Sample Type: intact	Elevation: ---
	Description: Moist, brown clay with sand		
	Remarks: System LTIII-H, Swell Pressure = 0.0646 tsf		

One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 11 of 15

Constant Load Step

Stress: 8 tsf



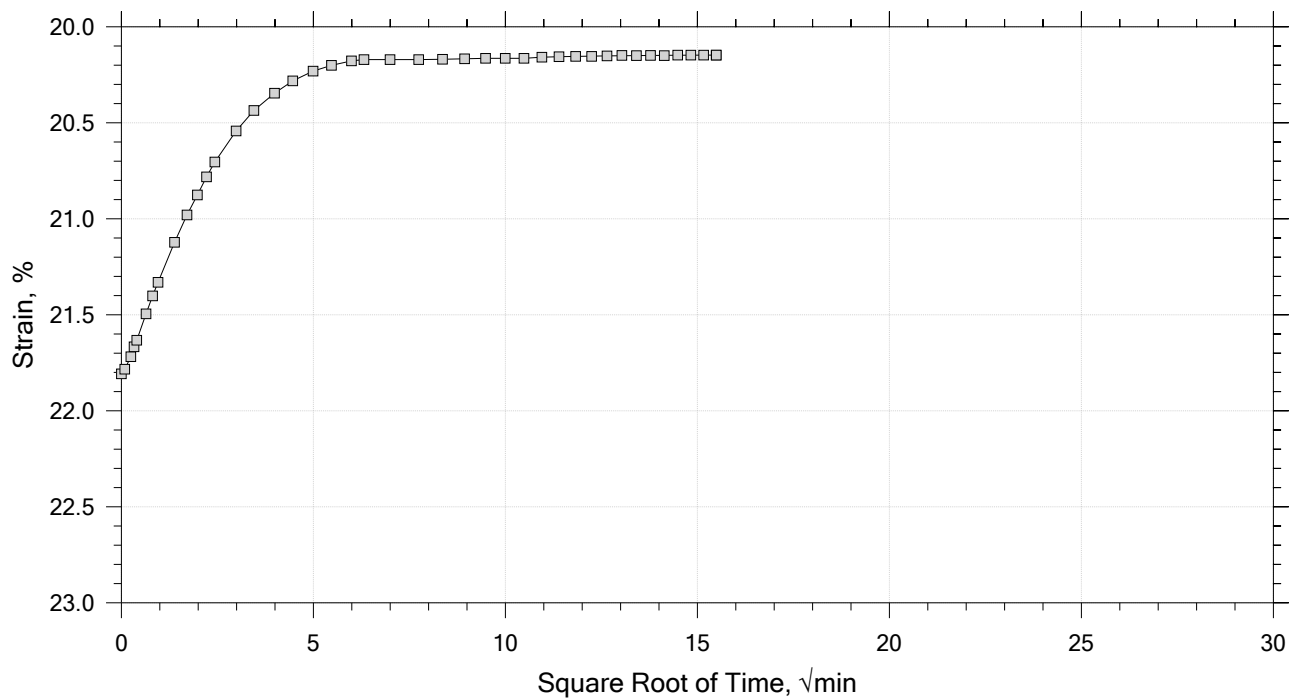
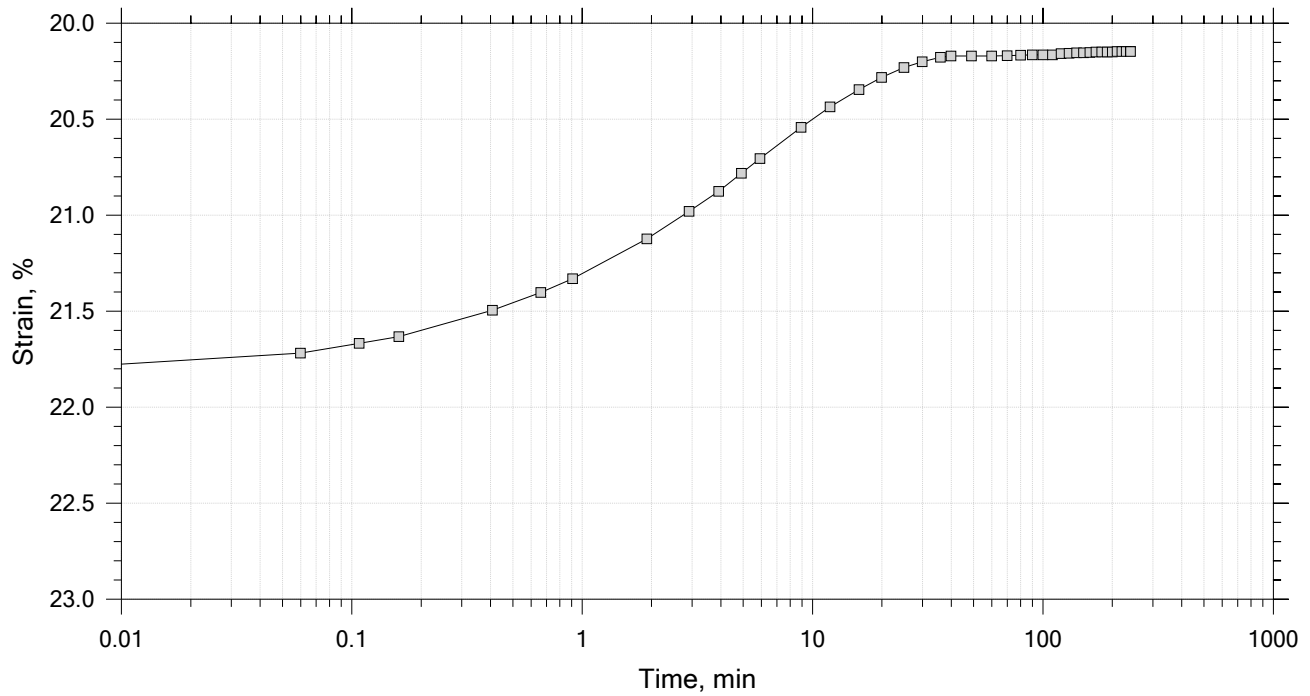
	Project: Howard Center	Location: Burlington, VT	Project No.: GTX-316555
	Boring No.: ---	Tested By: md	Checked By: anm
	Sample No.: B-3	Test Date: 12/28/22	Depth: 25-27 ft
	Test No.: IP-1	Sample Type: intact	Elevation: ---
	Description: Moist, brown clay with sand		
	Remarks: System LTIII-H, Swell Pressure = 0.0646 tsf		

