LEVEL 2 UNIFIED PERMIT APPLICATION

16 Bulge Road

Devens, Massachusetts

PREPARED FOR

Scannell Properties
8801 River Crossing Blvd., Suite 300
Indianapolis, Indiana 46240
317.499.6740

PREPARED BY

101 Walnut Street
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MARCH 11, 2021

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A. Project Description and Development Team

The tenant for this facility is the leader in peristaltic pump technology across the world. This expertise has made their products critical in the development of new technologies across many industries, including the Bio/Pharmaceutical and medical device sectors. The growth in these industries has led them to grow with the customer demand, in a collaborative, and environmentally-sustainable manner, by centralizing manufacturing processes closer to its customers in North America. This state of the art facility, will provide the world with faster turnaround times on life-saving products, such as the pumps built into devices used to preserve heart and lungs during surgery, and the continuing development of the critical Covid-19 vaccines among many others. To support this mission, they are interested in establishing a manufacturing facility at 16 Bulge Road in Devens, MA. This parcel will be home to a LEED-Certified facility which will include a number of cleanrooms, tool storage area, customer demo center, and warehouse. In addition to the manufacturing facilities, the proposed building will also include supporting office space.

The tenant has partnered with Scannell Properties, an international private real estate development firm, and ARCO Construction Company, Inc. to design and construct the proposed manufacturing facility. Scannell Properties #460, LLC will have ARCO deliver the permitting, design, and construction of this facility and will closely coordinate with the tenant to deliver the proposed facility. The facility will be built on a land parcel of approximately 25 acres.

The proposed building will be approximately 150,843 sf including 94,260 sf state-of-the-art manufacturing area with clean room facilities that will produce advanced components for the Biopharm, medical and other sectors. This building will also include 48,000 square feet of office space that will provide the tenant with space to provide employees a healthy, sustainable work environment, and in line with the latest industry standards in Covid-19 safety. The office space has been designed to accommodate employees who may have physical, and/or neurological conditions. The tenant recognizes and embraces the value of diversity in the workplace; to this end, quiet rooms and a lactating space has been created. In addition, a multi-faith room has been included in the office area, to encourage employees to bring their authentic self to work each day.

The proposed building is purposely located on the eastern side of the parcel with circulation driveway around the perimeter of the developable portion of the parcel in order to accommodate future building expansion and growth of the facility with minimal disruption to business operations. While the space for this future expansion was accommodated in the site planning, the requirements for this facility are not known at this time and would be

subject to a future application for review and approval by the Devens Enterprise Commission.

This application to the Devens Enterprise Commission is for a Level 2 Unified Permit for Scannell Properties. The application seeks approval for the respective building project as presented in the enclosed application.

Development Team

Applicant/Developer	**Scannell Properties** 8801 River Crossing Blvd., Suite 300 Indianapolis, Indiana 46240 Contact: Matt Boone Phone: 317.499.6740
Tenant Contact	**Colliers International** 160 Federal Street | Flor 11 Boston, MA 02110 Contact: Jake Borden Phone: 617.330.8162
General Contractor	**ARCO** 900 North Rock Hill Road St. Louis, MO 63119 Contact: Steve Eisenbeis Phone: 314.918.2159
Architect	**GMA Architects** 900 North Rock Hill Road St. Louis, MO 63119 Contact: Michael Young Phone: 314.614.4489
Civil Engineering, Landscape Architect, Surveyor, Traffic Engineer, Noise/Vibration Consultant, Environmental Engineer	**VHB** 101 Walnut Street Watertown, MA 02471 Contact: Jon Stabach, P.E. Phone: 401.457.2079
Geotechnical Engineer	**Sandborn Head** 1 Technology Park Drive Westford, MA 01886 Contact: Kevin Stetson Phone: 978.577.1015

Structural Engineering	**McNealy Engineering, Inc.** 11457 Olde Cabin Road, Suite 350 St. Louis, MO 63141 Contact: Greg Smith Phone: 314.997.7310 x 102

Development Team (continued)

Legal Counsel	**Nutter McClennen & Fish** 155 Seaport Boulevard Boston, MA 02210 Contact: Michael Scott Phone: 617.439.2811
Electrical Engineering, Lighting Design	**Energy Electrical Contractors** 740 Quaker Highway Uxbridge, MA 01569 Contact: Craig Cressey Phone: 508.278.3200
LEED Consultant	**Resilient Buildings Group** 6 Dixon Avenue Concord, NH 03301 Contact: Paul Leveille Phone: 603.226.1009

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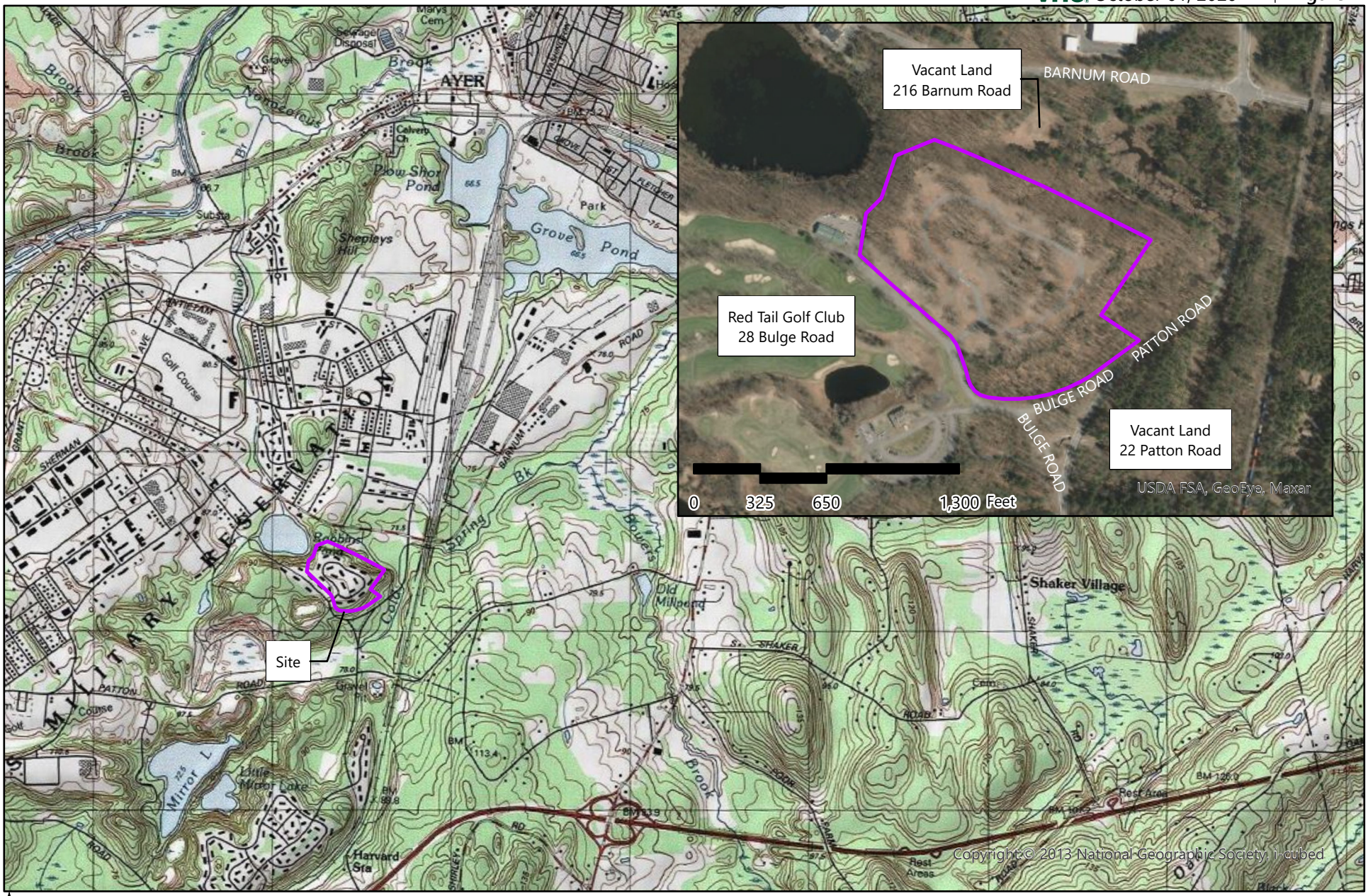

0 1,250 2,500 5,000 Feet

Site Boundary

Housing Property
Former Davao Circle | 16 Bulge Road, Devens, Massachusetts

Site Location and Local Area Map

Sources: ESRI, US Topographic Map

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B. Administrative, Processing, and Peer Review Fee

The administrative, processing and peer review fees will be paid by the Applicant directly to the Devens Enterprise Commission (the "DEC") in accordance with an agreed upon fee schedule. Applicant has included an application fee of $118,207.75 with this application based on the anticipated project cost of $10,564,341.

C. Project Plans

A full set of site drawings of the Project are provided as part of this Unified Permit Application. A drawing list has been incorporated on the cover sheet of the site drawings.

D. List of Abutters

As required, the following list of abutters for the property located at 16 Bulge Road (Map/Lot 016.0-0018-0200.0) was provided by the Devens Community Property Viewer GIS on February 22, 2021. Refer to Attachment B – Certified List of Abutters for the certified list and Abutter Map.

Table 1 List of Abutters

Parcel Number	Property Address	Mailing Address
011.0-0099-0103.0	1 Bulge Road	MDFA/Cold Spring Pond 160 Federal Street Boston, MA 02110
015.0-0018-0100.0	28 Bulge Road	MDFA/Devens Golf Course, LLC 99 High Street, 11th Floor Boston, MA 02110
015.0-0099-0100.0	216 Barnum Road	MDFA/Devens Golf Course, LLC 99 High Street, 11th Floor Boston, MA 02110
016.0-0099-0105.0	222 Patton Road	MDFA/Devens Golf Course, LLC 99 High Street, 11th Floor Boston, MA 02110
016.0-0099-0105.2	204 Patton Road	MDFA/Devens Golf Course, LLC 99 High Street, 11th Floor Boston, MA 02110

E. Drainage Calculations

A Stormwater Report, including drainage calculations, for the Project may be found in **Attachment C – Stormwater Report.**

F. Notice of Intent

Not Applicable. In September 2020, a wetland site reconnaissance was performed by VHB. VHB did not identify any state or federally jurisdictional wetlands or waterbodies within the overall project site. VHB did identify the banks of Robbins Pond and wetlands, just offsite. Wetland resources as well as other nearby environmental resources can be found in Attachment A – Project Graphics on the Site Constraints Map and the FEMA Map.

G. Natural Heritage

The entire site lies within an area identified as a priority habitat of rare species by the Natural Heritage and Endangered Species Program (NHESP). A habitat assessment was completed and submitted to the Natural Heritage & Endangered Species Program of the Massachusetts Division of Fisheries & Wildlife, the Division. The Division determined that the project will occur within habitat of the Blanding's Turtle, a Threatened species and required the prepartion and implement a Turtle Protection Plan prior to the start of work. See Attachment G. The Division found the project will not result in a Take of state listed species, provided the Turtle Protection Plan is fully implemented.

H. Existing Easements, Covenants, Restrictions and Institutional Controls

The Owner, MassDevelopment, has not specifically defined easements on the property but the following are anticipated, and it is expected these will be appropriately documented by MassDevelopment in coordination with the Applicant and the final site plans in due course:

1. A 20' to 30' wide utility easement will be required for the active sanitary sewer along the south side of property, providing sanitary sewer service to the maintenance building for the Red Tail Golf Club on the adjacent parcel.
2. The Site was first developed in the early 1960s with the Davao Housing Area, which included 19 multi-family residential buildings associated with Fort Devens. Prior to the completion of the Davao Housing Area buildings in 1962, pesticides were applied to the building foundations and frost walls. Subsurface investigations between 2000 and 2014 on the Site revealed impacted surficial soils in close proximity to the building foundations. The primary pesticides identified at the Site are aldrin and dieldrin; groundwater impacts were not identified. In 2017, an AUL was placed on the disposal site to maintain a Condition of No Significant Risk for potential receptors. The AUL limits the future use of the Site due to the residual pesticide contamination in soil that exceeds residential risk-

based limits, but allows commercial/industrial use. A Partial Permanent Solution Statement (PSS) and Method 3 Risk Assessment were prepared for RTN 2-662 in February 2018 to address the on-Site pesticide contamination.

I. Soil Suitability Tests and Analysis

An extensive amount of soil borings and test pits have been conducted across the project site to inform the design team on the conditions of the soils. Boring and test pit logs prepared by the Applicant's geotechnical engineer, Sandborn Head, are being collated and a copy of their final report will be provided upon completion. Sandborn Head have evaluated the soils testing data and issued geotechnical considerations and recommended design parameters to the structural engineer to use for foundation design. A copy of the memo can be found in Attachment E – Geotechnical Considerations and Recommendations. A map showing locations of the boring and test pit program is included within Attachment C - Stormwater Report.

J. List of Waivers

The Project Team has endeavored to comply with all requirements contained within the Devens Rules and Regulations, both administrative and regulatory, and we have identified conditions unique to this project that require relief from the regulations. Therefore, pursuant to 974 CMR 1.02(4)(e), the Applicant requests waivers of requirements and design standards listed in Table I-1.

TableI-1 List of Waivers

Requirement Citation	Requirement Description	Waiver Request
974 CMR 3.02 (3)(a)	Minimum Drawing Scale of 1"=40'	Drawing Scale adjusted to 1"=50' to fit on one standard 24"x36" sheet

K. Variances

The Project does not require any variance from the By-Laws.

L. Compliance with the Reuse Plan and Bylaws

The following section describes the Project's compliance with the goals and objectives of the Devens Reuse Plan and Bylaws, as applicable.

Compliance with the Devens Reuse Plan

The 1994 Devens Reuse Plan (the "Reuse Plan") provides a blueprint for future redevelopment of the former Fort Devens Military Reservation located within the towns of Harvard, Ayer and Shirley.[1] The Reuse Plan outlines general goals and objectives to guide planning and reuse of the former Army base. The Reuse Plan also describes the goals and objectives of each zoning district, including the Innovation and Business Technology zone in which the Project is located. Development at Devens has grown to be increasingly more sustainable, thus reducing overall environmental impacts of development and producing region-wide environmental benefits. As described below, the Project is consistent with numerous goals and objectives of the Reuse Plan and supports the mission of sustainable development at Devens.

Overall Goals and Objectives

The Project is consistent with the following overall goals and objectives contained within the Reuse Plan:

Development must be sustainable, which means achieving a balance of economic, social and environmental needs, while maintaining and enhancing the natural resource base.

› The Project has been designed to satisfy the Industrial Performance Standards and to be compliant with the Devens Rules and Regulations, which are crafted to attain these stated goals. Additionally, the Project contains numerous sustainable measures as discussed in the "Sustainability" section below as well as in Section S of this Application; and most importantly, the sustainability aspects of the project will help advance the tenant's goal of being Carbon Neutral by 2040. This facility will shift the tenant's current practice of supplying customers in the Americas with products from its main manufacturing facility outside the United States to products made in the U.S. The tenant's presence in Devens also provides an opportunity to create a facility that will become the model standard for sustainable manufacturing infrastructure for its subsidiaries across the world.

Take advantage of the skills and experience of the regional work force and match the skills of the future work force with the needs of industries of the future.

› The project will require employees of various skill levels for the design, construction, operation and maintenance of the facility. This facility will attract future employees from the many colleges and universities within close proximity to Devens. Workforce from the local communities will also be an asset for this project.

Build on Devens' unique characteristics to complement the regional economy and expand the economic base.

› Devens was selected due to its close proximity to the tenant's U.S. Sales office located in Massachusetts, and its customer base. In addition, its proximity to the cities of Worcester and Boston provide a unique opportunity to access talent and collaborate with

1 *Devens Reuse Plan*, Prepared for the Boards of Selectmen for the Towns of Ayer, Harvard, Lancaster and Shirley and the Massachusetts Government Land Bank, Prepared by Vanasse Hangen Brustlin, Inc., November 14, 1994.

community colleges, universities, and research facilities within close proximity. The campus will create hundreds of jobs at all skill-levels, and some will inevitably settle into the surrounding communities, buy homes, raise families and shop locally.

Goals and Objectives by Zoning Districts

The Reuse Plan lists the goals and objectives for each zoning district within Devens to help guide appropriate development. The entire Site is located entirely within the Innovation and Technology Business zoning district. Additionally, the Site is also overlain with the Water Resources Protection (WRP) Overlay District. Compliance with the applicable zoning district and the WRP Overlay District is discussed further in the sections below.

Innovation and Technology Business District

The Project is consistent with the following goals and objectives specific to the Innovation and Technology Business zone outlined in the Reuse Plan:

Provide space to those industries and businesses that develop and require on-site expansion.

› The tenant is a growing organization with a global presence, and this facility provides its first multi-brand manufacturing operation within the US to support its customers and continue to sustain growth.

Provide space to accommodate industries and businesses that want to relocate to Devens or have large or difficult siting requirements.

› The project site at 25-acres is sufficiently large to allow construction of this initial facility, as well as a future building expansion. The site is also very attractive to the tenant due to the Devens innovation and technology site, rapid permitting, proximity to its customers and a site that allows the tenant to construct an appropriate sized facility for its short to medium-term growth plans, with an opportunity to expand in future for long-term growth.

Encourage uses that exhibit one or more of the following qualities: development or sale of a new product or service, expanding business, education/academic links, research and development oriented, or support service to other industries/businesses on Devens.

› The Project involves the construction of a manufacturing facility that is advancing and expanding growth from its main manufacturing facilities outside the U.S. The close proximity to the tenant's customers already present in Devens, provides a unique opportunity to collaborate, and advance products development like never before. In addition, the tenant's focus in developing talent in STEM fields facilitates outreach with school-aged children and supports the annual Women in Engineering Day (WED). The WED initiative is a collaborative event that provides day-long interactive activities led by employees during the annual internationally-celebrated Engineering Week.

Water Resources Protection Overlay District

The Facility is located partially within the Aquifer sub-district of the Water Resource Protection Overlay District. The Facility is consistent with the following goals and objectives

outlined in the Reuse Plan and Section 4.09 of the Rules and Regulations. Compliance is provided in Section R of this document.

To promote the health, safety, and general welfare of the community by ensuring the appropriate level of protection for all water resources within Devens in recognition of the importance of this resource to the region.

› The stormwater management system is designed to meet or exceed all DEP and Devens requirements. Additionally, the tenant will prepare and implement applicable and appropriate plans for short term and long-term erosion and sedimentation control, and for spill prevention and containment.

To preserve the high quality of surface and ground water in the aquifer underlying the Devens area (the "Aquifer") in order to ensure its future use.

› All stormwater runoff from impervious areas will be collected and treated prior to infiltration. There will be no discharges to surface water resources. See Attachment C for the Stormwater Management Plan.

› As discussed in Section S of this Application, the Project will contain sustainable site design and facility operation measures, including those designed to preserve the high quality of surface and ground water underlying the Devens area.

To conserve natural resources wherever possible.

› Construction limits of disturbance have been minimized to the extent required to logistically construct the facility and retain excess soils on site.

› Landscape design leverages native plant species to minimize irrigation needs. Temporary irrigation will be used to establish plantings, however, no permanent irrigation system is proposed.

To promote statewide goals for surface water quality in the Nashua River Basin.

› The stormwater management system is designed to meet or exceed all DEP and Devens requirements for runoff control, water quality, groundwater recharge, and sedimentation control.

To prevent the temporary or permanent contamination of soils, surface water, and ground water on Devens.

› During and after construction, the Facility will be consistent with the WRPZD and with all applicable federal, state and local regulations applying to water resources, including the Massachusetts Department of Environmental Protection (DEP) Stormwater Management Policy for development projects and to the maximum extent possible with the Devens Enterprise Commission Development Rules and Regulations. Specifically, the Facility will implement Best Management Practice (BMP) in stormwater management, implement erosion and sedimentation control, reduce water use for irrigation, and limit the use of chemicals in landscaping, among other actions. BMPs will be monitored for effectiveness and adapted over time as necessary. See Attachment C for the Stormwater Report.

› The Facility will comply with all general design and planning requirements applicable to the Water Resources Protection District pursuant to Section XI of the Zoning By-Laws.

Sustainability

The first and most visible goal of the Reuse Plan states, "Development must be sustainable, which means achieving a balance of economic, social, and environmental needs, while maintaining and enhancing the natural resource base." The tenant is committed to incorporating sustainable measures to enhance the Project and offer benefits to Devens.

The project will be designed and constructed to achieve optimum energy performance while meeting the performance criteria of this unique facility. The project team will strive to incorporate the most relevant and economically-feasible technologies to reduce energy consumption and/or cost, and sustainable design elements will be included consistent with the United States Green Building Council's Leadership in Energy and Environmental Design (LEED) Building Design and Construction (BD+C): New Construction rating system, v4.1 for Sustainable Sites. Refer to Section S of this document for more detailed information.

M. Construction Phasing Plan

Construction is planned to start with initial site preparations and ground breaking near the beginning of June. The new facility will be operational in approximately 14 months. Foundation work is anticipated to begin at the end of June. Tilt up wall construction is anticipated to begin in the middle of August with the completion of steel work anticipated in the middle of November. Tenant improvements will begin in the middle of November and the facility is anticipated to be turned over for operation in August of 2022. A preliminary construction logistics plan has been included in Attachment A – Project Graphics.

N. Compliance with the Devens Open Space and Recreation Plan and Devens Main Post Trails Report

This section demonstrates how the Project complies with the Devens Open Space and Recreation Plan as well as the Devens Post Trails Report.

Compliance with the Devens Open Space and Recreation Plan

The current *Devens Open Space and Recreation Plan: 2008-2013* prepared by the Nashua River Watershed Association, Montachusett Regional Planning Commission, and the Massachusetts Development Finance Agency in January 2008 builds off of previous versions of open space plans and provides a guide for the preservation of critical environmental resources and management of open space and recreational resources at Devens (the "Open Space Plan").[2] As part of the current Open Space Plan update, lands at Devens to be placed under permanent protection by adoption of conservation restrictions, transfer of ownership,

2 Nashua River Watershed Association, Montachusett Regional Planning Commission, and the Massachusetts Development Finance Agency, *Devens Open Space and Recreation Plan: 2008-2013*, January 23, 2008.

or some other means that would provide permanent protection consistent with that of Article 97 were identified and are listed in Table 4-1 of the Open Space Plan. The Project Site does not contain any active or passive recreation area, or any other amenity included in the Open Space Plan. Refer to the Site Constraints Map in Attachment A – Project Graphics.

The Project will be located predominately in previously disturbed land (see Figure 1). The Project Site lies within Priority Habitat 1667 which is attributed to the Blanding's turtle which has a "Threatened status" designated by the Massachusetts Division of Fisheries and Wildlife (MDFW). A Habitat Assessment was completed in November 2020 by Oxbow Associates, Inc. which confirmed the Site could provide transitional habitat, and in its current, transient disturbed state, potentially opportunities for nesting. The recommended mitigation measures to protect the Blanding's turtle include installing an animal exclosure at the periphery of proposed construction activities and clearing the interior of any turtles by approved personnel authorized under a Scientific Collection Permit issued by the MDFW.

Compliance with the Devens Multi-Use Trail Network Plan

Previous versions of the Open Space Plan included provisions for the Devens Multi-Use Trail Network (the "Multi-Use Trail"), which identifies connections between existing and proposed trail networks and sidewalks throughout Devens linked to surrounding communities. The Multi-Use Trail, as depicted on the 2010 Devens Trail Map, is an updated version of the 2001 Devens Main Post Trail study. The project will include a walking/jogging trail around the perimeter of the site for use by employees, however, due to the confidential nature of the work performed at the facility, these trails will not be open to the public and will not connect to the adjacent public trail network. The Multi-Use Trail includes three phases, none of which are currently within or proposed within the Site boundary or would be impacted by the project.

O. Parking

The project proposes 299 parking spaces in order to provide sufficient spaces for employees, visitors, clients, and contractors. The campus at 16 Bulge Rd is the only facility of its kind within the tenant's portfolio in the U.S., and as a result, it is expected that the facility will see a frequent number of visitors (executives, customers, investors, service technicians) on a daily basis. For this purpose, 15 parking spaces have been reserved to accommodate visitors.

The manufacturing operations will be carried out across three (3) work shifts. It is expected that the majority of employees (approximately 225) will work on the manufacturing floor, and fifty (50) will work in the office areas.

The parking area will include seven (7) accessible spaces, fifteen (15) spaces for EV charging, and fifteen (15) spaces for clients, visitors, and contractors, leaving the remaining spaces for broader employee use. Within the remaining spaces for employees, fifteen (15) spaces will be dedicated for carpooling with preferred parking adjacent to the building entrance in accordance with the LEED credit criteria.

The tenant intends to promote use of other modes of transport to the site including walking, cycling, or train, to minimize car transport where possible. The site is served by the Massachusetts Bay Transportation Authority (MBTA) Commuter Rail stops in the Town of Shirley and in the Town of Ayer, both located on the Fitchburg line, and within 3.5 miles of 16 Bulge Road. Given that passengers are allowed and encouraged to bring their bicycles onboard off-peak MBTA trains, it is reasonably expected that a portion of the staff may choose multimodal transportation to reach the site due to its feasibility and convenience.

A portion of people traveling to/from the site could also ride their bicycles as a primary form of transportation since Devens in located within ¼ mile from the nearest residential area, and within the boundaries of the historic Minuteman trail which provides a dedicated right-of-way bike access to nearby Towns, and the City of Boston. Lastly, the Devens Regional Shuttle serves the site via the Quiet Logistics/Food Pantry bus stop which can be accessed via the Markley Range Trail. It could be expected that about 10% of employees may take advantage of multimodal transportation options on any given day.

P. Vehicle Trip Generation

The overall development involves the construction of a two story, 150,843 sf manufacturing building with 299 parking spaces. The number of vehicle-trips to be generated by the proposed development was estimated based on trip generation rates published in the Institute of Transportation Engineers (ITE), Trip Generation Manual, 10th Edition. Based on its primary function as a manufacturing facility, ITE land use code 140 (Manufacturing) was determined to be the most appropriate land use code for this development. The table below summarizes the projected trip generation associated with the proposed development. Trip generation worksheets are included in the Appendix of Attachment F - Traffic Impact and Access Study (under separate cover due to document size).

Table 3 Projected Trip Generation

Time Period	Movement	Site-Generated Vehicle Trips
Weekday Daily [b]	Enter	296
	Exit	296
	Total	592
Weekday Morning Peak Period [c]	Enter	72
	Exit	22
	Total	94
Weekday Evening Peak Period [c]	Enter	31
	Exit	70
	Total	101

a Based on ITE land use code 140 (manufacturing) for 150,843 sf
b vehicles per day
c vehicles per hour

As shown in Table 3, the Project is expected to generated approximately 592 new vehicle trips (296 entering/296 exiting) on a typical weekday, with 94 new vehicle trips (72 entering/22 exiting) during the weekday morning peak hour and 101 new vehicle trips (31 entering/70 exiting) during the weekday evening peak hour.

Q. Erosion and Sedimentation Plan

A Soil and Erosion Control Plan for the Project may be found in the Site Plans – see drawings ER-1 and ER-2. The Project will alter approximately 13 acres of land and will therefore require preparation of a Stormwater Pollution Prevention Plan (SWPPP) and filing a Notice of Intent (NOI) with the United States Environmental Protection Agency (EPA) for coverage under EPA's Construction General Permit (CGP) to discharge stormwater from construction sites. The contractor and Owner are required to file the NOI at least 14 calendar days prior to commencing earth-disturbing activities.

As the person overseeing the day to day construction activities, the Contractor will be responsible for preparing and implementing the SWPPP; adapting it as conditions of the project construction schedule and phasing program in whatever way necessary to meet the requirements and intent of the EPA Construction General Permit.

R. Landscaping Maintenance and Water Management Plan

Landscape Maintenance Plan

The Applicant will provide landscape maintenance for the Project for all lawns, shrub beds, and tree plantings within the Project Site. Landscaping maintenance operations will include watering; weed, diseases and insect control; fertilizing; liming; pruning and repair; mowing; mulching; guying; and sweeping/raking. Any plant disease problems will be treated following Best Management Practices and any insect infestations will be treated using Integrated Pest Management practices. Additionally, the removal of all rubbish and waste (i.e., clippings) will be conducted at the end of each workday. Refer to maintenance notes on the Landscape Plans for additional information.

Irrigation System Maintenance and Water Management Plan

In the spirit of Devens sustainability goals, an irrigation system is not proposed for the Project. The limited water needs during the first two growing seasons will be met through use of the Devens water system. Native plants will be used to enhance tolerance for drought conditions.

S. Compliance with Industrial Performance Standards

The Applicant provides the following information demonstrating anticipated compliance with the Industrial Performance Standards and findings regarding potential impacts related to noise, air quality, lighting, electromagnetic interference, wetlands, earth removal, stormwater management, water resource protection, renewable energy facilities, and green house gas (GHG) emissions. The potential sensitive receptors near the project site have been identified as the residential properties off Adams Circle to the north and off Old Mill Road east of the site on the opposite side of the railway right-of-way from the site. A completed Industrial Performance Standards checklist for the project is provided in Attachment G – Industrial Performance Standards Checklist.

Noise and Vibration

The proposed building has been situated toward the geometric center of the parcel to maximize the distance from property lines and minimize potential impacts to sensitive receptors. Additionally, exterior equipment that will contribute to the site's noise profile are positioned on the north side of the building so that the building will shield the golf course to the south. At the current stage of design the project is expected to meet the noise standards set forth in 974 CMR 4.05 (3)a and b at the closest residential land uses without mitigation. Scannell has commissioned a comprehensive noise study to establish existing ambient noise levels at the sensitive receptor locations and to construct an acoustic model to predict noise levels and measure effectiveness of mitigation measures. The 3D computer modeling program will account for existing and proposed topography and all noise generating equipment associated with the project.

A summary of the background noise levels and evaluation of the effect of new noise is provided in Attachment H. Sound level increases attributed to the Project's operations at the nearest active uses, including the closest-residential neighborhoods, are below the DEC's threshold for corresponding use. There are sound level increases above DEC's threshold at the northern and eastern property line. However, these adjacent parcels are undeveloped at this time with no active sensitive use. Construction of perimeter walls or berms for noise reduction is not anticipated.

With respect to vibration concerns the Project will comply with 974 CMR 4.05 (4)(a).

Air Quality, Odor and Emissions

Stationary Sources

The Project includes equipment that will be designed, installed and operated such that it is exempt from requiring an Air Permit approval from the State. Based on these de-minimis emissions, the Project will meet the standards in 974 CMR 4.02(3) and not adversely impact any internal or external receptors.

Mobile Sources

The Project is located in Middlesex and Worcester County, which are in attainment for all National Ambient Air Quality Standards (NAAQS) criteria pollutants and therefore no air quality analysis is required. Partial areas of the counties are in maintenance for carbon monoxide; however, the Devens area is not one of those partial areas. The mobile source emissions related to the proposed project are not projected to lead to any exceedances of current NAAQS. The Project is expected to add up to 94 vehicle trips during each peak hour to the roadways during a typical weekday and is distributed through the area's roadway network as presented under Section O above. With the area being in attainment for all criteria pollutant, the Project-related vehicle trip generation is expected to result in a negligible mobile source air quality increase in emissions.

During construction, the project will implement measures required in 974 CMR 4.07(7) and thus will minimize air quality impacts during earth removal.

Lighting/Illumination

The Site Lighting and Photometrics Plan included with the Site Plans illustrate how exterior site lighting will illuminate the proposed walkways, building entrances, parking lots, and loading docks for wayfinding, safety and security in compliance with 974 CMR 4.04(3). The exterior lighting has been designed with dark sky compliant fixtures – thus helping to meet LEED criteria and reduce illumination impacts to the night sky. Building lighting (wall packs) will be maintained around the building and pole mounted area lights will be located at the perimeter roadway and parking lot. The selected light fixtures are full cutoff and house-side shields will be used in fixtures at the perimeter of the project to prevent backlight. All will be LED light engines, 3000K lighting temperature. The illumination from the Project is not expected to affect the Observatory, in compliance with 974 CMR 4.04(1).

Earth Removal

The Project will comply with the Earth Removal standards in 974 CMR 4.07. The project will generate significant volumes of cuts and fills, but all earth material will be retained on site with the potential exception of surplus topsoil generated from the area of the new building and pavement surfaces. The grading plan envisions re-shaping the site within the limits of disturbance by spreading soils, but soils may be retained and stockpiled for future re-use on site. A soils management plan will be developed to address transport and re-use challenges. This plan will be aligned with the SMP prepared for Devens by Haley & Aldrich (2000) and the MassDevelopment Soils Management Policy (2020) while considering site-specific soil management.

Stormwater Management

The stormwater management practices for the Project have been designed to comply with the General Provisions of 974 CMR 4.08 (Stormwater Management). The proposed design efficiently captures, treats, and recharges stormwater runoff in a manner that replicates or

improves upon existing conditions. Refer to Attachment B – Stormwater Report (under separate cover due to document size) for the full report and analysis.

