March 29, 2019 | Technical Proposal

Town of Plainfield

Brook Road Bridge Replacement

Engineering Design Services

March 29, 2019

Ms. Alice Merrill, Plainfield Grant Coordinator
149 Main Street
Plainfield, VT 05667

Re: Town of Plainfield Request for Proposals
Design for Brook Road Bridge Replacement

Dear Alice and members of the Selection Committee:

VHB is pleased to submit the enclosed proposal highlighting our experience to perform engineering and permitting services for the design and benefit cost analysis of the Brook Road Bridge replacement project. VHB has the depth of experience with structural engineering, design, and permitting, and the in-house expertise to address the full range of services that may be needed.

Our proposal focuses on our understanding of the project area and our experience developing similar projects that meet VTrans' requirements and ensures all aspects of the design process and permitting are efficient. VHB's open communication and project management allows the Town and stakeholders to make informed decisions during the design process. This will make sure all requirements of the FEMA Flood Mitigation Assistance grant are meet, along with permitting requirements, to allow for an expedited design of the bridge. Our background and experience, in conjunction with our project understanding, allow the VHB team to:

- Anticipate the needs of the project—not simply react to them.
- Utilize working relationships with the various project participants both within the Town and at VTrans, FEMA, ANR, and the Army Corps of Engineers.
- Provide the best personnel with a depth and breadth of experience to cost-effectively address all issues and successfully and efficiently deliver the project.

VHB has assembled an experienced team with a proven track record of success in the design, permitting and construction of similar projects throughout Vermont. We have teamed with Milone & MacBroom who developed the Great Brook Alternatives Analysis for the Town, and Sanborn Head & Associates our geotechnical subconsultant who we have teamed with on a multitude of bridge projects. I will serve as the overall project manager and bring over twenty years of structural design and project management experience to the team. I will be supported by a core team of engineering staff located in our South Burlington office; each with a long history of working collaboratively on successful projects.

We appreciate the opportunity to provide the following proposal for the design services for the town's bridge replacement projects. If you have any questions please do not hesitate to call me at 802.497.6157, and we will look forward to hearing from you.

Very truly yours,

Scott E. Burbank

Scott Burbank, PE
Director of Structures
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Engineers | Scientists | Planners | Designers

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Introduction

For more than 35 years, VHB has been working to improve mobility, enhance economic vitality within communities, and balance development and infrastructure needs with environmental stewardship. VHB offers a diverse staff of engineers, scientists, planners, and designers—each of whom value embracing our clients' goals, anticipating challenges, building long-lasting partnerships, and providing exceptional service. Moreover, our local VHB professionals understand and appreciate the qualities that make Vermont unique. We have worked on diverse projects here for more than three decades and continue to do so from our South Burlington location.

Over the years, we have partnered with a wide range of municipal, state, federal, and private-sector clients. Our projects have taken us across the state, from Brattleboro to Highgate. VHB deeply values working with Vermont clients to build a better future, and we are eager to do the same for the Town of Plainfield.

VHB was a key partner working with VTrans and Vermont municipalities in the aftermath of Tropical Storm Irene. VTrans called on VHB for some of the most challenging projects in the State, including the reconstruction of VT 108 in Bethel and Stockbridge, and the replacement of the VT 73 bridge in Rochester. We also helped Towns such as Rochester and Stockbridge with bridge/culvert replacement projects and led them through the FEMA process for reimbursement. Through our Irene experience, and experience on many similar projects, VHB understands the relationship between the municipality and FEMA, and how their rules and requirements apply to infrastructure projects.

Subconsultants

VHB has assembled a highly-qualified team to assist the Town of Plainfield with this project. The VHB Team combines the requisite range of geotechnical engineering, project administration, environmental permitting, and bridge engineering design experience with an in-depth understanding of federal and state permitting requirements. While VHB provides most of the bridge design services in-house, we have asked Milone and MacBroom, Inc. and Sanborn, Head & Associates, Inc. to join us to create the most qualified group to serve the Town.

Milone and MacBroom, Inc.

Milone and MacBroom (MMI) has a long history providing geomorphology design assistance to VHB and other consultants for flood recovery, corridor projects, and construction oversight. Several of these projects are currently active and they continue to provide geomorphology design guidance, respond to permitting questions from VTANR and USACE about river impacts, and provide construction oversight support to VTrans staff and contractors to observe design implementation.

Sanborn, Head & Associates

Sanborn, Head provides geotechnical investigation and design services from their office located in Burlington, Vermont. Their trained staff combines observation, sound engineering judgment, and physical testing services to ensure that contractors are compliant with project plans and specifications. This combination of services provides a unique and integral approach for Clients helping maximize financial resources. Sanborn Head's Shawn Kelley, Ph.D., P.E., has directly managed assignments for VHB and is well acquainted with policies, procedures, and expectations with regard to state and federal permitting requirements for municipal projects.

Services provided by Sanborn, Head nclude compaction testing and reporting of structural backfill (using sand cone or nuclear density methods), observation of shallow foundation subgrades for building and bridge abutments both on soil and bedrock, drilled shaft observation, pile driving observation including observation of dynamic testing and reporting, MSE wall construction observation, and vibration monitoring of pile driving, blasting, and heavy construction activities.

Project Understanding and Approach

Through our investigations for this project and based on the previous work performed by our teaming partner, MMI, the VHB-Milone & MacBroom-Sandborn Head team has developed a thorough understanding of the project and the constraints that exist. VHB has visited the project site with MMI to make ourselves familiar with the existing conditions, to take key measurements, and to allow us to hit the ground running if selected.

Our Project Manager, Scott Burbank, PE, and the rest of the VHB-Milone & MacBroom-Sandborn Head team understand that the residents of Plainfield are anxious for the Brook Road Bridge to be replaced, to gain improved serviceability during large storm events. With extensive experience in the permitting process, the VHB-Milone & MacBroom-Sandborn Head team will be able to navigate through the permitting process smoothly allowing the design to proceed as quickly as possible.

Project Understanding

The Town, with assistance from the Vermont Emergency Management, has received funding through the FEMA Flood Mitigation Assistance grant program to design the replacement of the flood prone Brook Road Bridge (B21) that passes over Great Brook in the Village of Plainfield (Figure 1). The project will be administered by the Town.

The project generally includes topographic survey and deed research, delineation of the ordinary high water (OHW) line, geotechnical analysis for the bridge foundation design, a bridge type study, final bridge design, permitting, and a FEMA benefit-cost analysis (BCA).

The BCA is an essential last step of the design phase of the project, as it will confirm that the benefits outweigh the costs, making the construction of the bridge eligible for additional funding through one of FEMA's mitigation grant programs.

Figure 1. Location Map of the Subject Bridge (B21). Note that darker colored pavement due to resurfacing from the latest flood damages in 2015. *(Source: Google)*

Bridge 21 is impacted by flooding approximately every 5 to 10 years, which causes significant channel erosion and property damage. Per MMI's Great Bridge Alternatives Analysis, the bridge floods for the following reasons:

- It is hydraulically undersized (Figure 2).
- It is located at a break in channel slope.
- It has a nonuniform flow and a hydraulic jump.
- It is located on the outside of a channel meander bend.
- It is backwatered during the 10-year flood and larger.
- It is prone to debris jams.

Bridge 21 has a width that is just 49% of the bankfull width of Great Brook. For reference, the Vermont Stream Alteration Rules require structures to have a minimum width of 100% of the bankfull channel width. Bridge 21 does not fit the Great Brook channel and needs replacement to reduce the frequency of damages in this location (i.e., the bridge is geomorphically incompatible with the channel).

Figure 2. Upstream Face of the Brook Road Bridge at Full Flood Capacity *(Source: Springston, 2011)*

This project will build on the previous alternatives analysis that called to increase the span of Bridge 21 to at least the bankfull channel width (36 feet) and widen the channel to create a uniform transition into and out of the bridge. The proposed bridge improvements increase hydraulic capacity and improve the transport of large wood and sediment. Flood levels decrease, and velocities through the structures become more uniform. Flood and erosion risks are reduced but not completely eliminated given the confined nature of the Great Brook channel in the village area and the abundance of encroachments in the floodplain. The new bridge would accommodate a 5-foot wide sidewalk on the north or downstream side of the bridge.

Based on the span length and size and amount of debris that flows under the bridge, there are a few structure types that could be used to promote flow under the structure and limit debris catching on the superstructure, including adjacent box beams, voided slabs, or a three-side box or arch culvert. All superstructure types are precast concrete, and all are without bottom flanges that would catch debris and provide shallower superstructure depths which in turn increase the area under the bridge to allow for additional water flow in large storm events. These superstructure types can easily accommodate over a 36 foot span as well as a historic style concrete parapet that would likely be required as part of the historic mitigation. All of these superstructure options will be considered in the alternatives analysis to determine which superstructure types provide an economical solution that meets the Town's needs while providing resilience and a long structure life.

Due to the large volume of water that flows past the Brook Road Bridge during large storm events, and previous experience with VTrans during the aftermath of tropical storm Irene, the abutments for the bridge would either be doweled into bedrock or supported on deep foundations such as piles, to ensure that the abutments cannot be undermined, which would cause catastrophic failure of the bridge. The specific abutment type will be determined based on the results of the borings and could lead to two separate foundation types, as it is not uncommon in Vermont for bedrock depth to vary drastically between abutments.