One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 12 of 15

Constant Load Step

Stress: 2 tsf



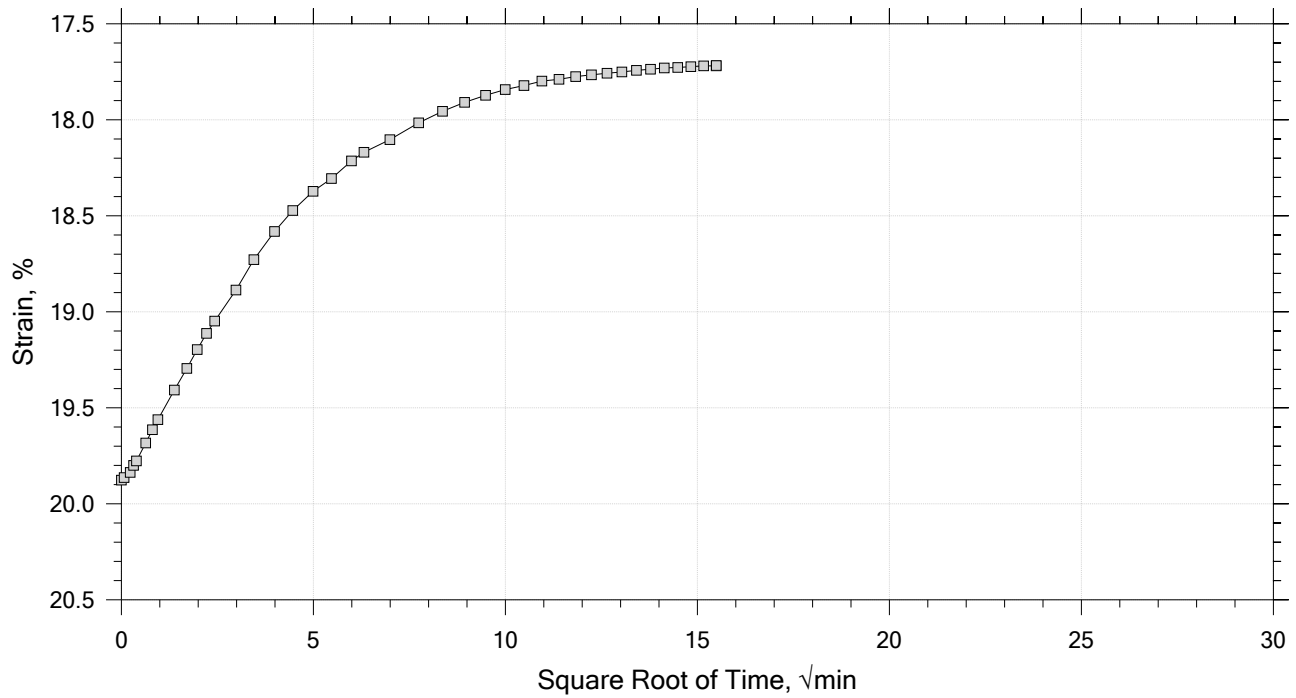
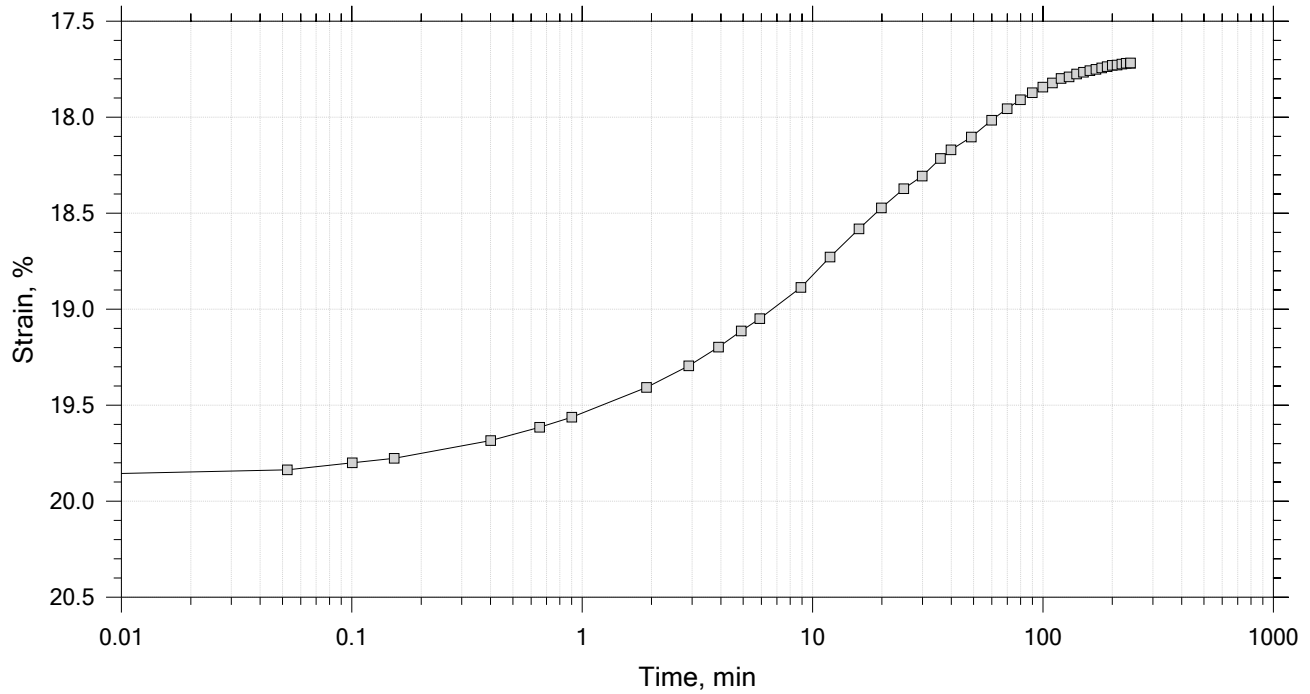
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	Boring No.: ---	Tested By: md	Checked By: anm
	Sample No.: B-3	Test Date: 12/28/22	Depth: 25-27 ft
	Test No.: IP-1	Sample Type: intact	Elevation: ---
	Description: Moist, brown clay with sand		
	Remarks: System LTIII-H, Swell Pressure = 0.0646 tsf		