Pursuant to General Provision 2(c)iii, pre-development drainage areas were analyzed as a "green field" condition regardless of any pre-existing development. As a result, there was a negligible allowance for post-development stormwater discharge, so the proposed stormwater management system is designed to capture and recharge 100% of all runoff for design storms up to and including the 100-year storm. This conservative approach guarantees there will be no negative impact from stormwater runoff on abutting properties or water supplies. All stormwater BMPs were designed using the Natural Resource Conservation Service TR-20 methodology in accordance with General Provision 4(e). The complete results of this analysis can be found in Appendix B of the Stormwater Report.

Water quality is provided by a combination of several infiltrating stormwater best management practices. Pretreatment targets are met pursuant to MassDEP and Devens regulations, which include generally achieving 44% total suspended solid (TSS) removal across the site, while also achieving 80% TSS removal prior to discharge to the subsurface infiltration chambers in the front parking field and the surface infiltration system at the north end of the site in accordance with General Provision 6(h). Water quality and TSS removal calculations are located in Appendix D of the Stormwater Report.

The closed drainage system is designed to comply with General Provision 6(b), which requires the accommodation of the 25-year storm event within the system. Pipe conveyance calculations and pipe network profiles are located in Appendix A of the Stormwater Report.

Operations and maintenance procedures are located in Appendix D of the Stormwater Report and have been written to meet or exceed the maintenance recommendations and cleaning frequencies as described in General Provision 7.

Water Resource Protection

The northern portion of the site is within the Aquifer District of the Water Resource Protection (WRP) Overlay District, and the front portion of the site along Bulge Road is within a Zone II Wellhead Protection area. Based on this, the design for the site must follow additional requirements according to the DEC rules and regulations Section 4.09 paragraph 2.a. The outlined purpose of this regulation is to protect the ground and surface water resources in Devens and abutting communities, promote statewide goals for surface water quality in the Nashua River Basin, and to prevent the temporary or permanent contamination of soils, surface water and ground water. The Project will comply with the Watershed WRPD regulations.

Greenhouse Gas Mitigation

The project is consistent with the goals and requirements outlined in the 974 CMR 4.11, as noted below.

The tenant will join the Devens Eco-Efficiency Center.

› This standard promotes additional actions that a business can take to reduce contributions to global warming, such as documenting and reducing overall emissions

associated with a business' activities. Separate from the energy needs for the development process, the buildings will be designed to reduce greenhouse gas emissions by including various building elements to reduce the required energy needs for the operation of the buildings. Some of these elements may include:

- Low window to wall ratio (below code maximum)
- Reduced or eliminated use of curtainwall
- Low-solar heat gain coefficient (SHGC) glazing
- Above-code wall insulations
- Condensing boilers
- Electrified hot water systems
- Low-flow fixtures
- High efficiency LED lighting
- Daylighting controls and occupancy sensors
- Energy Star equipment

Projects that (i) generate 2,000 or more average daily trips (adt) or (ii) generate 1,000 or more adt and involve construction of 150 or more parking spaces, or (iii) involve construction of 300 or more parking spaces shall comply with the MA Stretch Code (780 CMR 120AA) as amended.

› The project does not trigger the MA Stretch Code. Additionally, traffic information presented in Section O and Attachment F show the combined project site will generate less than 1000 average daily trips (adt).

Projects that require a MassDEP Air Quality Permit shall have a roof for which at least thirty (30) percent shall be vegetated, which vegetated portion shall comply with the DEC's Policy for Construction of Vegetated Roofs, dated August 2011, as amended.

› The Project does not require a MassDEP Air Quality Permit.

T. LEED Checklist – Sustainable Sites

A preliminary assessment of applicable SS Credits was conducted based on schematic design. The SS Credits identified as achievable are subject to further evaluation as project design progresses.

LEED Credit Category	Description	Goal
Prerequisite: Construction Activity Pollution Prevention		Achievable
Site Assessment	› This credit relates to date collection of property site assessment and analysis categories.	Achievable
Site Assessment - Protect or Restore Habitat	› This credit requires the protection of 40% habitat on a greenfield site and using native or adapted vegetation to restore 25% of previously disturbed site.	Unlikely

Open Space	› Requires outdoor space for 30% of total site area.	Achievable
Rainwater Management		Achievable
Heat Island Reduction		Unlikely
Light Pollution Reduction		Achievable

U. Building Elevations and Building Design Review

Conceptual building elevations are provided in Attachment A – Project Graphics. The building height and general shape is unlikely to change but the exterior aesthetic is presently under study by the design team and therefore the graphics provided are subject to change. Applicant will submit refined elevations along with building perspectives to MassDevelopment for design review approval prior to a public hearing on the project.

V.Slope Resource Areas

Slope resource areas (SRA) exist on the site along the northwestern, northern, and eastern portions of the parcel boundary. The slope areas were delineated based upon and confirmed by accurate topographic survey. The resource limits are shown on the Site Plans included in this application package.

As required by 974 CMR 3.06, Steep Slope Protection, no work is proposed within the SRAs, the presently undisturbed 15 foot No Disturbance zone of the 50-foot SRA buffer area or the outer 35 foot buffer with the exception of the installation of the walking/jogging trail.

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Attachment A: Project Graphics

- Logistics Plan
- Environmental Constraints Map
- FEMA
- Building Elevations

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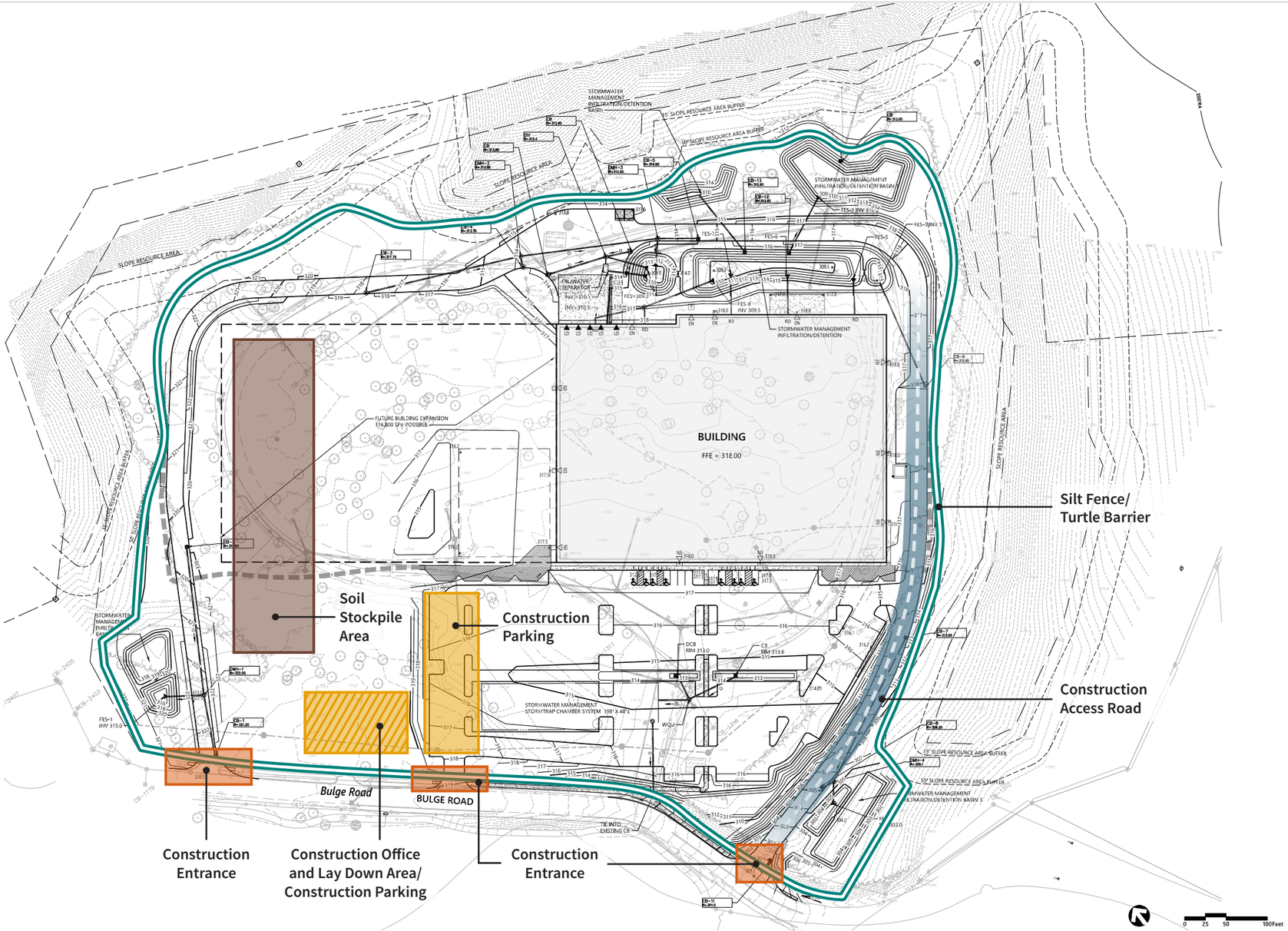
Logistics Plan

FIGURE 1



16 Bulge Road, Scannell | Devens, MA

Site Logistics Plan

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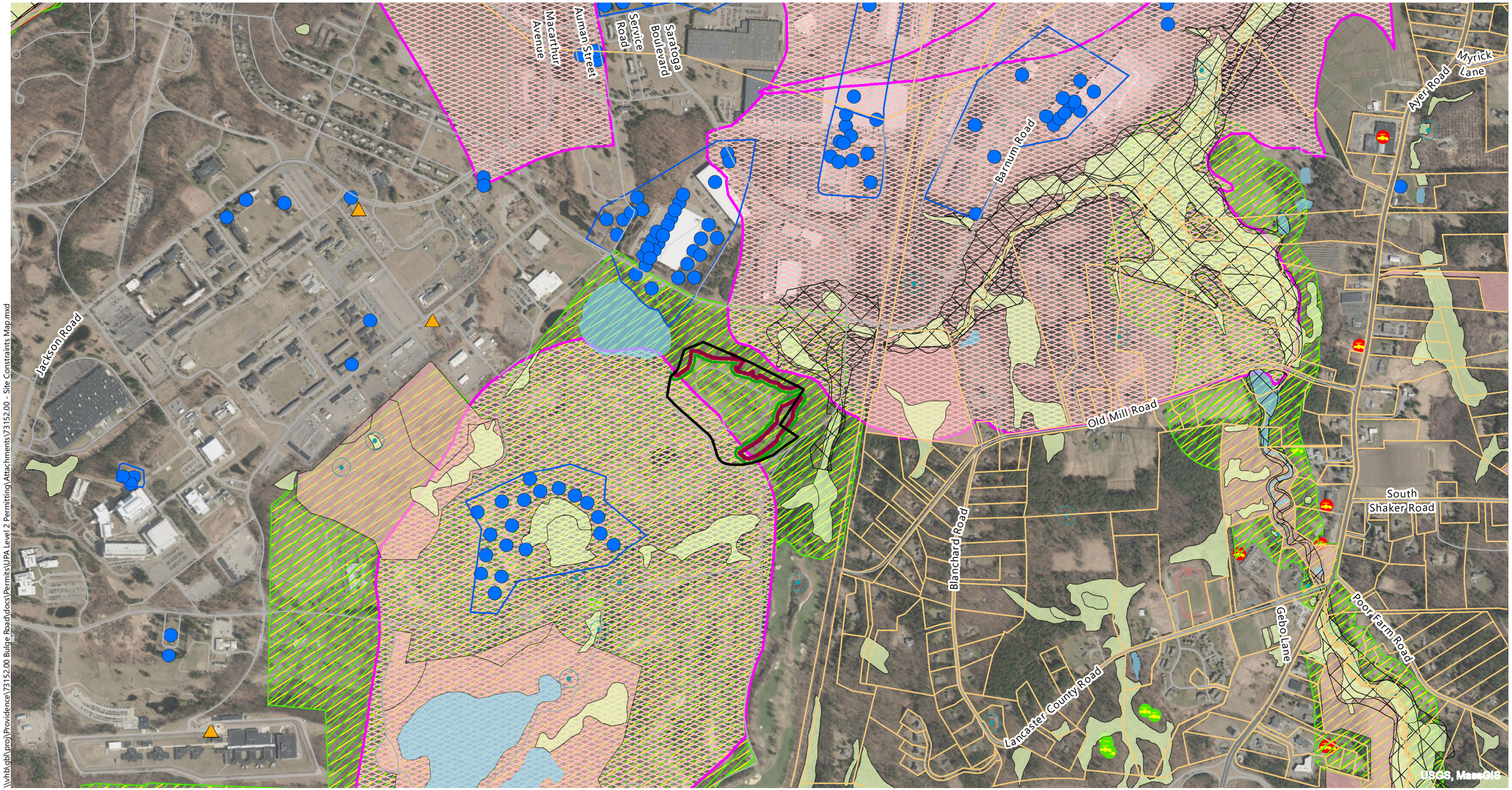
Environmental Constraints Map and FEMA Map



0 250 500 1000 Feet

16 Bulge Road, Scannell | Devens, MA

- Site Limit of Work
- **Administrative Type**
- State Route
- Non-numbered Road
- Parcels
- Slope Resource Area
- Slope Resource Area - 15 ft buffer
- Slope Resource Area - 50 ft buffer
- MHC Inventoried Area
- MHC Inventoried Property
- NHESP Potential Vernal Pools
- 100 Year Floodplain
- DEP Wetlands
- Open Water
- Protected and Recreational Open Space
- Zone II Wellhead Protection Areas
- NHESP Estimated Habitats of Rare Wildlife
- NHESP Priority Habitats of Rare Species
- ACECs
- Underground Storage Tanks
- Community Groundwater Source
- Non-Community Groundwater Source

Site Constraints Map

Data Source: Office of Geographic Information (MassGIS), Commonwealth of Massachusetts, MassIT, and Devens GIS

National Flood Hazard Layer FIRMette

71°36'22"W 42°32'18"N

71°35'44"W 42°31'51"N

0 250 500 1,000 1,500 2,000 Feet

1:6,000

Basemap: USGS National Map: Orthoimagery: Data refreshed October, 2020

Legend

SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT

SPECIAL FLOOD HAZARD AREAS
- Without Base Flood Elevation (BFE) *Zone A, V, A99*
- With BFE or Depth *Zone AE, AO, AH, VE, AR*
- Regulatory Floodway

OTHER AREAS OF FLOOD HAZARD
- 0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile *Zone X*
- Future Conditions 1% Annual Chance Flood Hazard *Zone X*
- Area with Reduced Flood Risk due to Levee. See Notes. *Zone X*
- Area with Flood Risk due to Levee *Zone D*

OTHER AREAS
- NO SCREEN — Area of Minimal Flood Hazard *Zone X*
- Effective LOMRs
- Area of Undetermined Flood Hazard *Zone D*

GENERAL STRUCTURES
- Channel, Culvert, or Storm Sewer
- Levee, Dike, or Floodwall

OTHER FEATURES
- 20.2 / 17.5 — Cross Sections with 1% Annual Chance / Water Surface Elevation
- Coastal Transect
- 513 — Base Flood Elevation Line (BFE)
- Limit of Study
- Jurisdiction Boundary
- Coastal Transect Baseline
- Profile Baseline
- Hydrographic Feature

MAP PANELS
- Digital Data Available
- No Digital Data Available
- Unmapped

N

The pin displayed on the map is an approximate point selected by the user and does not represent an authoritative property location.

This map complies with FEMA's standards for the use of digital flood maps if it is not void as described below. The basemap shown complies with FEMA's basemap accuracy standards

The flood hazard information is derived directly from the authoritative NFHL web services provided by FEMA. This map was exported on 1/14/2021 at 5:47 PM and does not reflect changes or amendments subsequent to this date and time. The NFHL and effective information may change or become superseded by new data over time.

This map image is void if the one or more of the following map elements do not appear: basemap imagery, flood zone labels, legend, scale bar, map creation date, community identifiers, FIRM panel number, and FIRM effective date. Map images for unmapped and unmodernized areas cannot be used for regulatory purposes.

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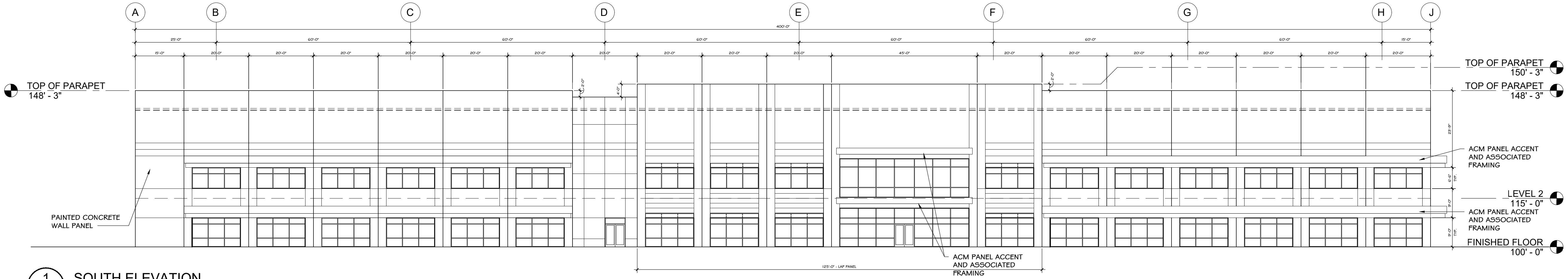
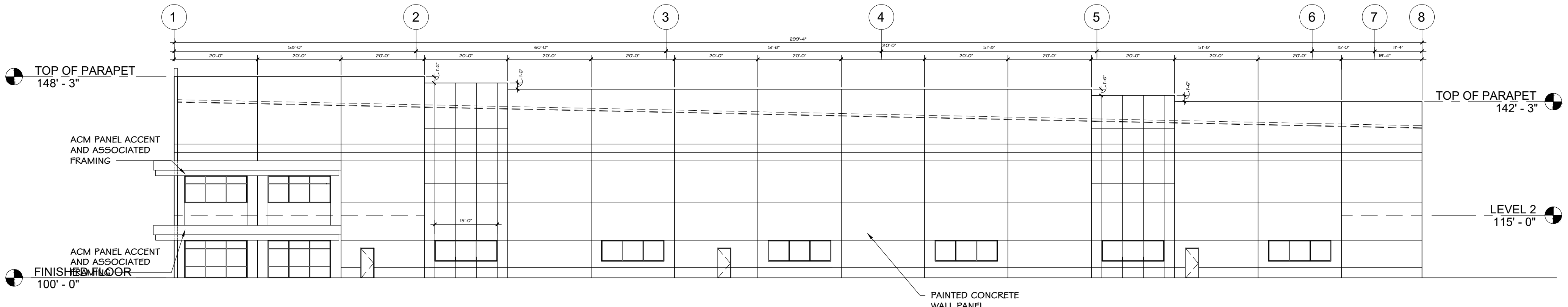
Building Elevations



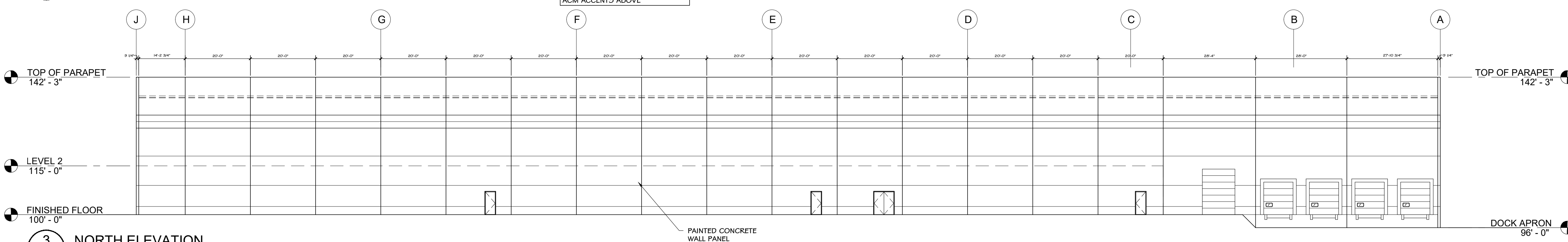
1 A5.1 SOUTH ELEVATION
SCALE : 1/16" = 1'-0"

NOTE: SUNSHADES TO BE PROVIDED AT WINDOWS NOT COVERED BY ACM ACCENTS ABOVE

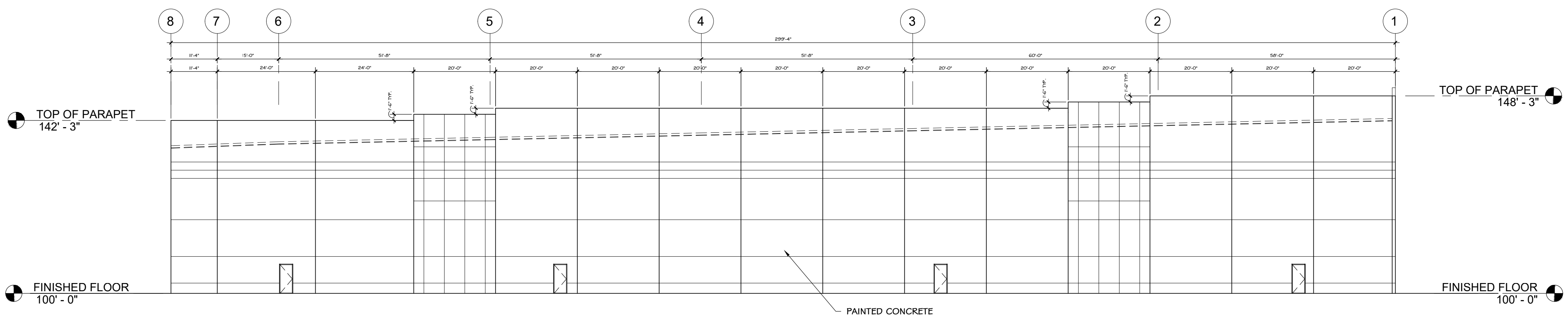


2 A5.1 EAST ELEVATION
SCALE : 1/16" = 1'-0"

NOTE: SUNSHADES TO BE PROVIDED AT WINDOWS NOT COVERED BY ACM ACCENTS ABOVE



3 A5.1 NORTH ELEVATION
SCALE : 1/16" = 1'-0"



4 A5.1 WEST ELEVATION
SCALE : 1/16" = 1'-0"

PRELIMINARY: NOT FOR CONSTRUCTION 03.04.2021

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GMA ARCHITECTS
900 NORTH ROCK HILL ROAD
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FENTON, MO 63026
PH: 636.349.1600
LEED: RESILIENT BUILDINGS GROUP
6 DIXON AVENUE
CONCORD, NH 03301
PH: 603.226.1009 x 205
FIRE PROTECTION:

SCANNELL PROPERTIES

PROJECT
SCANNELL
16 BULGE ROAD
DEVENS, MA

JOB NO : SJ2262
PA : MWY
DATE : XX.XX.2021

REVISIONS

SHEET NUMBER
A5.1
EXTERIOR ELEVATIONS

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Attachment B: Certified List of Abutters and Abutters Map

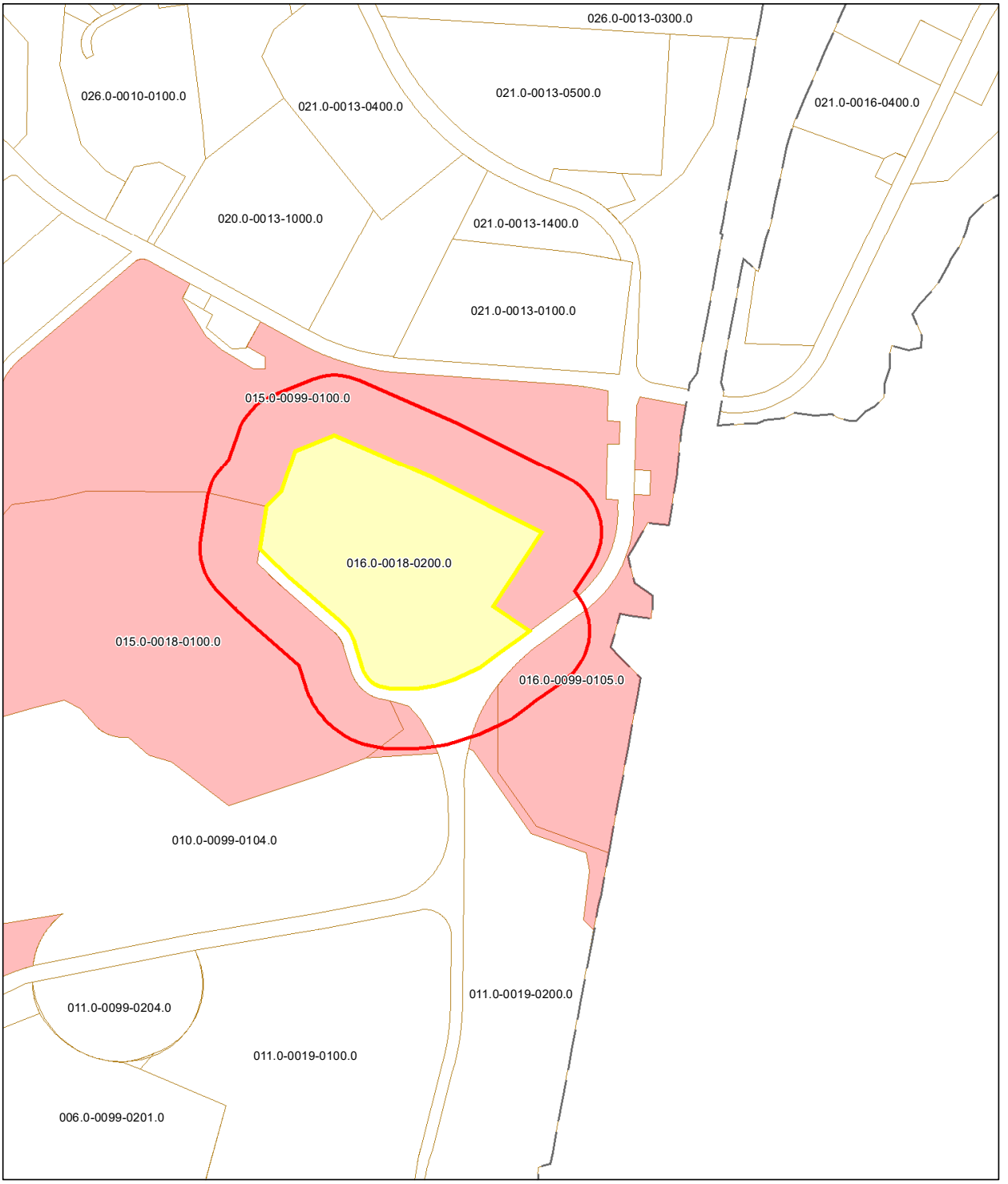
300 Ft Abutters to 16 Bulge Rd.

Devens, MA

1 inch = 500 Feet

0 500 1000 1500

January 11, 2021



Large Scale

Installation Boundary

Parcel Lines - No Ortho

300 foot Abutters List Report

Devens, MA
January 11, 2021

Subject Property:

Parcel Number:	016.0-0018-0200.0	Mailing Address:	MDFA / DAVAO-VACANT LOT
CAMA Number:	016.0-0018-0200.0		99 HIGH STREET 11TH FLOOR
Property Address:	16 BULGE ROAD DAVAO		BOSTON, MA 02110

Abutters:

Parcel Number:	011.0-0099-0103.0	Mailing Address:	MDFA / COLD SPRING POND
CAMA Number:	011.0-0099-0103.0		160 FEDERAL ST
Property Address:	1 BULGE ROAD COLD SPRING POND		BOSTON, MA 02110
Parcel Number:	015.0-0018-0100.0	Mailing Address:	MDFA/ DEVENS GOLF COURSE, LLP
CAMA Number:	015.0-0018-0100.0		99 HIGH STREET 11TH FLOOR
Property Address:	28 BULGE ROAD		BOSTON, MA 02110
Parcel Number:	015.0-0099-0100.0	Mailing Address:	MDFA
CAMA Number:	015.0-0099-0100.0		99 HIGH STREET 11TH FLOOR
Property Address:	216 BARNUM ROAD		BOSTON, MA 02110
Parcel Number:	016.0-0099-0105.0	Mailing Address:	MDFA
CAMA Number:	016.0-0099-0105.0		99 HIGH STREET 11TH FLOOR
Property Address:	222 PATTON ROAD		BOSTON, MA 02110
Parcel Number:	016.0-0099-0105.2	Mailing Address:	MDFA
CAMA Number:	016.0-0099-0105.2		99 HIGH STREET 11TH FLOOR
Property Address:	204 PATTON ROAD		BOSTON, MA 02110

ASSESSOR OFFICE
RECEIVED: 02/26/21
BY: Ruby Atano

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Attachment C: Stormwater Report

Under separate cover

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Attachment D: Geotechnical Considerations and Recommendations

SANBORN HEAD

Building Trust. Engineering Success.

GEOTECHNICAL ENGINEERING REPORT

16 Bulge Rd
Devens, Massachusetts

Prepared for Scannell Properties
File No. 4864.00
March 2021

SANBORN HEAD
Building Trust. Engineering Success.

1 Technology Park Drive
Westford, MA 01886

Mr. Matt Boone, P.E.
Scannell Properties
8801 River Crossing Boulevard, Suite 300
Indianapolis, IN 46240

March 3, 2021
File No. 4864.00

Re: Geotechnical Engineering Report
16 Bulge Road,
Devens, Massachusetts

Dear Matt,

Attached is an electronic (PDF) copy of our Geotechnical Engineering Report for the proposed project located at 16 Bulge Road in Devens, Massachusetts.

An Executive Summary of our findings is provided at the beginning of the report. We recommend that the proposed building be supported by conventional spread footings with the ground floor constructed as a slab-on-grade. In general, the site consists of topsoil and/or granular fill material overlying naturally occurring granular soils, comprised of fine to coarse sand and silty sand. Our recommendations for design and construction are provided in Section 7.0.

We trust this report meets the current needs of the project. If you have any questions, please contact the undersigned at (978) 392-0900.

Very truly yours,
SANBORN, HEAD & ASSOCIATES, INC.

Luke Norton, P.E.
Project Director

Kevin P. Stetson, P.E.
Senior Vice President

LDN/KPS: jtm

Encl. Geotechnical Engineering Report

P:\4800s\4864.00\Source Files\GT Report\20210303 Cover Ltr.docx

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Figure 2 Exploration Location Plan

APPENDICES

Appendix A Limitations

Appendix B Subsurface Exploration Logs

Appendix C Soil Laboratory Reports

EXECUTIVE SUMMARY

The proposed project located at 16 Bulge Road in Devens, Massachusetts involves construction of a new building with an approximate footprint of 118,000 square feet (sf) (with the potential for an additional 122,000 sf in the future) along with paved parking and stormwater management systems located on a 16.52-acre parcel.

We recommend that the proposed building be supported by shallow spread footings with the ground-level interior floor constructed as slab-on-grade. This report describes the subsurface conditions encountered in our test borings, and our engineering recommendations related to foundation design, pavement design, and earthwork procedures for site work. Engineering recommendations are provided in Section 7.0 of the report. Recommendations for the proposed stormwater systems were previously provided under separate cover.

1.0 INTRODUCTION

This geotechnical engineering report has been prepared for the proposed project located at 16 Bulge Road in Devens, Massachusetts (Site). This report provides an overview of the subsurface exploration program, the subsurface conditions encountered, and our geotechnical engineering recommendations for the design and construction of the proposed building, paved surface parking areas, and earthwork to develop the Site. Recommendations for the stormwater systems were provided in our Subsurface Evaluation for Stormwater data report dated February 8, 2021. This report has been prepared by Sanborn, Head & Associates, Inc. (Sanborn Head) on behalf of Scannell Properties (Client). This report is subject to the limitations in Appendix A.

2.0 SITE DESCRIPTION

The Site consists of a 16.52-acre parcel located on a portion of the former Fort Devens Army Installation in Devens, Massachusetts. Based on our knowledge of the area, we understand the Site was previously developed in the late 1950s to early 1960s as barracks, which were subsequently razed around 2005 with the foundations being removed and backfilled in an uncontrolled manner in 2016. The Site is now undeveloped, with the exception of Davao Circle, and partially wooded. Davao Circle, an asphalt-paved roadway, forms a loop on the Site and connects to Bulge Road, which borders the Site to the west. Utilities, including sanitary sewer, water, drainage, and utility poles, remain in place along Davao Circle. The existing grades within the footprint of the proposed building range from approximately elevation (El.) 314 to 320 feet. The Site is relatively flat in the area to be redeveloped with the ground surface sloping steeply downward in the north, east, and south directions beyond the development area.

The Site is part of a disposal site designated with Release Tracking Number (RTN) 2-0662 by the Massachusetts Department of Environmental Protection (MassDEP) due to the historic use of pesticides on the Site. The Site has reached regulatory closure with the implementation of an Activity and Use Limitation (AUL) deed restriction. VHB is providing environmental and Licensed Site Professional (LSP) services under the Massachusetts

Contingency Plan (MCP) for this project. We understand VHB will be providing environmental and soil management recommendations under separate cover.
Current ground surface elevations are available from Design Development (DD) plans provided by VHB of Providence, Rhode Island, received on February 5, 2021, and reference the North American Vertical Datum (NAVD) of 1988.