In addition to increasing the channel width and superstructure depth, raising the roadway six inches to one foot will also be reviewed. It should also be noted that as part of the future sidewalk project catch basins will be added on either side of the bridge and daylighted through the wingwall on the northwest side of the bridge and beyond the wingwall on the northeast side of the bridge. The VHB-Milone & MacBroom-Sanborn Head team will coordinate with the Town and Dufresne Group to either design a sleeve in the northwest wingwall for the future drainage pipe or design the two catch basins and drainage pipes as part of this project.

To replace the bridge, it will be necessary to relocate the aerial utilities on the north side of the bridge to allow for crane access. This would require coordination with Green Mountain Power, who owns the utility poles and aerial electric lines in this location, as well as developing a utility relocation plan that can be done ahead of the bridge replacement to expedite the construction schedule.

As the Town is likely aware from the Sidewalk study, the property at 100 Brook Rd. is a listed Hazardous Site with the Vermont Department of Environmental Conservation (DEC) due to a release of fuel oil from an aboveground storage tank (AST). After removal of contaminated soil and removal of the leaky AST, the site was given a Site Management Activity Complete (SMAC) status. SMAC status negates the need for additional site investigation work or corrective action, but does not terminate regulatory oversight of the property by the DEC. Furthermore, the site may be reopened if additional contamination is discovered, or if residual contamination left on-site poses a risk to sensitive receptors. For these reasons the DEC must be notified of planned construction activities on the property.

In addition to the Hazardous Site status at 100 Brook Rd., the entire project area is within the Urban Soil Background Area presented on the ANR Atlas. While this layer does not indicate locations where typical urban soil contaminants are definitively present, it does indicate a heightened risk for the presence of these common soil contaminants. Pre-characterization of urban soil that is not located at a DEC listed Hazardous Site and will be disposed off-site, as presumably will be the case for material excavated for a town project, is at the discretion of the landowner. In this case the landowner would be the Town, even for soil disturbed outside of the Town's ROW as it is being disturbed for this construction project. Because of this, VHB recommends the completion of an Environmental Site Assessment (ESA) of the Project area consisting of a Limited Phase I ESA. Based on the findings of the Limited Phase I ESA, a Limited Phase II ESA may be recommended to evaluate potential impacts to the Project from the presence of oil and hazardous materials (OHM). VHB will discuss these optional services further at the kick-off meeting.

The RFP notes that it is assumed that borings can be taken without further approval or determination by DHP. We do not see a reason that DHP would have an issue with conducting subsurface investigations in the roadway but do feel that the existing structure is historic and that further actions are required to remove and replace this structure.

The Brook Road Bridge is a concrete T-beam bridge with concrete parapet walls, constructed in the 1920s; it is a good, representative example from this era of bridge construction. Typically, 1920s concrete bridges are replaced in Vermont, resulting in an adverse effect to the historic resource. To mitigate these adverse effects, the bridges are photo-documented and, when necessary, the design of the replacement accounts for a context sensitive solution – one that is appropriate for the historic environment in massing, design, scale, width, materials, color, etc. The new design can be recognized as contemporary and avoid creating an inappropriate false appearance. VHB will discuss these historic resource requirements further at the kick-off meeting as this work may be completed by FEMA with assistance from VHB.

Approach

The VHB-Milone & MacBroom-Sandborn Head team will build on previous work by the community characterizing flooding and landslides in the area of Bridge 21 (Springston and Thomas, 2014; Springston, 2015) and the Milone & MacBroom bridge alternatives analysis (MMI, 2015). During the project we will keep an eye on the ultimate goal of

getting the best possible bridge installed to minimize flood risks that is cost-effective and likely fundable by FEMA or others.

The project will begin with field work to collect additional survey to detail topography, property boundaries, road right-of-way, retaining walls, utilities, and other features around Bridge 21. We will confirm the bankfull channel width and depth and delineate the ordinary high water (OHW) line.

The project team will perform borings and evaluate depth to bedrock and material texture/compaction to understand the required foundation for the proposed bridge. Between two and four borings will be performed depending on the subsurface findings.

Our team will perform a bridge type study that will evaluate up to three alternatives along with a hydraulic evaluation for each bridge type, to meet the bankfull width plus sizing recommendation for a new bridge. We will also work to maximize the bridge opening size to allow for the largest amount of flood waters, sediment, large wood, and ice to pass through the structure to minimize flood risk. For example, VHB will evaluate different superstructure options as noted above to span the desired width while minimizing the superstructure thickness. MMI will perform hydraulic analysis on each bridge alternative to determine which provides the greatest channel opening. Our analysis will also evaluate raising the road to increase the hydraulic opening at the bridge as discussed above.

We will prepare Draft Final Plans (75% complete) and Final Plans (90% complete). The Draft Final Plans will be submitted to the Town and State for review. Edits will be incorporated into the Final Plans along with additional details needed for permitting. Each plan submittal will include an Engineer's Opinion of Probable Construction cost (Engineer's Estimate). Final design plans will be used for permitting. Permit applications will be prepared for the US Army Corps of Engineers (USACE), DEC Stream Alteration and Flood Hazard and River Corridor, and the Town of Plainfield floodplain. Construction or Contract Plans (100% complete) will be developed following feedback from the regulators.

The final step of the project is to prepare a Benefit Cost Analysis using FEMA-approved software and methods. We will gather damage data from previous flood reports (Springston, 2015) and discussions with the Town. The project cost will be generated during design. The goal of this analysis is to confirm that the Benefit-cost Ratio is larger than 1 indicating that construction of the proposed bridge is eligible for FEMA funding. In addition to the Benefit Cost Analysis we will also provide a list of the remaining tasks necessary to secure FEMA funding for construction.

Our team will to collaborate with the Town over the course of the project to track progress and share information. We will be available for emails or calls as questions arise, will submit quarterly progress reports, and will participate in two meetings with the Town (one to review the preferred bridge type and the second to review the draft design plans). We also propose a public meeting to review the draft bridge plans to share progress with the community.

Scope of Work

The development of Contract Plans, Specifications and Engineer's Estimate will consist of the following Scope of Work.

Project Definition

Task 1: Project Management, Invoicing, and Meetings

1.1: Project Management and Invoicing

VHB will provide project management services during the development and design of the project. This includes internal and external coordination and communication with the project team and project stakeholders, via emails and conference calls. VHB will provide monthly invoicing outlining the hours spent on each task by employee and the work completed for that billing period in a bulleted list. In addition to the information provided in the invoice, VHB will develop and submit quarterly progress reports to the Town.

1.2: Kick-Off Meeting

Organize, plan, and attend a project kick-off meeting to discuss the goals and objectives of the municipality and further refine the project development process.

VHB will discuss the project schedule and arrange to collect all information relevant to the project, including all existing project files, tax maps of the affected properties, in addition to other documents. VHB will coordinate and schedule this meeting and take notes to document the discussions and decisions made, and to distribute to parties of interest.

1.3: Alternatives Meeting

Convene and attend a meeting to review the results of the bridge type study and seek consensus from the Town on the preferred alternative for design.

1.4: Draft Final Plan Review Meeting

Convene and attend a meeting to review the draft final design plans with the Town.

1.5: Draft Final Plan Public Meeting

Coordinate and attend a public meeting to provide the Town residents with an update on the project and the proposed draft final design.

Task 1.0 Deliverables:

- Quarterly Progress Reports (PDF)
- Monthly Invoice (PDF or Mailed Paper Copy)
- Meeting Notes (PDF)

Task 2: Review Existing Information and Data Collection

2.1: Collect and Review Existing Information

Collect and review existing information such as past studies, available Geographic Information System (GIS) data, aerial photography, survey, and LiDAR data pertinent to the project. Collect and review existing mapping and design plans of the project site. Mapping and data collected will be used to develop a base map of the project site and perform stormwater computations for planning and design.

2.2: Right-of-Way and Deed Information

VHB will develop a base map that shows the approximate limits of the existing right of way. The municipality will provide available property deeds and tax maps on file for the properties within the project limits. The purpose will be to document the property lines and owners within the project limits for subsequent right of way use. This right of way and property information will be compiled and presented on the plans.

2.3: Utility Location

VHB will identify all existing overhead and underground utilities (water and sewer) and depict their location on project plans.

2.4: Ground Survey

VHB will perform the topographic survey for this project. The survey will include enough information to design, permit, acquire right of way, and construct the project.

2.5: OHW Delineation

The project team will confirm the bankfull channel width and depth and delineate the ordinary high water line.

2.6: Wetland Delineation and Resource Assessment

VHB will conduct detailed wetland delineation and survey for vernal pools within all areas of Project activity, including the construction staging area (Recreational Fields). Wetland and vernal pool limits will be flagged, USACE data (vegetation, soils, and hydrology) will be collected for the wetlands, wetland functions and values will be assessed, and resources will be photo-documented and GPS located. VHB's fieldwork will include a general evaluation of areas where tree clearing is anticipated to assess the presence of potential roost trees for threatened and endangered ("T&E") bats.

2.7: Geotechnical Investigations

Perform borings and evaluate depth to bedrock and material texture/compaction to understand the required foundation for the proposed bridge. Between two and four borings will be performed depending on depth of ledge. Boring logs will be submitted along with a geotechnical report.

> ***Task 2.0 Deliverables:***
>
> - Existing Information (PDF)
> - Base Map with Property Lines and Town ROW Shown
> - Collected Data including OHW line and Wetland and Vernal Pool limits if present (PDF)
> - Boring Logs
> - Geotechnical Analysis and Report

Task 3: Alternatives Analysis

Based on our review of the site, and the recommendations from the Milone and MacBroom, four structure types, noted above (adjacent box beams, voided slabs, or a three-side box or arch culvert) seem to be the best fit to satisfy the needs of the project and will provide a reasonable cost solution that many contractors will be able to readily construct. VHB is very familiar with the design and construction of these types of structures.