One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 13 of 15

Constant Load Step

Stress: 0.5 tsf



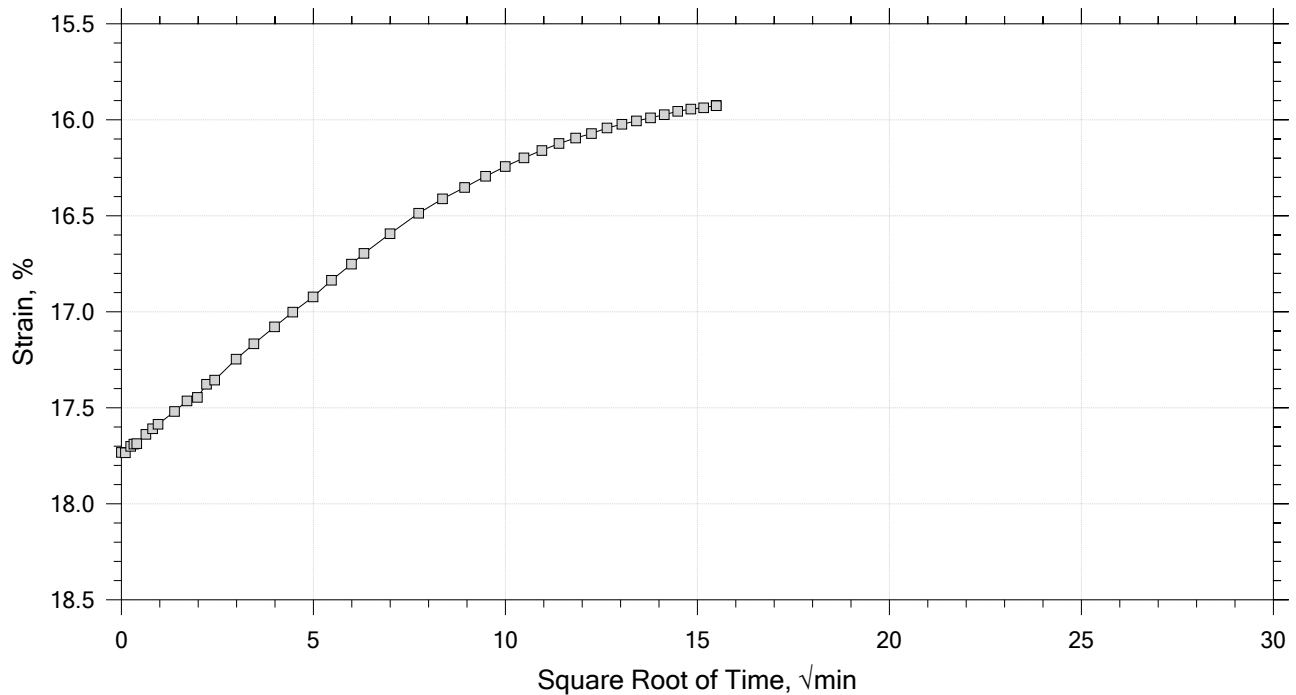
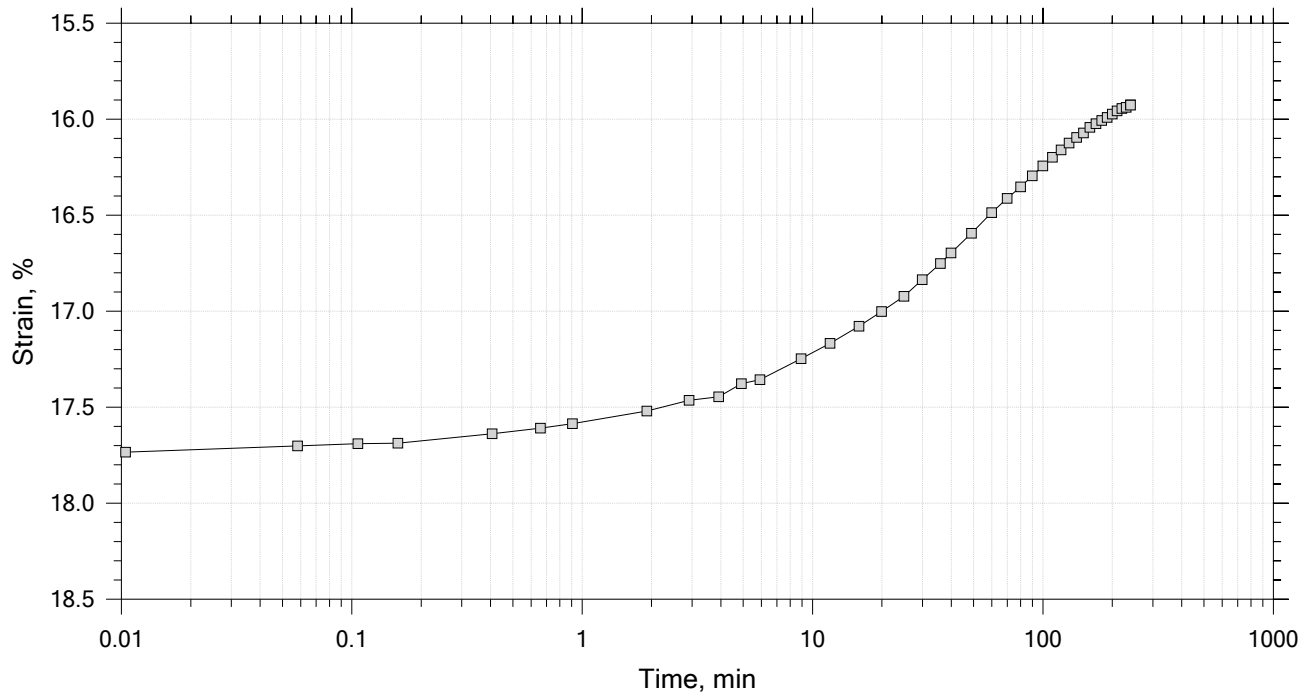
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	Boring No.: ---	Tested By: md	Checked By: anm
	Sample No.: B-3	Test Date: 12/28/22	Depth: 25-27 ft
	Test No.: IP-1	Sample Type: intact	Elevation: ---
	Description: Moist, brown clay with sand		
	Remarks: System LTIII-H, Swell Pressure = 0.0646 tsf		