3.0 PROJECT DESCRIPTION

Based on our review of the latest DD plans, we understand that the proposed project consists of constructing a new building with an approximate footprint of 118,000 square feet (sf) (with the potential for an additional 122,000 sf in the future) along with paved parking and stormwater management system. The proposed finished floor elevation (FFE) is 318.00 feet. Based on the preliminary proposed grading, we anticipate the Site to be include fills of up to approximately 4 feet.

4.0 SUBSURFACE EXPLORATION PROGRAM

Geotechnical Test Borings

On September 23, 2020, Soil X Corp. (Soil-X) of Leominster, Massachusetts advanced three (3) test borings (identified as SH-1 through SH-3) at the Site. The test borings were advanced using hollow-stem auger drilling methods to depths ranging between approximately 27 and 52 feet below the ground surface (bgs).

On February 11, 2021, Soil-X advanced six (6) test borings (identified as SH-101 through SH-106) at the Site. The test borings were advanced using hollow-stem auger drilling methods to depths ranging between approximately 12 and 17 feet bgs.

Standard Penetration Tests (SPTs) were completed and split-spoon soil samples were obtained in general accordance with ASTM International Standard D1586.

The test borings were observed and logged by Sanborn Head personnel on a full-time basis. Soil samples were field classified based on visual estimates of grain size distribution and plasticity. Additional soil characteristics such as density and consistency (based on Standard Penetration Test data), color and moisture were noted on the logs included in Appendix B. Soil samples were classified using the Modified Burmister System and a legend is also provided in Appendix B that describes the classification system. The locations of the subsurface explorations performed by Sanborn Head are shown on Figure 2.

Stormwater Test Pits

On January 20 to January 22, 2021, Machine Time, LLC of Hudson, New Hampshire, excavated sixteen (16) stormwater test pits (identified as SH-TP-1 through SH-TP-16) at the Site. The test pits were excavated to total depths of approximately 10 to 12 feet bgs using a Bobcat E50 excavator. The test pits were observed by Sanborn Head personnel on a full-time basis and logged by Sanborn Head personnel, who field classified the soils using the United States Department of Agriculture (USDA) Textural Classification System. Logs of the test pits were prepared by a Soil Evaluator certified in Massachusetts from Sanborn Head

and are included in Appendix B. The locations of the test pits performed by Sanborn Head are shown on Figure 2.

The locations of the test borings and test pits observed by Sanborn Head were located by tape measurements from site features. Ground surface elevations were estimated from topographic contours in the electronic drawing received from VHB and are referenced to the vertical project datum in this file. The locations of the subsurface explorations should be considered accurate to the degree implied by the method used.

5.0 SOIL LABORATORY TESTING

To evaluate the engineering properties of the soils at the Site, six (6) soil samples taken from the proposed stormwater basins were submitted to a geotechnical laboratory for grain size distribution (sieve) analysis and USDA Textural Triangle Classification in accordance with ASTM D422. Additionally, one (1) composite sample of the natural sand was submitted for grain size distribution (sieve) analysis (ASTM D6913), Proctor Compaction (Method C – Modified Proctor) (ASTMD1557), and California Bearing Ratio (CBR) (ASTM D1883). The soil laboratory tests were completed by GeoTesting Express, Inc. of Acton, MA and copies of the laboratory reports are included in Appendix C.

6.0 SUBSURFACE CONDITIONS

The explorations generally encountered a surface layer of organic topsoil, underlain by a natural sand or loamy sand subsoil, underlain by natural sand with slightly varying silt content. Trace amounts of clay were also observed within the sand deposit between 40 and 52 feet in test boring SH-2.

The following paragraphs provide a general description of the subsurface conditions observed in the explorations. This report primarily evaluates subsurface explorations pertinent to the proposed building footprint and pavement areas; additional subsurface conditions at other parts of the Site were previously provided under separate cover. The subsurface conditions encountered at individual explorations are summarized on the exploration logs provided in Appendix B.

Topsoil and Subsoil: In undeveloped and landscaped areas of the Site, organic topsoil typically 2 to 10 inches thick was observed at the existing ground surface. The topsoil typically consists of dark brown, fine to coarse sand, little silt, trace gravel with varying amounts of organic particles/fragments.

Subsoil approximately 1.3 to 3.5 feet thick consisting of fine to course sand, little to some silt, and varying amounts of root matter was observed below topsoil at test boring locations SH-1 to SH-3, as well as the majority of the stormwater test pit locations.

Asphalt Pavement: In paved areas of the Site (Davao Circle), 4-inches of existing asphalt pavement was observed at the ground surface with an underlying base course fill of approximately 5-inches. The base course fill primarily consisted of medium dense, fine to coarse sand with varying amounts of gravel and silt.

Existing Fill: Discontinuous layers of existing fill were encountered at the Site, generally in areas previously developed for the former barracks buildings and Davao Circle. At SH-TP-4, an approximately 1.7 feet thick layer of general raise-in-grade fill was observed, comprised of fine to coarse sand, some gravel, little silt and few asphalt fragments. At SH-TP-6 (adjacent to the existing Davao Circle roadway) sand and gravel fill layers associated with roadway and utility construction were observed to approximately 8 feet bgs.

At SH-TP-12 through SH-TP-16 there was approximately 0.5 to 4 feet of general raise-in-grade fill and/or pavement base course fill.

Existing fill, placed in an uncontrolled manner, is also anticipated within the general footprints of the former barracks buildings as result of the removal of the previous foundations based on observations in test pits SH-TP-1, SH-TP-2, SH-TP-4, and SH-TP-14. The approximate locations of the former barracks are shown on Figure 2.

Natural Sand: Below the existing topsoil/subsoil and/or existing fill, a natural sand deposit was encountered across the site and consists of sand or silty sand with trace to no amounts of gravel. We note that SPT N-values were generally observed to increase with depth; SPT N-values within the first 20 feet bgs typically range from 7 to 19, whereas N-values below 20 feet bgs typically range from 14 to 25, indicating the material is generally loose to medium dense. In addition, trace amounts of clay were also observed within the sand deposit between 40 and 52 feet in test boring SH-2.

Groundwater: In general, groundwater was not encountered during the subsurface exploration program. As an exception, perched groundwater was encountered in test boring SH-2 at 41 feet bgs and in SH-3 at 27 feet bgs (corresponding to approximately El. 273 and 287 feet, respectively). The groundwater observations in the test borings are interpreted to be perched and not indicative of the stabilized groundwater level.

It should be noted that groundwater levels will vary depending on seasonal variations in temperature and precipitation and may be influenced by topography, nearby utilities, and other subsurface structures.

7.0 GEOTECHNICAL ENGINEERING RECOMMENDATIONS

The following paragraphs present our geotechnical engineering evaluation of the impact of subsurface conditions on the proposed development and our recommendations related to subgrade preparation and foundation design.

7.1 Engineering Evaluation of Subsurface Conditions

After evaluating the subsurface conditions at the Site, we believe the primary geotechnical engineering considerations are as follows:

- ***Building Foundations:*** The proposed building can be supported by shallow spread footings bearing on either: (1) the existing inorganic granular fill or natural soil which has been proof compacted prior to footing construction as described herein; or, (2) on

compacted Structural Fill as specified later in this report. Ground level floor slabs can be constructed as a slab-on-grade provided the subgrade is prepared as recommended later in this report.

- ***Unsuitable Organic Soils:*** Organic topsoil and subsoil containing organic matter such as tree roots should be considered unsuitable material below the proposed building, floor slabs and pavement areas. Topsoil and subsoil containing roots should be removed down to a subgrade of inorganic soil. Given the AUL on the property, the reuse and/or off-site disposal of soils should be evaluated by VHB for environmental considerations

- ***Existing Utilities:*** Existing utilities to be abandoned at the Site (in particular, the utilities within Davao Circle) should be removed to at least 10 feet beyond the proposed building lines and backfilled with compacted Structural Fill. Alternatively, if the existing utilities do not conflict with proposed footings and are located outside the zone of influence of proposed footings [defined as the area projecting downward and outward from the bottom of footing at one horizontal to one vertical (1H:1V) slope angle], the utility may be abandoned in-place and filled and sealed with flowable fill (or grouted).

- ***Former Barracks Foundations:*** We understand that the foundation elements from the former barracks were removed by excavation and may have been backfilled with on-Site soils in an uncontrolled manner. Previously disturbed soils within areas of the former barracks buildings may require over-excavation and placement of compacted Structural Fill. These areas should be evaluated by the Contractor using test pits and proof-compaction and observed in the field by the project Geotechnical Engineer. The approximate locations of the former buildings within the footprint of the proposed building are shown on Figure 2.

- ***Reuse of Excavated Materials:*** Excavated soils that meet the material specifications in Table 1 for Structural Fill may be reused as compacted fill below the base course layer in building and pavement areas provided it meets the requirements of the AUL. Excavated materials that meet the material specifications in Table 1 for Common Fill may be reused as compacted fill below the base course in pavement areas. We note that premium costs may be associated with soil management, particularly for the uppermost five (5) feet of soil, due to known environmental contamination on the Site and the requirements of the MCP, MassDEP, and the on-Site AUL. Refer to the Environmental Engineer, VHB, for soil management recommendations. Additionally, the Site contains a significant amount of asphalt pavement and was formerly developed with multiple structures. The pavement and existing base course may be suitable for reuse as reclaimed asphalt base course under paved areas.

- ***Subgrade Preparation and Compaction During Construction:*** The on-site material has variable sand and silt content. In areas where the sand content is high with trace fines, the material may be difficult to compact to specifications without the systematic application of water to each lift. These sandy soils will have a tendency to become loose, even after being compacted to specifications, if the soil is allowed to remain exposed to the elements and become dry. In areas where the silt content is high, the soil will be

sensitive to moisture, difficult to compact when wet, and likely to become unstable when subject to repetitive loads from construction activities. As such, we recommend that a 3 to 4-inch thick layer of compacted ¾-inch Crushed Stone be placed below footing areas to protect the subgrade from disturbance during construction.

- ***Temporary Dewatering:*** Perched groundwater is expected to exist at depths between 26 to 41 feet below the existing surface. As such, temporary dewatering is not expected to be necessary to control groundwater. Limited temporary dewatering may be needed to control precipitation and surface water entering excavations to allow earthwork to be completed in the dry if the earthwork is performed during wet periods of the year. If precipitation water does accumulate in excavations, the water could be allowed to infiltrate into the ground after storm events, or water could be pumped from filtered sumps installed below the corners of the excavation. Water from temporary dewatering should be managed in accordance with applicable regulations and the project-specific Stormwater Pollution Prevention Plan (SWPPP).

7.2 Foundation Design Recommendations

7.2.1 Building Foundation Design

The following design criteria are provided for use by the structural engineer for design of the foundation system to support the building foundation walls:

- We recommend that the building foundation walls be supported by spread footings bearing on the existing fill, undisturbed natural inorganic soils, or on compacted Structural Fill placed over those materials provided the subgrade is prepared as described in Section 7.3. Over-excavation and replacement of existing soils may be required within the footprints of the former barracks buildings.

- Spread footings should be proportioned based on a net allowable bearing capacity of 4.0 kips per square foot (ksf).

- The minimum recommended lateral dimension for isolated spread footings is 36 inches, while continuous wall footings should be at least 24 inches wide.

- Footings in areas exposed to freezing temperatures should be founded at least four (4) feet below exterior finished grade for frost protection. Interior footings, in areas not exposed to freezing temperatures, should be at least 18 inches below finished floor grade, or depth that provides at least 6 inches between top of footing and finished floor elevation, whichever is deeper.

- For the seismic design of the proposed building, we recommend that the Site be classified as Site Class "D" as defined in Table 1613.5.2 in the International Building Code (IBC) 2015 and the 9th Edition of the Massachusetts Building Code. Design Spectral Response Accelerations: S_{DS}=0.220g and S_{D1} = 0.112g (IBC 2015, Equation 16-39 and Equitation 16-40).

- The Massachusetts State Building Code 9th Edition; Section 1804.6 provides a screening method to analyze the potential susceptibility of a saturated soil to liquefy in a typical "design" earthquake in Massachusetts. The screening method employs the sample depth and uncorrected SPT N-value, the depth to water and the type of hammer used. The results of the screening indicate that the conditions encountered within the building footprint are not susceptible to liquefaction.

- Below grade walls restrained from rotation, with a horizontal backfill surface, and no groundwater should be designed based on an "at-rest" lateral earth pressure of 60 pounds per cubic foot (pcf).

- Below grade walls which are unrestrained at the top and allowed to rotate at least 0.0005 times the height of the wall may be designed based on an "active" lateral earth pressure of 40 pcf.

- Below grade walls should also be designed to resist lateral earth pressure from a seismic event as required by Section 1605.3.1 of the Massachusetts State Building Code.

- A coefficient of friction of 0.50 is recommended for cast-in-place concrete on granular soil. This should be considered an ultimate strength value, and an appropriate factor of safety should be applied for the sliding analysis.

- Total settlement for building foundations is anticipated to be less than 1 inch with less than ½ inch of differential settlement. The differential settlement will depend on the actual loads applied.

7.2.2 Floor Slab-on-Grade Design

The proposed ground level floor slabs should be designed as slab-on-grade bearing on at least 6 inches of Gravel Fill as specified in Table 1. The material should be compacted to at least 95 percent of its maximum dry density as determined by ASTM D-1557, Method C (Modified Proctor). If the subgrade is prepared as described herein, a modulus of subgrade reaction of at least 150 pounds per cubic inch (pci) should be achieved. Insulation and a subslab vapor barrier should be installed where required by the state building code.

7.2.3 Foundation Drains and Subslab Underdrains

It is our opinion that foundation drains and subslab underdrains are not required as part of the building design for long term control of groundwater.

7.3 Building Area and Footing Subgrade Preparation During Construction

The following paragraphs describe the recommended earthwork procedures for preparation of the building area and footing subgrade during construction.

- In proposed building areas, the surface should be cleared of vegetation and grubbed, and existing unsuitable topsoil and subsoil containing roots should be removed down to a natural, inorganic soil subgrade to a distance of 10 feet beyond the building lines.

Likewise, any existing pavement, concrete slabs, and subsurface utilities to be abandoned should be removed from the proposed building and garage areas to at least 10 feet beyond the exterior walls.

- After removal of surface materials and prior to placing new fill, the exposed soil subgrade should be proof-compacted with at least 6 passes of a 10-ton smooth drum vibratory roller under the observation of a qualified geotechnical engineer, or his/her representative. Any soft or loose zones identified by the proof compaction should be evaluated by excavation and replaced with compacted fill as necessary. Proof compaction may be waived by the project geotechnical engineer in the field if, in their opinion, the proof compaction will cause disturbance to the subgrade.

- Any areas of existing fill within the proposed building footprint that resulted from the uncontrolled backfill of the former barracks buildings should be removed down to a natural, inorganic soil subgrade. Prior to placing new fill, the exposed soil subgrade should be proof-compacted with at least 6 passes of a 10-ton smooth drum vibratory roller under the observation of a qualified geotechnical engineer, or his/her representative. Proof compaction may be waived by the project geotechnical engineer in the field if, in their opinion, the proof compaction will cause disturbance to the subgrade.

- Where additional fill is necessary to achieve the proposed grades in proposed building areas, Structural Fill that meets the material specifications in Table 1 should be spread in loose lifts not to exceed 12 inches thick and compacted to at least 95 percent of its maximum dry density as determined by ASTM D1557, Method C (Modified Proctor).

- Footings should be excavated to expose a subgrade consisting of existing inorganic granular fill, natural inorganic soils, or compacted Structural Fill placed as described above. To stabilize the soil subgrade in footing areas during construction, we recommend that footing areas be over-excavated by 3 to 4 inches and backfilled up to the bottom of footing elevation with ¾-inch Crushed Stone and compacted until visually firm and stable. Material specifications for ¾-inch Crushed Stone are provided in Table 1. Crushed Stone should be compacted with at least 6 passes of a hand operated vibratory plate compactor with a dynamic weight of at least 1,000 pounds, or equivalent effort.

- Fill should not be placed, and footings should not be constructed, over a subgrade with standing water or that is frozen. If there is standing water on the subgrade, the water should be removed from the surface and any soft and yielding soils should be removed or allowed to dry prior to placement of additional fill or concrete. If the subgrade is frozen, the soil that is frozen should be removed, or thawed and recompacted, prior to placement of fill or concrete.

7.4 Pavement Design and Earthwork Recommendations

The following paragraphs provide our recommendations for pavement design and earthwork procedures to prepare the proposed pavement areas.

7.4.1 Asphalt (Flexible) Pavement Design

The asphalt (flexible) pavement design is intended to strike a balance between performance and cost after considering the soil available at the site and anticipated traffic loads for mixed use (office/warehouse/clean room). We recommend the following asphalt pavement cross-sections for standard-duty and heavy-duty applications.

Layer	Thickness	
	Standard Duty (Car Parking)	**Heavy Duty (Access Roads)**
Asphalt Wearing Course	1.5 inches	1.5 inches
Asphalt Binder Course	1.5 inches	2.5 inches
Pavement Base Course (Processed Gravel for Subbase, MassDOT Item M1.03.1, or Dense-Graded Crushed Stone for Subbase, MassDOT Item M2.01.7)	12 inches	12 inches

7.4.2 Rigid (Portland Cement Concrete) Pavement Design

We recommend the following typical cross-sections for standard duty and heavy duty rigid pavement applications:

Layer	Thickness	
	Standard Duty	**Heavy Duty**
Portland Cement Concrete (Unreinforced 4,000 psi)	5 inches	6 inches
Base Course (MassDOT Item M2.01.7, Dense-Graded Crushed Stone; MassDOT Item M1.03.1, Processed Gravel for Subbase)	12 inches	12 inches

Crack control joints should be installed at a spacing of no more than 12 feet on center for standard duty pavement and no more than 15 feet on center for heavy duty pavement.

Please note that some frost-heave should be expected below unheated areas unless four (4) feet of non-frost susceptible material (e.g. Gravel Fill) is provided. The Owner may consider a minimum of 12 inches of Gravel Fill (or similar non-frost susceptible soil) as base course below sidewalks and landscape pavers, especially at building entrances. Under no circumstance should on-site fill be used as base course below sidewalks or pavement; base course should consist only of those materials described herein.

7.4.3 Subgrade Preparation Procedures for Pavement Areas

It is recommended that pavement areas be prepared as follows:

- Vegetation, topsoil, organic matter, and existing asphalt should be removed to expose the top of the existing inorganic, granular soil subgrade.
- The Site should be properly graded to limit surface water from entering the work areas or ponding on the exposed soil subgrade. The exposed subgrade soils may be sensitive to

disturbance and strength degradation in the presence of excess moisture. Construction traffic over the exposed soil subgrade should be limited to the extent practical. The subgrade soils should also be considered frost susceptible.

- Prior to placing fill, the subgrade should be proof-compacted with at least 4 passes of a 10-ton vibratory roller under the observation of a qualified geotechnical engineer, or his/her representative. Any soft or loose zones identified by the proof compaction should be evaluated by excavation and replaced with compacted Structural Fill or Common Fill as necessary. Proof compaction may be waived by the project geotechnical engineer in the field if, in their opinion, the proof compaction will cause disturbance to the subgrade.

- Any areas of existing fill within the proposed pavement areas that resulted from the uncontrolled backfill of the former barracks buildings should be removed down to a natural, inorganic soil subgrade. Prior to placing new fill, the exposed soil subgrade should be proof-compacted with at least 6 passes of a 10-ton smooth drum vibratory roller under the observation of a qualified geotechnical engineer, or his/her representative. Proof compaction may be waived by the project geotechnical engineer in the field if, in their opinion, the proof compaction will cause disturbance to the subgrade.

- General raise-in-grade fill to be placed up to subgrade for pavement base course in proposed pavement areas should consist of Structural Fill or Common Fill as specified in Table 1. This material should be placed in loose lifts not exceeding 12 inches thick, and compacted to at least 95 percent of its maximum dry density as determined by ASTM D1557, Method C (Modified Proctor).

- Construct the appropriate pavement cross-section (standard-duty or heavy-duty) as shown on the plans. The base course layer should be placed and compacted to at least 95 percent of its maximum dry density as determined by ASTM D1557, Method C (Modified Proctor).

8.0 SLOPE DESIGN RECOMMENDATIONS

The proposed redevelopment includes minor changes to existing slopes facing the wetlands to the north, west, and east. We recommend that cut and fill slopes be designed with a slope angle of 2.5H:1V, or flatter if the slope face is to be reseeded to establish vegetative cover. Vegetative cover should be established on the slope surface as soon as practical after final grading to reduce erosion and the potential for sloughing failures. Cut or fill slopes steeper than 2.5H:1V should be stabilized with Riprap at least 18 inches thick, underlain by Geotextile for Riprap as specified in Table 1. Slope angles steeper than 1.5H:1V in soil are not recommended. Inboard slopes of stormwater basins should be graded to a slope angle of 3H:1V, or flatter and reseeded to establish vegetative cover.

Fill slopes should be constructed with compacted Structural Fill that meets the material specifications in Table 1 and should be spread in loose lifts not to exceed 12 inches thick and compacted to at least 95 percent of its maximum dry density as determined by ASTM D1557,

Method C (Modified Proctor). Surface water swales or curbing should be provided at the crest of soil cut and fill slopes to intercept and divert runoff from the slope face.

9.0 CONSTRUCTION MONITORING

Sanborn Head should be provided the opportunity to review the design plans, specifications, and contractor submittals to see that the recommendations of this report have been properly incorporated.

We further recommend that our firm be retained during earthwork construction to observe preparation of footing subgrade areas, excavation and reuse of existing fill, pavement subgrade preparation, and compaction testing of fill material to check that the recommendations in the report are being implemented as intended in the field. Our construction phase services should include observation of the work for compliance with the recommendations in this report, and assistance in the development of design changes should subsurface conditions differ from those anticipated prior to the start of construction.

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TABLE

TABLE 1
MATERIAL SPECIFICATIONS
16 Bulge Road
Devens, Massachusetts

Structural Fill to be used for general raises in grade below the building and pavement areas and shall consist of Gravel Fill, Granular Fill, and On-Site Fill, as described below.

Gravel Fill imported fill to be used as base course below footings shall consist of hard, inert, durable gravel and coarse sand and shall conform to the material and gradation requirements for one of the following MassDOT materials in Standard Specifications for Highways and Bridges, latest edition: Dense Graded Crushed Stone for Subbase - Item M2.01.7. Fill shall be free from ice and snow, roots, surface coatings, sod, loam, clay, rubbish, and other deleterious or organic matter. The gradation requirements, with exceptions, are reproduced as follows:

	Dense Graded Crushed Stone for Subbase, Item M2.01.7
Sieve Size	**Percent Passing**
2-inch	100
1½-inch	70-100
¾-inch	50-85
No. 4	30-55
No. 50	8-24
No. 200	3-10

Granular Fill imported fill to be used for general raises-in-grade in the proposed building and pavement areas shall be free from ice, snow, roots, surface coatings, sod, loam, clay, rubbish, and other deleterious matter, and shall be well-graded within the following gradation requirements:

Sieve Size	**Percent Passing by Weight**
6-inch	100
1-inch	70-100
No. 4	50-100
No. 40	15-75
No. 200	0-12

On-Site Fill to be used for general raises in grade (below the base course layer) in proposed building, pavement and landscape areas shall consist of inorganic soil from cut areas and shall be free from ice, snow, roots, surface coatings, sod, loam, clay, rubbish, and other deleterious matter. On-Site Fill shall be well-graded within the following gradation requirements:

Sieve Size	Percent Passing by Weight
6-inch	100
No. 4	30-100
No. 40	10-75
No. 200	0-20

Common Fill to be used for general raise-in-grade fill in proposed pavement areas more than 3 feet below finished and landscaped areas shall consist of inorganic soil from on-site cut areas with a maximum particle size of 8 inches and less than 40 percent passing the No. 200 sieve. The material shall be free from ice, snow, roots, surface coatings, sod, loam, clay, rubbish, and other organics or deleterious matter (i.e. plastic, metal, foam insulation, rubber).

Base Course for Pavement to be used as the base course layer directly beneath the asphalt binder course in pavement areas, and as the base course layer directly below Portland cement concrete pavement shall conform to the material and gradation requirements for one of the following MassDOT Items M1.09.0, M2.01.7, or M1.03.1, in the MassDOT Specifications. If Reclaimed Pavement Borrow is used, it shall be processed by recycling existing on-site asphalt pavement and shall not be produced from off-site asphalt pavement. The gradation requirements, with exceptions, are reproduced as follows:

	Reclaimed Pavement Borrow Material, Item M1.09.0	Dense Graded Crushed Stone for Subbase, Item M2.01.7	Processed Gravel for Subbase, Item M1.03.1
Sieve Size	**Percent Passing**	**Percent Passing**	**Percent Passing**
3-inch	100	---	100
2-inch	---	100	---
1½-inch	70-100	70-100	70-100
¾-inch	50-85	50-85	50-85
No. 4	30-60	30-55	30-60
No. 50	8-24	8-24	---
No. 200	0-10	3-10	0-10

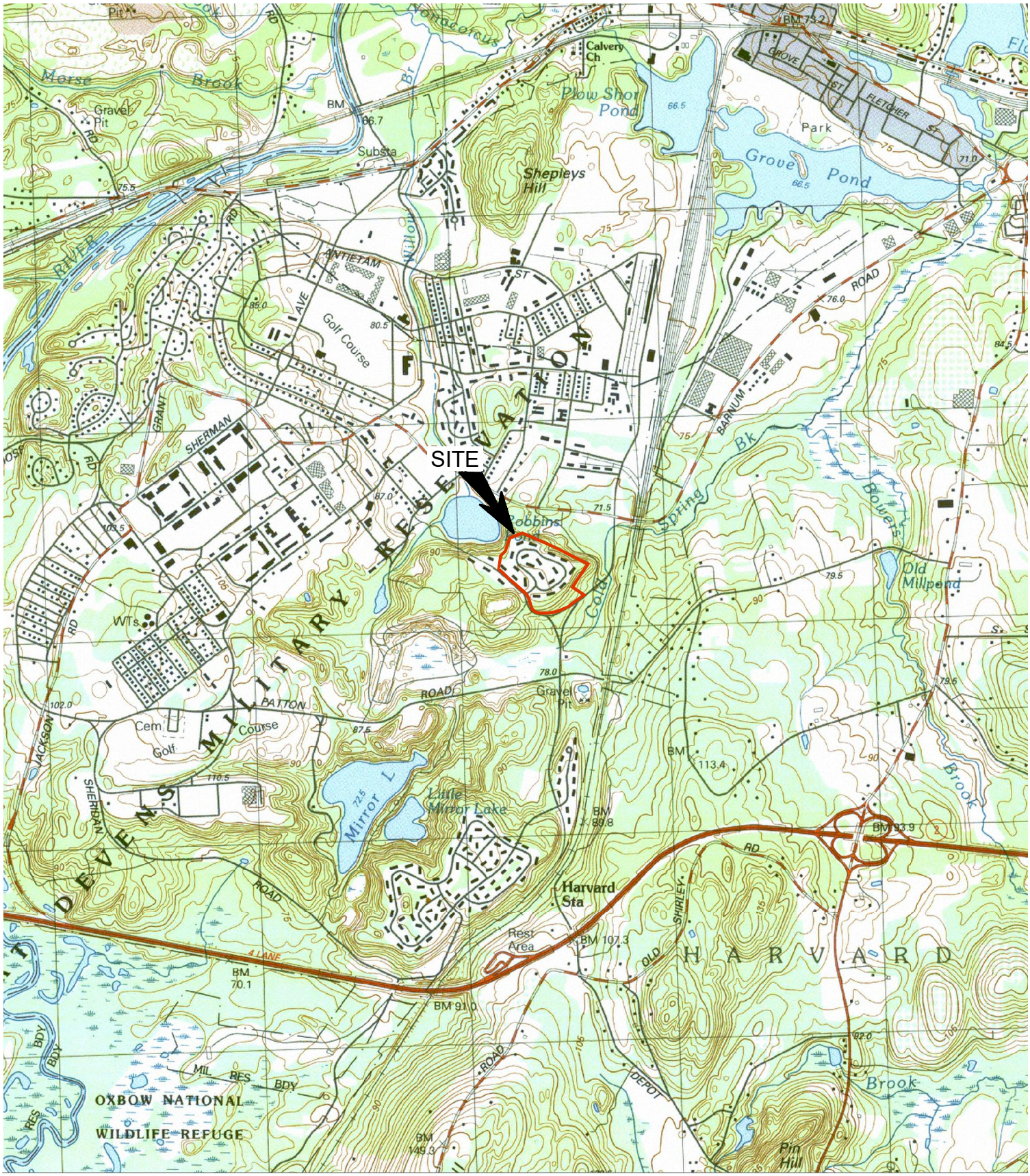
¾-inch Crushed Stone shall be used as the base course layer below the slab for the underdrain system, and as specified on the Drawings. Crushed stone shall consist of hard durable processed crushed stone that meets the requirements for MassDOT Item, M2.01.4, in the MassDOT Specifications. The gradation requirements are reproduced as follows:

Sieve Size	**Item M2.01.4**
1 inch	100
3/4 inch	90-100
1/2 inch	10-50
3/8 inch	0-20
No. 4	0-5

Vapor Barrier shall consist of a polyethylene sheet at least 10 mils thick placed over the base course layer and directly beneath the concrete slab-on-grade.

Geotextile shall consist of a non-woven polypropylene fabric having a Puncture Resistance (ASTM D4833) of at least 65 pounds, a Permittivity (ASTM D4491) of at least 130 gal/min/sf, and an Apparent Opening Size (ASTM D4751) of 0.15 to 0.22 millimeters such as Mirafi 140N, or Contech C-40NW, or approved equivalent.

FIGURES



NOTES:
Base map was taken from the "Office of Geographic and Environmental Information (MassGIS), Commonwealth of Massachusetts Information Technology Division"
7.5 minute USGS Quadrangle Maps: Harvard, Massachusetts, REV: 1988

Drawn By: C.Dias
Designed By: J.McCarthy
Reviewed By: K.Stetson
Project No: 4864.00
Date: March 2021

SCALE: 1:25,000

SANBORN HEAD

Figure 1

Locus Plan

Geotechnical Engineering Report

16 Bulge Road
Devens, Massachusetts

NOTES:

1. THE BASE MAP WAS DRAWN FROM A PLAN ENTITLED, "GRADING AND DRAINAGE PLAN", PREPARED BY VANASSE HANGEN BRUSTLIN, INC. (VHB) OF WATERTOWN, MA, DATED OCTOBER 2, 2020 WITH AN ORIGINAL SCALE OF 1" = 50'.
2. EXPLORATIONS DESIGNATED SH-1 THROUGH SH-3 WERE ADVANCED BY SOIL X CORP. (SOIL X) OF LEOMINSTER, MA AND OBSERVED BY SANBORN HEAD ON SEPTEMBER 23, 2020.
3. TEST PITS DESIGNATED SH-TP-1 THROUGH SH-TP-16 WERE EXCAVATED BY MACHINE TIME, LLC. (MACHINE TIME) OF HUDSON, NH AND OBSERVED BY SANBORN HEAD BETWEEN JANUARY 20 AND 22, 2021.
4. EXPLORATIONS DESIGNATED SH-101 THROUGH SH-106 WERE ADVANCED BY SOIL X AND OBSERVED BY SANBORN HEAD ON FEBRUARY 11, 2021.
5. APPROXIMATE LOCATIONS OF EXPLORATIONS ARE BASED ON TAPED MEASUREMENTS MADE IN THE FIELD RELATIVE TO PROMINENT SITE FEATURES. THIS DATA SHOULD BE CONSIDERED ACCURATE ONLY TO THE DEGREE IMPLIED BY THE METHOD USED.

LEGEND:

- APPROXIMATE SITE BOUNDARY
- SH-101 — APPROXIMATE LOCATION AND DESIGNATION OF TEST BORING OBSERVED BY SANBORN HEAD (FEBRUARY 2021)
- SH-TP-1 — APPROXIMATE LOCATION AND DESIGNATION OF TEST PIT OBSERVED BY SANBORN HEAD (JANUARY 2021)
- SH-1 — APPROXIMATE LOCATION AND DESIGNATION OF TEST BORING OBSERVED BY SANBORN HEAD (SEPTEMBER 2020)

SANBORN HEAD

GRAPHICAL SCALE
60' 30' 0' 60' 120'

NO.	DATE	DESCRIPTION	BY

DRAWN BY: C.DIAS
DESIGNED BY: S.RING/J.MCCARTY
REVIEWED BY: L.NORTON
PROJECT MGR: L.NORTON
PIC: K.STETSON
DATE: MARCH 2021

GEOTECHNICAL ENGINEERING REPORT
16 BULGE ROAD
DEVENS, MASSACHUSETTS

PROJECT NUMBER: 4864.00

EXPLORATION LOCATION PLAN

SHEET NUMBER: 2

ATTACHMENT A

LIMITATIONS

ATTACHMENT A
LIMITATIONS

Explorations

1. The analyses, recommendations, and designs submitted in this letter are based in part on the data obtained from subsurface explorations. The nature and extent of variations between these explorations may not become evident until construction. If variations then appear evident, 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 soil transitions may be more or less gradual than indicated. For specific information, refer to the test boring logs.