3.1: Conceptual Design of Alternatives

Typical bridge sections and a plan view of each alternative will be developed, along with anticipated wingwall lengths for each alternative and at least one substructure type to allow for a comparison of each alternative. A conceptual roadway profile will be developed to determine the amount the roadway can be raised and to define the conceptual limits of the project.

3.2: Hydraulic Evaluation of Alternatives

Using the previous information from the MMI Alternatives Analysis and the topographical survey a HEC-RAS model will be developed for each bridge alternative to determine its effect on the stream hydrology and the specific alternative's hydraulic capacity.

3.3: Alternatives Report

Prepare a brief alternatives analysis and make a recommendation to the Town for a preferred alternative. Our recommendation will be summarized in a letter report that includes a description of each alternative, advantages and disadvantages, impacts, permitting requirements, constructability, and Order-of-magnitude costs for each alternative. The Conceptual Design of each alternative and the hydraulic evaluation of each alternative will be included in the Alternatives Report.

> ***Task 3.0 Deliverables:***
>
> - Alternatives Report (PDF)

Project Design

Task 4: Draft Final Plan Design (75%)

The design for the Draft Final Plans will be in accordance with the Town of Plainfield's Roads and Bridge Standards Policies, Roads and Streets Specifications Policy, ASCE-24 Flood Resistance Design and Construction Standards as applicable, MMI Alternatives Analysis, 2018 VTrans Standard Specifications for Construction, VTrans 2010 Structures Design Manual 5th Edition, the current editions of the Vermont State Standards, the Public Rights of Way Accessibility Guidance issued by the US Access Board, and the most recent edition of the Manual on Uniform Traffic Control Devices.

4.1: Final Design

VHB will complete the design for the project during this phase. This will include the final design of the preferred alternative including design of the bridge superstructure and substructure, roadway and drive way design, coordination with GMP and the Town on the proposed relocation of the overhead utilities and coordination with the Town on any changes to the sewer manholes and gate values. Additionally, VHB will coordinate with the Town and Dufresne Group on the drainage design for the future sidewalk project and if a sleeve or catch basins and drainage pipes will be a part of the project design. It is assumed work will be performed in English units on the CADD MicroStation platform.

4.2: Draft Final Plans

The draft final plans will contain:

- Title Sheet
- Typical Sections
- Quantity Sheets
- Layout Sheet with Roadway and Channel Horizontal Alignments and existing ROW information and construction notes
- Proposed Stream and Roadway Profiles
- Cross Sections (25 ft increment and key locations)
- Driveway details
- Bridge Details (superstructure, abutment, wingwalls, footings doweled to ledge or supported on deep foundations)
- Erosion Prevention measures and details (as applicable)
- Drainage Details (as applicable)
- Signs (as applicable)
- Traffic Control Plans including any details not covered by VTrans' standard drawings or MUTCD Typical Applications.

It is anticipated that Brook Road will be closed to through traffic and traffic will be detoured on Main and Creamery Streets during construction.

VHB will develop a detailed engineer's estimate to determine if the bids can be expected to fall within the FEMA and Town budgets.

The draft final plans will be submitted to the Town and State for review. All comments and changes resulting from the review will be addressed in the Final Plans.

> ***Task 4.0 Deliverables:***
>
> - Draft Final Plans (PDF)
> - Draft Final Plans Engineer's Estimate (PDF)

Task 5: Final Plan Design (90%)

5.1: Final Plans

Final design plans will be updated based on comments received from the State and Town on the draft final plan submission. These plans will be used to complete the project permitting and submitted to the regulators with the permit applications.

5.2: Special Provisions

VHB will develop any project special provisions to cover items not contained in the VTrans 2018 Standard Specifications for Construction or those items that vary from the standard specifications.

5.3 Final Estimate

VHB will develop a final engineer's construction cost estimate.

> ***Task 5.0 Deliverables:***
>
> - Final Plans (PDF)
> - Special Provisions (PDF)
> - Final Plans Engineer's Estimate (PDF)

Task 6: Contract Plans (100%)

6.1: Contract Plans

VHB will submit contract (100%) plans along with an updated list of items, quantities and an associated engineer's cost estimate, and any revised Special Provisions. These plans will incorporate any final changes requested by the regulators and be used to develop the Benefit Cost Analysis and used by the Town to acquire additional FEMA funding for construction. These plans will be signed and stamped by VHB's licensed Project Manager.

Task 6.0 Deliverables:

- Contract Plans (PDF)
- Special Provisions (PDF)
- Contract Plans Engineer's Estimate (PDF)

Task 7: Permitting

VHB and MMI will assist the municipality in acquiring the necessary federal, state, and local environmental permits necessary to complete the project to include permits required by Army Corps of Engineers and Vermont Agency of Natural Resources, Department of Environmental Conservation, and the Town.

7.1: USACE Section 404 General Permit

Prepare an application for a Programmatic General Permit to the US Army Corps of Engineers. Submit the application and respond to two rounds of comments.

7.2: Vermont Stream Alternations Permit

Prepare an application for a Vermont Stream Alteration Permit to the Vermont Department of Environmental Conservation. Submit the application and respond to one round of comments.

7.3: Local Floodplain Permit

Prepare an application for a local floodplain permit to the Town of Plainfield. Submit the application and respond to one round of comments. Attend one local hearing and one site walk. This permit will likely include a review by the state floodplain manager. We anticipate completing a no-rise certification as part of this permit application with the expected drop in flood levels with the proposed bridge.

7.4: Limited Phase I ESA

VHB will perform a Limited Phase I ESA on the Project area. The proposed Limited Phase I ESA would not fully adhere to the ASTM E 1527-13 standard or satisfy the "All Appropriate Inquiries" standard, which is generally completed for property transactions. Instead, the desktop evaluation will include a review of available federal and state databases, as well as a review of historical aerial photographs and sanborn fire insurance maps. If the Limited Phase I ESA indicates the need for performing a Limited Phase II ESA, VHB will incorporate the findings of the Phase I into a memorandum for DEC review and comment and will meet with DEC as required to confirm their concurrence with the proposed sampling (if required). The optional Phase I ESA has been included in the cost proposal, but the Phase II ESA has not. The Phase II ESA can be added if it is agreed upon by the Town to perform this work.

7.5: Historic Resource Coordination

VHB will provide coordination for the historic resource requirements of Section 106 of the National Historic Preservation Act (NHPA). VHB will coordinate with the Vermont State Historic Preservation Officer in order to prepare necessary documentation. VHB anticipates that the project will result in an Adverse Effect to this historic bridge and will require mitigation measures including preparation of a Historic Resource Documentation Packages (HRDP) for the bridge.

7.6: Preparation of the Section 106 Letter

If not performed by FEMA, VHB will complete the Section 106 Letter. The Section 106 letter will include a project description, discussion of historic resources, discussion of project alternatives, analysis of project effects to historic resources (the bridge and any adjacent historic resources), recommendation of project effects, mitigation recommendations, photographs, and a location map. VHB will incorporate the archaeological findings from the completed Archaeological Resource Assessment into the Section 106 letter.

7.7: Preparation of the Historic Resource Documentation Package (HRDP)

If requested, VHB will complete mitigation for the Adverse Effect under Section 106 of the NHPA in the form of an HRDP, as required by the VDHP.

Task 7.0 Deliverables:

- Permit Applications (PDF)
- Limited Phase I ESA Report (PDF)
- Section 106 Letter (PDF)
- Historic Resource Documentation Package (PDF)

Task 8: Benefit-Cost Analysis

8.1: Collection of Damage Data

Collect damage data from past reports and the Town.

8.2: FEMA Benefit-Cost Analysis

Perform a FEMA Benefit-Cost Analysis using the current software.

8.3: FEMA Benefit-Cost Analysis Memorandum

Summarize the findings, inputs, and outputs of the FEMA Benefit-Cost Analysis in a memorandum.

> ***Task 8.0 Deliverables:***
>
> - Memorandum (PDF)

Exclusions and Limitations

The following services are not included in this proposal:

1. Full property boundary survey
2. Permitting fees
3. NEPA
4. Act 250
5. Design or permitting for a GP 9015 Operational Stormwater Permit
6. GP 9020 Construction Stormwater
7. Phase II ESA
8. Laboratory testing
9. Cultural resource reviews or assessments (e.g., archaeologic investigations)
10. Right-of-Way Services including development of ROW Plans and ROW acquisitions
11. Sewer and Water Design and/or relocation
12. There are and will be no utilities on, under, or support by the new bridge
13. Design revisions for off-site mitigation or modifications or improvements to public streets or infrastructure outside the project limits

Should the these items or any additional services be required, they can be provided on a cost-plus fixed fee basis for an agreed-upon fee only after discussion and agreement with you.

Estimated Labor Hours

The table below summarizes the labor hours by task associated with the overall approach and scope of work outlined in this proposal.