One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 14 of 15

Constant Load Step

Stress: 0.125 tsf



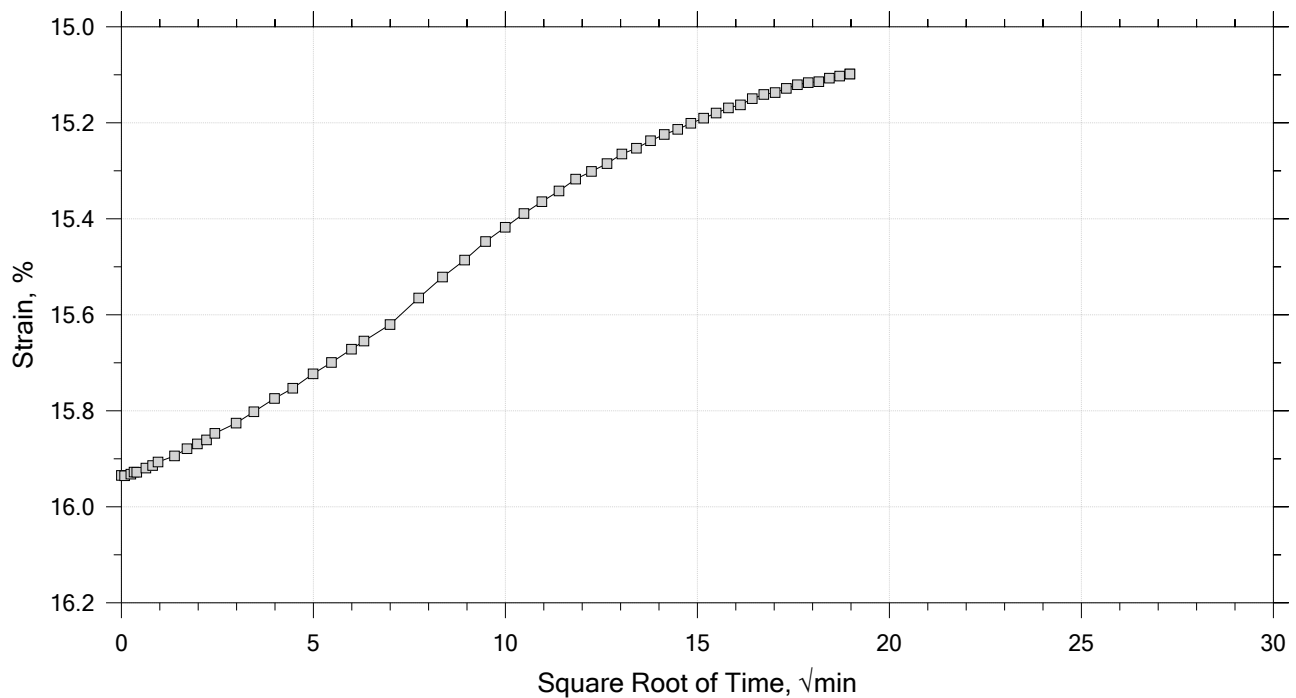
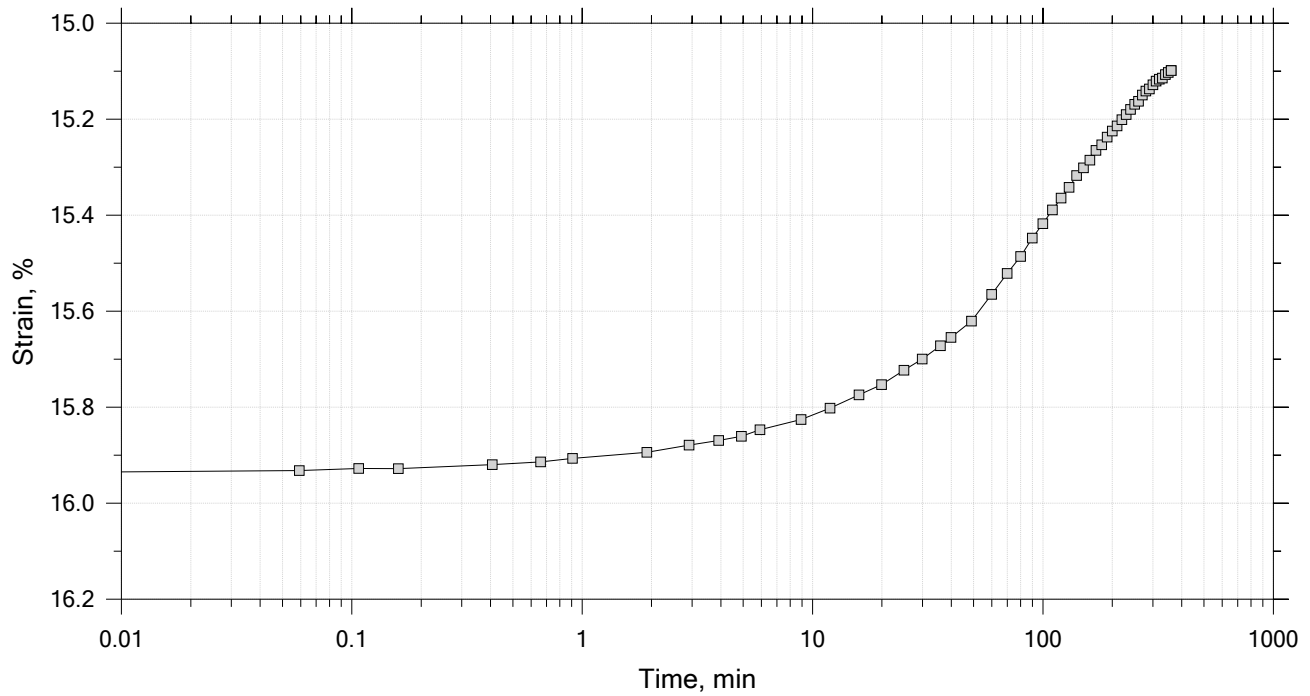
	Project: Howard Center	Location: Burlington, VT	Project No.: GTX-316555
	Boring No.: ---	Tested By: md	Checked By: anm
	Sample No.: B-3	Test Date: 12/28/22	Depth: 25-27 ft
	Test No.: IP-1	Sample Type: intact	Elevation: ---
	Description: Moist, brown clay with sand		
	Remarks: System LTIII-H, Swell Pressure = 0.0646 tsf		