3. Water level readings have been made in the drill holes at the times and under the conditions stated on the test boring logs. These data have been reviewed and interpretations have been made in the text of this letter. 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 those occurring at the time measurements were made.

Review

4. In the event that any changes in the nature, design, or location of the proposed building are planned, the conclusions and recommendations contained in this letter shall not be considered valid unless the changes are reviewed and conclusions of the letter modified or verified in writing by Sanborn Head.

Construction

5. It is recommended that this firm be retained to provide soil engineering services during the excavation and earthwork construction phases of the work. This is to observe compliance with the design concepts, specifications, or 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

6. This letter has been prepared for the exclusive use of Scannell Properties of Indianapolis, Indiana for the project at 16 Bulge Road in Devens, Massachusetts, in accordance with generally accepted soil and foundation engineering practices. No other warranty, expressed or implied, is made.

7. This soil and foundation engineering report has been prepared for this project by Sanborn Head for design purposes only and is not sufficient to prepare an accurate bid. Contractors wishing a copy of this letter may secure it with the understanding that its scope is limited to design considerations only.

P:\4800s\4864.00\Source Files\GT Report\Att - A Limitations\20210303 Attachment A - Limitations.docx

ATTACHMENT B

SUBSURFACE EXPLORATION LOGS

Description and Classification of Soil

1. Density or Consistency: The density or consistency of a soil sample is based on the Standard Penetration Test N-value according to the following table:

Density of Granular Soil	SPT N-Value		Consistency of Cohesive Soil
Very Loose	0-4	<2	Very Soft
Loose	5-10	2-4	Soft
Medium Dense	11-30	5-8	Medium Stiff
Dense	31-50	9-15	Stiff
Very Dense	>50	16-30	Very Stiff
		>30	Hard

The Standard Penetration Resistance, or N-value in blows per foot, is the sum of the blows recorded over the second and third 6-inch interval.

A number followed by "/3" indicates the distance that the sampler advanced. For example "100/4" indicates that 100 blows of a 140 pound hammer falling 30 inches advanced the sampler 4 inches. "WOR/24" indicates the weight of the drilling rods without the hammer caused the sampler to advance 24 inches.

"WOH" indicates the static weight of the 140 pound hammer and the drilling rods attached to the split spoon sampler were sufficient to cause the sampler to advance.

"WOR" indicates the static weight of the drilling rods attached to the split spoon sampler was sufficient to cause the sampler to advance.

2. Color: The color of a soil sample is based on visual observation.

3. Soil Components

A. Description: The components of a soil sample are described by visually estimating the percentage of each component by weight of the total sample using a Modified Burmister System.

i. Major Component: The major soil component is written with upper case letters for granular soil (e.g., SAND, GRAVEL) and a combination of upper and lower case letters for fine grained soil (e.g., Silty CLAY, Clayey SILT).

ii. Minor Component: The minor soil components are written with the first letter of each soil type in upper case, and the remaining letters in lower case (e.g., Gravel, Silt). The minor components are identified and prefaced in the description based on the following percentages:

Preface	Percentage
and	35-50
some	20-35
little	10-20
trace	0-10

iii. Note: The actual percentages of gravel soil may differ from that measured when sampling with a standard split spoon sampler because of the relatively small sampler diameter. Also, it is not possible to identify the presence of boulders and cobbles using a standard split spoon sampler.

B. Definitions

i. Granular Soil: A granular soil sample is defined by the following particle sizes as referenced to a standard sieve:

Material	Description	Standard Sieve Limit	
		Upper	Lower
Boulders	C-sized	--	36 inch
	B-sized	36 inch	24 inch
	A-sized	24 inch	12 inch
Cobbles	--	12 inch	3 inch
Gravel	coarse	3 inch	3/4 inch
	fine	3/4 inch	No. 4
Sand	coarse	No. 4	No. 10
	medium	No. 10	No. 40
	fine	No. 40	No. 200

ii. Fine Grained Soil: The degree of plasticity of fine-grained soils is defined as follows:

Material	Degree of Plasticity	Plasticity Index (PI)	Smallest Thread Diameter (in.)
SILT	Non-Plastic	0	None
Clayey SILT	Slight	1 to 5	1/4
SILT & CLAY	Low	5 to 10	1/8
CLAY & SILT	Medium	10 to 20	1/16
Silty CLAY	High	20 to 40	1/32
CLAY	Very High	40+	1/64

iii. Organic Soil: An organic soil sample is classified by observation of the sample structure as follows:

Material	Description
TOPSOIL	Surficial soils that support plant life and which contain organic matter.
SUBSOIL	Soil underlying the topsoil which may contain roots or plant fibers.
PEAT	Deposits of plant remains in which the original plant fibers or root structure are visible.
ORGANIC SILT	Deposit of plant remains in which the original plant fibers or root structure have decomposed.

iv. Non-Soil Constituents: Non-soil constituents (artificial or anthropogenic material, organic materials, cobbles and boulders) are described as follows:

The following terminology is used to denote size ranges of non-soil constituents such as man-made objects or fill material:

Descriptive Term	Size Range	Comparative Term
Specks	< No. 200 Sieve	Silt and Clay fines
Particles	No. 200 Sieve to No. 4 Sieve	Sand
Fragments	No. 4 Sieve to 3 in.	Gravel
Pieces	3 in. to 12 in.	Cobbles
Blocks	> 12 in.	Boulders

The following terminology is used to describe the frequency that a non-soil constituent is observed by estimating the percentage of the constituent by weight of the total sample:

Descriptor	Percentage
very few	0-5
few	5-10
common	10-20
frequent	20-35
numerous	35-50

4. Moisture Content: The moisture content of a soil sample is based on the observable presence of water according to the following table:

Dry	Moisture is not apparent, dusty.
Moist	No visible water.
Wet	Visible free water.

5. Other Pertinent Characteristics: Pertinent characteristics observed in a soil sample should be noted according to the following table:

Soil Structure Produced by Deposition of Sediments	
Stratified	Random soil deposits of varying components of color.
Varved	Alternating soil deposits of varying thickness (i.e., clays or silts).
Stratum	Soil deposit > 12 inches thick.
Layer	Soil deposit 3 inches to 12 inches thick.
Seam	Soil deposit 1/8 inch to 3 inches thick.
Parting/Lens	Soil deposit <1/8 inch thick.

SANBORN HEAD

Sanborn, Head & Associates, Inc.

Project: 16 Bulge Rd
Location: Devens, MA
Project No.: 4864.00

Log of Boring SH-1

Ground Elevation: 314 ± feet
Datum:

Drilling Method: Truck-Mounted Hollow Stem Auger

Sampling Method: 2" O.D. Split Spoon, Automatic Hammer

Drilling Company: Soil X Corp
Foreman: K. Bonetti
Date Started: 09/23/20 **Date Finished: 09/23/20**
Logged By: S. Ring **Checked By: L. Norton**

Groundwater Readings

Date	Time	Depth to Water	Ref. Pt.	Depth of Casing	Depth of Hole	Stab. Time
09/23/20	10:17	No Groundwater Encountered			27'	1 Hour

Depth (ft)	Sample Information: Sample No.	Depth (ft)	Spoon Blows per 6 in	Pen/ Rec (in)	Field Testing Data	Stratum: Log	Description	Geologic Description	Remarks
0	S-1	0 - 2	3 6 9 17	24/12	PID: 18.6 ppmv		0' TOPSOIL 0.3	S-1A (0 to 0.3'): TOPSOIL. S-1B (0.3 to 2'): Medium dense, tan, fine to coarse SAND, some Gravel, little Silt. Moist. [Gravelly Loamy Sand].	
2									
4									
6	S-2	5 - 7	5 9 9 5	24/15	PID: 33.7 ppmv			S-2 (5 to 7'): Medium dense, tan, fine to coarse SAND, little Silt. Moist. [Loamy Sand].	
8									
10	S-3	10 - 12	5 6 6 8	24/16	PID: 36.3 ppmv			S-3 (10 to 12'): Medium dense, tan, fine to coarse SAND, little Silt. Moist. [Loamy Sand].	
12							SAND		
14									
16	S-4	15 - 17	4 6 8 12	24/17	PID: 16.2 ppmv			S-4 (15 to 17'): Medium dense, tan, fine to coarse SAND, little Silt. Moist. [Loamy Sand].	
18									
20	S-5	20 - 22	5 8 9 15	24/20	PID: 17.3 ppmv			S-5 (20 to 22'): Medium dense, tan, fine to coarse SAND, little Silt. Moist. [Loamy Sand].	
22									
24									

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SANBORN HEAD

Sanborn, Head & Associates, Inc.

Project: 16 Bulge Rd
Location: Devens, MA
Project No.: 4864.00

Log of Boring SH-1

Ground Elevation: 314 ± feet
Datum:

Drilling Method: Truck-Mounted Hollow Stem Auger

Sampling Method: 2" O.D. Split Spoon, Automatic Hammer

Drilling Company: Soil X Corp
Foreman: K. Bonetti
Date Started: 09/23/20 **Date Finished: 09/23/20**
Logged By: S. Ring **Checked By: L. Norton**

Groundwater Readings

Date	Time	Depth to Water	Ref. Pt.	Depth of Casing	Depth of Hole	Stab. Time
09/23/20	10:17	No Groundwater Encountered			27'	1 Hour

Depth (ft)	Sample Information					Stratum		Geologic Description	Remarks
	Sample No.	Depth (ft)	Spoon Blows per 6 in	Pen/ Rec (in)	Field Testing Data	Log	Description		
26	S-6	25 - 27	3 9 11 13	24/19	PID: 7.8 ppmv		SAND	S-6 (25 to 27'): Medium dense, light tan, fine to medium SAND, some Silt. Moist. [Loamy Sand].	
							-----27'-----	Boring terminated at 27 feet. No refusal encountered.	
28								NOTES:	
								1. USDA textural soil classifications are shown in brackets [ ].	
30								2. Soil samples were screened for volatile organic compounds (VOCs) using a MiniRAE 2000 Photoionization Detector (PID) with a 10.6 eV lamp, calibrated to a 100 parts per million by volume (ppmv) isobutylene-in-air standard using a response factor of 1.0. Results are presented in ppmv; the typical detection limit is 1 ppmv. ND indicates not detected. NA indicates not available. The PID measures relative levels of VOCs. Although PID screening cannot be used directly to quantify VOC concentrations or identify individual compounds, the results can serve as a relative indicator for the presence of VOCs.	
32									
34									
36									
38									
40									
42									
44									
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48									
50									

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SANBORN HEAD

Sanborn, Head & Associates, Inc.

Project: 16 Bulge Rd
Location: Devens, MA
Project No.: 4864.00

Log of Boring SH-2

Ground Elevation: 314 ± feet
Datum:

Drilling Method: Truck-Mounted Hollow Stem Auger

Sampling Method: 2" O.D. Split Spoon, Automatic Hammer

Drilling Company: Soil X Corp
Foreman: K. Bonetti
Date Started: 09/23/20 **Date Finished: 09/23/20**
Logged By: S. Ring **Checked By: L. Norton**

Groundwater Readings

Date	Time	Depth to Water	Ref. Pt.	Depth of Casing	Depth of Hole	Stab. Time
09/23/20	13:10	41'	Ground Surface			1.5 Hours

Depth (ft)	Sample Information: Sample No.	Depth (ft)	Spoon Blows per 6 in	Pen/ Rec (in)	Field Testing Data	Stratum: Log	Description	Geologic Description	Remarks
0	S-1	0 - 2	3 6 8 7	24/10	PID: 8.6 ppmv		-----0'----- TOPSOIL -----0.5'-----	S-1A (0 to 0.5'): TOPSOIL. S-1B (0.5 to 2'): Medium dense, brown, fine to coarse SAND, little Silt, trace Gravel, very few Root fragments. Moist. [Loamy Sand].	
2									
4									
6	S-2	5 - 7	4 5 7 9	24/18	PID: 4.3 ppmv			S-2 (5 to 7'): Medium dense, tan, fine to coarse SAND, some Gravel, trace Silt. Moist. [Gravelly Sand].	
8									
10	S-3	10 - 12	6 5 6 7	24/19	PID: 37.0 ppmv			S-3 (10 to 12'): Medium dense, tan, fine to coarse SAND, little Silt. Moist. [Loamy Sand].	
12							SAND		
14									
16	S-4	15 - 17	3 5 9 10	24/15	PID: 2.5 ppmv			S-4 (15 to 17'): Medium dense, tan, fine to coarse SAND, trace Gravel, trace Silt. Moist. [Sand].	
18									
20	S-5	20 - 22	3 6 7 7	24/19	PID: 2.8 ppmv			S-5 (20 to 22'): Medium dense, tan, fine to coarse SAND, trace Silt. Moist. [Sand].	
22									
24									

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SANBORN HEAD

Sanborn, Head & Associates, Inc.

Project: 16 Bulge Rd
Location: Devens, MA
Project No.: 4864.00

Log of Boring SH-2

Ground Elevation: 314 ± feet
Datum:

Drilling Method: Truck-Mounted Hollow Stem Auger

Sampling Method: 2" O.D. Split Spoon, Automatic Hammer

Drilling Company: Soil X Corp
Foreman: K. Bonetti
Date Started: 09/23/20 **Date Finished: 09/23/20**
Logged By: S. Ring **Checked By: L. Norton**

Groundwater Readings

Date	Time	Depth to Water	Ref. Pt.	Depth of Casing	Depth of Hole	Stab. Time
09/23/20	13:10	41'	Ground Surface			1.5 Hours

Depth (ft)	Sample Information					Stratum		Geologic Description	Remarks
	Sample No.	Depth (ft)	Spoon Blows per 6 in	Pen/ Rec (in)	Field Testing Data	Log	Description		
26	S-6	25 - 27	6 6 7 11	24/19	PID: 1.1 ppmv			S-6 (25 to 27'): Medium dense, light tan, fine to coarse SAND, trace Silt. Moist. [Sand].	
28									
30	S-7	30 - 32	4 8 9 10	24/22	PID: 1.5 ppmv			S-7 (30 to 32'): Medium dense, light tan, fine to medium SAND, little Silt. Moist. [Loamy Sand].	
32									
34									
36	S-8	35 - 37	8 11 10 13	24/24	PID: 1.8 ppmv			S-8 (35 to 37'): Medium dense, light tan, fine to medium SAND, little Silt. Moist. [Loamy Sand].	
38							SAND		
40	S-9	40 - 42	11 13 14 18	24/16	PID: 7.6 ppmv			S-9 (40 to 42'): Medium dense, brown, fine to medium SAND, little Silt, trace Clay. Moist to wet. [Sandy Loam].	Observation interpreted to be a perched groundwater condition due to discontinuous groundwater table.
42									
44									
46	S-10	45 - 47	7 10 11 11	24/21	PID: 5.4 ppmv			S-10 (45 to 47'): Medium dense, tan, fine to medium SAND, trace Silt. Wet. [Sand].	
48									
50									

SANBORN HEAD

Sanborn, Head & Associates, Inc.

Project: 16 Bulge Rd
Location: Devens, MA
Project No.: 4864.00

Log of Boring SH-2

Ground Elevation: 314 ± feet
Datum:

Drilling Method: Truck-Mounted Hollow Stem Auger

Sampling Method: 2" O.D. Split Spoon, Automatic Hammer

Drilling Company: Soil X Corp
Foreman: K. Bonetti
Date Started: 09/23/20 **Date Finished: 09/23/20**
Logged By: S. Ring **Checked By: L. Norton**

Groundwater Readings

Date	Time	Depth to Water	Ref. Pt.	Depth of Casing	Depth of Hole	Stab. Time
09/23/20	13:10	41'	Ground Surface			1.5 Hours

Depth (ft)	Sample Information					Stratum		Geologic Description	Remarks
	Sample No.	Depth (ft)	Spoon Blows per 6 in	Pen/ Rec (in)	Field Testing Data	Log	Description		
50	S-11	50 - 52	7 11 14 15	24/22	PID: 1.7 ppmv		SAND	S-11 (50 to 52'): Medium dense, tan, fine to medium SAND, little Silt, trace Clay. Moist. [Sandy Loam].	
52							-----52'-----	Boring terminated at 52 feet. No refusal encountered.	
54								NOTES: 1. USDA textural soil classifications are shown in brackets [ ]. 2. Soil samples were screened for volatile organic compounds (VOCs) using a MiniRAE 2000 Photoionization Detector (PID) with a 10.6 eV lamp, calibrated to a 100 parts per million by volume (ppmv) isobutylene-in-air standard using a response factor of 1.0. Results are presented in ppmv; the typical detection limit is 1 ppmv. ND indicates not detected. NA indicates not available. The PID measures relative levels of VOCs. Although PID screening cannot be used directly to quantify VOC concentrations or identify individual compounds, the results can serve as a relative indicator for the presence of VOCs.	
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58									
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72									
74									

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SANBORN HEAD

Sanborn, Head & Associates, Inc.

Project: 16 Bulge Rd
Location: Devens, MA
Project No.: 4864.00

Log of Boring SH-3

Ground Elevation: 313 ± feet
Datum:

Drilling Method: Truck-Mounted Hollow Stem Auger

Sampling Method: 2" O.D. Split Spoon, Automatic Hammer

Drilling Company: Soil X Corp
Foreman: K. Bonetti
Date Started: 09/23/20 **Date Finished: 09/23/20**
Logged By: S. Ring **Checked By: L. Norton**

Groundwater Readings

Date	Time	Depth to Water	Ref. Pt.	Depth of Casing	Depth of Hole	Stab. Time
09/23/20	11:44	26'	Ground Surface			1 Hour

Depth (ft)	Sample Information: Sample No.	Depth (ft)	Spoon Blows per 6 in	Pen/ Rec (in)	Field Testing Data	Stratum: Log	Description	Geologic Description	Remarks
0	S-1	0 - 2	3 8 6 8	24/17	PID: ND		-----0'----- TOPSOIL -----0.5'-----	S-1A (0 to 0.5'): TOPSOIL. S-1B (0.5 to 2'): Medium dense, tan, fine to coarse SAND, little Gravel, little Silt, very few Root fragments. Moist. [Sandy Loam].	
2									
4									
6	S-2	5 - 7	4 4 5 8	24/17	PID: 5.8 ppmv			S-2 (5 to 7'): Loose, tan, fine to coarse SAND, little Silt, trace Gravel. Moist. [Loamy Sand].	
8									
10	S-3	10 - 12	4 5 6 6	24/19	PID: 4.5 ppmv			S-3 (10 to 12'): Medium dense, tan, fine to coarse SAND, little Silt, trace Gravel. Moist. [Loamy Sand].	
12							SAND		
14									
16	S-4	15 - 17	7 8 8 11	24/17	PID: 9.5 ppmv			S-4 (15 to 17'): Medium dense, tan, fine to coarse SAND, little Silt, trace Gravel. Moist. [Loamy Sand].	
18									
20	S-5	20 - 22	6 10 16 21	24/18	PID: 7.7 ppmv			S-5 (20 to 22'): Medium dense, tan, fine to coarse SAND, trace Silt. Moist. [Sand].	
22									
24									

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SANBORN HEAD

Sanborn, Head & Associates, Inc.

Project: 16 Bulge Rd
Location: Devens, MA
Project No.: 4864.00

Log of Boring SH-3

Ground Elevation: 313 ± feet
Datum:

Drilling Method: Truck-Mounted Hollow Stem Auger

Sampling Method: 2" O.D. Split Spoon, Automatic Hammer

Drilling Company: Soil X Corp
Foreman: K. Bonetti
Date Started: 09/23/20 **Date Finished: 09/23/20**
Logged By: S. Ring **Checked By: L. Norton**

Groundwater Readings

Date	Time	Depth to Water	Ref. Pt.	Depth of Casing	Depth of Hole	Stab. Time
09/23/20	11:44	26'	Ground Surface			1 Hour

Depth (ft)	Sample Information					Stratum		Geologic Description	Remarks
	Sample No.	Depth (ft)	Spoon Blows per 6 in	Pen/ Rec (in)	Field Testing Data	Log	Description		
26	S-6	25 - 27	4 7 7 9	24/18	PID: 14.4 ppmv		SAND -----27'-----	S-6 (25 to 27'): Medium dense, tan, fine to coarse SAND, trace Silt. Moist to wet. [Sand]. Boring terminated at 27 feet. No refusal encountered.	Observation interpreted to be a perched groundwater condition due to discontinuous groundwater table.
28									
30									
32									
34									
36									
38									
40									
42									
44									
46									
48									
50									

NOTES:

1. USDA textural soil classifications are shown in brackets [ ].

2. Soil samples were screened for volatile organic compounds (VOCs) using a MiniRAE 2000 Photoionization Detector (PID) with a 10.6 eV lamp, calibrated to a 100 parts per million by volume (ppmv) isobutylene-in-air standard using a response factor of 1.0. Results are presented in ppmv; the typical detection limit is 1 ppmv. ND indicates not detected. NA indicates not available. The PID measures relative levels of VOCs. Although PID screening cannot be used directly to quantify VOC concentrations or identify individual compounds, the results can serve as a relative indicator for the presence of VOCs.

SANBORN HEAD

Sanborn, Head & Associates, Inc.

Project: 16 Bulge Rd
Location: Devens, MA
Project No.: 4864.00

Log of Boring SH-101

Ground Elevation: 315.0 ± feet
Datum:

Drilling Method: ATV Mounted Acker AD-11 Drill, 4¼" Hollow Stem Auger

Sampling Method: 2" O.D. Split Spoon, Automatic Hammer

Drilling Company: Soil X Corp

Foreman: R. Bonetti

Date Started: 02/11/21 **Date Finished: 02/11/21**

Logged By: S. Ring **Checked By: L. Norton**

Groundwater Readings

Date	Time	Depth to Water	Ref. Pt.	Depth of Casing	Depth of Hole	Stab. Time
02/11/21	---	No Groundwater Encountered				

Depth (ft)	Sample Information: Sample No.	Depth (ft)	Spoon Blows per 6 in	Pen/ Rec (in)	Field Testing Data	Stratum: Log	Description	Geologic Description	Remarks
0	S-1	0 - 2	2 2 7 6	24/17			0' TOPSOIL -----0.3-----	S-1A (0 to 0.3'): Loose, dark brown, fine to coarse SAND, numerous Organic fragments, little Silt, trace Gravel. Moist. TOPSOIL.	
2								S-1B (0.3 to 2'): Loose, brown, fine to coarse SAND, little Gravel, trace Silt. Moist.	
4									
6	S-2	5 - 7	2 2 2 WOH	24/16				S-2 (5 to 7'): Very loose, brown, fine to coarse SAND, little Gravel, trace Silt. Moist.	
8							SAND		
10	S-3	10 - 12	4 5 5 7	24/14				S-3 (10 to 12'): Loose, light brown, fine to coarse SAND, trace Gravel, trace Silt. Moist.	
12									
14									
16	S-4	15 - 17	4 6 8 9	24/15				S-4 (15 to 17'): Medium dense, fine to medium SAND, some Silt. Moist.	
18							-----17'-----	Boring terminated at 17 feet. No refusal encountered.	
20									
22									
24									

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SANBORN HEAD

Sanborn, Head & Associates, Inc.

Project: 16 Bulge Rd
Location: Devens, MA
Project No.: 4864.00

Log of Boring SH-102

Ground Elevation: 318.0 ± feet
Datum:

Drilling Method: ATV Mounted Acker AD-11 Drill, 4¼" Hollow Stem Auger
Sampling Method: 2" O.D. Split Spoon, Automatic Hammer
Drilling Company: Soil X Corp
Foreman: R. Bonetti
Date Started: 02/11/21 **Date Finished: 02/11/21**
Logged By: S. Ring **Checked By: L. Norton**

Groundwater Readings

Date	Time	Depth to Water	Ref. Pt.	Depth of Casing	Depth of Hole	Stab. Time
02/11/21	---	No Groundwater Encountered				

Depth (ft)	Sample Information: Sample No.	Depth (ft)	Spoon Blows per 6 in	Pen/ Rec (in)	Field Testing Data	Stratum: Log	Description	Geologic Description	Remarks
0	S-1	0 - 2	3 4 7 8	24/17			0' TOPSOIL -----0.3-----	S-1A (0 to 0.3'): Medium dense, dark brown, fine to coarse SAND, numerous Organic fragments, little Silt, trace Gravel. Moist. TOPSOIL.	
2								S-1B (0.3 to 1'): Medium dense, gray, fine to coarse SAND, some Gravel, trace Silt. Moist. S-1C (1 to 2'): Medium dense, brown, fine to coarse SAND, little Gravel, trace Silt. Moist.	
4									
6	S-2	5 - 7	6 6 6 9	24/17				S-2 (5 to 7'): Medium dense, brown, fine to coarse SAND, some Gravel, trace Silt. Moist.	
8							SAND		
10	S-3	10 - 12	5 8 8 6	24/16				S-3 (10 to 12'): Medium dense, brown, fine to coarse SAND, little Gravel, trace Silt. Moist.	
12									
14									
16	S-4	15 - 17	2 8 8 10	24/13				S-4 (15 to 17'): Medium dense, brown, fine to coarse SAND, little Gravel, trace Silt. Moist.	
18							-----17'-----	Boring terminated at 17 feet. No refusal encountered.	
20									
22									
24									

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SANBORN HEAD

Sanborn, Head & Associates, Inc.

Project: 16 Bulge Rd
Location: Devens, MA
Project No.: 4864.00

Log of Boring SH-103

Ground Elevation: 319.0 ± feet
Datum:

Drilling Method: ATV Mounted Acker AD-11 Drill, 4¼" Hollow Stem Auger

Sampling Method: 2" O.D. Split Spoon, Automatic Hammer

Drilling Company: Soil X Corp

Foreman: R. Bonetti

Date Started: 02/11/21 **Date Finished: 02/11/21**

Logged By: S. Ring **Checked By: L. Norton**

Groundwater Readings

Date	Time	Depth to Water	Ref. Pt.	Depth of Casing	Depth of Hole	Stab. Time
02/11/21	---	No Groundwater Encountered				

Depth (ft)	Sample Information: Sample No.	Depth (ft)	Spoon Blows per 6 in	Pen/ Rec (in)	Field Testing Data	Stratum: Log	Description	Geologic Description	Remarks
0	S-1	0 - 2	5 6 7 14	24/15			0' TOPSOIL -----0.3-----	S-1A (0 to 0.3'): Medium dense, dark brown, fine to coarse SAND, numerous Organic fragments, little Silt, trace Gravel. Moist. TOPSOIL.	Refusal encountered at 7 feet due to probable boulder; boring offset approximately 10 feet to the southwest and sampling resumed at 10 feet.
2								S-1B (0.3 to 2'): Medium dense, brown, fine to coarse SAND, little Gravel, trace Silt. Moist.	
4									
6	S-2	5 - 7	10 7 3 3	24/10				S-2 (5 to 7'): Loose, brown, fine to coarse SAND, some Gravel, trace Silt. Moist.	
8							SAND	Boring terminated at 7 feet due to refusal on probable Boulder.	
10	S-3	10 - 12	4 4 4 7	24/19				S-3 (10 to 12'): Loose, fine to coarse SAND, little Gravel, trace Silt. Moist.	
12									
14									
16	S-4	15 - 17	3 3 5 8	24/16				S-4 (15 to 17'): Loose, brown, fine to coarse SAND, trace Gravel, trace Silt. Moist.	
18							-----17'-----		
20									
22									
24									

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SANBORN HEAD

Sanborn, Head & Associates, Inc.

Project: 16 Bulge Rd
Location: Devens, MA
Project No.: 4864.00

Log of Boring SH-104

Ground Elevation: 316.0 ± feet
Datum:

Drilling Method: ATV Mounted Acker AD-11 Drill, 4¼" Hollow Stem Auger
Sampling Method: 2" O.D. Split Spoon, Automatic Hammer
Drilling Company: Soil X Corp
Foreman: R. Bonetti
Date Started: 02/11/21 **Date Finished: 02/11/21**
Logged By: S. Ring **Checked By: L. Norton**

Groundwater Readings

Date	Time	Depth to Water	Ref. Pt.	Depth of Casing	Depth of Hole	Stab. Time
02/11/21	---	No Groundwater Encountered				

Depth (ft)	Sample Information: Sample No.	Depth (ft)	Spoon Blows per 6 in	Pen/ Rec (in)	Field Testing Data	Stratum: Log	Description	Geologic Description	Remarks
0	S-1	0 - 2	12 14 11 15	24/17			0' TOPSOIL -----0.3-----	S-1A (0 to 0.3'): Medium dense, dark brown, fine to coarse SAND, numerous Organic fragments, little Silt, trace Gravel. Moist. TOPSOIL.	
2								S-1B (0.3 to 2'): Medium dense, brown, fine to coarse SAND, little Gravel, trace Silt. Moist.	
4									
6	S-2	5 - 7	11 8 8 8	24/15			SAND	S-2 (5 to 7'): Medium dense, brown, fine to coarse SAND, trace Gravel, trace Silt. Moist.	
8									
10	S-3	10 - 12	5 6 6 8	24/19				S-3 (10 to 12'): Medium dense, brown, fine to coarse SAND, trace Gravel, trace Silt. Moist.	
12							-----12'-----	Boring terminated at 12 feet. No refusal encountered.	
14									
16									
18									
20									
22									
24									

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SANBORN HEAD

Sanborn, Head & Associates, Inc.

Project: 16 Bulge Rd
Location: Devens, MA
Project No.: 4864.00

Log of Boring SH-105

Ground Elevation: 321.5 ± feet
Datum:

Drilling Method: ATV Mounted Acker AD-11 Drill, 4¼" Hollow Stem Auger

Sampling Method: 2" O.D. Split Spoon, Automatic Hammer

Drilling Company: Soil X Corp

Foreman: R. Bonetti

Date Started: 02/11/21 **Date Finished: 02/11/21**

Logged By: S. Ring **Checked By: L. Norton**

Groundwater Readings

Date	Time	Depth to Water	Ref. Pt.	Depth of Casing	Depth of Hole	Stab. Time
02/11/21	---	No Groundwater Encountered				

Depth (ft)	Sample Information: Sample No.	Depth (ft)	Spoon Blows per 6 in	Pen/ Rec (in)	Field Testing Data	Stratum: Log	Description	Geologic Description	Remarks
0	S-1	0 - 2	19 27 13 14	24/18			0' TOPSOIL -----0.3-----	S-1A (0 to 0.3'): Dense, dark brown, fine to coarse SAND, numerous Organic fragments, little Silt, trace Gravel. Moist. TOPSOIL.	
								S-1B (0.3 to 2'): Dense, brown, fine to coarse SAND, little Gravel, trace Silt. Moist.	
2									
4									
	S-2	5 - 7	9 10 9 15	24/18				S-2 (5 to 7'): Medium dense, brown, fine to coarse SAND, little Gravel, trace Silt. Moist.	
6							SAND		
8									
10	S-3	10 - 12	7 6 6 7	24/17				S-3 (10 to 12'): Medium dense, brown, fine to coarse SAND, some Gravel, trace Silt. Moist.	
12							-----12'-----	Boring terminated at 12 feet. No refusal encountered.	
14									
16									
18									
20									
22									
24									

BORING LOG P:\4800S\4864.00\WORK\LOGS\BORING LOGS\4864.00 LOGS.GPJ 2017 SANBORN HEAD V1.GLB 2017 SANBORN HEAD V1.GDT 3/3/21

SANBORN HEAD

Sanborn, Head & Associates, Inc.