Town of Plainfield
Brook Road Bridge Replacement
LABOR HOURS

	TASK DESCRIPTION	Project Manager	Project Engineer	Structural Engineer	Design Consultant	Survey Chief	Surveyor	Environmental Engineer	Environmental Specialist	Historical Resource Specialist	Total Hours
Project Definition											
1.0	***Project Management, Invoicing, and Meetings***										
1.1	Project Management and Invoicing	2	8								10
1.2	Kick-Off Meeting	4	4								8
1.3	Alternatives Meeting	4	4								8
1.4	Draft Final Plan Meeting		4								4
1.5	Draft Final Plan Public Meeting	4	4								8
2.0	***Review Existing Information and Data Collection***										
2.1	Collect and Review Existing Information			2		2					4
2.2	Right-of-Way and Deed Information	1				4	12				17
2.3	Utility Location					4	4				8
2.4	Ground Survey	1	8			12	12				33
2.5	OHW Delineation				1						1
2.6	Wetland Delineation and Resource Assessment	2	6						20		28
2.7	Geotechnical Investigations		2								2
3.0	***Alternatives Analysis***										
3.1	Conceptual Design of Alternatives	1	4		16						21
3.2	Hydraulic Evaluation of Alternatives		2								2
3.3	Alternatives Report	1	2	8							11
Project Design											
4.0	***Draft Final Plan Design***										
4.1	Final Design	1	14	32	60						107
4.2	Draft Final Plans	1	4	24	72						101
5.0	***Final Plan Design***										
5.1	Final Plans	1	4		12						17
5.2	Special Provisions	1	2	6							9
5.3	Final Estimate	1	2		4						7
6.0	***Contract Plans***										
6.1	Contract Plans	1	4		8						13
7.0	***Permitting***										
7.1	USACE Section 404 General Permit		4	8					24		36
7.2	Vermont Stream Alternations Permit		2								2
7.3	Local Floodplain Permit		2								2
7.4	Limited Phase I ESA **(Optional)**	See Optional Labor Tasks Budget for Additional Hours and Costs									
7.5	Historic Resource Coordination									12	12
7.6	Preparation of Section 106 **(Optional)**	See Optional Labor Tasks Budget for Additional Hours and Costs									
7.7	Preparation of the HRDP **(Optional)**	See Optional Labor Tasks Budget for Additional Hours and Costs									
8.0	***Benefit-Cost Analysis***										
8.1	Collection of Damage Data		1								1
8.2	FEMA Benefit-Cost Analysis		1								1
8.3	FEMA Benefit-Cost Analysis Memo	1									1
	VHB TOTAL HOURS:	27	88	80	173	22	28	0	44	12	474
										Milone & MacBroom, Inc. Hours	206
										Sanborn Head & Associates, Inc. Hours	82.9
										Project Total:	**762.9**

Preliminary Schedule

For this project, we propose the following conceptual schedule for the development of this project:

- Project Kickoff — April 2019
- Topographic Survey & Base Mapping — May 2019
- Resource Delineation & Documentation — May 2019
- Boring Program — May 2019
- Geotechnical Boring Report — July 2019
- Bridge Alternative Analysis — May 2019 - June 2019
- Meet with Town, Select Preferred Alternative — July 2019
- Draft Final Design Plans — July 2019 - September 2019
- Draft Final Design Plans Review — September 2019
- Final Design Plans — October 2019
- Permitting — September 2019 – December 2019
- Contract Plans — November 2019
- Benefit Cost Analysis — November 2019 - December 2019

Availability of Technical Disciplines

We have chosen our project team members with much attention and care. These individuals have extensive structural design, culvert and bridge plan development, and permitting experience. Our project team is presented under Section 5 below, where a brief introduction of each Project Team member is provided. Full resumes for key personnel are provided in Appendix A.

We understand the importance of keeping individuals on a given project as it is carried through the design process and our team has the experience and capability to take the project from project definition through final design and construction.

Project Management: VHB's management of this project will be completed out of our South Burlington Office. Our project management style is for open and regular communication so that all stakeholders know the project status at all times. Our high level of communication and direct approach will keep the team organized and the project advancing.

Survey: VHB's survey crew that operates out of our South Burlington location. In addition to two survey technicians, our Vermont crew includes a survey manager, who recently led the Survey section at VTrans and the Plans & Titles section within VTrans ROW.

Hydraulics/Stream Design: Team member MMI has a strong team of hydraulic engineers and who are regularly called on by VTrans and other Vermont municipalities to perform design and analysis for their most challenging hydraulics projects. MMI hydraulics engineers will confirm the VTrans hydraulic study conclusions and will complete the natural channel design required by the VT ANR.

Environmental Resources/Permitting/NEPA: VHB and MMI are particularly known in Vermont for our ability to efficiently provide environmental permitting services for a range of clients. This project will require a Stream Alteration Permit, a Local Floodplain Permit and a Section 404 Vermont General Permit from the USACE We have permitted many similar projects throughout Vermont and maintain a strong working relationship with regulators who will be responsible for authorizing permits.

Design and Plan Development: In our Vermont office, VHB employs a staff of more than 60 engineers and environmental specialists. While a project of this size doesn't require the resources of our full engineering staff, we do have the availability to scale our project team to accelerate a project schedule if needed. Our engineers have a full understanding of the design requirements for this project having completed similar projects for VTrans and other Vermont municipalities.

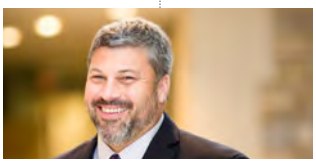
Qualifications of Key Personnel

In partnering with you, the Town of Plainfield, we are proposing to deploy a talented team of qualified engineering staff, each of whom has the experience and expertise needed for their respective roles. Our approach to a small but highly qualified team will enable us to efficiently advance the project and allow us to be nimble in responding to stakeholder requests. Our Project Manager, Scott Burbank, PE, will see to it that the work is done the right way the first time, on-time, and within budget. We've found that with municipal projects such as this, regular communication to all stakeholders and a direct approach will keep the team organized and the project advancing.

The following pages present our project Organizational Chart along with brief biographies and qualifications to serve the Town if selected for this contract. Additional information is provided in the Resumes attached to this proposal in Appendix A.

Project Team

Town of Plainfield



Project Manager
Scott Burbank, PE

Survey
Ryan Cloutier, LS

Hydrology & Hydraulics (Milone & MacBroom)
Roy Shiff, PHD, PE
Brian Cote, PE, CFM
Jessica C. Louisos, PE

Project Engineer
Megan Ooms, PE

Structural Engineer
Jason Keener, PE

Design Consultant
Ryan Forbes

Permitting
Brad Ketterling
Charlie Farmer, PE

Geotechnical Investigations (Sanborn Head)
Shawn Kelley, PE
Jon Grace, PE
Ian Donovan, EIT

VHB Support Personnel (as needed)

60+ Professionals in South Burlington, VT Office
60+ Professionals in Bedford, NH Office
400+ Professionals in Albany, NY, Portland, ME, & Watertown, Boston, & Springfield, MA

Project Manager

Scott Burbank, PE

Director of Structures in VHB's South Burlington office with extensive experience in planning, design and construction of both highway and railroad bridges and roadway reconstruction projects. His qualifications also include services for quality control and quality assurance, construction cost estimating, accelerated bridge construction (ABC), and structural inspections of both railroad and highway bridges. With 24 years of experience Scott has served as a project manager on dozens of similar municipal structures projects, which makes him uniquely qualified to understand the requirements from the municipal and state side of the project as well as from the design development side of the project. His role for this project will be to lead the VHB Team and serve as an adviser to the Town, oversee all work, and ensure that administrative and technical tasks are completed as directed.

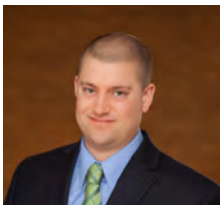
Scott will manage communication and provide oversight throughout the project in order to maintain schedule, budget, and quality.

VHB will provide regularly scheduled updates to the Town and request feedback throughout the design effort. Real-time updates will also provide an arena for quickly answering questions and getting feedback from the Town of Milton officials, eliminating lost time to the schedule.

Project Engineer

Megan Ooms, PE

Megan is a structures Project Manager in VHB's South Burlington, VT office with a decade of structural engineering and project management experience working on bridge projects up and down the east coast. Her background includes technical experience in both new bridge construction as well as rehabilitations and seismic analysis. Megan will provide overall engineering guidance and task management and QA/QC services for the project.



Structural Engineer

Jason Keener, PE

Jason is a Transportation Engineer in VHB's South Burlington office with experience in the planning, design, and construction of culvert, roadway, and bridge projects throughout Vermont. He has worked on the development of culvert, highway, and bridge projects for federal, state, and municipal clients and fully understands the process for project development, design codes, and state and federal standards.

Jason will perform as the structural engineer for this project, a role he has been in for dozens of culvert replacement projects for the US Forest Service. He will consistently incorporate the stream design aspects with the selected structure resulting in a long term, low maintenance finished project.

Structural Design Consultant

Ryan Forbes, EIT

Ryan is a Structural Designer in VHB's South Burlington, Vermont office. Previous experience in construction engineering includes design of temporary structures, erection and demolition plans and erection strategies for projects in New England and the greater NYC area.

Permitting

Brad Ketterling

Brad has worked as an environmental scientist for close to two decades, specifically in the fields of wetland mitigation site feasibility and design, stream assessment, watershed planning, state and federal permitting, and NEPA compliance. Brad helps clients navigate complex regulatory requirements and achieve successful results by identifying and assessing natural and cultural resource issues and constraints and developing strategies to obtain authorizations that are in the best interest of the client and the environment. He has worked on a variety of projects from linear transportation and energy infrastructure improvements to natural area restorations. Brad has managed projects for a variety of private and public-sector clients, including the National Park Service, the Vermont Agency of Transportation, Green Mountain Railroad Company, and numerous Vermont municipalities. For this project, Brad will lead the preparation of the USACE Section 404 permit application, and the Vermont Individual Wetland Permit application.