One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 15 of 15

Constant Load Step

Stress: 0.0625 tsf



	Project: Howard Center	Location: Burlington, VT	Project No.: GTX-316555
	Boring No.: ---	Tested By: md	Checked By: anm
	Sample No.: B-3	Test Date: 12/28/22	Depth: 25-27 ft
	Test No.: IP-1	Sample Type: intact	Elevation: ---
	Description: Moist, brown clay with sand		
	Remarks: System LTIII-H, Swell Pressure = 0.0646 tsf		

One-Dimensional Consolidation by ASTM D2435 - Method B

Specimen Diameter: 2.50 in	Estimated Specific Gravity: 2.73	Liquid Limit: ---
Initial Height: 1.00 in	Initial Void Ratio: 0.783	Plastic Limit: ---
Final Height: 0.84 in	Final Void Ratio: 0.498	Plasticity Index: ---

	Before Test Trimmings	Before Test Specimen	After Test Specimen	After Test Trimmings
Container ID	E-5371	RING		E3727
Mass Container, gm	8.63	111.23	111.23	8.33
Mass Container + Wet Soil, gm	190.71	269.6	257	155.45
Mass Container + Dry Soil, gm	152.15	234.55	234.55	132.79
Mass Dry Soil, gm	143.52	123.32	123.32	124.46
Water Content, %	26.87	28.42	18.21	18.21
Void Ratio	---	0.78	0.50	---
Degree of Saturation, %	---	99.23	100.00	---
Dry Unit Weight, pcf	---	95.705	113.93	---

Note: Specific Gravity and Void Ratios are calculated assuming the degree of saturation equals 100% at the end of the test. Therefore, values may not represent actual values for the specimen.

	Project: Howard Center	Location: Burlington, VT	Project No.: GTX-316555
	Boring No.: ---	Tested By: md	Checked By: anm
	Sample No.: B-3	Test Date: 12/28/22	Depth: 25-27 ft
	Test No.: IP-1	Sample Type: intact	Elevation: ---
	Description: Moist, brown clay with sand		
	Remarks: System LTIII-H, Swell Pressure = 0.0646 tsf		

One-Dimensional Consolidation by ASTM D2435 - Method B

Square Root of Time Coefficients

[illegible]

	Project: Howard Center	Location: Burlington, VT	Project No.: GTX-316555
	Boring No.: ---	Tested By: md	Checked By: anm
	Sample No.: B-3	Test Date: 12/28/22	Depth: 25-27 ft
	Test No.: IP-1	Sample Type: intact	Elevation: ---
	Description: Moist, brown clay with sand		
	Remarks: System LTIII-H, Swell Pressure = 0.0646 tsf		
	Displacement at End of Increment		

APPENDIX G: SITE PHOTOGRAPHS

PHOTO LOG

John Turner Consulting, Inc.		Site Location: 300 Flynn Avenue, Burlington, VT	
Photo No. 1	Date: 12/12/2022	Photo No. 2	Date: 12/12/2022
 Description: B-57 Truck Mounted Drilling Rig		 Description: B-1 (10-12 Feet)	
Photo No. 3	Date: 12/12/2022	Photo No. 4	Date: 12/12/2022
 Description: B-3 (20-22 Feet)		 Description: B-4 (10-12 Feet)	

Figure 2. Locations and Drainage Areas of BMPs Considered in Developing Englesby Brook FRP