Project: 16 Bulge Rd
Location: Devens, MA
Project No.: 4864.00

Log of Boring SH-106

Ground Elevation: 321.0 ± feet
Datum:

Drilling Method: ATV Mounted Acker AD-11 Drill, 4¼" Hollow Stem Auger
Sampling Method: 2" O.D. Split Spoon, Automatic Hammer
Drilling Company: Soil X Corp
Foreman: R. Bonetti
Date Started: 02/11/21 **Date Finished: 02/11/21**
Logged By: S. Ring **Checked By: L. Norton**

Groundwater Readings

Date	Time	Depth to Water	Ref. Pt.	Depth of Casing	Depth of Hole	Stab. Time
02/11/21	---	No Groundwater Encountered				

Depth (ft)	Sample Information: Sample No.	Depth (ft)	Spoon Blows per 6 in	Pen/ Rec (in)	Field Testing Data	Stratum: Log	Description	Geologic Description	Remarks
0	S-1	0 - 2	7 8 8 10	24/17			0' TOPSOIL -----0.3-----	S-1A (0 to 0.3'): Medium dense, brown, fine to coarse SAND, numerous Organic fragments, some Silt, trace Gravel. Moist. TOPSOIL.	
								S-1B (0.3 to 2'): Medium dense, brown, fine to coarse SAND, little Gravel, trace Silt. Moist.	
2									
4									
	S-2	5 - 7	4 3 3 5	24/16				S-2 (5 to 7'): Loose, fine to coarse SAND, trace Gravel, trace Silt. Moist.	
6							SAND		
8									
10	S-3	10 - 12	3 5 5 7	24/19				S-3 (10 to 12'): Loose, brown, fine to coarse SAND, trace Gravel, trace Silt. Moist.	
12							-----12'-----	Boring terminated at 12 feet. No refusal encountered.	
14									
16									
18									
20									
22									
24									

BORING LOG P:\4800S\4864.00\WORK\LOGS\BORING LOGS\4864.00 LOGS.GPJ 2017 SANBORN HEAD V1.GLB 2017 SANBORN HEAD V1.GDT 3/3/21

Deep Observation Hole

Site Name:	Devens, Massachusetts	Date:	1/21/2021
Site Address:	Davao Circle	Time:	12:00
Project No.:	4864.00		
Ground Surface Elev. (ft.):	324.5	Weather :	Partly Cloudy, 10-30°F

SANBORN HEAD

Logged by: J. McCarthy/L. Norton

Test Pit Number: SH-TP-1 Soil Evaluator #: SE13281

Depth (inches)	Soil Horizon or Layer	Soil Matrix Color (Moist)	Redoximorphic Features			Soil Texture (NRCS)	Coarse Fragments (% by Volume)		Soil Structure	Soil Consistence (Moist)	Other
			Depth	Color	Percent		Gravel	Cobbles			
0 - 8	A_P	7.5 YR 2.5/2	-	-	-	Sandy Loam	5	--	Granular	Very Friable	
8 - 36	Fill	10 YR 4/3	-	-	-	Very Gravelly Loamy Sand	30	5	Structureless	Very Friable	1
36 - 48	Fill	10 YR 6/8	-	-	-	Sand	--	--	Structureless	Very Friable	2
44 - 96	B_b	2.5 Y 6/4	-	-	-	Very Gravelly Sand	30	10	Single Grain	Loose	
96 - 120	C_1	10 YR 4/6	96	10 YR 5/8	10	Sand	<5	<5	Single Grain	Loose	3
-											
-											

Test Pit Termination Depth (in.): 120 **Reason for Termination:** Target depth achieved

Groundwater Observations:			**In-Situ Testing:**		
Depth to water weeping from pit face (in.):	N/A		Percolation Test:	N/A	Depth (in.):
Depth to standing water in hole (in.):	N/A	Stabilization Time:	Permeameter Test:	N/A	Depth (in.):
Depth to estimated seasonal high groundwater [ESHGW] (in.):	N/A	Basis for ESHGW:	Falling Head Test:	N/A	Depth (in.):
			Other Test:	N/A	Depth (in.):

Additional Notes:

1. General raise-in-grade fill (contains Concrete/Asphalt fragments).
2. Bedding Sand used for 4-inch PVC utility at 3.5 feet bgs.
3. Redoximorphic features not interpreted as seasonal high groundwater; observed at layer interface.

Deep Observation Hole

Site Name:	Devens, Massachusetts	Date:	1/21/2021
Site Address:	Davao Circle	Time:	9:00
Project No.:	4864.00		
Ground Surface Elev. (ft.):	324.0	Weather :	Partly Cloudy, 10-30°F

SANBORN HEAD

Logged by: J. McCarthy/L. Norton

Test Pit Number: SH-TP-2 Soil Evaluator #: SE13281

Depth (inches)	Soil Horizon or Layer	Soil Matrix Color (Moist)	Redoximorphic Features			Soil Texture (NRCS)	Coarse Fragments (% by Volume)		Soil Structure	Soil Consistence (Moist)	Other
			Depth	Color	Percent		Gravel	Cobbles			
0 - 6	A_P	7.5 YR 2.5/2	-	-	-	Sandy Loam	5	--	Granular	Very Friable	
6 - 42	Fill	10 YR 4/3	-	-	-	Very Gravelly Loamy Sand	30	5	Structureless	Very Friable	1
42 - 46	A_b	7.5 YR 2.5/2	-	-	-	Sandy Loam	5	--	Granular	Very Friable	
46 - 96	B_b	2.5 Y 6/4	90	10 YR 5/8	10	Gravelly Sand	20	5	Single Grain	Loose	2
96 - 120	C_1	10 YR /6	-	-	-	Sand	<5	<5	Single Grain	Loose	
-											
-											

Test Pit Termination Depth (in.): 120 **Reason for Termination:** Target depth achieved

Groundwater Observations:			**In-Situ Testing:**		
Depth to water weeping from pit face (in.):	N/A		Percolation Test:	N/A	Depth (in.):
Depth to standing water in hole (in.):	N/A	Stabilization Time:	Permeameter Test:	N/A	Depth (in.):
Depth to estimated seasonal high groundwater [ESHGW] (in.):	N/A	Basis for ESHGW:	Falling Head Test:	N/A	Depth (in.):
			Other Test:	N/A	Depth (in.):

Additional Notes:

1. General raise-in-grade fill (contains Concrete/Asphalt fragments).
2. Redoximorphic features not interpreted as seasonal high groundwater; observed at layer interface.

Deep Observation Hole

Site Name:	Devens, Massachusetts	Date:	1/21/2021
Site Address:	Davao Circle	Time:	10:00
Project No.:	4864.00		
Ground Surface Elev. (ft.):	322.5	Weather :	Partly Cloudy, 10-30°F
Test Pit Number:	SH-TP-3	Logged by:	J. McCarthy/L. Norton
		Soil Evaluator #:	SE13281

Depth (inches)	Soil Horizon or Layer	Soil Matrix Color (Moist)	Redoximorphic Features			Soil Texture (NRCS)	Coarse Fragments (% by Volume)		Soil Structure	Soil Consistence (Moist)	Other
			Depth	Color	Percent		Gravel	Cobbles			
0 - 6	A_P	7.5 YR 2.5/2	-	-	-	Sandy Loam	5	--	Granular	Very Friable	
6 - 24	B_w	2.5 Y 5/6	-	-	-	Loamy Sand	10	<5	Single Grain	Very Friable	
24 - 84	C_1	2.5 Y 6/4	-	-	-	Very Gravelly Sand	30	--	Single Grain	Loose	
84 - 120	C_2	10 YR 4/6	90	10 YR 5/8	10	Sand	<5	<5	Single Grain	Loose	1, 2
-											
-											
-											

Test Pit Termination Depth (in.): 120 **Reason for Termination:** Target depth achieved

Groundwater Observations:			**In-Situ Testing:**		
Depth to water weeping from pit face (in.):	N/A		Percolation Test:	N/A	Depth (in.):
Depth to standing water in hole (in.):	N/A	Stabilization Time:	Permeameter Test:	N/A	Depth (in.):
Depth to estimated seasonal high groundwater [ESHGW] (in.):	N/A	Basis for ESHGW:	Falling Head Test:	N/A	Depth (in.):
			Other Test:	N/A	Depth (in.):

Additional Notes:

1. Stratified from 84-120 inches
2. Redoximorphic features not interpreted as seasonal high groundwater; observed at layer interface.

Deep Observation Hole

Site Name:	Devens, Massachusetts	Date:	1/20/2021
Site Address:	Davao Circle	Time:	8:00
Project No.:	4864.00		
Ground Surface Elev. (ft.):	317.0	Weather :	Partly Cloudy, 20-30°F
Test Pit Number:	SH-TP-4	Logged by:	J. McCarthy/L. Norton
		Soil Evaluator #:	SE13281

Depth (inches)	Soil Horizon or Layer	Soil Matrix Color (Moist)	Redoximorphic Features			Soil Texture (NRCS)	Coarse Fragments (% by Volume)		Soil Structure	Soil Consistence (Moist)	Other
			Depth	Color	Percent		Gravel	Cobbles			
0 - 20	Fill	10 YR 4/3	-	-	-	Very Gravelly Loamy Sand	30	5	Structureless	Very Friable	1
20 - 36	B_w	2.5 Y 6/4	-	-	-	Sand	10	<5	Single Grain	Very Friable	2
36 - 144	C_1	10 YR 4/6	-	-	-	Sand	<5	<5	Single Grain	Loose	
-											
-											
-											
-											

Test Pit Termination Depth (in.): 144 **Reason for Termination:** Target Depth achieved

Groundwater Observations:			**In-Situ Testing:**		
Depth to water weeping from pit face (in.):	N/A		Percolation Test:	N/A	Depth (in.):
Depth to standing water in hole (in.):	N/A	Stabilization Time:	Permeameter Test:	N/A	Depth (in.):
Depth to estimated seasonal high groundwater [ESHGW] (in.):	N/A	Basis for ESHGW:	Falling Head Test:	N/A	Depth (in.):
			Other Test:	N/A	Depth (in.):

Additional Notes:

1. General raise-in-grade fill (contains Asphalt fragments).
2. Subsoil horizon observed to a depth of 54 inches on western sidewall.

Deep Observation Hole

Site Name:	Devens, Massachusetts	Date:	1/20/2021
Site Address:	Davao Circle	Time:	9:00
Project No.:	4864.00		
Ground Surface Elev. (ft.):	315.5	Weather :	Partly Cloudy, 20-30°F
Test Pit Number:	SH-TP-5	Logged by:	J. McCarthy/L. Norton
		Soil Evaluator #:	SE13281

Depth (inches)	Soil Horizon or Layer	Soil Matrix Color (Moist)	Redoximorphic Features			Soil Texture (NRCS)	Coarse Fragments (% by Volume)		Soil Structure	Soil Consistence (Moist)	Other
			Depth	Color	Percent		Gravel	Cobbles			
0 - 12	A_P	7.5 YR 2.5/2	-	-	-	Sandy Loam	5	--	Granular	Very Friable	
12 - 54	B_w	2.5 Y 5/6	-	-	-	Sand	10	<5	Single Grain	Very Friable	
54 - 132	C_1	10 YR 4/6	-	-	-	Loamy Sand	<5	<5	Single Grain	Very Friable	
132 - 144	C_2	10 YR 4/6	-	-	-	Sand	10	<5	Single Grain	Loose	
-											
-											
-											

Test Pit Termination Depth (in.): 144 **Reason for Termination:** Target depth achieved

Groundwater Observations:			**In-Situ Testing:**		
Depth to water weeping from pit face (in.):	N/A		Percolation Test:	N/A	Depth (in.):
Depth to standing water in hole (in.):	N/A	Stabilization Time:	Permeameter Test:	N/A	Depth (in.):
Depth to estimated seasonal high groundwater [ESHGW] (in.):	N/A	Basis for ESHGW:	Falling Head Test:	N/A	Depth (in.):
			Other Test:	N/A	Depth (in.):

Additional Notes:

Deep Observation Hole

Site Name:	Devens, Massachusetts	Date:	1/20/2021
Site Address:	Davao Circle	Time:	10:30
Project No.:	4864.00		
Ground Surface Elev. (ft.):	312.0	Weather :	Partly Cloudy, 20-30°F
Test Pit Number:	SH-TP-6	Logged by:	J. McCarthy/L. Norton
		Soil Evaluator #:	SE13281

Depth (inches)	Soil Horizon or Layer	Soil Matrix Color (Moist)	Redoximorphic Features			Soil Texture (NRCS)	Coarse Fragments (% by Volume)		Soil Structure	Soil Consistence (Moist)	Other
			Depth	Color	Percent		Gravel	Cobbles			
0 - 1	Asphalt	-	-	-	-	-	-	-	-	-	
1 - 6	Fill	10 YR 4/3	-	-	-	Very Gravelly Sand	50	<5	Structureless	Very Friable	1
6 - 96	Fill	10 YR 4/3	-	-	-	Gravelly Sand	15	5	Structureless	Very Friable	2,3,4
96 - 144	C_1	2.5 Y 5/6	-	-	-	Sand	5	<5	Single Grain	Loose	
-											
-											
-											

Test Pit Termination Depth (in.): 144 **Reason for Termination:** Target depth achieved

Groundwater Observations:			**In-Situ Testing:**		
Depth to water weeping from pit face (in.):	N/A		Percolation Test:	N/A	Depth (in.):
Depth to standing water in hole (in.):	N/A	Stabilization Time:	Permeameter Test:	N/A	Depth (in.):
Depth to estimated seasonal high groundwater [ESHGW] (in.):	N/A	Basis for ESHGW:	Falling Head Test:	N/A	Depth (in.):
			Other Test:	N/A	Depth (in.):

Additional Notes:

1. Pavement base course fill.
2. General raise-in-grade fill.
3. Gas line at 2.4 feet bgs
4. Drainage line at 6.5 feet bgs

Deep Observation Hole

Site Name:	Devens, Massachusetts	Date:	1/20/2021
Site Address:	Davao Circle	Time:	12:00
Project No.:	4864.00		
Ground Surface Elev. (ft.):	313.5	Weather :	Partly Cloudy, 20-30°F

SANBORN HEAD

Logged by: J. McCarthy/L. Norton

Test Pit Number: SH-TP-7 Soil Evaluator #: SE13281

Depth (inches)	Soil Horizon or Layer	Soil Matrix Color (Moist)	Redoximorphic Features			Soil Texture (NRCS)	Coarse Fragments (% by Volume)		Soil Structure	Soil Consistence (Moist)	Other
			Depth	Color	Percent		Gravel	Cobbles			
0 - 10	A_P	7.5 YR 2.5/2	-	-	-	Sandy Loam	5	--	Granular	Very Friable	
10 - 18	B_w	2.5 Y 5/6	-	-	-	Sand	10	<5	Single Grain	Very Friable	
18 - 120	C_1	2.5 Y 5/6	-	-	-	Sand	5	<5	Single Grain	Loose	1
-											
-											
-											
-											

Test Pit Termination Depth (in.): 120 **Reason for Termination:** Target depth achieved

Groundwater Observations:			**In-Situ Testing:**		
Depth to water weeping from pit face (in.):	N/A		Percolation Test:	N/A	Depth (in.):
Depth to standing water in hole (in.):	N/A	Stabilization Time:	Permeameter Test:	N/A	Depth (in.):
Depth to estimated seasonal high groundwater [ESHGW] (in.):	N/A	Basis for ESHGW:	Falling Head Test:	N/A	Depth (in.):
			Other Test:	N/A	Depth (in.):

Additional Notes:

1. 2" Gravelly seam at 3.5 feet bgs.

Deep Observation Hole

Site Name:	Devens, Massachusetts	Date:	1/20/2021
Site Address:	Davao Circle	Time:	13:00
Project No.:	4864.00		
Ground Surface Elev. (ft.):	312.0	Weather :	Partly Cloudy, 20-30°F
Test Pit Number:	SH-TP-8	Logged by:	J. McCarthy/L. Norton
		Soil Evaluator #:	SE13281

Depth (inches)	Soil Horizon or Layer	Soil Matrix Color (Moist)	Redoximorphic Features			Soil Texture (NRCS)	Coarse Fragments (% by Volume)		Soil Structure	Soil Consistence (Moist)	Other
			Depth	Color	Percent		Gravel	Cobbles			
0 - 2	A_P	7.5 YR 2.5/2	-	-	-	Sandy Loam	5	--	Granular	Very Friable	
2 - 18	B_w	2.5 Y 5/6	-	-	-	Loamy Sand	5	<5	Single Grain	Very Friable	
18 - 120	C_1	10 YR 4/6	-	-	-	Sand	<5	<5	Single Grain	Loose	1
-											
-											
-											
-											

Test Pit Termination Depth (in.): 120 **Reason for Termination:** Target depth achieved

Groundwater Observations:			**In-Situ Testing:**		
Depth to water weeping from pit face (in.):	N/A		Percolation Test:	N/A	Depth (in.):
Depth to standing water in hole (in.):	N/A	Stabilization Time:	Permeameter Test:	N/A	Depth (in.):
Depth to estimated seasonal high groundwater [ESHGW] (in.):	N/A	Basis for ESHGW:	Falling Head Test:	N/A	Depth (in.):
			Other Test:	N/A	Depth (in.):

Additional Notes:

1. Stratified from 75-120 inches

Deep Observation Hole

Site Name:	Devens, Massachusetts	Date:	1/20/2021
Site Address:	Davao Circle	Time:	14:00
Project No.:	4864.00		
Ground Surface Elev. (ft.):	307.0	Weather :	Partly Cloudy, 20-30°F
Test Pit Number:	SH-TP-9	Logged by:	J. McCarthy/L. Norton
		Soil Evaluator #:	SE13281

Depth (inches)	Soil Horizon or Layer	Soil Matrix Color (Moist)	Redoximorphic Features			Soil Texture (NRCS)	Coarse Fragments (% by Volume)		Soil Structure	Soil Consistence (Moist)	Other
			Depth	Color	Percent		Gravel	Cobbles			
0 - 2	A_P	7.5 YR 2.5/2	-	-	-	Sandy Loam	5	--	Granular	Very Friable	
2 - 24	B_w	2.5 Y 5/6	-	-	-	Loamy Sand	5	<5	Single Grain	Very Friable	
24 - 120	C_1	10 YR 4/6	48	10 YR 5/8	10	Sand	<5	<5	Single Grain	Loose	1, 2
-											
-											
-											
-											

Test Pit Termination Depth (in.): 120 **Reason for Termination:** Target depth achieved

Groundwater Observations:			**In-Situ Testing:**		
Depth to water weeping from pit face (in.):	N/A		Percolation Test:	N/A	Depth (in.):
Depth to standing water in hole (in.):	N/A	Stabilization Time:	Permeameter Test:	N/A	Depth (in.):
Depth to estimated seasonal high groundwater [ESHGW] (in.):	N/A	Basis for ESHGW:	Falling Head Test:	N/A	Depth (in.):
			Other Test:	N/A	Depth (in.):

Additional Notes:

1. Stratified from 84-120 inches
2. Redoximorphic features not interpreted as seasonal high groundwater; observed at layer discontinuity.

Deep Observation Hole

Site Name:	Devens, Massachusetts	Date:	1/21/2021
Site Address:	Davao Circle	Time:	12:00
Project No.:	4864.00		
Ground Surface Elev. (ft.):	303.5	Weather :	Partly Cloudy, 10-30°F

SANBORN HEAD

Logged by: J. McCarthy/L. Norton

Test Pit Number: SH-TP-10 Soil Evaluator #: SE13281

Depth (inches)	Soil Horizon or Layer	Soil Matrix Color (Moist)	Redoximorphic Features			Soil Texture (NRCS)	Coarse Fragments (% by Volume)		Soil Structure	Soil Consistence (Moist)	Other
			Depth	Color	Percent		Gravel	Cobbles			
0 - 5	A_P	7.5 YR 2.5/2	-	-	-	Sandy Loam	5	--	Granular	Very Friable	
5 - 20	B_w	2.5 Y 5/6	-	-	-	Loamy Sand	5	<5	Single Grain	Very Friable	
20 - 120	C_1	10 YR 4/6	-	-	-	Sand	<5	<5	Single Grain	Loose	
-											
-											
-											
-											

Test Pit Termination Depth (in.): 120 **Reason for Termination:** Target depth achieved

Groundwater Observations:			**In-Situ Testing:**		
Depth to water weeping from pit face (in.):	N/A		Percolation Test:	N/A	Depth (in.):
Depth to standing water in hole (in.):	N/A	Stabilization Time:	Permeameter Test:	N/A	Depth (in.):
Depth to estimated seasonal high groundwater [ESHGW] (in.):	N/A	Basis for ESHGW:	Falling Head Test:	N/A	Depth (in.):
			Other Test:	N/A	Depth (in.):

Additional Notes:

Deep Observation Hole

Site Name:	Devens, Massachusetts	Date:	1/22/2021
Site Address:	Davao Circle	Time:	10:30
Project No.:	4864.00		
Ground Surface Elev. (ft.):	318.5	Weather :	Partly Cloudy, 30°F

SANBORN HEAD

Logged by: J. McCarthy/L. Norton

Test Pit Number: SH-TP-11 Soil Evaluator #: SE13281

Depth (inches)	Soil Horizon or Layer	Soil Matrix Color (Moist)	Redoximorphic Features			Soil Texture (NRCS)	Coarse Fragments (% by Volume)		Soil Structure	Soil Consistence (Moist)	Other
			Depth	Color	Percent		Gravel	Cobbles			
0 - 6	A_P	7.5 YR 2.5/2	-	-	-	Sandy Loam	5	--	Granular	Very Friable	
6 - 9	B_w	2.5 Y 5/6	-	-	-	Loamy Sand	5	<5	Single Grain	Very Friable	
9 - 126	C_1	10 YR 4/6	-	-	-	Sand	<5	<5	Single Grain	Loose	1
-											
-											
-											
-											

Test Pit Termination Depth (in.): 126 **Reason for Termination:** Target depth achieved

Groundwater Observations:			**In-Situ Testing:**		
Depth to water weeping from pit face (in.):	N/A		Percolation Test:	N/A	Depth (in.):
Depth to standing water in hole (in.):	N/A	Stabilization Time:	Permeameter Test:	N/A	Depth (in.):
Depth to estimated seasonal high groundwater [ESHGW] (in.):	N/A	Basis for ESHGW:	Falling Head Test:	N/A	Depth (in.):
			Other Test:	N/A	Depth (in.):

Additional Notes:

1. Stratified deposit.

Deep Observation Hole

Site Name:	Devens, Massachusetts	Date:	1/22/2021
Site Address:	Davao Circle	Time:	9:30
Project No.:	4864.00		
Ground Surface Elev. (ft.):	315.5	Weather :	Partly Cloudy, 30°F

SANBORN HEAD

Logged by: J. McCarthy/L. Norton

Test Pit Number: SH-TP-12 Soil Evaluator #: SE13281

Depth (inches)	Soil Horizon or Layer	Soil Matrix Color (Moist)	Redoximorphic Features			Soil Texture (NRCS)	Coarse Fragments (% by Volume)		Soil Structure	Soil Consistence (Moist)	Other
			Depth	Color	Percent		Gravel	Cobbles			
0 - 6	Fill	7.5 YR 3/2	-	-	-	Gravelly Loamy Sand	20	<5	Structureless	Very Friable	1
6 - 96	C_1	10 YR 4/6	-	-	-	Sand	5	<5	Single Grain	Loose	
96 - 132	C_2	10 YR 4/6	60	10 YR 5/8	5	Sand	<5	<5	Single Grain	Loose	2
-											
-											
-											
-											

Test Pit Termination Depth (in.): 132 **Reason for Termination:** Target depth achieved

Groundwater Observations:			**In-Situ Testing:**		
Depth to water weeping from pit face (in.):	N/A		Percolation Test:	N/A	Depth (in.):
Depth to standing water in hole (in.):	N/A	Stabilization Time:	Permeameter Test:	N/A	Depth (in.):
Depth to estimated seasonal high groundwater [ESHGW] (in.):	N/A	Basis for ESHGW:	Falling Head Test:	N/A	Depth (in.):
			Other Test:	N/A	Depth (in.):

Additional Notes:

1. Pavement base course fill.
2. Redoximorphic features not interpreted as seasonal high groundwater; observed at layer discontinuity.

Deep Observation Hole

Site Name:	Devens, Massachusetts	Date:	1/22/2021
Site Address:	Davao Circle	Time:	8:30
Project No.:	4864.00		
Ground Surface Elev. (ft.):	315.0	Weather :	Partly Cloudy, 30's
Test Pit Number:	SH-TP-13	Logged by:	J. McCarthy/L. Norton
		Soil Evaluator #:	SE13281

Depth (inches)	Soil Horizon or Layer	Soil Matrix Color (Moist)	Redoximorphic Features			Soil Texture (NRCS)	Coarse Fragments (% by Volume)		Soil Structure	Soil Consistence (Moist)	Other
			Depth	Color	Percent		Gravel	Cobbles			
0 - 8	Fill	7.5 YR 3/2	-	-	-	Very Gravelly Loamy Sand	35	5	Structureless	Very Friable	1
8 - 126	C_1	10 YR 4/6	-	-	-	Sand	<5	<5	Single Grain	Loose	2
-											
-											
-											
-											
-											

Test Pit Termination Depth (in.): 126 **Reason for Termination:** Target depth achieved

Groundwater Observations:			**In-Situ Testing:**		
Depth to water weeping from pit face (in.):	N/A		Percolation Test:	N/A	Depth (in.):
Depth to standing water in hole (in.):	N/A	Stabilization Time:	Permeameter Test:	N/A	Depth (in.):
Depth to estimated seasonal high groundwater [ESHGW] (in.):	N/A	Basis for ESHGW:	Falling Head Test:	N/A	Depth (in.):
			Other Test:	N/A	Depth (in.):

Additional Notes:
1. Pavement base course fill.
2. Stratified deposit.

Deep Observation Hole

Site Name:	Devens, Massachusetts	Date:	1/22/2021
Site Address:	Davao Circle	Time:	7:30
Project No.:	4864.00		
Ground Surface Elev. (ft.):	314.5	Weather :	Partly Cloudy, 30's

SANBORN HEAD

Logged by: J. McCarthy/L. Norton

Test Pit Number: SH-TP-14 Soil Evaluator #: SE13281

Depth (inches)	Soil Horizon or Layer	Soil Matrix Color (Moist)	Redoximorphic Features			Soil Texture (NRCS)	Coarse Fragments (% by Volume)		Soil Structure	Soil Consistence (Moist)	Other
			Depth	Color	Percent		Gravel	Cobbles			
0 - 14	Fill	10 YR 4/6	-	-	-	Sand	5	<5	Structureless	Very Friable	1
14 - 18	Fill	7.5 YR 3/2	-	-	-	Gravelly Loamy Sand	25	<5	Structureless	Very Friable	2
18 - 48	Fill	7.5 YR 2.5/2	-	-	-	Sandy Loam	5	--	Structureless	Very Friable	3
48 - 132	C_1	10 YR 4/6	-	-	-	Sand	<5	<5	Single Grain	Very Friable	4
-											
-											
-											

Test Pit Termination Depth (in.): 132 **Reason for Termination:** Target depth achieved

Groundwater Observations:			**In-Situ Testing:**		
Depth to water weeping from pit face (in.):	N/A		Percolation Test:	N/A	Depth (in.):
Depth to standing water in hole (in.):	N/A	Stabilization Time:	Permeameter Test:	N/A	Depth (in.):
Depth to estimated seasonal high groundwater [ESHGW] (in.):	N/A	Basis for ESHGW:	Falling Head Test:	N/A	Depth (in.):
			Other Test:	N/A	Depth (in.):

Additional Notes:

1. General raise-in-grade fill.
2. Pavement base course fill.
3. General raise-in-grade fill.
4. Stratified deposit.

Deep Observation Hole

Site Name:	Devens, Massachusetts	Date:	1/21/2021
Site Address:	Davao Circle	Time:	14:00
Project No.:	4864.00		
Ground Surface Elev. (ft.):	314.0	Weather :	Snow, 10-30°F
Test Pit Number:	SH-TP-15	Logged by:	J. McCarthy/L. Norton
		Soil Evaluator #:	SE13281

Depth (inches)	Soil Horizon or Layer	Soil Matrix Color (Moist)	Redoximorphic Features			Soil Texture (NRCS)	Coarse Fragments (% by Volume)		Soil Structure	Soil Consistence (Moist)	Other
			Depth	Color	Percent		Gravel	Cobbles			
0 - 7	Fill	10 YR 4/6	-	-	-	Sand	5	<5	Structureless	Very Friable	1
7 - 12	A_b	7.5 YR 2.5/2	-	-	-	Sandy Loam	5	--	Granular	Very Friable	
12 - 21	B_b	2.5 Y 5/6	-	-	-	Loamy Sand	10	<5	Single Grain	Very Friable	
21 - 132	C_1	10 YR 4/6	-	-	-	Sand	<5	<5	Single Grain	Loose	2
-											
-											
-											

Test Pit Termination Depth (in.): 132 **Reason for Termination:** Target depth achieved

Groundwater Observations:			**In-Situ Testing:**		
Depth to water weeping from pit face (in.):	N/A		Percolation Test:	N/A	Depth (in.):
Depth to standing water in hole (in.):	N/A	Stabilization Time:	Permeameter Test:	N/A	Depth (in.):
Depth to estimated seasonal high groundwater [ESHGW] (in.):	N/A	Basis for ESHGW:	Falling Head Test:	N/A	Depth (in.):
			Other Test:	N/A	Depth (in.):

Additional Notes:

1. General raise-in-grade fill.
2. Gas line at 2 feet bgs

Deep Observation Hole

Site Name:	Devens, Massachusetts	Date:	1/21/2021
Site Address:	Davao Circle	Time:	13:00
Project No.:	4864.00		
Ground Surface Elev. (ft.):	313.0	Weather :	Partly Cloudy/Snow, 10-30's
Test Pit Number:	SH-TP-16	Logged by:	J. McCarthy/L. Norton
		Soil Evaluator #:	SE13281

Depth (inches)	Soil Horizon or Layer	Soil Matrix Color (Moist)	Redoximorphic Features			Soil Texture (NRCS)	Coarse Fragments (% by Volume)		Soil Structure	Soil Consistence (Moist)	Other
			Depth	Color	Percent		Gravel	Cobbles			
0 - 5	Fill	10 YR 4/6	-	-	-	Gravelly Sand	20	<5	Structureless	Very Friable	1
5 - 9	A_b	7.5 YR 2.5/2	-	-	-	Sandy Loam	5	--	Granular	Very Friable	
9 - 126	C_1	10 YR 4/6	-	-	-	Sand	<5	<5	Single Grain	Loose	
-											
-											
-											
-											

Test Pit Termination Depth (in.): 126 **Reason for Termination:** Target depth achieved

Groundwater Observations:			**In-Situ Testing:**		
Depth to water weeping from pit face (in.):	N/A		Percolation Test:	N/A	Depth (in.):
Depth to standing water in hole (in.):	N/A	Stabilization Time:	Permeameter Test:	N/A	Depth (in.):
Depth to estimated seasonal high groundwater [ESHGW] (in.):	N/A	Basis for ESHGW:	Falling Head Test:	N/A	Depth (in.):
			Other Test:	N/A	Depth (in.):

Additional Notes:

1. General raise-in-grade fill.

ATTACHMENT C

LABORATORY RESULTS

GeoTesting EXPRESS

Client:	Sanborn, Head & Associates, Inc.				
Project:	VHB Devens				
Location:	Devens, MA			Project No:	GTX-313122
Boring ID:	SH-TP-1	Sample Type:	bag	Tested By:	ckg
Sample ID:	Layer C1	Test Date:	02/03/21	Checked By:	emm
Depth :	96-120 In	Test Id:	609005		
Test Comment:	---				
Visual Description:	Moist, light yellowish brown sand				
Sample Comment:	---				

USDA Textural Classification

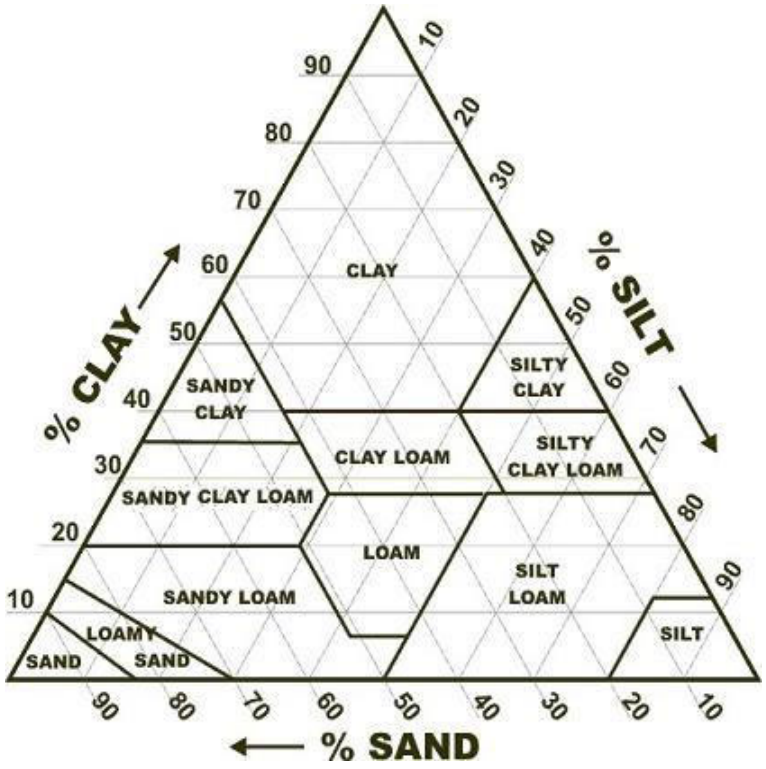
Boring ID	Sample ID	Depth	Sand, %	Fines, %	Classification
SH-TP-1	Layer C1	96-120 In	98	2	Sand