Charlie Farmer, PE

Charlie has over 16 years of environmental science and engineering experience with specific expertise in: environmental investigations/site characterization, environmental remediation systems, wastewater treatment systems, NPDES permit compliance; stormwater management; hydrology/geomorphology; water supply; and discharge monitoring and permitting.

Survey and Right-of-Way

Ryan Cloutier, LS

Ryan provides overall program management for our survey team. Ryan has close to 20 years of experience in survey on projects across New England for both public and private sector clients. Ryan has in-depth experience of surveying and right-of-way on both the public and private sectors, having held senior positions at the Vermont Agency of Transportation (head of plans & titles and survey in the VTrans ROW section) and with private consulting firms throughout New England.

Historic Resources

Kaitlin O'Shea

Kaitlin is a Preservation Planner with a strong background in and understanding of preservation principles and practices. Kaitlin provides expertise in regulatory process and compliance, particularly Section 106 review and Section 4(f) evaluations, as well as historic documentation, historic resource identification, and project management in the government framework. From national and statewide conference presentations to public meetings, she is skilled in stakeholder interaction and communication. Kaitlin meets the Secretary of the Interior's Professional Qualification Standards for an Architectural Historian and Historian (36 CFR 61).

Hydrology/Hydraulics - Milone & MacBroom

Roy Schiff, PhD, PE

Roy specializes in river and floodplain restoration, geomorphic and habitat assessment, flood mitigation, hydrology and hydraulics, and sediment transport analysis. In addition to applied restoration work such as channel creation, bank stabilization, and dam/levee removal, he has been involved in several research projects across Vermont and the region evaluating the economic impacts of living in floodplains, drafting best engineering practices to reduce future flood risks, improving protocols for habitat assessment, and creating guidelines for channel restoration. Other experience includes dam removal, dam failure analysis, culvert design, bridge scour analysis, floodplain management, and biomonitoring.

Brian M. Cote, PE, CFM

Brian specializes in hydrologic and hydraulic analysis and design. His project experience includes design and analysis of stormwater management and treatment systems using traditional as well as green stormwater infrastructure and best management practices. Additional project experience includes detention/water quality basin design; floodplain management; site development and layout; Low Impact Development (LID) design; sediment and erosion control measures; hydraulic analysis of stream channels, culverts, and bridges; dam safety assessment, modification, and removal; as well as the development of construction plans and project specifications.

Jessica C. Louisos, MS, PE

Jessica is a water resource engineer specializing in geomorphological and bio-engineering designs for riverine systems and watersheds. She has designed numerous river restoration, dam removal, stormwater mitigation and green infrastructure, flood mitigation and recovery, bank and gully stabilization, culvert, bridge scour, and aquatic organism passage projects. She has managed projects and performed tasks at all project stages including project scoping, field data collection, modeling, design, permitting, cost estimating, and construction oversight for many projects. Jessica has broad field experience in geomorphic and habitat assessment, stormwater master planning, and construction observation. She has advanced river and watershed modeling experience including multiple hydrology models and one- and two-dimensional hydraulic modeling to inform flood mitigation, bridge scour and design, and restoration projects.

Geotechnical Investigations - Sanborn Head

Shawn Kelley, PE - Project Director

Shawn has over 20 years of geotechnical engineering experience on a wide range of development projects. As a specialist in geotechnical engineering design, geotechnical instrumentation, and geotechnical soil testing, he has authored numerous publications, reports and presentations. In 2016, Shawn was named Vermont's Civil Engineer of the Year by the Vermont Section of American Society of Civil Engineering (VTASCE). In 2017, Shawn was named Engineer of the Year by the State of Vermont Engineer of the Year selection committee.

Jon Grace, PE - Project Engineer

Jon provides geotechnical engineering, design, and permitting services for a variety of project types ranging from land development projects to large multi-structure developments and provides construction quality assurance services for large earthwork projects. Jon routinely prepares application and design packages that include geotechnical engineering reports, Act 250 Land Use Permits, Individual Construction Stormwater Discharge Permits, Stormwater Discharge Permits, Post-Closure Amendment Requests to support development projects.

Ian Donovan, EIT - Project Engineer

Ian is a geotechnical engineer with extensive experience in both soil and rock engineering projects. Ian has assisted with design and analysis of deep and shallow foundation systems, soil and rock slopes, dewatering and excavation support systems, and various underground construction projects. Ian's field experience includes performing complex geotechnical exploration programs and construction management for public and private sector clients.

Project Experience

Huntington Main Road (TH 1) Bridge #8 | Huntington, VT

Project Reference: Rob Young, VTrans Structures Project Manager | 802.828.0052 | rob.young@vermont.gov

VHB was contracted by VTrans to provide structural design, construction cost estimating, bid analysis, and construction engineering services for the replacement of the existing tangential 63'-0" long bridge over the Huntington River. VHB also assisted VTrans with the with the Title 19 (Stream Alterations) and U.S. Army Corp of Engineers permitting and right-of-way acquisition. The new 97' long bridge was constructed with tangential steel plate girders and a curved concrete deck to better align with the roadway geometry.

As this is a major local route for the residents of Huntington and for people going from the App Gap on VT 17 to I-89 in Richmond it was necessary to minimize the bridge closure period for the reconstruction of this bridge. VHB designed the bridge so that one side of the bridge was supported on a single row of piles and the other side which had exposed ledge was supported on a spread footing. The piles were driven under alternating one-way traffic to reduce the bridge closure period and precast concrete was used for the abutment pile cap and the spread footing and abutment stem which reduced the length of the bridge closure.

Salisbury Maple Street (TH 1) Bridge #4 | Salisbury, VT

Project Reference: John Rouse, Former Salisbury Selectboard Member, 802.388.4053 & Martha Sullivan, Selectboard Chair 802.352.4307

VHB was contracted by the Town of Salisbury to provide design and construction Engineering Services for the complete replacement of Bridge 4 on Maple Street (TH 1) over the Leicester River in the village of Salisbury. VHB also assisted the Town of Salisbury with acquiring a Vermont Agency of Transportation Structures Grant to assist with the payment of the bridge construction. This project includes the replacement of the existing 23'-0" long concrete T-Beam bridge with a precast concrete arch to increase the span length on the north side of the bridge to allow for the existing penstock which was embedded in the existing concrete abutment to be separate from the structure and allow access to the penstock as it went through the bridge.

This bridge was also located in the Historic Salisbury Village and had an old mill foundation on the northwest corner, which required extensive coordination with the VTrans and State Historic Preservation Officer as well as the other three property owners and GMP who not only owned the penstock but had both transmission and service lines crossing and immediately adjacent to the bridge. From conducting hydraulic analysis, utility relocations, multiple public meetings, and the necessary permitting to developing contract and bid documents, VHB assisted and guided the Town through the project development process and the successful completion of this project on time and within budget.

Ranney Road (TH 18) Bridge #28 | Stockbridge, VT

Project Reference: Mark Pelletier, Town Selecboard, 802.746.8400

VHB was contracted by the Town of Stockbridge to provide design and construction Engineering Services for the complete replacement of Bridge 28 on Ranney Road (TH 28) over Stony Brook. VHB also assisted the Town of Stockbridge with developing FEMA documentation to estimate construction costs and coordinate for the allocation of funding for the project. This project included the replacement of the existing 42'-0 single span steel beam bridge that was swept away during Tropical Storm Irene, with a 53'-0" single span precast/prestressed voided slab bridge to increase the span length to provide a greater hydraulic capacity and increased flood resiliency.

The project was located at the intersection of Ranney Road and Stony Brook Road in Stockbridge Vermont. The existing bridge had been replaced with a temporary bridge supported by the existing abutments, following it being swept away. Design of the new bridge consisted of one abutment being pinned to ledge and the other supported by driven steel piles. The design and development of contact documents also required maintaining one-way traffic along Stony Brook road at all times. From developing a Project Management Plan, conducting hydraulic analysis, utility relocations, multiple public meetings, and the necessary permitting to developing contract and bid documents, VHB assisted and guided the Town through the project development process and the successful completion of this project on time and within budget.

Kelley Stand Road Reconstruction | Sunderland, VT

Project Reference: Mark Hyde, Selectboard Chair, 802.375.6106; mhyde@sunderlandvt.org

For this project VHB provided project scoping, design services, and full construction oversight for reconstruction of approximately four miles of Kelley Stand Road (Forest Highway 6) and reconstruction along sections of Roaring Branch stream channel located in Sunderland, Vermont. Project scope included reconstruction of 32 damaged sites along to the road, including two bridges, multiple roadway sections, and channel reconstruction.

Tweed River Bridge | Pittsfield, Vermont

Project Reference: Mark Begin, former Selectboard Chair; 802.746.7906

VHB provided emergency engineering services for the Town of Pittsfield, VT related to flood damage sustained by Tropical Storm Irene to Town Highway Bridge No. 11 over the Tweed River on Tweed River Drive (TH 15). The scope of the emergency engineering services involved the inspection of Bridge No. 11, recommendations for repair and rehabilitation of the bridge, geotechnical investigation and engineering, survey, structural design for the repair and rehabilitation of the bridge, contract bidding services, and construction services.

Great Brook Bridge Alternatives Analysis

Plainfield, VT

CLIENT
Town of Plainfield
Plainfield, VT

Services Provided

- Engineering
- Hydrologic & Hydraulic Analysis

Milone & MacBroom was retained by the Town of Plainfield to perform an alternatives analysis to reduce the chance of flooding and erosion at two bridges (B21-Brook Road and B20-Mill Street) in lower Great Brook in Plainfield, Vermont that are prone to flood and erosion damages. The project included data review and collection, hydrology and hydraulics, and the alternatives analysis. The subject bridges periodically get clogged and outflanked, meaning flows bypass the openings and flood and erode surrounding property and infrastructure. The latest episode of flooding took place in spring 2011 where Brook Road washed out.