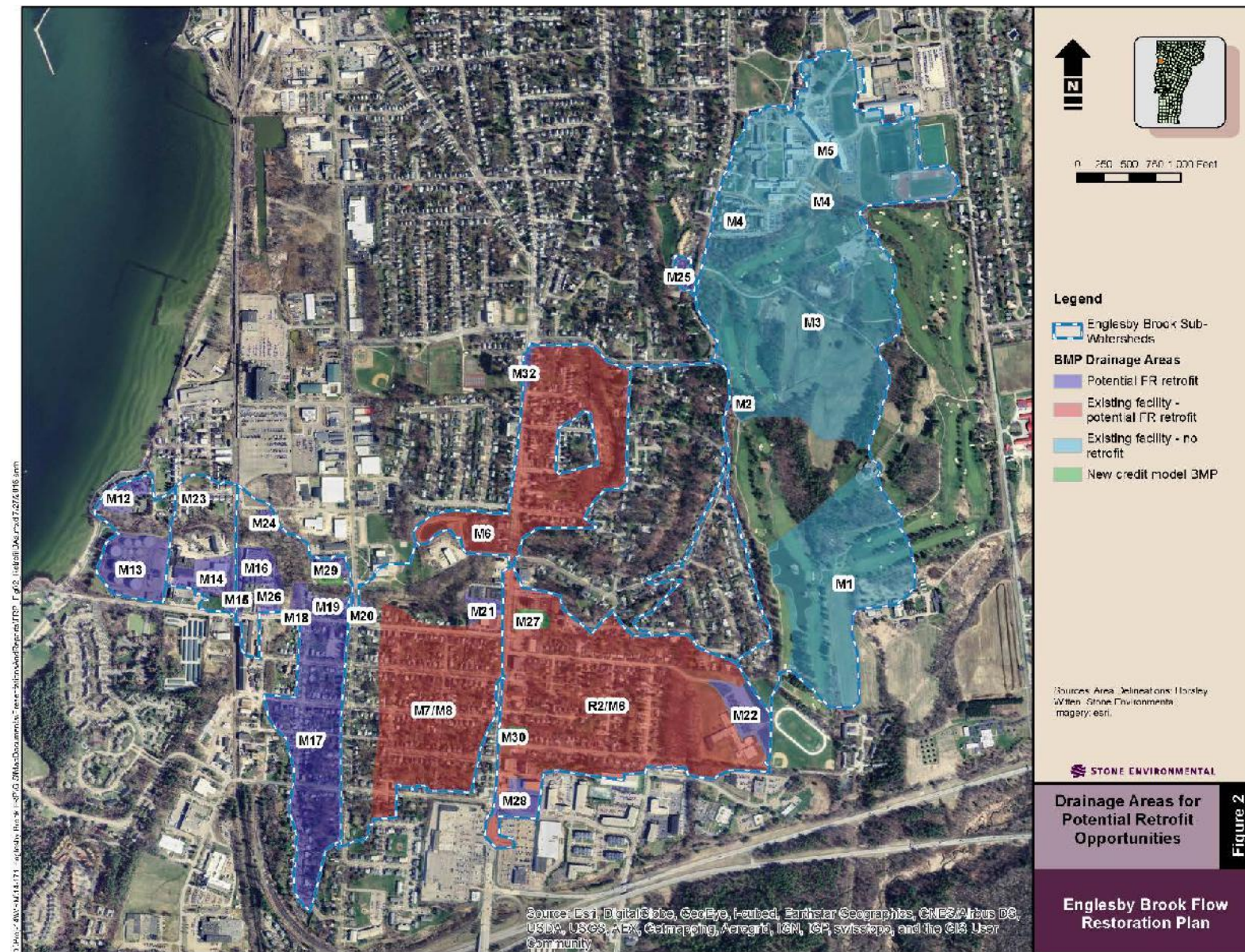


Table 7: Summary of BMPs Included in Englesby Brook Flow Restoration Scenario.

Site ID	Site Name	BMP Type	Model Scenario	DA (ac)	IA (ac)	% Difference in Q03 ¹		Detention Time ⁴ (min)
						BMP ²	Water-shed ³	
M1	BCC Lower Pond	Wet Basin	Base/ Credit	43.40	1.28	-6.7	-3.0	997
M2	BCC Upper Pond 2	Wet Basin	Base/ Credit	9.34	0.54	-0.2	0.7	33
M3	BCC Upper Pond 1	Wet Basin	Base/ Credit	67.94	5.60	-0.1	0.0	17
M4	Catamount Lower Pond	Wet Basin	Base/ Credit	7.46	3.36	-37.5	-1.6	517
M5	Catamount Upper Pond	Wet Basin	Base/ Credit	45.23	20.61	-46.3	-8.5	843
M6B (M10)	Englesby 08 Pond Retrofit	Wet Basin	Credit/FRP	129.76	48.55	-63.4	-36.9	721
M7/M8/M9	Englesby SM6 Ponds	Forebay/ 2 Wet Basins	Credit	44.09	19.52	3.5	0.05	47
M17	288 Flynn Ave/ Champlain Pkwy	Dry Basin	FRP	30.77	13.07	-49.4	-5.1	763
M18	208 Flynn Ave Coop	Dry Basin	FRP	0.42	0.30	-66.7	0.0	758
M19	Pine St. Counseling Ctr.	Dry Basin	FRP	0.80	0.48	-50.0	-0.1	704
M25	Overlake Condos	Dry Basin	FRP	1.19	0.73	-62.5	-0.8	647
V27/M27A/ M27B	Hickok & Boardman	Swale/Wet Pond/Infil. Chamber	Credit	1.29	0.92	-100.0	-0.9	55
M29	Champlain Co-op	Dry Basin	FRP	1.59	1.09	-57.1	-0.6	847
M30	Pizzagalli Properties	Permeable Pavement	Credit	0.64	0.58	-100.0	-0.3	360
M31	847 Pine St.	Dry Basin	Credit	0.45	0.23	-100.0	-0.1	101

¹ Percent difference in high flows is negative when showing a reduction. The model was run with all BMPs turned on and then with individual BMPs turned off, one at a time, to quantify differences in flow and relative performance.

² Differences at each BMP were determined by comparing the inflows and outflows in the BMP. 100% represents no surface discharge; BMPs with less than 50% at the BMP outlet could be opportunities to enhance performance.

³ Differences in flow at the watershed outlet are intended as a relative comparison of BMP effectiveness, but are not absolute or additive. Individual BMP values do not add up to corresponding total watershed reductions due to other losses in the system.

⁴ Detention times are restricted to ~12 hrs (720 mins) per cold water fisheries requirements.