Classifications based only on material passing the #10 sieve

Sand: material passing 2.0 mm and retained on 0.05 mm diameter

Silt: material passing 0.05 mm and retained on 0.002 mm diameter

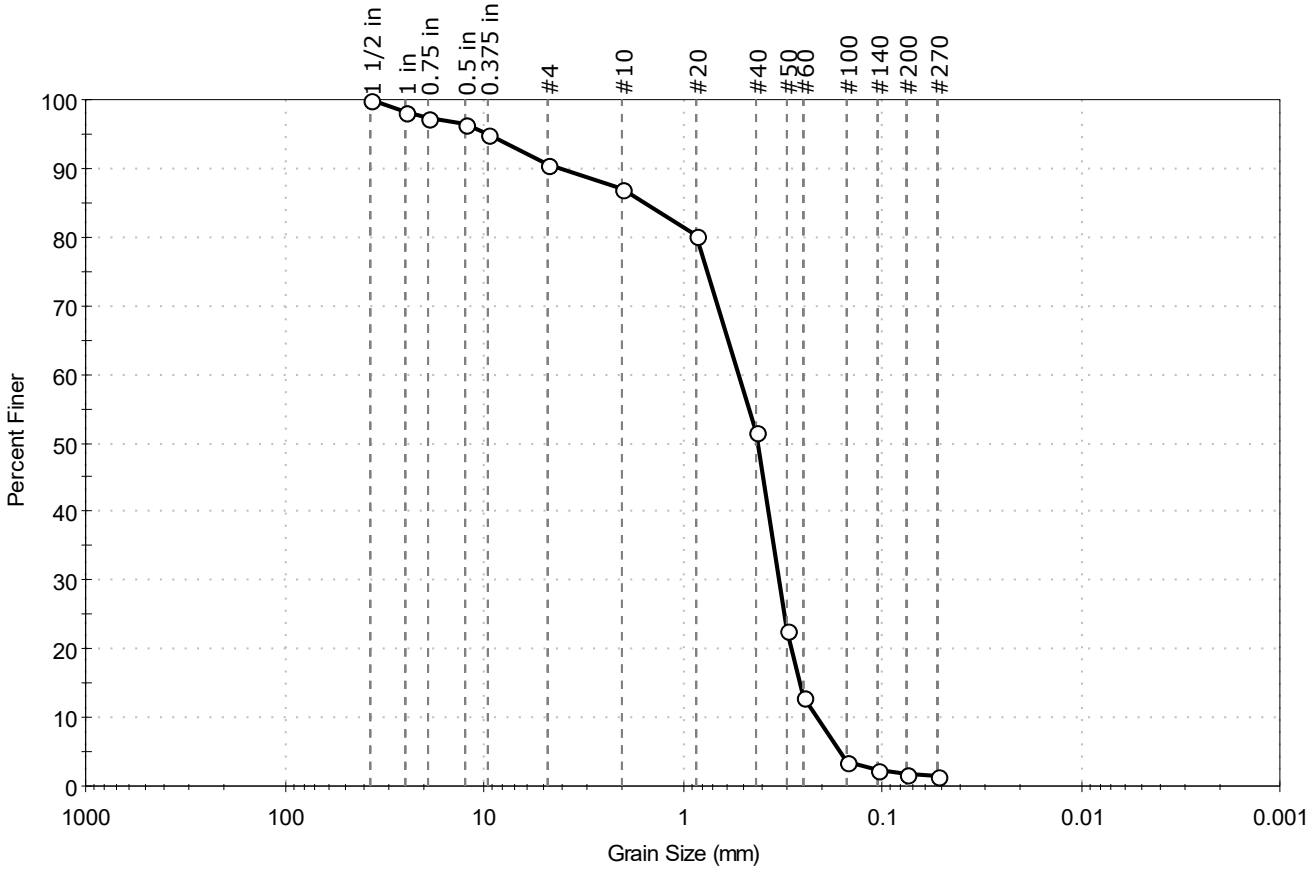
Clay: material passing 0.002 mm diameter



GeoTesting EXPRESS

Client:	Sanborn, Head & Associates, Inc.				
Project:	VHB Devens				
Location:	Devens, MA			Project No:	GTX-313122
Boring ID:	SH-TP-1	Sample Type:	bag	Tested By:	ckg
Sample ID:	Layer C1	Test Date:	02/03/21	Checked By:	emm
Depth :	96-120 In	Test Id:	608999		
Test Comment:	---				
Visual Description:	Moist, light yellowish brown sand				
Sample Comment:	---				

Particle Size Analysis - ASTM D6913/D7928



% Cobble	% Gravel	% Sand	% Silt & Clay Size
—	9.4	88.8	1.8

Sieve Name	Sieve Size, mm	Percent Finer	Spec. Percent	Complies
1 1/2 in	37.50	100		
1 in	25.00	98		
0.75 in	19.00	97		
0.5 in	12.50	96		
0.375 in	9.50	95		
#4	4.75	91		
#10	2.00	87		
#20	0.85	80		
#40	0.42	52		
#50	0.30	23		
#60	0.25	13		
#100	0.15	4		
#140	0.11	2		
#200	0.075	1.8		
#270	0.053	1		

Coefficients

D_{85} = 1.5489 mm	D_{30} = 0.3277 mm
D_{60} = 0.5197 mm	D_{15} = 0.2601 mm
D_{50} = 0.4163 mm	D_{10} = 0.2133 mm
C_u = 2.436	C_c = 0.969

Classification

ASTM Poorly graded SAND (SP)

AASHTO Fine Sand (A-3 (1))

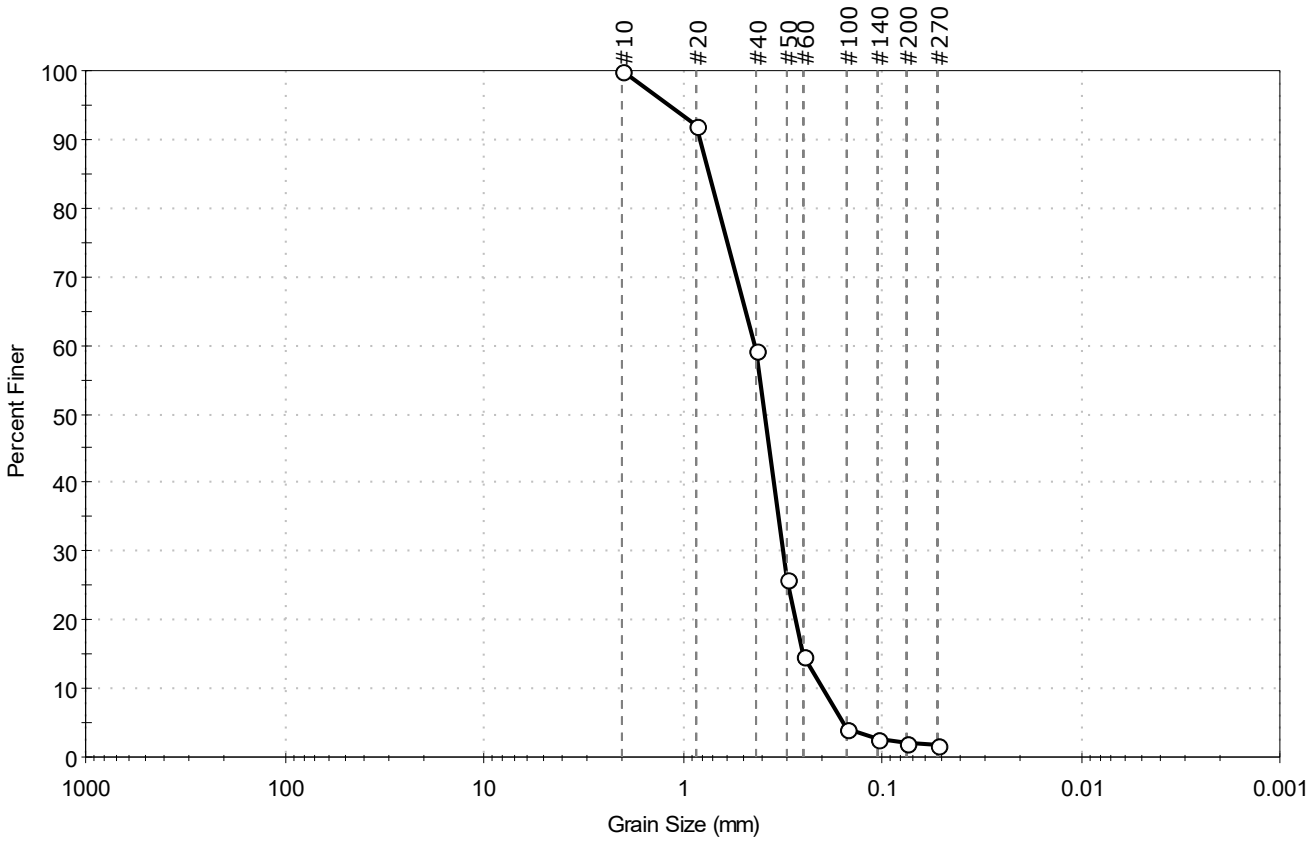
Sample/Test Description

Sand/Gravel Particle Shape : ANGULAR

Sand/Gravel Hardness : HARD

Client:	Sanborn, Head & Associates, Inc.				
Project:	VHB Devens				
Location:	Devens, MA			Project No:	GTX-313122
Boring ID:	SH-TP-1	Sample Type:	bag	Tested By:	ckg
Sample ID:	Layer C1	Test Date:	02/03/21	Checked By:	emm
Depth :	96-120 In	Test Id:	608999		
Test Comment:	Only minus No. 10 sieve for USDA classification				
Visual Description:	Moist, light yellowish brown sand				
Sample Comment:	---				

Particle Size Analysis - ASTM D6913/D7928



% Cobble	% Gravel	% Sand	% Silt & Clay Size
--	0.0	98.0	2.0

Sieve Name	Sieve Size, mm	Percent Finer	Spec. Percent	Complies
#10	2.00	100		
#20	0.85	92		
#40	0.42	59		
#50	0.30	26		
#60	0.25	15		
#100	0.15	4		
#140	0.11	3		
#200	0.075	2.0		
#270	0.053	2		

Coefficients

D_{85} = 0.7302 mm	D_{30} = 0.3128 mm
D_{60} = 0.4301 mm	D_{15} = 0.2508 mm
D_{50} = 0.3852 mm	D_{10} = 0.1986 mm
C_u = 2.166	C_c = 1.145

Classification

ASTM Poorly graded SAND (SP)

AASHTO Fine Sand (A-3 (1))

Sample/Test Description

Sand/Gravel Particle Shape : ANGULAR

Sand/Gravel Hardness : HARD

GeoTesting EXPRESS

Client:	Sanborn, Head & Associates, Inc.				
Project:	VHB Devens				
Location:	Devens, MA			Project No:	GTX-313122
Boring ID:	SH-TP-12	Sample Type:	bag	Tested By:	ckg
Sample ID:	Layer C2	Test Date:	02/03/21	Checked By:	emm
Depth :	96-132 In	Test Id:	609009		
Test Comment:	---				
Visual Description:	Moist, light yellowish brown sand				
Sample Comment:	---				

USDA Textural Classification

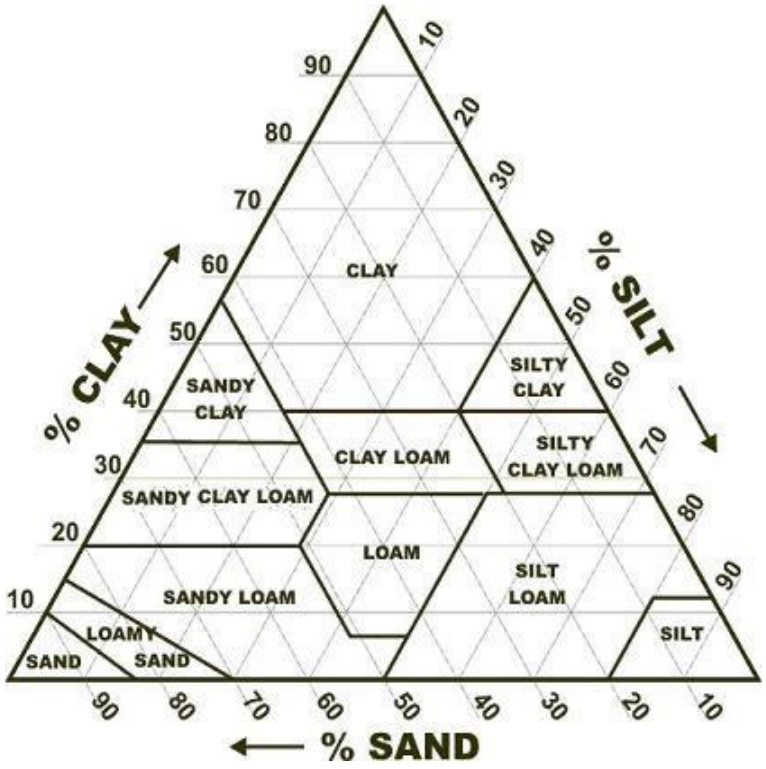
Boring ID	Sample ID	Depth	Sand, %	Fines, %	Classification
SH-TP-12	Layer C2	96-132 In	98	2	Sand

Classifications based only on material passing the #10 sieve

Sand: material passing 2.0 mm and retained on 0.05 mm diameter

Silt: material passing 0.05 mm and retained on 0.002 mm diameter

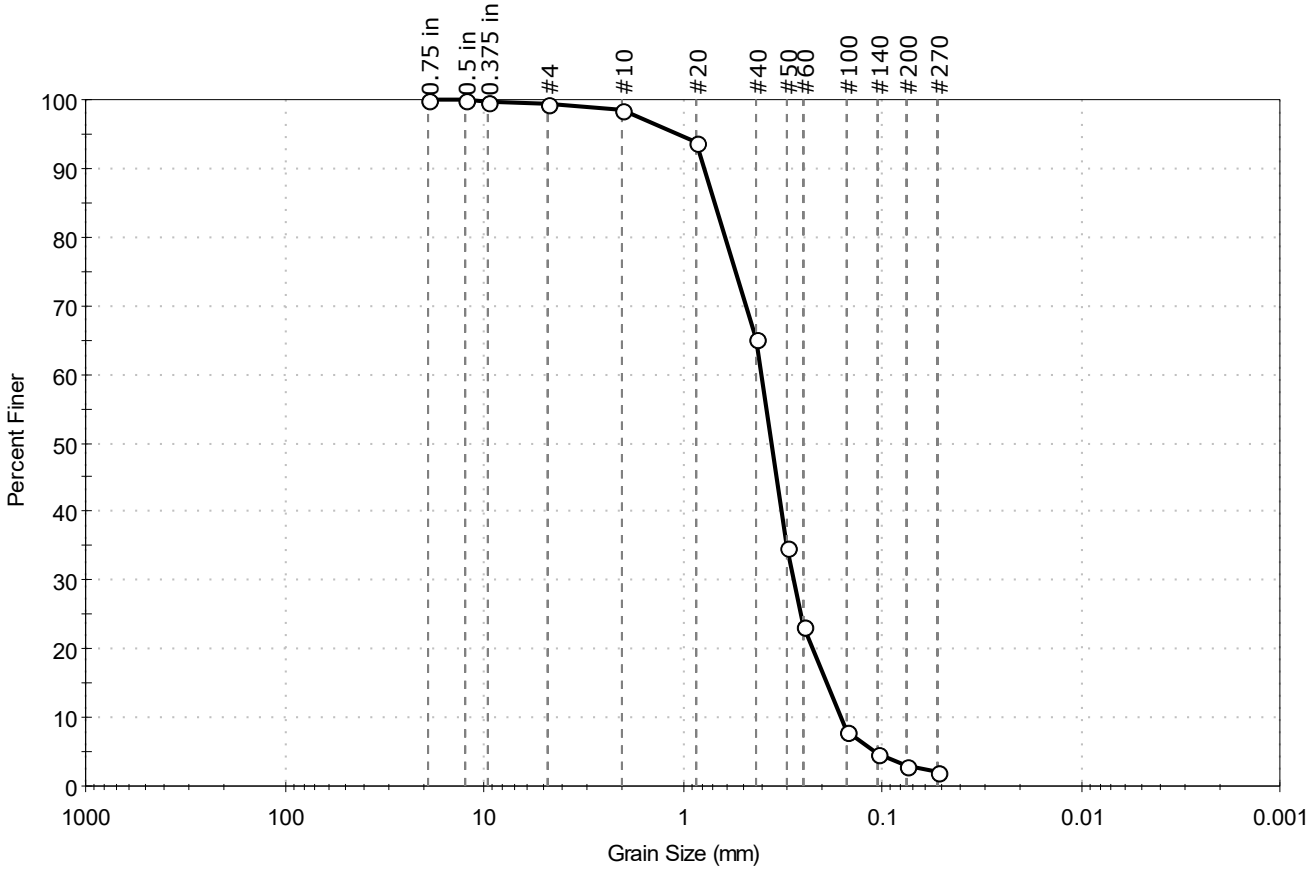
Clay: material passing 0.002 mm diameter



GeoTesting EXPRESS

Client:	Sanborn, Head & Associates, Inc.				
Project:	VHB Devens				
Location:	Devens, MA			Project No:	GTX-313122
Boring ID:	SH-TP-12	Sample Type:	bag	Tested By:	ckg
Sample ID:	Layer C2	Test Date:	02/03/21	Checked By:	emm
Depth :	96-132 In	Test Id:	609003		
Test Comment:	---				
Visual Description:	Moist, light yellowish brown sand				
Sample Comment:	---				

Particle Size Analysis - ASTM D6913/D7928



% Cobble	% Gravel	% Sand	% Silt & Clay Size
--	0.5	96.5	3.0

Sieve Name	Sieve Size, mm	Percent Finer	Spec. Percent	Complies
0.75 in	19.00	100		
0.5 in	12.50	100		
0.375 in	9.50	100		
#4	4.75	99		
#10	2.00	98		
#20	0.85	94		
#40	0.42	65		
#50	0.30	35		
#60	0.25	23		
#100	0.15	8		
#140	0.11	5		
#200	0.075	3.0		
#270	0.053	2		

Coefficients

D_{85} = 0.6866 mm	D_{30} = 0.2780 mm
D_{60} = 0.4003 mm	D_{15} = 0.1889 mm
D_{50} = 0.3571 mm	D_{10} = 0.1599 mm
C_u = 2.503	C_c = 1.207

Classification

ASTM Poorly graded SAND (SP)

AASHTO Fine Sand (A-3 (1))

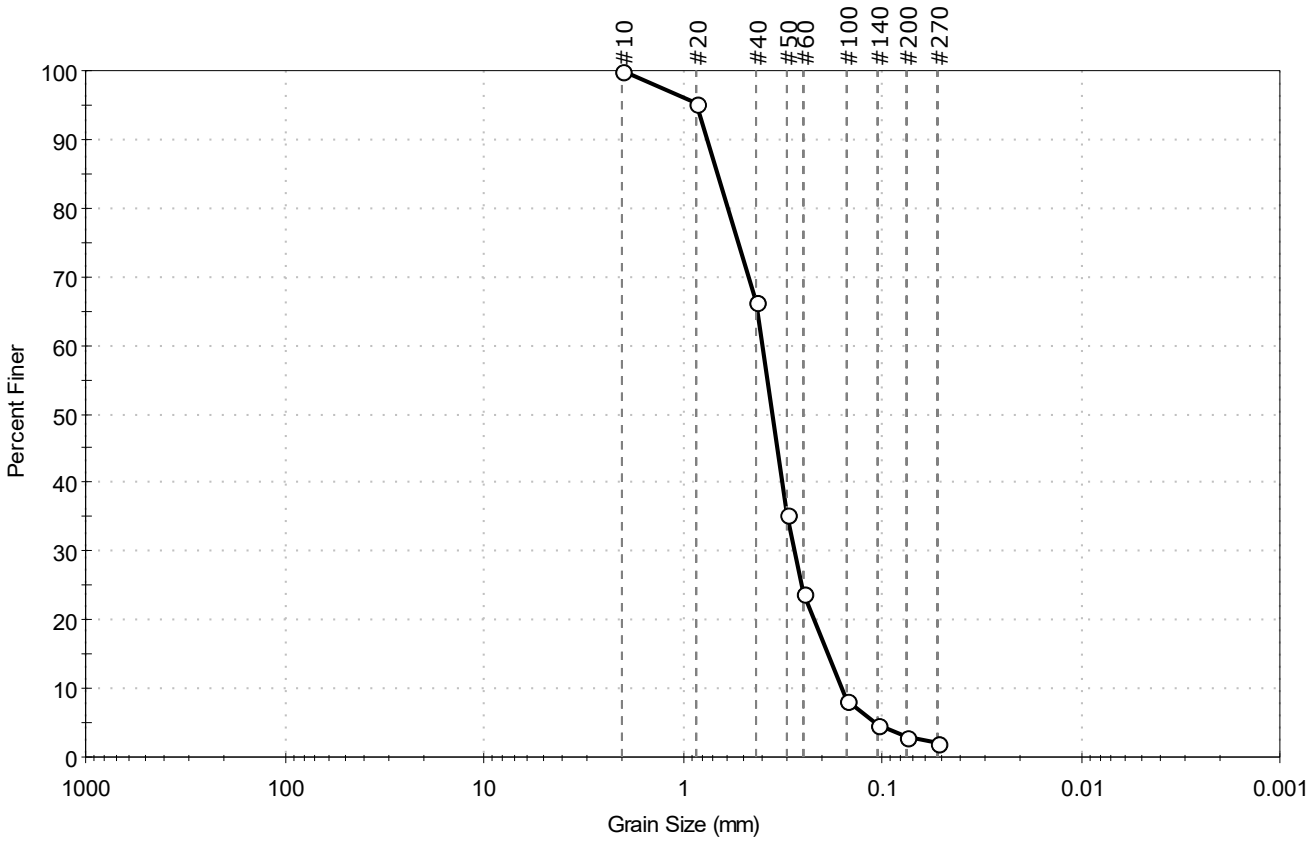
Sample/Test Description

Sand/Gravel Particle Shape : ANGULAR

Sand/Gravel Hardness : HARD

Client:	Sanborn, Head & Associates, Inc.				
Project:	VHB Devens				
Location:	Devens, MA			Project No:	GTX-313122
Boring ID:	SH-TP-12	Sample Type:	bag	Tested By:	ckg
Sample ID:	Layer C2	Test Date:	02/03/21	Checked By:	emm
Depth :	96-132 In	Test Id:	609003		
Test Comment:	Only minus No. 10 sieve for USDA classification				
Visual Description:	Moist, light yellowish brown sand				
Sample Comment:	---				

Particle Size Analysis - ASTM D6913/D7928



% Cobble	% Gravel	% Sand	% Silt & Clay Size
--	0.0	97.0	3.0

Sieve Name	Sieve Size, mm	Percent Finer	Spec. Percent	Complies
#10	2.00	100		
#20	0.85	95		
#40	0.42	66		
#50	0.30	35		
#60	0.25	24		
#100	0.15	8		
#140	0.11	5		
#200	0.075	3.0		
#270	0.053	2		

Coefficients

D_{85} = 0.6642 mm
D_{30} = 0.2759 mm
D_{60} = 0.3959 mm
D_{15} = 0.1874 mm
D_{50} = 0.3539 mm
D_{10} = 0.1590 mm
C_u = 2.490
C_c = 1.209

Classification

ASTM Poorly graded SAND (SP)

AASHTO Fine Sand (A-3 (1))

Sample/Test Description

Sand/Gravel Particle Shape : ANGULAR

Sand/Gravel Hardness : HARD

Client:	Sanborn, Head & Associates, Inc.				
Project:	VHB Devens				
Location:	Devens, MA			Project No:	GTX-313122
Boring ID:	SH-TP-13	Sample Type:	bag	Tested By:	ckg
Sample ID:	Layer C1	Test Date:	02/03/21	Checked By:	emm
Depth :	8-126 In	Test Id:	609010		
Test Comment:	---				
Visual Description:	Moist, light yellowish brown sand				
Sample Comment:	---				

USDA Textural Classification

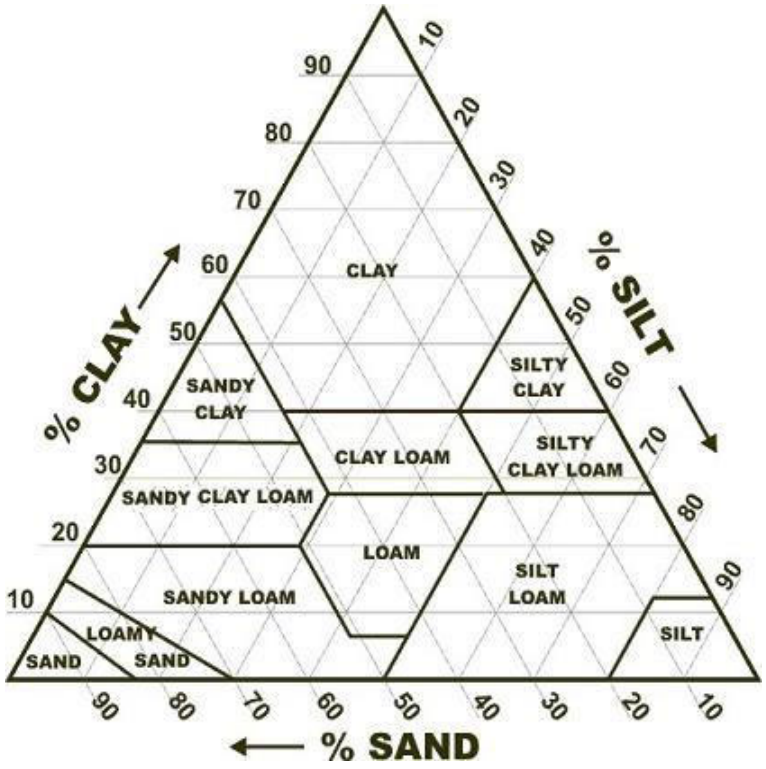
Boring ID	Sample ID	Depth	Sand, %	Fines, %	Classification
SH-TP-13	Layer C1	8-126 In	97	3	Sand

Classifications based only on material passing the #10 sieve

Sand: material passing 2.0 mm and retained on 0.05 mm diameter

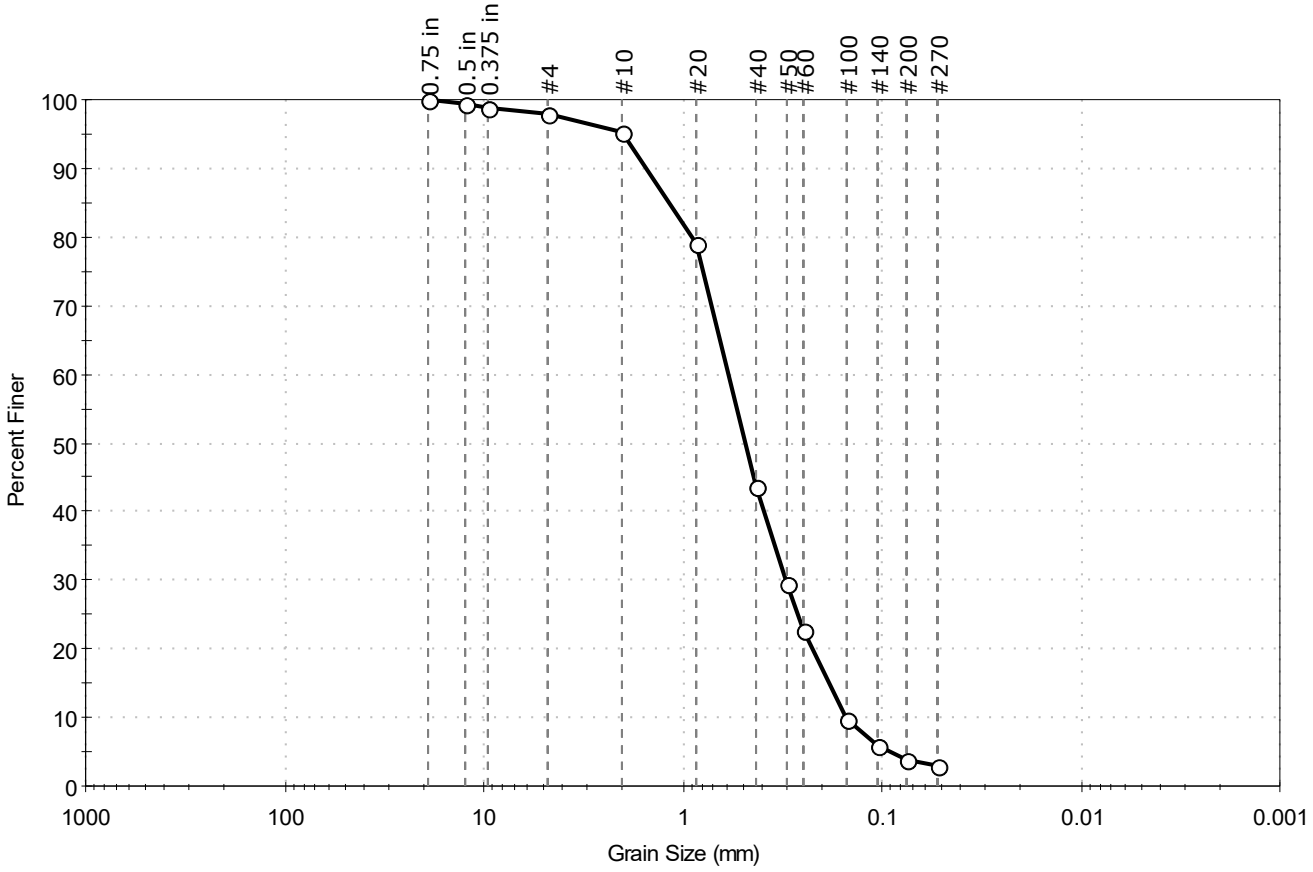
Silt: material passing 0.05 mm and retained on 0.002 mm diameter

Clay: material passing 0.002 mm diameter



Client:	Sanborn, Head & Associates, Inc.				
Project:	VHB Devens				
Location:	Devens, MA			Project No:	GTX-313122
Boring ID:	SH-TP-13	Sample Type:	bag	Tested By:	ckg
Sample ID:	Layer C1	Test Date:	02/03/21	Checked By:	emm
Depth :	8-126 In	Test Id:	609004		
Test Comment:	---				
Visual Description:	Moist, light yellowish brown sand				
Sample Comment:	---				

Particle Size Analysis - ASTM D6913/D7928



% Cobble	% Gravel	% Sand	% Silt & Clay Size
—	2.1	94.0	3.9

Sieve Name	Sieve Size, mm	Percent Finer	Spec. Percent	Complies
0.75 in	19.00	100		
0.5 in	12.50	99		
0.375 in	9.50	99		
#4	4.75	98		
#10	2.00	95		
#20	0.85	79		
#40	0.42	44		
#50	0.30	29		
#60	0.25	23		
#100	0.15	10		
#140	0.11	6		
#200	0.075	3.9		
#270	0.053	3		

Coefficients

D_{85} = 1.1603 mm	D_{30} = 0.3043 mm
D_{60} = 0.5849 mm	D_{15} = 0.1849 mm
D_{50} = 0.4814 mm	D_{10} = 0.1521 mm
C_u = 3.845	C_c = 1.041

Classification

ASTM — Poorly graded SAND (SP)

AASHTO — Stone Fragments, Gravel and Sand (A-1-b (1))

Sample/Test Description

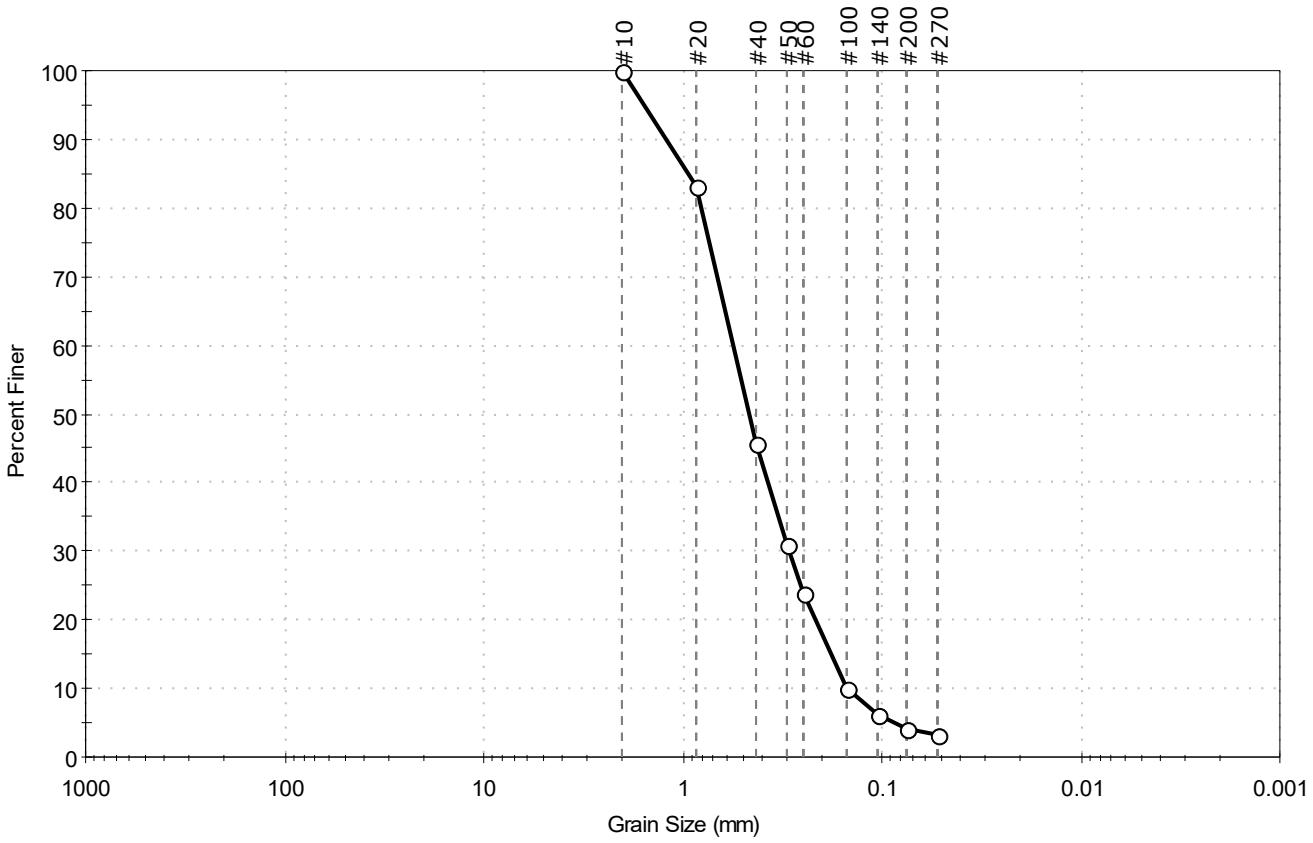
Sand/Gravel Particle Shape : ---

Sand/Gravel Hardness : ---

GeoTesting EXPRESS

Client:	Sanborn, Head & Associates, Inc.				
Project:	VHB Devens				
Location:	Devens, MA			Project No:	GTX-313122
Boring ID:	SH-TP-13	Sample Type:	bag	Tested By:	ckg
Sample ID:	Layer C1	Test Date:	02/03/21	Checked By:	emm
Depth :	8-126 In	Test Id:	609004		
Test Comment:	Only minus No. 10 sieve for USDA classification				
Visual Description:	Moist, light yellowish brown sand				
Sample Comment:	---				