Great Brook is a highly dynamic channel. Past geomorphic assessment data indicate that the channel is largely down-cutting. Many landslides are evident in the valley (Springston and Thomas, 2014) and erosion hazards are prominent given the channel is filled with eroded sediments and large wood and moving laterally in many locations (BCE, 2014). The fundamental problem at the bridges is that they are undersized and a high volume of incident sediment and large wood makes its wat to the structures under flood. The change in sediment transport capacity, the potential for blockage by large wood and sediment, the manipulated local channel, and the abundant nearby infrastructure were all considered as part of the analysis. The preferred alternative is to widen the bridges to the bankfull channel width that allows more flow, sediment, and woody debris to pass through the structures during flood.

Resumes

Scott Burbank, PE

Director of Structures - Vermont

Education

BS, Civil Engineering, Worchester Polytechnic Institute, 1993

Registrations/Certifications

Professional Engineer (Structural I) VT, 2000

Scott is Director of Structures in VHB's South Burlington office with extensive experience in planning, design and construction of both highway and railroad bridges. His qualifications also include services for accelerated bridge construction (ABC), quality assurance, construction cost estimating and engineering services, and inspections of both railroad and highway bridges.

24 years of professional experience

VTrans, VT Route 100 over Deerfield River, Readsboro, VT

VHB is designing the complete replacement of Bridge 25 on VT Route 100 over the Deerfield River. This project includes roadway and stormwater drainage design, waterline design, regulatory permitting, hydraulics analysis, Right-of-Way, structural design and construction cost estimating and bid analysis for the construction of a 285 feet long single span bridge. The bridge will be constructed using construction phasing and weekend closures to maintain vehicular and pedestrian access across the Deerfield River during a majority of the construction due to the length of the detour and time required to construct the bridge. Scott is the Project Manager responsible for the internal management of the VHB and subconsultant project team, coordination with the VTrans Project Manager, and other VTrans staff, as well as external stakeholders, such as the Town of Readsboro, Federal and State Regulators, Property Owners, and Utility Companies. Scott also provides project oversight, ensuring the project permitting, design and plan submittals are completed and delivered on-time and on budget.

VTrans, Main Road (TH 1) Bridge 8 over Huntington River, Huntington, VT

VHB was the selected designer for the complete replacement of Bridge 8 on Main Road (TH 1) over the Huntington River. The design includes a steel girder bridge with a curved deck to better fit the roadway geometry. For the substructure, piles were driven under alternating one-way traffic and precast concrete elements were used to reduce the length of the bridge closure. VHB performed roadway and structural design, construction cost estimating, and bid analysis for the construction of this 97'-2½" long single span bridge. VHB also assisted VTrans with the with the regulatory permitting and right-of-way acquisition. Scott was the Project Manager responsible for the internal management of the VHB project team, coordinated with the VTrans Project Manager and other VTrans staff, as well as external stakeholders, such as the Town of Huntington, Federal and State Regulators, Property Owners, and Utility Companies. Scott also provided project oversight, ensuring the project permitting, design and plan submittals were completed and delivered on time and within the allotted budget.

VTrans, I-89 Bridges 76N&S and 77N&S, Colchester, VT

VHB was tasked with designing the deck replacement of Bridges 76N&S and 77N&S on I-89 over Bay Road and Mallets Creek respectively. This project consists of the removal and replacement of four bridge decks with precast concrete deck panels using cross-overs and a 59-hour bridge closure period for four separate weekends to reduce impacts to the traveling public. As the bridges superstructures are three-span continuous steel beam and 154 feet and 185 feet long, VHB is using lane shifts to manage the northbound and southbound traffic to ensure there are two lanes of traffic southbound in the morning and northbound in the evening to allow for partial demo of

the bridge deck prior to closing the bridge and reducing the northbound and southbound traffic to a single lane over the weekend. VHB is also using multiple weekend closures prior to the deck replacement to allow work to occur on the substructures which need to be modified for the deck replacement. Scott is the Project Manager responsible for the internal management of the VHB project team, coordination with the VTrans Project Manager, and other VTrans staff, as well as external stakeholders, such as the Town of Colchester, Federal and State Regulators, and Property Owners. Scott also provides project oversight, ensuring the project permitting, design and plan submittals are completed and delivered on-time and on budget.

VTrans, Engineering Support Services, Statewide, VT
VHB is providing VTrans with on-call technical engineering services to support the delivery of multiple internal projects through the Structures Program as required. Under this contract VHB has assisted the Structures Engineers with the design of the piers for the Bethel BHF-0241(35) project. This worked consisted of checking VTrans' design calculations, performing an independent design check for the foundation and stem of Piers #1 and #2, and designed the two pier caps using the strut and tie design methodology. VHB also did a presentation on how to design a hammerhead pier using the strut and tie method to the VTrans Structures Section. We are currently working on checking the Bradford Truss load rating completed by VTrans and will be investigating the impacts of anchor bolts being placed through the pier cap reinforcing on a bridge on VT 279 in Bennington. Scott is the Project Manager responsible for the internal management of the VHB project team, and coordinates with the VTrans Project Manager and the Structures Designers to provide the appropriate level of engineering support to the VTrans Structures staff, within the agreed upon timeframe and budget.

VTrans, VT 4 over Ottauquechee River (Bridge #33), Killington, VT
VHB is the design consultant responsible for the roadway and structural design for the replacement of Bridge #33 over the Ottauquechee River on US Route 4 in Killington. VHB is currently assisting with the regulatory permitting, ROW acquisition, and public meetings with VTrans, the Town, and project stakeholders. The existing single span concrete deck and steel beam bridge requires a complete bridge replacement along with roadway widening and approach railing. As part of the partially accelerated bridge construction the substructures will be precast pile caps with steel beams and cast-in-place deck. Scott is the Project Manager responsible for the internal management of the VHB project team, coordination with the VTrans Project Manager and other VTrans staff, as well as external stakeholders, such as the Town of Killington, Federal and State Regulators, Property Owners, and Utility Companies. Scott also provides project oversight, ensuring the project permitting, design and plan submittals are completed and delivered on-time and on budget.

Megan E. Ooms, PE

Structural Engineer

Megan is a structures Project Manager in VHB's South Burlington, Vermont, office with more than a decade of structural engineering and project management experience working on bridge projects up and down the east coast. Her background includes technical experience in both new bridge construction as well as rehabilitations and seismic analysis.

11 years of professional experience

Education

MS, Structural Engineering, Rutgers University, 2016

BS, Civil Engineering, University of Delaware, 2008

Registrations/Certifications

Professional Engineer (Structural) DE, 2017

Affiliations/Memberships

WTS International, Vermont, 2017

Vermont Society of Engineers, 2017

North Beach Overpass and Campground, Burlington, VT

VHB was responsible for engineering services to design a new overpass carrying the Burlington Bike Path over Institution Road. This work included lowering of Institution Road to provide adequate clearance for emergency vehicles and designing the overpass structure to support rail loading per AREMA as the Burlington Bike Path in this area is rail banked land. Additionally, VHB provided input on aesthetic opportunities for the structure to be used as a gateway to North Beach, one of Burlington's most popular parks. For the North Beach Overpass project, Megan was the Structures Task Manager responsible for overseeing the design of the overpass and the development of the bid documents associated with the overpass.

NPS, Fort Tilden Gateway National Recreation Area, Long Island, NY

For the National Park Service (NPS), VHB was responsible for the engineering and construction support for the replacement of a concrete top slab of a pump station and the steel frame and concrete slab foundation supporting a generator and associated electrical cabinets. The design and detailing of the concrete top slab accounted for several access hatches and various connections required. Megan is the Structures Task Manager responsible for overseeing the design of the concrete slab and generator platform, coordinating with other disciplines and development of the bid documents for the structural elements.

Grout Road Bridge, Montpelier, VT

Grout Road Bridge is a single-span steel girder with timber deck bridge supported on unreinforced concrete abutments that services four private residences. For the City of Montpelier, VHB is responsible for the engineering to provide a load rating of the bridge in existing conditions, alternatives analysis report, permitting, utility coordination and design bid documents for the selected alternative (complete bridge replacement). In order for the existing structure to last until full replacement can be completed, VHB is responsible for providing interim repair recommendations and interim repair documents for bid. Megan is the Task Manager/Deputy Project Manager responsible for overseeing the entire project and coordinating with the City and other stakeholders while ensuring the development of the deliverables meets the requirements of the scope.

VTrans, Middlebury WCRS(23) – Bridge and Rail Project, Middlebury, VT

For the Vermont Agency of Transportation (VTrans), VHB was responsible for the engineering and construction support for the replacement of six switches in the Middlebury Railyard and an additional siding that ties into the existing Rutland siding extending from Park Street to the south for approximately one mile on the eastern side of the existing mainline tracks. This included developing a new alignment for the new

Rutland Siding, detailing retaining walls and laying out the new siding turnouts. Megan was the Project Manager/Task Manager responsible for overseeing the development of the bid documents and coordination with the client.

VTrans, Wye North Leg Rehabilitation, Leicester, VT
For the Vermont Agency of Transportation (VTrans), VHB was responsible for the engineering and construction support for a new wye in Leicester that ties into an existing rail siding. This project included the rehabilitation of the existing railroad embankment, replacement of failed or damaged culverts and construction of new ballasted track section along approximately 2,500 linear feet of the north leg of the wye. Megan was the Project Manager/Task Manager responsible for overseeing the development of the bid documents and coordination with the client.