Figure 3: Englesby Brook Watershed Areas Receiving Treatment in the Flow Restoration Scenario

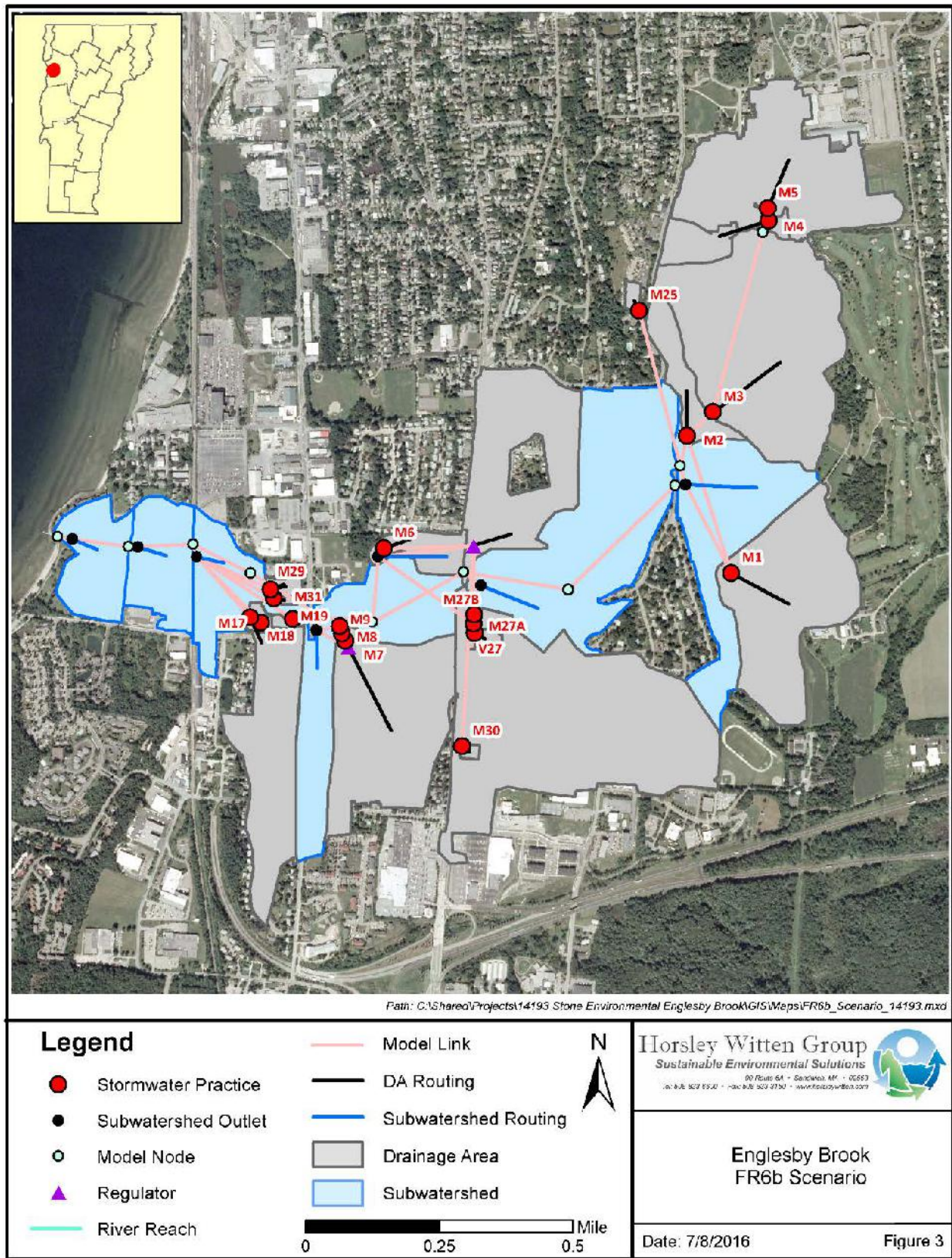


Table 8: Proposed Priority BMP Cost Estimates.

BMP ID	Site Name	Storage Volume (cf)	Total Cost (\$)	Impervious Area (ac)	Cost per Impervious Acre
M10	O8 Pond retrofit ¹	136,061	\$360,850	48.55	\$7,433
M17	288 Flynn Ave/ Champlain Pkwy	74,201	\$385,500	13.07	\$29,495
TOTAL			\$746,350	61.62	

¹ This is an expansion of an existing practice which increases available storage and optimizes detention; costs reflect only the incremental cost of the retrofit.

5.2. Spreadsheet Cost Estimates

Estimating costs for implementing BMP retrofits for sites with expired permits utilized a somewhat less robust approach. Cost estimates were calculated as a base construction cost plus a 30% contingency factor for final design and permitting. The base cost was estimated on a unit cost basis, using a specified design volume (cu. ft.) multiplied by a unit cost (\$/cu. ft.). Unit costs were calculated based on the memorandum from Tetra Tech, Inc. dated October 30, 2007. These rates use a 2000 base year and have been updated to account for inflation to the year 2016, using a 2.5% inflation rate. The costs are calculated based on the following equation:

$$\text{total cost} = \text{installation cost (I)} + \text{land cost (L)} + \text{fixed cost (F)}$$

Where:

I = \$6/cf of infiltration, inflated at 2.5% to year 2016 = \$8.70/cf

L = \$0 as it is not anticipated that property will be required to be purchased

F = design/permitting costs (30% of I)

The anticipated costs associated with implementing the expired permit BMP retrofits, as identified in Table 7 as part of the Flow Restoration Scenario, are presented below in Table 9. Although all of these projects would be located on private land, no cost has been assigned for land acquisition.

Table 9: Proposed Expired Permit BMP Retrofit Cost Estimates.

BMP ID	Site Name	Treatment Volume (cf)	I (\$)	F (\$)	Total Cost (\$)	Impervious Area (ac)	Cost per Impervious Acre
M18	208 Flynn Ave Coop	1,370	\$11,919	\$3,576	\$15,495	0.30	\$51,649
M19	Pine St Counseling Ctr	2,349	\$20,436	\$6,131	\$26,567	0.48	\$55,348
M25	Overlake Condos	3,537	\$30,772	\$9,232	\$40,004	0.73	\$54,799
M29	Champlain Co-op ¹	5,089	\$55,343	\$16,603	\$71,946	1.09	\$66,005
TOTAL					\$154,011	2.60	

¹ Any BMP at this location will likely need to be subsurface, and therefore the assumed unit cost per cf treated was increased by 25%.