Particle Size Analysis - ASTM D6913/D7928



% Cobble	% Gravel	% Sand	% Silt & Clay Size
--	0.0	95.9	4.1

Sieve Name	Sieve Size, mm	Percent Finer	Spec. Percent	Complies
#10	2.00	100		
#20	0.85	83		
#40	0.42	46		
#50	0.30	31		
#60	0.25	24		
#100	0.15	10		
#140	0.11	6		
#200	0.075	4.1		
#270	0.053	3		

Coefficients

D_{85} = 0.9318 mm	D_{30} = 0.2930 mm
D_{60} = 0.5528 mm	D_{15} = 0.1797 mm
D_{50} = 0.4593 mm	D_{10} = 0.1483 mm
C_u = 3.728	C_c = 1.047

Classification

ASTM: Poorly graded SAND (SP)

AASHTO: Stone Fragments, Gravel and Sand (A-1-b (1))

Sample/Test Description

Sand/Gravel Particle Shape : ---

Sand/Gravel Hardness : ---

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GeoTesting EXPRESS

Client:	Sanborn, Head & Associates, Inc.				
Project:	VHB Devens				
Location:	Devens, MA			Project No:	GTX-313122
Boring ID:	SH-TP-5	Sample Type:	bag	Tested By:	ckg
Sample ID:	Layer C1	Test Date:	02/03/21	Checked By:	emm
Depth :	54-132 In	Test Id:	609006		
Test Comment:	---				
Visual Description:	Moist, light yellowish brown silty sand				
Sample Comment:	---				

USDA Textural Classification

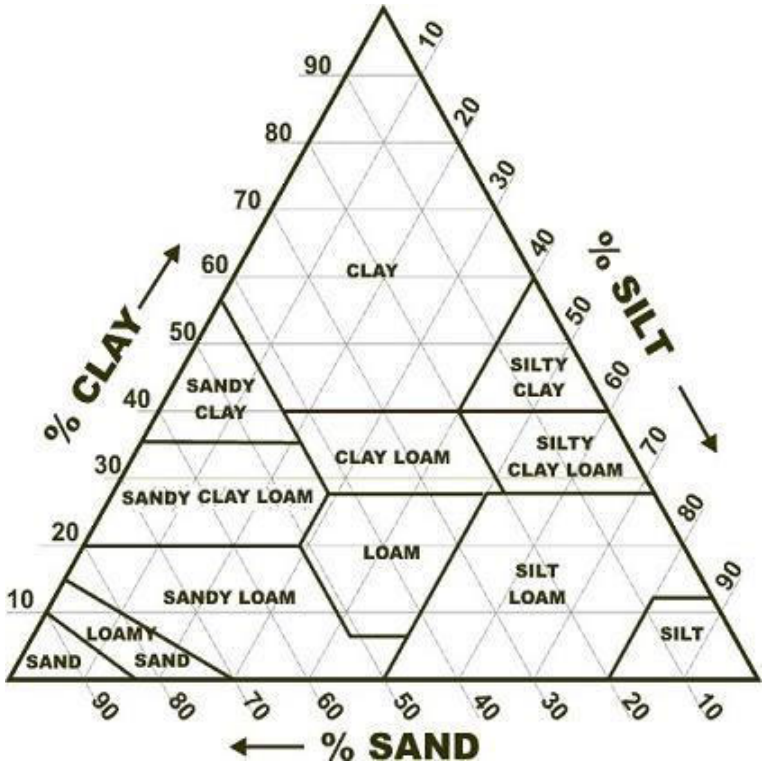
Boring ID	Sample ID	Depth	Sand, %	Silt, %	Clay, %	Classification
SH-TP-5	Layer C1	54-132 In	72	28	0	Loamy Sand

Classifications based only on material passing the #10 sieve

Sand: material passing 2.0 mm and retained on 0.05 mm diameter

Silt: material passing 0.05 mm and retained on 0.002 mm diameter

Clay: material passing 0.002 mm diameter

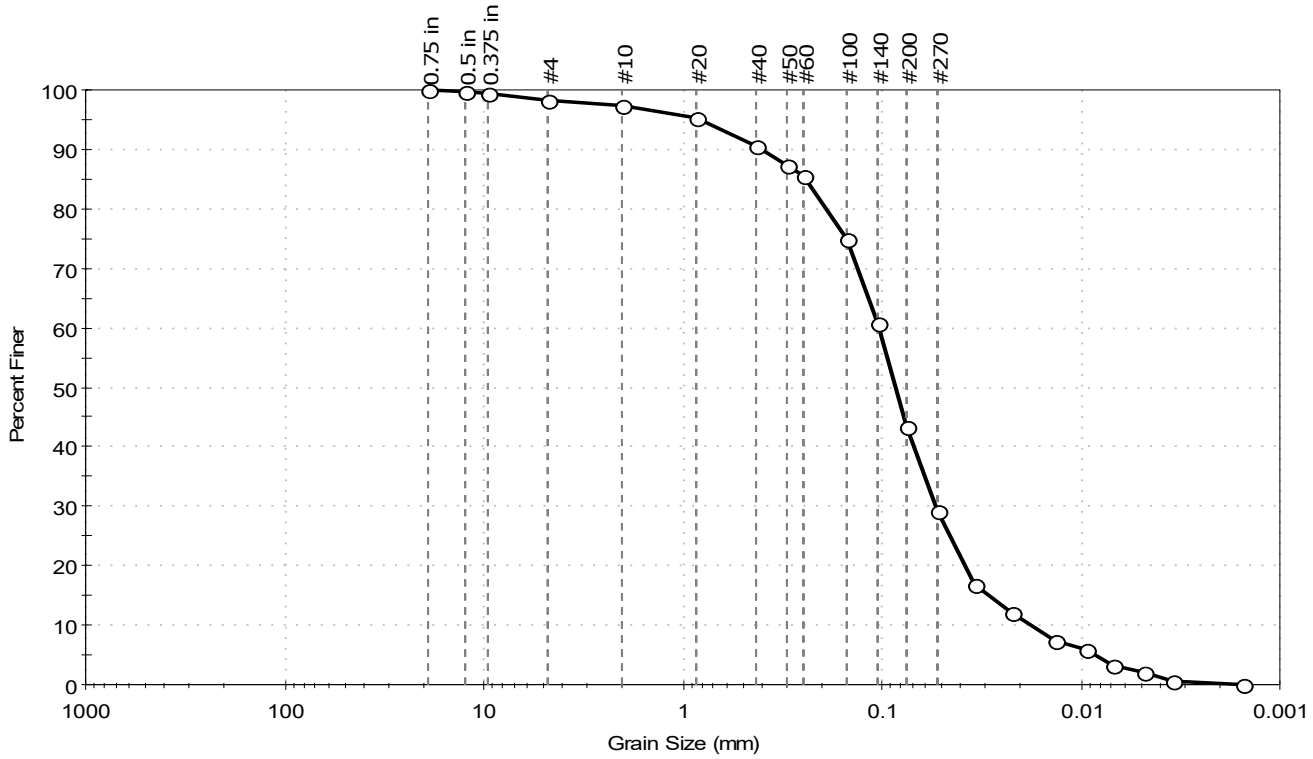


GeoTesting EXPRESS

Client:	Sanborn, Head & Associates, Inc.				
Project:	VHB Devens				
Location:	Devens, MA			Project No:	GTX-313122
Boring ID:	SH-TP-5	Sample Type:	bag	Tested By:	ckg
Sample ID:	Layer C1	Test Date:	02/03/21	Checked By:	emm
Depth :	54-132 In	Test Id:	609000		

Test Comment: ---
Visual Description: Moist, light yellowish brown silty sand
Sample Comment: ---

Particle Size Analysis - ASTM D6913/D7928



% Cobble	% Gravel	% Sand	% Silt & Clay Size
--	1.8	54.7	43.5

Sieve Name	Sieve Size, mm	Percent Finer	Spec. Percent	Complies
0.75 in	19.00	100		
0.5 in	12.50	100		
0.375 in	9.50	99		
#4	4.75	98		
#10	2.00	97		
#20	0.85	95		
#40	0.42	91		
#50	0.30	87		
#60	0.25	85		
#100	0.15	75		
#140	0.11	61		
#200	0.075	43		
#270	0.053	29		
Hydrometer	Particle Size (mm)	Percent Finer	Spec. Percent	Complies
---	0.0343	17		
---	0.0224	12		
---	0.0134	7		
---	0.0093	6		
---	0.0068	3		
---	0.0049	2		
---	0.0035	1		
---	0.0015	0		

Coefficients

D_{85} = 0.2445 mm D_{30} = 0.0541 mm
D_{60} = 0.1043 mm D_{15} = 0.0293 mm
D_{50} = 0.0854 mm D_{10} = 0.0179 mm
C_u = 5.827 C_c = 1.568

Classification

ASTM N/A

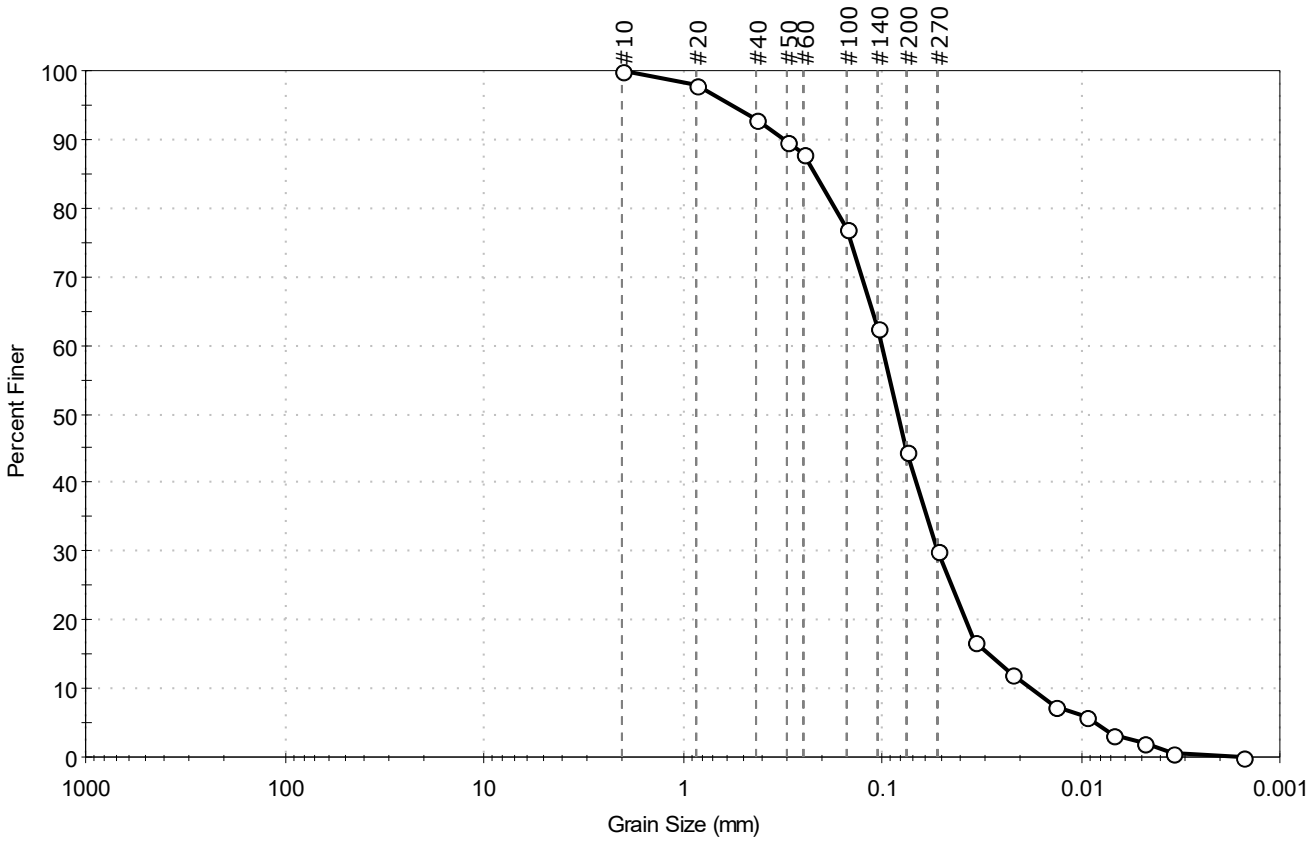
AASHTO Silty Soils (A-4 (0))

Sample/Test Description

Sand/Gravel Particle Shape : ---
Sand/Gravel Hardness : ---
Dispersion Device : Apparatus A - Mech Mixer
Dispersion Period : 1 minute
Est. Specific Gravity : 2.65
Separation of Sample: #270 Sieve

Client:	Sanborn, Head & Associates, Inc.				
Project:	VHB Devens				
Location:	Devens, MA			Project No:	GTX-313122
Boring ID:	SH-TP-5	Sample Type:	bag	Tested By:	ckg
Sample ID:	Layer C1	Test Date:	02/03/21	Checked By:	emm
Depth :	54-132 In	Test Id:	609000		
Test Comment:	Only minus No. 10 sieve for USDA classification				
Visual Description:	Moist, light yellowish brown silty sand				
Sample Comment:	---				

Particle Size Analysis - ASTM D6913/D7928



% Cobble	% Gravel	% Sand	% Silt & Clay Size
--	0.0	55.4	44.6

Sieve Name	Sieve Size, mm	Percent Finer	Spec. Percent	Complies
#10	2.00	100		
#20	0.85	98		
#40	0.42	93		
#50	0.30	90		
#60	0.25	88		
#100	0.15	77		
#140	0.11	62		
#200	0.075	45		
#270	0.053	30		
Hydrometer	Particle Size (mm)	Percent Finer	Spec. Percent	Complies
---	0.0343	17		
---	0.0224	12		
---	0.0134	7		
---	0.0093	6		
---	0.0068	3		
---	0.0049	2		
---	0.0035	1		
---	0.0015	0		

Coefficients

D_{85} =0.2196 mm	D_{30} =0.0531 mm
D_{60} =0.1011 mm	D_{15} =0.0293 mm
D_{50} =0.0832 mm	D_{10} =0.0179 mm
C_u =5.648	C_c =1.558

Classification

ASTM N/A

AASHTO Silty Soils (A-4 (0))

Sample/Test Description

Sand/Gravel Particle Shape : ---

Sand/Gravel Hardness : ---

Dispersion Device : Apparatus A - Mech Mixer

Dispersion Period : 1 minute

Est. Specific Gravity : 2.65

Separation of Sample: #270 Sieve

GeoTesting EXPRESS

Client:	Sanborn, Head & Associates, Inc.				
Project:	VHB Devens				
Location:	Devens, MA			Project No:	GTX-313122
Boring ID:	SH-TP-7	Sample Type:	bag	Tested By:	ckg
Sample ID:	Layer C1	Test Date:	02/03/21	Checked By:	emm
Depth :	10-120 In	Test Id:	609007		
Test Comment:	---				
Visual Description:	Moist, light yellowish brown sand				
Sample Comment:	---				

USDA Textural Classification

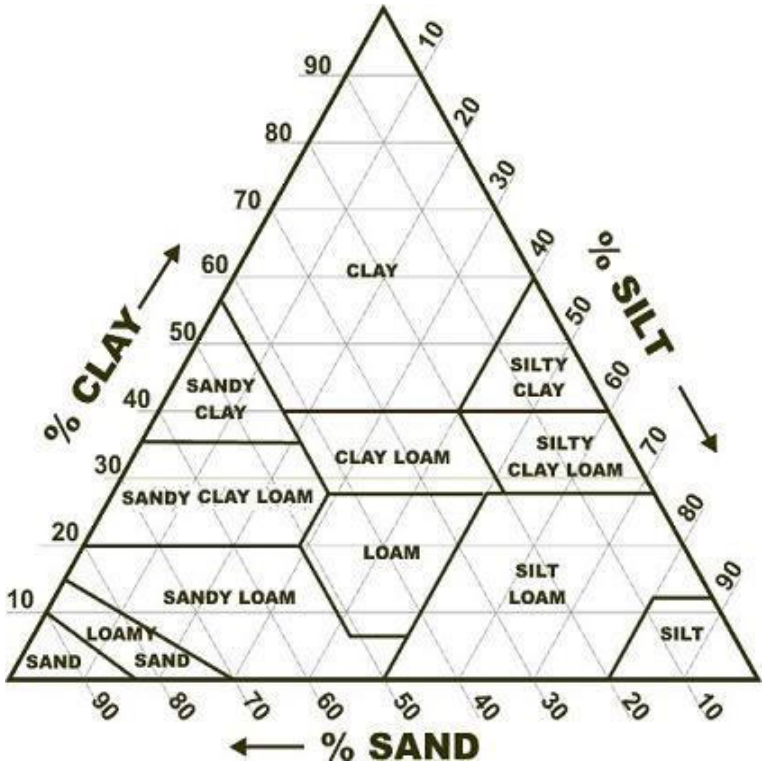
Boring ID	Sample ID	Depth	Sand, %	Fines, %	Classification
SH-TP-7	Layer C1	18-120 In	97	3	Sand

Classifications based only on material passing the #10 sieve

Sand: material passing 2.0 mm and retained on 0.05 mm diameter

Silt: material passing 0.05 mm and retained on 0.002 mm diameter

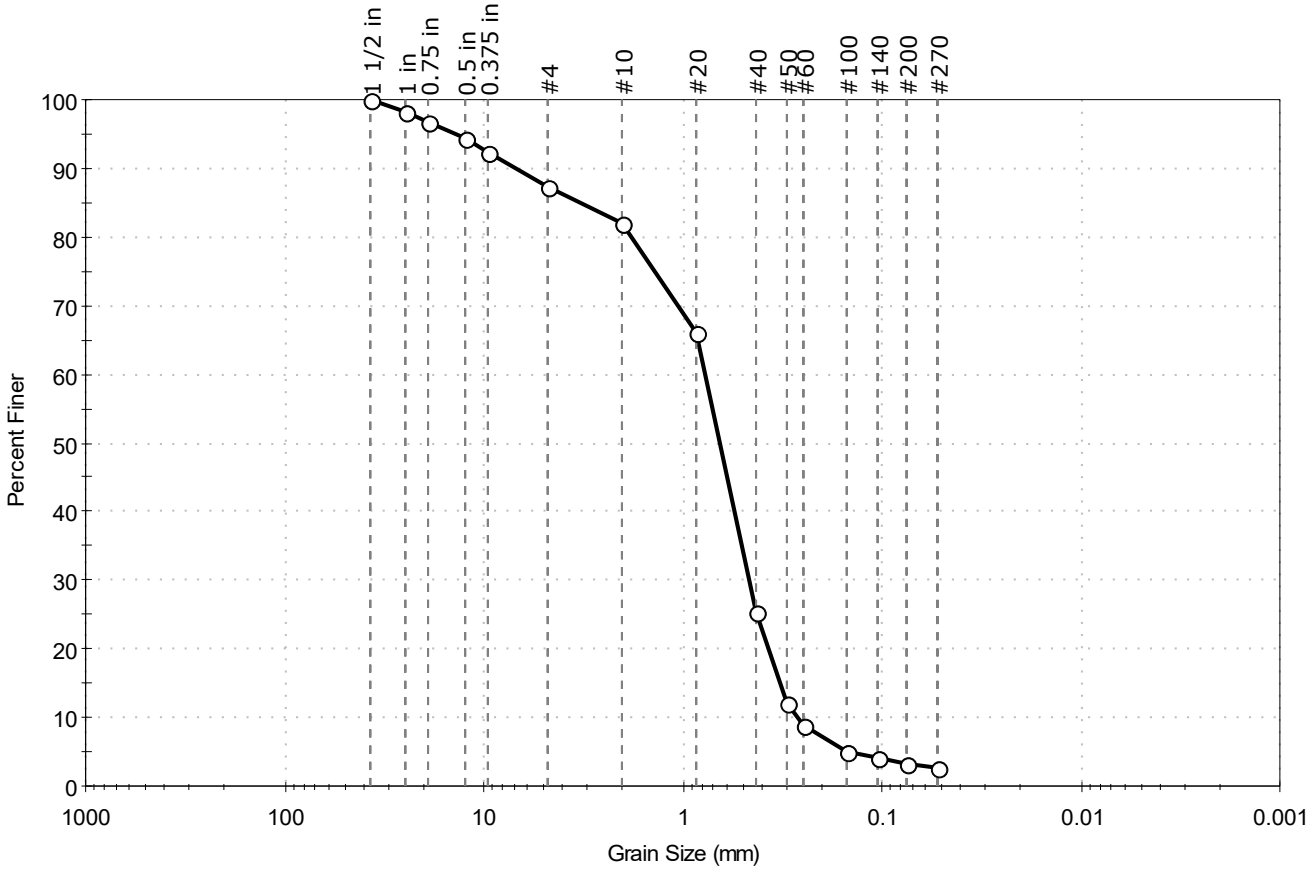
Clay: material passing 0.002 mm diameter



GeoTesting EXPRESS

Client:	Sanborn, Head & Associates, Inc.				
Project:	VHB Devens				
Location:	Devens, MA			Project No:	GTX-313122
Boring ID:	SH-TP-7	Sample Type:	bag	Tested By:	ckg
Sample ID:	Layer C1	Test Date:	02/03/21	Checked By:	emm
Depth :	10-120 In	Test Id:	609001		
Test Comment:	---				
Visual Description:	Moist, light yellowish brown sand				
Sample Comment:	---				

Particle Size Analysis - ASTM D6913/D7928



% Cobble	% Gravel	% Sand	% Silt & Clay Size
—	12.8	83.9	3.3

Sieve Name	Sieve Size, mm	Percent Finer	Spec. Percent	Complies
1 1/2 in	37.50	100		
1 in	25.00	98		
0.75 in	19.00	97		
0.5 in	12.50	95		
0.375 in	9.50	92		
#4	4.75	87		
#10	2.00	82		
#20	0.85	66		
#40	0.42	25		
#50	0.30	12		
#60	0.25	9		
#100	0.15	5		
#140	0.11	4		
#200	0.075	3.3		
#270	0.053	3		

Coefficients

D_{85} = 3.2970 mm	D_{30} = 0.4594 mm
D_{60} = 0.7664 mm	D_{15} = 0.3239 mm
D_{50} = 0.6462 mm	D_{10} = 0.2661 mm
C_u = 2.880	C_c = 1.035

Classification

ASTM — Poorly graded SAND (SP)

AASHTO — Stone Fragments, Gravel and Sand (A-1-b (1))

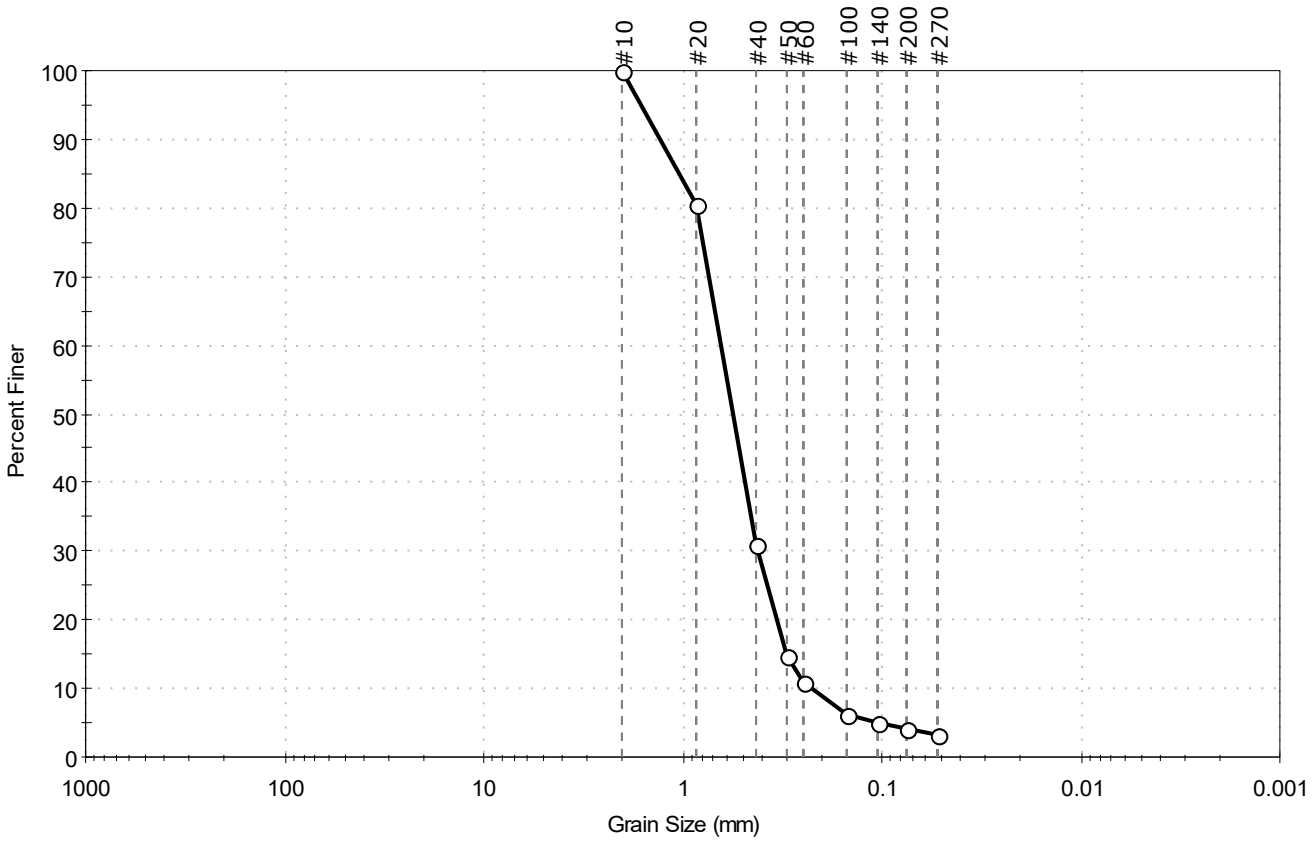
Sample/Test Description

Sand/Gravel Particle Shape : ANGULAR

Sand/Gravel Hardness : HARD

Client:	Sanborn, Head & Associates, Inc.				
Project:	VHB Devens				
Location:	Devens, MA			Project No:	GTX-313122
Boring ID:	SH-TP-7	Sample Type:	bag	Tested By:	ckg
Sample ID:	Layer C1	Test Date:	02/03/21	Checked By:	emm
Depth :	10-120 In	Test Id:	609001		
Test Comment:	Only minus No. 10 sieve for USDA classification				
Visual Description:	Moist, light yellowish brown sand				
Sample Comment:	---				

Particle Size Analysis - ASTM D6913/D7928



% Cobble	% Gravel	% Sand	% Silt & Clay Size
--	0.0	96.0	4.0

Sieve Name	Sieve Size, mm	Percent Finer	Spec. Percent	Complies
#10	2.00	100		
#20	0.85	81		
#40	0.42	31		
#50	0.30	15		
#60	0.25	11		
#100	0.15	6		
#140	0.11	5		
#200	0.075	4.0		
#270	0.053	3		

Coefficients

D_{85} = 1.0320 mm D_{30} = 0.4158 mm

D_{60} = 0.6373 mm D_{15} = 0.3019 mm

D_{50} = 0.5541 mm D_{10} = 0.2269 mm

C_u = 2.809 C_c = 1.196

Classification

ASTM: Poorly graded SAND (SP)

AASHTO: Stone Fragments, Gravel and Sand (A-1-b (1))

Sample/Test Description

Sand/Gravel Particle Shape : ANGULAR

Sand/Gravel Hardness : HARD

Client:	Sanborn, Head & Associates, Inc.				
Project:	VHB Devens				
Location:	Devens, MA			Project No:	GTX-313122
Boring ID:	SH-TP-8	Sample Type:	bag	Tested By:	ckg
Sample ID:	Layer C1	Test Date:	02/03/21	Checked By:	emm
Depth :	18-120 In	Test Id:	609008		
Test Comment:	---				
Visual Description:	Moist, light yellowish brown sand				
Sample Comment:	---				

USDA Textural Classification

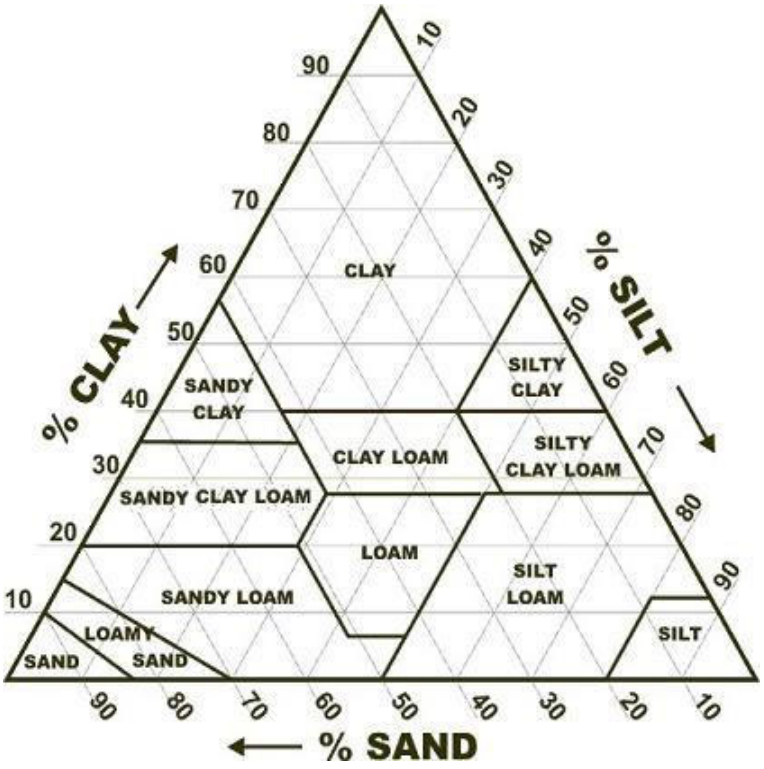
Boring ID	Sample ID	Depth	Sand, %	Fines, %	Classification
SH-TP-8	Layer C1	18-120 In	96	4	Sand