NJDOT, Pulaski Skyway Rehabilitation Contract No. 6
Prior to joining VHB, Megan worked on a project that consisted of almost a mile of deck and through trusses with a pin and hanger system. Substructure typically consisted of concrete columns on concrete caissons. Project complexities include severe ASR in existing substructure, connection of ramp between Eastbound and Westbound lanes on the structure and limited construction access to many structural elements. As Project Manager, she was responsible for coordinating with five other main consulting firms involved on the Rehabilitation Program as well as maintaining scope and budget and managing project staff. She also led 3-D finite element modeling of 18 spans and 17 piers, performing seismic analysis. (2013-2017)

VTrans, Middlebury Main Street and Merchants Row Bridges, Middlebury, VT
For the Vermont Agency of Transportation (VTrans), VHB is the lead designer for the Town of Middlebury's replacement of two 93-year-old bridges spanning the Vermont Railway mainline track in downtown Middlebury. The project is using Vermont's first Construction Manager/General Contractor (CMGC) project delivery system. The project also includes significant work to lower the railroad track and provide appropriate vertical clearance and will improve streetscaping, upgrade municipal drainage, create street and sidewalk improvements, and allow for future passenger rail. Megan is the Task Manager and plan development leader responsible for coordinating all disciplines and seeing that a complete set of plans is delivered to VTrans that is biddable, buildable and meets all specified requirements.

VTrans, VT 100 over Deerfield River, Readsboro, VT
VHB is designing the complete replacement of Bridge 25 on VT 100 over the Deerfield River for the Vermont Agency of Transportation (VTrans). This project includes roadway and stormwater drainage design, waterline design, regulatory permitting, hydraulics analysis, Right-of-Way, structural design and construction cost estimating and bid analysis for the construction of a 285 feet long single span bridge. The bridge will be constructed using construction phasing and weekend closures to maintain vehicular and pedestrian access across the Deerfield River during a majority of the construction due to the length of the detour and time required to construct the bridge. Megan is the Structures Task Manager, responsible for coordinating with other task managers and overseeing the design of the bridge as well as the development of the 3-D bridge BIM, plan set, cost estimate and specifications.

Jason David Keener, PE

Project Engineer

Education

BS, Civil Engineering, Clarkson University, 2006

Registrations/Certifications

Professional Engineer VT, 2016

Affiliations/Memberships

Vermont Society of Engineers

Jason is a Project Engineer in VHB's South Burlington, Vermont, office with experience in culvert, roadway, and bridge replacement, Vermont stormwater standards, and construction inspection. His skills include computer-aided drafting programs AutoCAD and Microstation as well as surveying with a robotic total station.

12 years of professional experience

VTrans / Main Street and Merchants Row over Vermont Rail, Middlebury, VT
VHB is the lead designer for the Town of Middlebury's replacement of two 93-year-old bridges spanning the Vermont Railway mainline track in downtown Middlebury. The project is using Vermont's first Construction Manager/General Contractor (CMGC) project delivery system. The project also includes significant work to lower the railroad track and provide appropriate vertical clearance and will improve streetscaping, upgrade municipal drainage, create street and sidewalk improvements, and allow for future passenger rail. As a Design Engineer, Jason assisted with the development of plans, quantities, and various design tasks for the project.

VTrans / VT Route 100 over Deerfield River, Readsboro, VT
VHB is designing the complete replacement of Bridge 25 on VT Route 100 over the Deerfield River. This project includes roadway and stormwater drainage design, waterline design, regulatory permitting, hydraulics analysis, Right-of-Way, structural design and construction cost estimating and bid analysis for the construction of a 285 feet long single span bridge. The bridge will be constructed using construction phasing and weekend closures to maintain vehicular and pedestrian access across the Deerfield River during a majority of the construction due to the length of the detour and time required to construct the bridge. Jason assisted in the Preliminary Plan development, specifically cross section development which required analyzing existing conditions and proposed roadway profiles and sections.

VRS / Vermont Rail Systems Bridge Engineering Services, VT
VHB provides Bridge Engineering Services for the Vermont Rail Systems (VRS), which consists providing all necessary support to the railroad for maintaining, inspecting, rehabbing, and replacing the Railroad responsible bridges on four railroads as well as all the bridges on the Clarendon Pittsford Railroad (CLP). These services include annual bridge inspection, load rating for normal live loads and special overweight loads, review of load ratings by other consultants and VTrans, designing repairs, and new bridges, and emergency inspections. The types of bridges ranged from simple span concrete slabs and culverts to multi-span thru-girders and truss bridges. Jason worked as an Inspection Team Leader and Team Member, completing both annual inventory/condition and load rating inspections. He was responsible for performing and overseeing inspections, completing Initial Inspection reports and Final Inspection reports.

City of Montpelier / Grout Road Bridge, Montpelier, VT
Grout Road Bridge is a single span steel girder with timber deck bridge supported on unreinforced concrete abutments that services four private residences. VHB is responsible for the engineering to provide a load rating of the bridge in existing conditions, alternatives analysis report, permitting, utility coordination and design bid documents for the selected alternative (complete bridge replacement). In order for the existing structure to last until full replacement can be completed, VHB is responsible for providing interim repair recommendations and interim repair documents for bid. Following VTrans and AASHTO guidelines, Jason completed as-built and as-inspected load ratings for the existing Bridge 15 in Montpelier, VT. He also completed an alternatives analysis for rehabilitation and replacement of the existing steel beam and concrete substructure bridge.

VTrans / I-89 Bridges 76N&S and 77N&S, Colchester, VT
VHB was tasked with designing the deck replacement of Bridges 76N&S and 77N&S on I-89 over Bay Road and Mallets Creek respectively. This project consists of the removal and replacement of four bridge decks with precast concrete deck panels using cross-overs and a 59-hour bridge closure period for four separate weekends to reduce impacts to the traveling public. As the bridges superstructures are three-span continuous steel beam and 154 feet and 185 feet long, VHB is using lane shifts to manage the northbound and southbound traffic to ensure there are two lanes of traffic southbound in the morning and northbound in the evening to allow for partial demo of the bridge deck prior to closing the bridge and reducing the northbound and southbound traffic to a single lane over the weekend. VHB is also using multiple weekend closures prior to the deck replacement to allow work to occur on the substructures which need to be modified for the deck replacement. As a Design Engineer, Jason was responsible for the design and detailing of the precast concrete deck panels, approach slabs and sleeper slabs. He attended project coordination meetings to assist in tracking of action items, project schedule, and coordination of design tasks between the Owner, Design Consultant, Construction Manager, and Independent Cost Estimator.

VTrans / Main Road (TH 1) Bridge 8 over Huntington River, Huntington, VT
VHB was the selected designer for the complete replacement of Bridge 8 on Main Road (TH 1) over the Huntington River. The design includes a steel girder bridge with a curved deck to better fit the roadway geometry. For the substructure, piles were driven under alternating one-way traffic and precast concrete elements were used to reduce the length of the bridge closure. VHB performed roadway and structural design, construction cost estimating, and bid analysis for the construction of this 97'-2½" long single span bridge. VHB also assisted VTrans with the with the regulatory permitting and right-of-way acquisition. Jason designed the steel girder with cast-in-place concrete deck superstructure that will be supported by integral abutments. Jason also assisted with the detailing and design checks for both pre-cast and cast-in-place substructure components.

Ryan J. Forbes

Structural Designer

Education

BS, Civil Engineering, University of Vermont, 2017

Registrations/Certifications

Engineer in Training VT

Affiliations/Memberships

American Society of Civil Engineers

American Institute of Steel Construction

Ryan is a Structural Designer in VHB's South Burlington, Vermont office. Previous experience in construction engineering includes design of temporary structures, erection and demolition plans and erection strategies for projects in New England and the greater NYC area.

1 year of professional experience

VTrans / Main Street and Merchants Row over Vermont Rail, Middlebury, VT
VHB is the lead designer for the Town of Middlebury's replacement of two 93-year-old bridges spanning the Vermont Railway mainline track in downtown Middlebury. The project is using Vermont's first Construction Manager/General Contractor (CMGC) project delivery system. The project also includes significant work to lower the railroad track and provide appropriate vertical clearance and will improve streetscaping, upgrade municipal drainage, create street and sidewalk improvements, and allow for future passenger rail. Ryan worked as a design consultant, assisting with the development of plans, quantities, and various design tasks for the project.

VTrans / VT Route 100 over Deerfield River, Readsboro, VT
VHB is designing the complete replacement of Bridge 25 on VT Route 100 over the Deerfield River. This project includes roadway and stormwater drainage design, waterline design, regulatory permitting, hydraulics analysis, Right-of-Way, structural design and construction cost estimating and bid analysis for the construction of a 285 feet long single span bridge. The bridge will be constructed using construction phasing and weekend closures to maintain vehicular and pedestrian access across the Deerfield River during a majority of the construction due to the length of the detour and time required to construct the bridge. Ryan assisted with the development of EPSC plans and grading, along with various other tasks for the project.

National Park Service / Fort Tilden Gateway National Recreation Area, Long Island, NY
VHB Vermont was responsible for the engineering and construction support for the replacement of a concrete top slab of a pump station and the steel frame and concrete slab foundation supporting a generator and associated electrical cabinets. The design and detailing of the concrete top slab accounted for several access hatches and various connections required. Ryan assisted with designing the concrete slab for an industrial pumphouse.