ID#: M19		
Name: Pine Street Counseling Center		
Concept Description: Install dry basin or possibly bioretention area in north central area of lot to capture flows from roof and parking areas.		
Notes/Feasibility: Expired permit 1-0337		
GENERAL SITE INFORMATION		RETROFIT DETAILS
Site Contact Info:		Project Candidate: 1 st tier
Ownership:		Retrofit of new or existing BMP: New
Land Use Type:		Proposed Retrofit Practice 1: Dry basin
Land Use Detail:		Proposed Retrofit Practice 2: Bioretention
Existing BMP on Site?		Non-Structural Controls:
Is site a hotspot?		Non-Structural Other:
Sources/pollutants:		Maintenance Burden: moderate
Soils:		Benefits: Storage: Y Water Quality: Y Recharge: M Demonstration: N Repair: N Reuse: N
Use in Retrofit DA:		Conflicts: Soils: Access: Land Use: Utilities: Polluted: High WT: Wetlands: Other:
SIZING INFORMATION		
Drainage Area (ac):	0.80	
Impervious Area (ac):	0.48	
Practice Area Available (ft²):	1750	
Existing Head Available?	Y	

Date: 04/10/15

Assessed by: JSM



March 29, 2016

To: Megan Moir, CPESC, CPSWQ

From: Julie Moore, PE

Stone Project No. 16-030

Subject: Englesby Watershed Expired Stormwater Permit Review

MEMO

Stone completed a field assessment of each of the five systems in the Englesby Brook watershed with expired stormwater permits. These systems are identified in Table 1, below.

Table 1: Expired Stormwater Permits in the Englesby Brook Watershed

Permit Number	Project Name	Permit Issued
1-0337	Howard Mental Health Services	3/4/1982
1-1087	Flynn Ave Coop Housing	9/15/1992
2-0789	Overlake Condominiums	11/24/1988
2-0999	Champlain Apartments	4/20/1982
2-1052	Crescent Terrace	12/20/1985

In general, the permits are written rather broadly with few enforceable items and typically focus on curb-and-gutter system elements, including catch basins. Further, the site plans available in the permit files tend to lack the specificity and level of detail provided for systems constructed post-2002. A brief summary of our observations is provided below, including recommendations for completing any actions that would be required to bring the facilities into compliance.

1-0337, Howard Mental Health Services, 300 Flynn Ave.

Permit covers the discharge of roof drainage via “stone lined ditch in natural drainage swale” to Englesby Brook; parking lot runoff does not appear to be regulated under the permit. During the site visit we found that the stone lined ditch is not well defined. The majority of flow leaving the site and discharging to Englesby Brook appears to occur via subsurface drain pipes not included in the permit; four outfalls were identified during the site visit that are not included in the City’s stormwater GIS layer, including one of which appears to divert water directly from Pine Street. In order to bring this facility into compliance with its existing permit, the stone lined ditch would need to be improved. In addition, the source of the water draining to each of the subsurface drains should be confirmed. As part of the Englesby Brook Flow

Restoration Plan (FRP), a potential retrofit was identified for managing runoff from parking lots draining to the existing green space behind 300 Flynn Ave.

Photo 1: Presumed Location of Natural Drainage Swale and Unknown Subsurface Drainage Outlet



1-1087, Flynn Ave Coop Housing, 288 Flynn Ave

Permit covers the discharge of stormwater runoff from roofs and paved parking lots following treatment “via grass-lined swales, through rip-rapped areas at the top of bank of Englesby Ravine, and via overland flow across vegetated terrain...” During the site visit we found that there are grass-lined to the north of the apartment complex which appear to convey stormwater runoff to rip-rapped areas that lead down to the ravine. We also noted during our site visit that the parking lot catch basin indicated in the City’s stormwater GIS layer does not exist. This site was generally found to be in compliance with its permit. As part of the Englesby Brook FRP, a significant potential retrofit was identified for in the green space immediately to the west of 288 Flynn Ave. and to the east of the proposed Champlain Parkway alignment.



Path: \\CIFS1\netdrv-o\Proj-14\WRM\14-171 Englesby Brook FRP\GIS\MapDocuments\PpresentationsAndReports\FR_concepts\Englesby_Concept_14193_M19.mxd

Legend

- Proposed M19 BMP
- Proposed M19 Depth Contours
- Proposed M19 Drainage Area
- Sub-watersheds



0 25 50 Feet

Horsley Witten Group
Sustainable Environmental Solutions

50 Route 5A • Sandwich, MA • 02563
Tel: 508-833-6600 • Fax: 508-833-3150 • www.horsleywitten.com

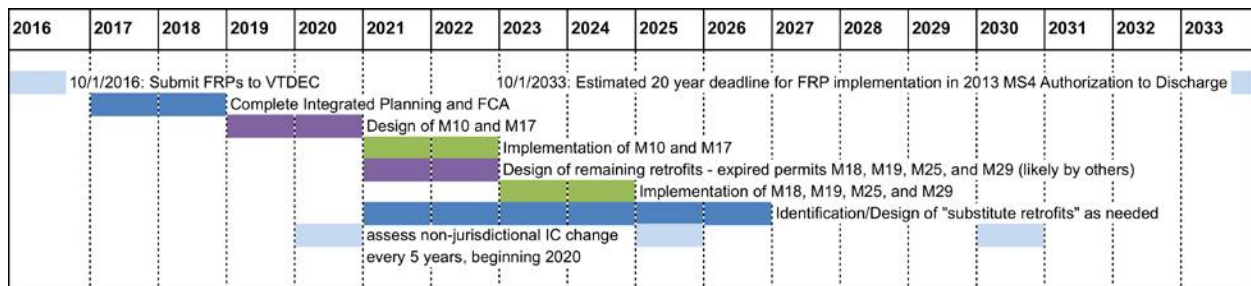


M19 Concept Design

Date: 7/29/2016

Figure C.3

APPENDIX E: DESIGN AND CONSTRUCTION SCHEDULE





FLYNN AVENUE PARKING LOT



VIEW FROM FLYNN AVENUE PARKING LOT



FLYNN AVENUE ENTRANCE



NEIGHBORING BUILDING



VIEW FROM FLYNN AVENUE



VIEW FROM PINE STREET



PINE STREET PARKING LOT AND ENTRANCE



WALKWAY BEHIND BUILDING



VIEW TO FLYNN AVENUE PARKING LOT



NORTH SIDE OF BUILDING



EXISTING FLYNN AVENUE PARKING LOT