Classifications based only on material passing the #10 sieve

Sand: material passing 2.0 mm and retained on 0.05 mm diameter

Silt: material passing 0.05 mm and retained on 0.002 mm diameter

Clay: material passing 0.002 mm diameter

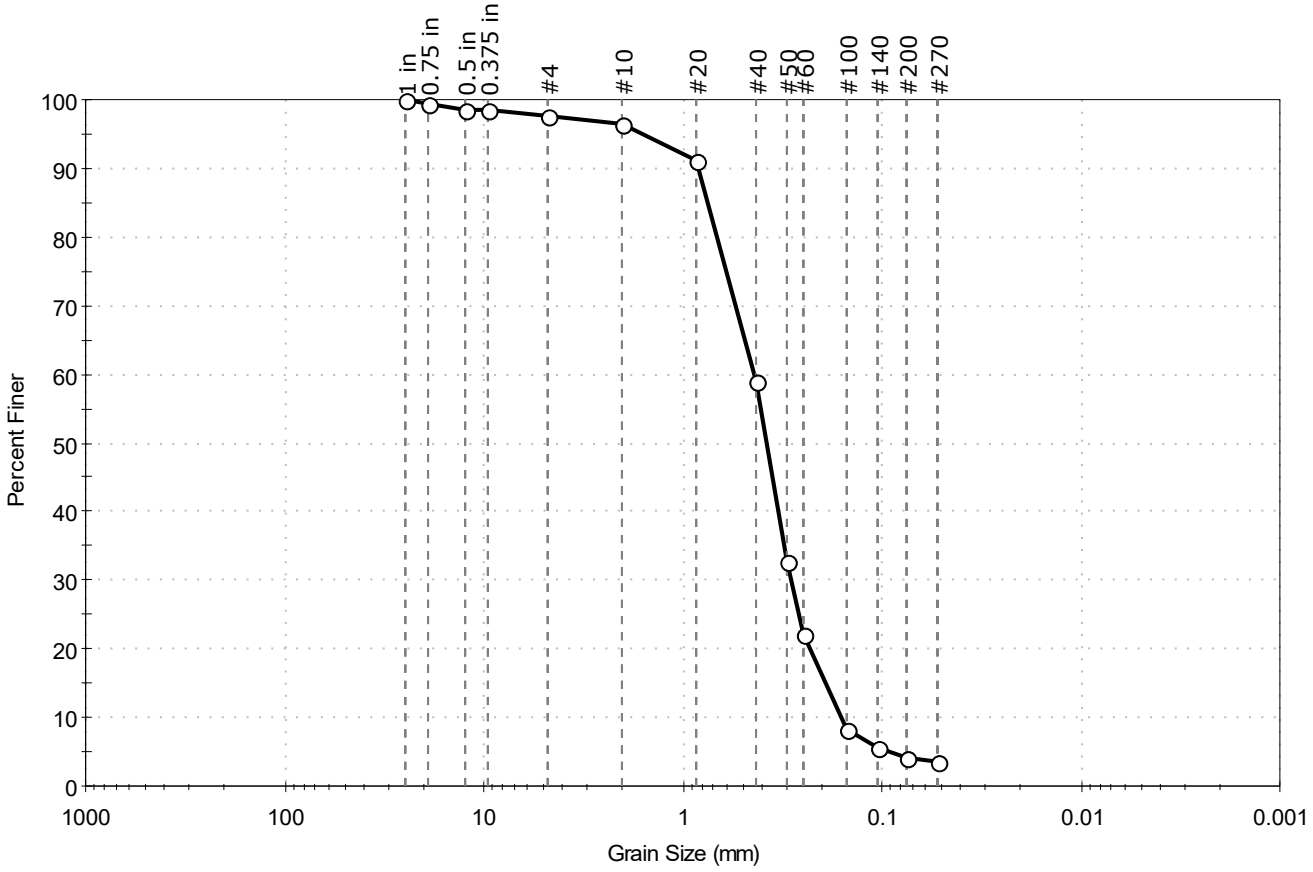


GeoTesting EXPRESS

Client:	Sanborn, Head & Associates, Inc.				
Project:	VHB Devens				
Location:	Devens, MA			Project No:	GTX-313122
Boring ID:	SH-TP-8	Sample Type:	bag	Tested By:	ckg
Sample ID:	Layer C1	Test Date:	02/03/21	Checked By:	emm
Depth :	18-120 In	Test Id:	609002		

Test Comment: ---
Visual Description: Moist, light yellowish brown sand
Sample Comment: ---

Particle Size Analysis - ASTM D6913/D7928



% Cobble	% Gravel	% Sand	% Silt & Clay Size
—	2.4	93.4	4.2

Sieve Name	Sieve Size, mm	Percent Finer	Spec. Percent	Complies
1 in	25.00	100		
0.75 in	19.00	99		
0.5 in	12.50	99		
0.375 in	9.50	98		
#4	4.75	98		
#10	2.00	97		
#20	0.85	91		
#40	0.42	59		
#50	0.30	33		
#60	0.25	22		
#100	0.15	8		
#140	0.11	6		
#200	0.075	4.2		
#270	0.053	4		

Coefficients

D_{85} = 0.7434 mm D_{30} = 0.2857 mm
D_{60} = 0.4333 mm D_{15} = 0.1924 mm
D_{50} = 0.3766 mm D_{10} = 0.1602 mm
C_u = 2.705 C_c = 1.176

Classification

ASTM Poorly graded SAND (SP)

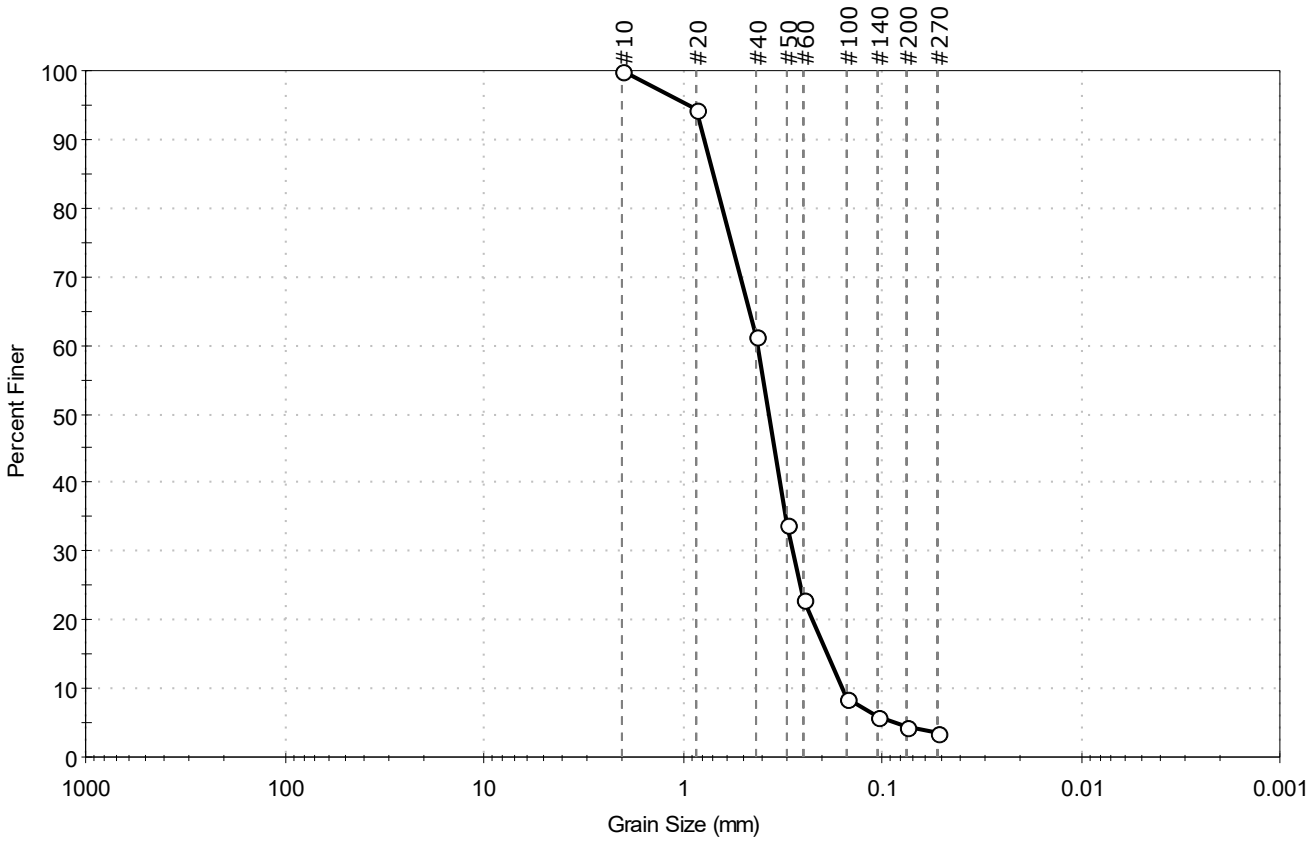
AASHTO Fine Sand (A-3 (1))

Sample/Test Description

Sand/Gravel Particle Shape : ---
Sand/Gravel Hardness : ---

Client:	Sanborn, Head & Associates, Inc.				
Project:	VHB Devens				
Location:	Devens, MA			Project No:	GTX-313122
Boring ID:	SH-TP-8	Sample Type:	bag	Tested By:	ckg
Sample ID:	Layer C1	Test Date:	02/03/21	Checked By:	emm
Depth :	18-120 In	Test Id:	609002		
Test Comment:	Only minus No. 10 sieve for USDA classification				
Visual Description:	Moist, light yellowish brown sand				
Sample Comment:	---				

Particle Size Analysis - ASTM D6913/D7928



% Cobble	% Gravel	% Sand	% Silt & Clay Size
--	0.0	95.6	4.4

Sieve Name	Sieve Size, mm	Percent Finer	Spec. Percent	Complies
#10	2.00	100		
#20	0.85	94		
#40	0.42	61		
#50	0.30	34		
#60	0.25	23		
#100	0.15	9		
#140	0.11	6		
#200	0.075	4.4		
#270	0.053	4		

Coefficients

D_{85} = 0.6977 mm	D_{30} = 0.2807 mm
D_{60} = 0.4184 mm	D_{15} = 0.1887 mm
D_{50} = 0.3680 mm	D_{10} = 0.1581 mm
C_u = 2.646	C_c = 1.191

Classification

ASTM Poorly graded SAND (SP)

AASHTO Fine Sand (A-3 (1))

Sample/Test Description

Sand/Gravel Particle Shape : ---

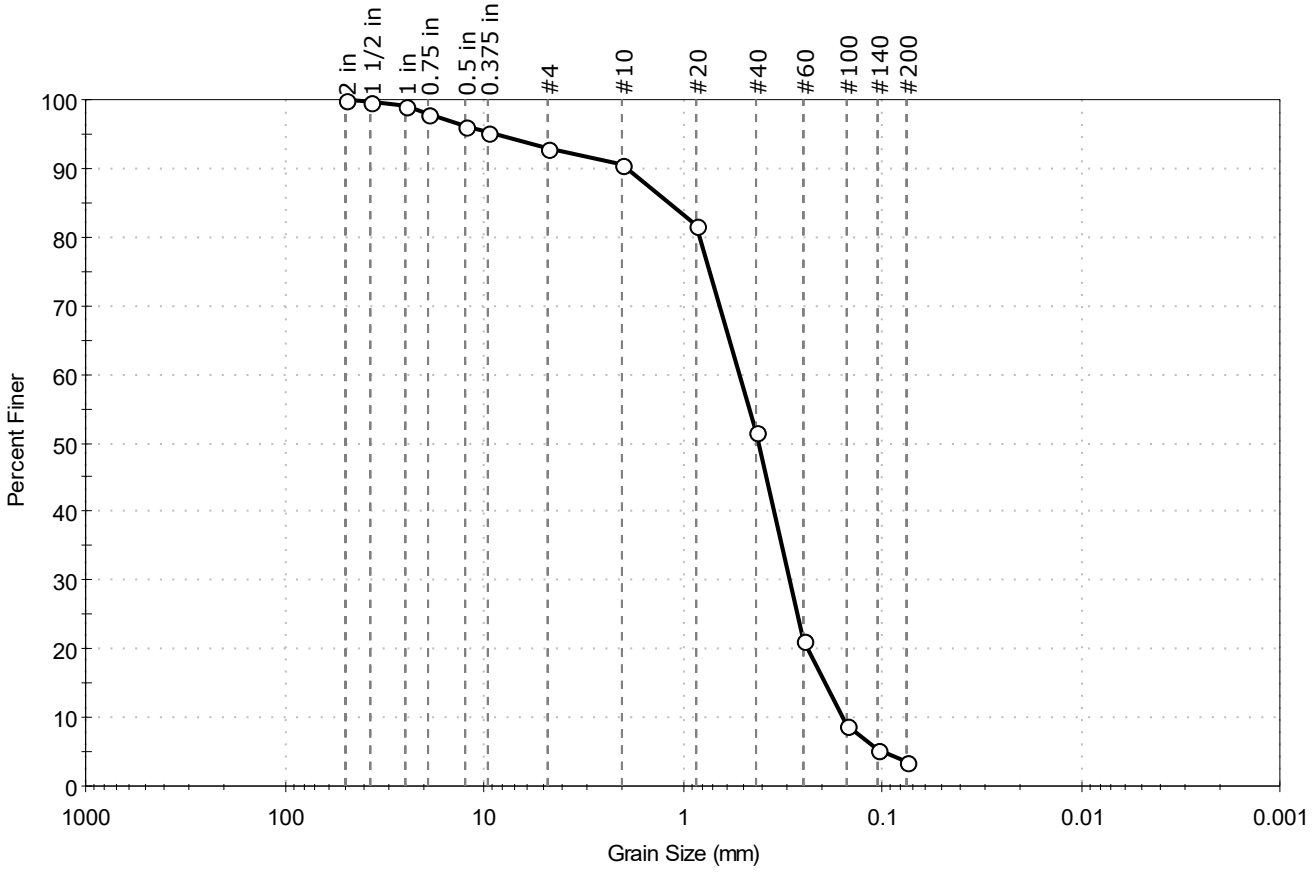
Sand/Gravel Hardness : ---

GeoTesting EXPRESS

Client:	Sanborn, Head & Associates, Inc.				
Project:	Scannell Devens				
Location:	Devens, MA			Project No:	GTX-313208
Boring ID:	---	Sample Type:	bag	Tested By:	ckg
Sample ID:	Layer C1 Composite	Test Date:	02/23/21	Checked By:	emm
Depth :	---	Test Id:	610735		

Test Comment: ---
Visual Description: Moist, lght yellowish brown sand
Sample Comment: ---

Particle Size Analysis - ASTM D6913



% Cobble	% Gravel	% Sand	% Silt & Clay Size
—	7.2	89.2	3.6

Sieve Name	Sieve Size, mm	Percent Finer	Spec. Percent	Complies
2 in	50.00	100		
1 1/2 in	37.50	100		
1 in	25.00	99		
0.75 in	19.00	98		
0.5 in	12.50	96		
0.375 in	9.50	95		
#4	4.75	93		
#10	2.00	91		
#20	0.85	82		
#40	0.42	52		
#60	0.25	21		
#100	0.15	9		
#140	0.11	5		
#200	0.075	3.6		

Coefficients

D_{85} = 1.1697 mm D_{30} = 0.2916 mm
D_{60} = 0.5168 mm D_{15} = 0.1936 mm
D_{50} = 0.4140 mm D_{10} = 0.1577 mm
C_u = 3.277 C_c = 1.043

Classification

ASTM Poorly graded SAND (SP)

AASHTO Fine Sand (A-3 (1))

Sample/Test Description

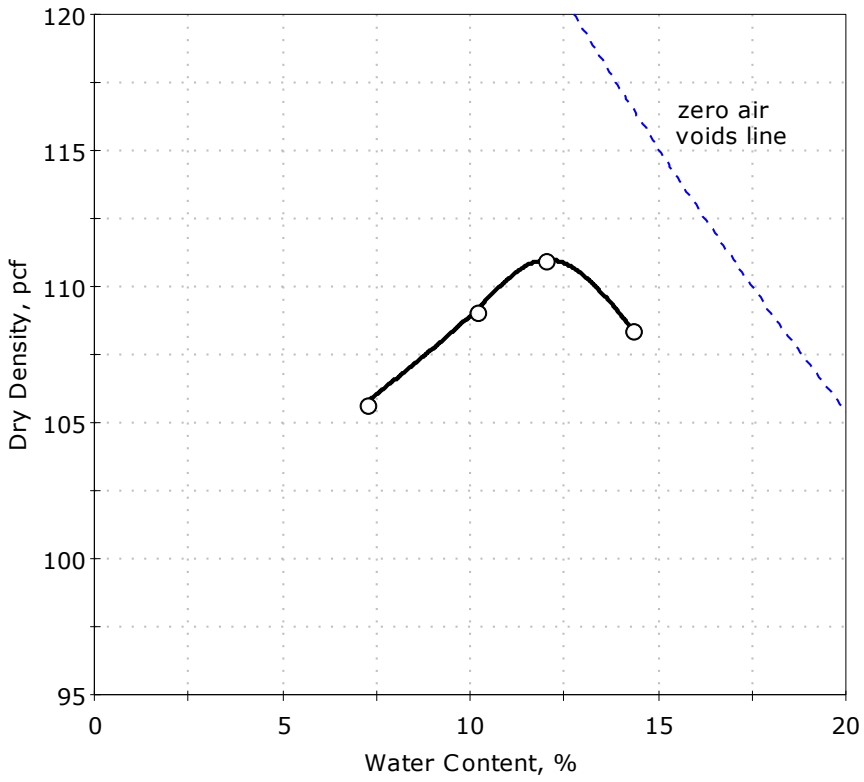
Sand/Gravel Particle Shape : ANGULAR
Sand/Gravel Hardness : HARD

GeoTesting EXPRESS

Client:	Sanborn, Head & Associates, Inc.				
Project:	Scannell Devens				
Location:	Devens, MA			Project No:	GTX-313208
Boring ID:	---	Sample Type:	bag	Tested By:	cwd
Sample ID:	Layer C1 Composite	Test Date:	02/26/21	Checked By:	emm
Depth :	---	Test Id:	610736		

Test Comment: ---
Visual Description: Moist, lght yellowish brown sand
Sample Comment: ---

Compaction Report - ASTM D1557



Data Points	Point 1	Point 2	Point 3	Point 4
Dry density, pcf	105.7	109.1	111.0	108.4
Moisture Content, %	7.2	10.2	12.0	14.3

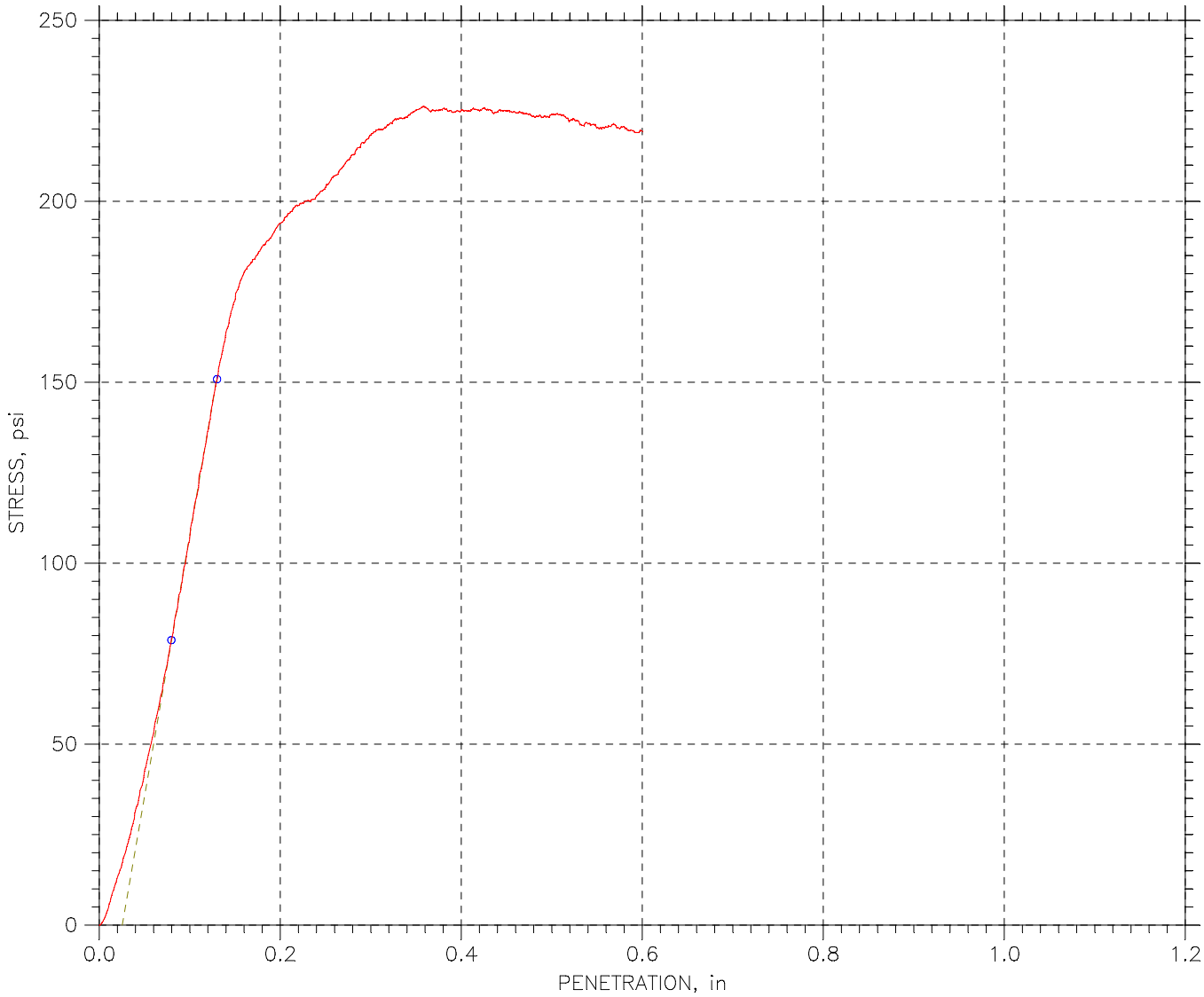
Method : C
Preparation : DRY
As received Moisture :5 %
Rammer : Mechanical
Zero voids line based on assumed specific gravity of 2.55

Maximum Dry Density= 111.0 pcf
Optimum Moisture= 12.1 %

GeoTesting EXPRESS

CALIFORNIA BEARING RATIO TEST REPORT

by ASTM D1883.



Sample Height: 4.58 in	California Bearing Ratio				
Sample Area: 28.274 in^2	at 0.1 in: 14	at 0.3 in: 12	at 0.5 in: 9		
Sample Volume: 0.07494 ft^3	at 0.2 in: 13	at 0.4 in: 10			
Sample Mass: 4014.8 gm					
Sample Condition: Soaked	Water Content		Before	Top	Average
Swell: 0.00 %	Tare ID		D-294	E2761	E2816
Surcharge: 4540 gm	Tare Mass, gm		8.6	8.2	8.21
Void Ratio: 0.57	Mass Tare + Wet Soil, gm		374.28	238.43	325.2
Wet Unit Weight: 118.11 pcf	Mass Tare + Dry Soil, gm		335.52	208.77	282.42
Dry Unit Weight: 105.59 pcf	Water Content, %		11.86	14.79	15.60

Project: Scannell Devens	Location: Devens Ma	Project No.: GTX-313208
Boring No.:	Tested By: md	Checked By: emm
Sample No.: Layer CL Co	Test Date: 03/02/21	Depth: +/- 1-5 ft
Test No.: CBR-1	Sample Type: remolded	Elevation: ---
Description: Moist dark yellowish brown sand		
Remarks: Target compaction: 95% of the max dry density (111.0) at the optimum moisture content (12.1%).		

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Attachment E: Traffic Impact and Access Analysis

Under separate cover

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Attachment F: Checklist - Industrial Performance Standards

Industrial Performance Standards Checklist for Newly Proposed Projects

All projects within the Devens Regional Enterprise Zone (DREZ) must comply with the Devens Enterprise Commission (DEC) Industrial Performance Standards (IPS) under 974 CMR 4.00. This checklist is intended to assist Applicants in determining at the time of submittal, or ideally before submittal, if their project may or may not involve development and/or activities that may impact sound, vibration, air quality, or lighting within the DREZ.

Site layout, building(s) design/orientation, traffic patterns, location of outdoor equipment and numerous other project components can impact sound, vibration, air quality, and lighting within the DREZ. By identifying any potential IPS concerns early on in the review process, Applicants can design their projects to ensure compliance with the IPS at all times and avoid potential future violations of the IPS and costly mitigation after the fact.

Please note, if a project requires an air permit from the Massachusetts Department of Environmental Protection (DEP), the Applicant will need to initiate permitting through the DEP office as well. Even if a project requires a DEP air permit, the proponent still must demonstrate compliance with the DEC IPS.

Please circle the correct answer to each question in this checklist. Please note that by circling "NO", the Applicant is not relieved of demonstrating compliance with the IPS requirements. If "NO" is circled and a potential concern is identified during the review process, it could temporarily suspend the approval process timeline until the concern is adequately addressed. If "YES" is answered, please explain and provide any supporting studies or information to aid the DEC in their evaluation of the project.

Project Name 16 Bulge Road

Does the proposed project and associated activities involve any potential increases in sound, vibration, air quality, odor, dust, lighting and/or electromagnetic interference that are covered under the DEC Industrial Performance Standards?	**YES**	**NO**

If you answered yes, will the Applicant demonstrate compliance directly or will the project proponent employ an expert to demonstrate compliance? Please provide pertinent contact information of the responsible official:

Refer to page 2 of the Level 2 Unified Permit Application for a list of all consultants.

Industrial Performance Standards Checklist for Newly Proposed Projects cont…

Noise

Does the proposed project have the ability to increase sound? YES NO

1. Will the increase in sound plus background sound exceed 974 CMR 4.05 (3)a?	YES NO
2. Will the total sound plus background sound exceed 974 CMR 4.05 (3)b?	YES NO
3. Will the increase in sound create pure tones that will exceed 974 CMR 4.05 (3)c and/or 974 CMR 4.05 (3)d7?	YES NO
4. Will the increase in sound create impulsive sounds that will exceed 974 CMR 4.05 (3)d1-6 and/or 974 CMR 4.05 (3)d8?	YES NO
5. Are there procedures and controls proposed to reduce sound during earth removal per 974 CMR 4.07(10)?	YES NO

Checklist Options to Demonstrate Sound Compliance

6. Have all of your potential sound sources been identified?	YES NO
7. Will spreadsheet calculations of the potential increase in sound be provided?	YES NO
8. Will sound modeling of the proposed project be provided?	YES NO
9. Will the facility submit a protocol describing the potential sound monitoring, metrics, and modeling as required?	YES NO
10. Does the project propose to collect background sound data (typically 7-days worth of valid data is sufficient)?	YES NO
11. If the facility intends to collect background sound data will it include other qualifying weather data such as wind speed, wind direction, sky conditions, etc.?	YES NO
12. Is mitigation to reduce the overall sound profile proposed?	YES NO
13. Is sound mitigation to be assumed when calculations or modeling is performed?	YES NO
14. Is compliance monitoring proposed to demonstrate that the project meets the estimated increases in sound?	YES NO
15. Have increases in sound with respect to traffic been considered?	YES NO

Industrial Performance Standards Checklist for Newly Proposed Projects cont…

Vibration

Does the proposed project have the ability to increase vibration? YES NO

16. Will the increase in vibration exceed 974 CMR 4.05 (4)a?? YES NO

Checklist Options to Demonstrate Vibration Compliance

17. Have all of the potential vibration sources been identified? YES NO

18. Will spreadsheet calculations of the potential increase in vibration be provided? YES NO

19. Will the proponent provide vibration modeling of the proposed project? YES NO

20. Does the project propose to collect background vibration data? YES NO

21. Is mitigation proposed to reduce the overall vibration profile? YES NO

22. Is vibration mitigation to be assumed when the calculations or modeling performed? YES NO

23. Is compliance monitoring proposed to demonstrate that the project meets the estimated increases in vibration as proposed? YES NO

Industrial Performance Standards Checklist for Newly Proposed Projects cont…

Air Quality

Does the proposed project have the ability to create air, visible, and/or odor emissions?	**YES**	**NO**
24. Will the proposed project meet the air quality standards in 974 CMR 4.02(3)	YES	NO
25. Are there procedures and controls proposed to minimize impacts during earth removal per 974 CMR 4.07(7)?	YES	NO
26. Will the proposed project require a MassDEP air quality permit per 974 CMR 4.02 (1)	YES	NO
If the project will require an air permit, then the proponent should set up a meeting with the regional MassDEP office to determine air permitting requirements, and answer the following:		
27. Will the proposed project submit a Limited Plan Approval application?	YES	NO
28. Will the proposed project submit a Non-Major Comprehensive Plan Approval application?	YES	NO
29. Will the proposed project submit a Major Comprehensive Plan Approval application?	YES	NO
30. Will the proposed project be a Title V source?	YES	NO
31. Will the proposed project be a PSD source?	YES	NO
Checklist Options to Demonstrate Air Quality Compliance		
32. Have you identified all of your potential air, visible and/or odor sources?	YES	NO
33. Will there be any visible emissions?	YES	NO
34. Will there be any dust emissions?	YES	NO
35. Will there be any odor emissions?	YES	NO
36. Will there be any potential increases in air, odor or dust emissions within the DREZ that will impact any internal or external receptors?	YES	NO
37. Will the project proponent provide spreadsheet calculations of the potential increase in air and/or odor emissions within the DREZ to demonstrate how the increase will not impact any internal or external receptors?	YES	NO

Industrial Performance Standards Checklist for Newly Proposed Projects cont…

Checklist Options to Demonstrate Air Quality Compliance (cont.)

38. Will the project proponent provide air and/or odor modeling of the proposed project within the DEC or into the neighborhood surrounding the DEC??	YES **NO**
39. Is mitigation proposed to reduce the overall air and/or odor profile?	YES **NO**
40. Is air pollution and/or odor control to be assumed when the calculations or modeling is performed?	YES **NO**
41. Is compliance monitoring proposed to demonstrate that the project meets the estimated increases in air and/or odor as proposed?	YES **NO**

Lighting/Illumination

Does the proposed project have the ability to create additional Illumination?	**YES** NO
42. Will lighting meet the illumination standards set forth in 974 CMR 4.04(3)?	**YES** NO
43. Have all of the potential light sources been identified?	**YES** NO
44. Will spreadsheet calculations of the potential increase in light and how it will not affect the Observatory outlined in 974 CMR 4.04(1) or any external or internal receptors be provided?	YES **NO**
45. Is mitigation proposed to reduce the overall light profile?	**YES** NO

Electromagnetic Interference

Does the proposed project have the ability to create electromagnetic interference?	**YES** NO
46. Have you identified all your potential electromagnetic sources?	YES **NO**
47. Are you proposing to provide spreadsheet calculations of the potential increase in electromagnetic interference and how it will not affect any internal or external receptors as per 974 CMR 4.03(3)?	YES **NO**
48. Are you proposing any mitigation to reduce your overall electromagnetic profile?	YES **NO**
49. Will your project comply with all the electromagnetic requirements under 974 CMR 4.03?	**YES** NO

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Attachment G: Natural Heritage

MASSWILDLIFE

DIVISION OF
FISHERIES & WILDLIFE

1 Rabbit Hill Road, Westborough, MA 01581
p: (508) 389-6300 | f: (508) 389-7890
MASS.GOV/MASSWILDLIFE

December 28, 2020

Edmund Starzec
MassDevelopment
99 High Street, 11th Floor
Boston, MA 02110

RE:	Applicant:	Edmund Starzec, Mass Development
	Project Location:	16 Bulge Rd, Devens
	Project Description:	Construction of biotech office building with option for future expansion, associated landscaping, parking, drainage
	NHESP File No.:	**20-39634**
	Plans Referenced:	"Concept Site Improvements" (dated October 2, 2020; prepared by VHB, 1 page) the "Site Plan"; "Figure 4. Proposed Site Alteration 2019 Orthophotograph" (dated 24 Novermer 2020; prepared by Oxbow Associates inc., 1 page) the "LOW Plan";

Dear Applicant:

The Natural Heritage & Endangered Species Program of the Massachusetts Division of Fisheries & Wildlife (the "Division") received the MESA Project Review Checklist, plans including the Site Plan and LOW Plan, and other required materials for review pursuant to the Massachusetts Endangered Species Act (MESA) (MGL c.131A) and its implementing regulations (321 CMR 10.00).

The MESA is administered by the Division and prohibits the Take of state-listed species. The Take of state-listed species is defined as "in reference to animals…harm…kill…disrupt the nesting, breeding, feeding or migratory activity…and in reference to plants…collect, pick, kill, transplant, cut or process…Disruption of nesting, breeding, feeding, or migratory activity may result from, but is not limited to, the modification, degradation, or destruction of Habitat" of state-listed species (321 CMR 10.02).

The Division has determined that this Project, as currently proposed, will occur **within** the actual habitat of the Blanding's Turtle (*Emydoidea blandingii*), a Threatened species. This species and its habitats are protected in accordance with the MESA.

Based on the information provided and the information contained in our database, the Division finds that a portion of this project, as currently proposed, **must be conditioned** in order to avoid a prohibited Take of state-listed species (321 CMR 10.18(2)(a)). To avoid a prohibited Take of state-listed species, the following condition must be met:

1. Turtle Protection Plan: *Prior to the start of Work,* the Applicant shall submit a Blanding's Turtle Protection Plan to the Division for review and written approval. Said plan shall detail procedures for protecting state-listed turtles during construction, and be prepared and

implemented by a qualified biologist pre-approved by the Division. The plan shall contemplate both currently proposed development and proposed future expansion.

Please note that any searches for state-listed turtles associated with the Turtle Protection Plan must occur during the turtle active season (April 15 – October 15), unless otherwise approved by the Division. The Division is available for consultation on the development of the protection plan and for information regarding qualified biologists.

Provided the above-noted condition is fully implemented and there are no changes to the project plans, this project will not result in a Take of state-listed species. We note that all work is subject to the anti-segmentation provisions (321 CMR 10.16) of the MESA. This determination is a final decision of the Division of Fisheries and Wildlife pursuant to 321 CMR 10.18. Any changes to the proposed project or any additional work beyond that shown on the site plans may require an additional filing with the Division pursuant to the MESA. This project may be subject to further review if no physical work is commenced within five years from the date of issuance of this determination, or if there is a change to the project.

Please note that this determination addresses only the matter of state-listed species and their habitats. If you have any questions regarding this letter please contact Rebekah Zimmerer, Endangered Species Review Biologist, at 508-389-6354 or rebekah.zimmerer@mass.gov.

Sincerely,

Everose Schlüter, Ph.D.
Assistant Director

cc: Brian Butler, Oxbow Associates, Inc.

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Attachment H: Noise Analysis