VTrans / VT 4 over Ottauquechee River (Bridge #33), Killington, VT
VHB is the design consultant responsible for the roadway and structural design for the replacement of Bridge #33 over the Ottauquechee River on US Route 4 in Killington. VHB is currently assisting with the regulatory permitting, ROW acquisition, and public meetings with VTrans, the Town, and project stakeholders. The existing single span concrete deck and steel beam bridge requires a complete bridge replacement along with roadway widening and approach railing. As part of the partially accelerated bridge construction the substructures will be precast pile caps with steel beams and cast-in-place deck. Ryan assisted with the development of EPSC plans and plan development for a temporary bridge, along with various other tasks for the project

Brad Ketterling

Senior Environmental Scientist

Education

MS, Physical Geography, University of Western Ontario, 1995

BS, Geography, Concordia University, 1992

Brad has worked as an environmental scientist for close to two decades, specifically in the fields of wetland mitigation site feasibility and design, stream assessment, watershed planning, state and federal permitting, and NEPA compliance. Brad helps clients navigate complex regulatory requirements and achieve successful results by identifying and assessing natural and cultural resource issues and constraints and developing strategies to obtain authorizations that are in the best interest of the client and the environment. He has worked on a variety of projects from linear transportation and energy infrastructure improvements to telecommunications networks to ski resorts to natural areas restoration.

20 years of professional experience

Cold Brook Stream and Floodplain Enhancement Project, Wilmington, VT
Brad is Project Manager responsible for developing the mitigation strategy to reclaim two artificial ponds in the floodplain of Cold Brook in Wilmington, Vermont. Relicts of past sand and gravel mining activities, these ponds captured Cold Brook during Tropical Storm Irene, resulting in elevated water temperatures in this trout stream and a disruption of natural sediment transport processes. He developed an approach to fill the ponds with rock material from adjacent reservoir excavation, establishing a pilot channel for Cold Brook. He also coordinated extensively with the U.S. Army Corps of Engineers and Agency of Natural Resources to gain concept approval and obtain all necessary permits.

Burlington Bike Path Rehabilitation Project, Burlington, VT
Brad assisted with various permitting activities associated with the proposed rehabilitation of the Burlington Bike Path, including: coordinating the process of infiltration testing to support the use of a driveable grass pavement system in Waterfront Park; coordinating with Department of Public Works Stormwater Program Manager to discuss potential stormwater treatment approaches; permit applications for Construction and Operational Phase Permits from the DEC Stormwater Section; preparation of city permit applications (Zoning Permit and Small Project EPSC Plan); and coordination with Senior Planner at Department of Planning and Zoning. He also performed a shoreline assessment of the Urban Reserve to assess areas in potential need of stabilization to ensure resiliency of the future bike path alignment along the lakeshore.

Federal Street Multimodal Connector, Environmental Assessment, St. Albans, VT
Brad was Task Manager for National Environmental Policy Act (NEPA) compliance for the proposed Federal Street Multimodal Connector Project. He is the lead author of the Environmental Assessment (EA) and is responsible for outreach to and direct coordination with state and federal regulatory agencies, including the Federal Highway Administration's (FHWA) Environmental Program Manager and the Vermont Agency of Transportation's (VTrans) Historic Preservation and Archaeology Officers. Brad coordinated input from VHB specialists and consultants with respect to traffic analysis, air quality and noise assessment, cultural and historic resources, natural resources, stormwater, aesthetics, socioeconomics, and other relevant issues. He presented the

findings of the EA at a public hearing and finalized the EA to obtain a Finding of No Significant Impact (FONSI) in April 2013.

Main Street and Merchants Row Bridges, Middlebury, VT
Brad is Task Manager for Environmental Services, evaluating potential natural resources and other constraints on the design for the proposed replacement of two bridges over the Vermont Railway in Downtown Middlebury as part of an Environmental & Historic Structures Evaluation and National Environmental Policy Act (NEPA) documentation. As a Local Transportation Facilities (LTF) project, direct coordination with VTrans staff is ongoing with the Historic Preservation Officer, Archaeology Officer, and various members of the Environmental Section. He is also coordinating directly with the Federal Highway Administration (FHWA) Environmental Program Manager with respect to NEPA compliance documentation and the development of an appropriate Section 4(f) Evaluation for bridge replacement.

Kingdom Community Wind Project, Wetland Restoration Plan and Construction Oversight, Lowell, VT
In response to the unauthorized fill of a Class II wetland on a parcel proposed to act as mitigation for the environmental impacts associated with the Kingdom Community Wind Farm Project, Brad performed the fieldwork necessary to characterize the extent of the disturbance and depth of fill, quantify the degree of wetland and wetland buffer impact, and develop a restoration plan for the affected areas. His efforts included a site preparation plan (including guidelines for excavation), a planting plan, performance monitoring plan, and invasive species monitoring and control plan. After securing plan approval from the Department of Environmental Conservation Wetlands Section, Brad personally oversaw the site work, including the excavation of test pits, installation of erosion prevention and sediment control measures, mechanical removal of fill material, broadcasting of a wetland seed mix, and replanting of the site with containerized herbaceous and woody plants. The restored wetland was subject to inspection by the Chief of the Wetlands Section and readily approved without the need for any modifications.

Moran Center at Waterfront Park, Burlington, VT
Brad prepared a Department of the Army (Section 404/10) permit application and State Shoreland Encroachment Permit application for the proposed Moran Center at Waterfront Park, the original plans which involved the redevelopment of a relict coal-fired generating plant and the surrounding lands to provide a multi-season recreational destination on Burlington's waterfront. A key component of the federal permit application was an alternatives analysis that presented an authoritative case for the project's configuration and constituent elements and their spatial positioning. Brad also assisted the City of Burlington with presentations before the Conservation Board and coordinated the input from multiple design team members including engineers, landscape architects, and geotechnical specialists.

Charlie F. Farmer, Jr., PE

Remediation, Assessment, & Compliance

Education

BS, Environmental Engineering, University of Vermont, 2009

BS, Environmental Science, University of Denver, 2002

Registrations/Certifications

Professional Engineer (Environmental Engineering) VT, 2017

OSHA 40-Hour Hazwoper Certificate, 2008

OSHA 8- Hour Hazwoper Site Supervisor Certificate, 2008

Charlie has over 16 years of environmental science and engineering experience with specific expertise in: environmental investigations/site characterization, environmental remediation systems, wastewater treatment systems, NPDES permit compliance; stormwater management; hydrology/geomorphology; water supply; and discharge monitoring and permitting. After receiving his Environmental Science degree, Charlie worked on stormwater management, hydrology/geomorphology, surface water quality, sediment investigations, and discharge monitoring projects in Tennessee. He found a passion for designing practical solutions to real problems and pursued an additional degree in Environmental Engineering. After graduation, Charlie began work at The Johnson Company, Inc. where he focused on water and wastewater engineering, NPDES permit compliance, and site remediation from the initial investigations through remedial design.

16 years of professional experience

Pine Street Canal Superfund Site, Design of Coal Tar Pumping System, Burlington, VT

Prior to joining VHB, Charlie designed a coal tar pumping system for coal tar removal from the Pine Street Canal Superfund Site in Burlington. The system incorporated a high-flow peristaltic pump to recover coal tar for transport off-site. Managed field operations and compliance reporting.

U.S. Army Corps of Engineers, St. Albans Former Air Force Base, CERCLA Remedial Investigation, Vermont

Prior to joining VHB, Charlie was team member in a CERCLA Remedial Investigation at a former Air Force Base. Reviewed and synthesized data from seven different investigations on the property over a 23-year timespan. Designed a supplemental investigation and the preparation of a final Remedial Investigation Report including volumetric estimates of contaminated media and an evaluation of analytical results with applicable standards.

Bethel Transfer Station, Water Supply Design and Permitting on a Closed Landfill Site, Bethel, VT

Prior to joining VHB, Charlie was project lead for the permitting and installation of a new water supply for a closed landfill site. He evaluated geology, water quality, aquifer quantity potential, and permit requirements for a new water supply located on the property of a closed landfill. Permitted, designed, and tested the new water supply.

Pompanoosuc Mills, Underground Injection System, Vermont

Prior to joining VHB, Charlie provided re-design, operation, and monitoring of an underground injection system for boiler water from an active mill. Re-design of the system included a new pump, distribution system, alarm system, and automated data recording. Operation and monitoring of the system included remote analysis of injection data as well as preparation of Underground Injection Control permit documents.

Ryan Cloutier, LS

Survey Manager

Education

BS, Mathematics, Saint Michael's College, 1998

Registrations/Certifications

Licensed Surveyor VT, 2007

Presentations

'Making Right-of-Way Accessible' for FHWA's GIS in Transportation Webcast

Presenter at GIS-T and ESRI UC on Making Right of way Accessible

Awards

2017 State of Vermont Public Service Recognition - Team Honoree, Business Process Management/Right of way Team

Ryan is a Survey Manager in the VHB's growing South Burlington, Vermont office, with close to 20 years of professional experience. He provides overall program management for the Vermont office's survey team and expands the suite of survey services offered to state, municipal, and private sector clients. Ryan serves clients' survey needs through the full project lifecycle from initial planning and research, to right of way, utility and boundary survey, through final design, construction, as-built and ALTA survey. He has in-depth experience on both the public and private sectors having held senior positions at the Vermont Agency of Transportation and with private consulting firms throughout New England.

19 years of professional experience

Williston Stormwater Retrofits, Williston, VT

Ryan is the survey manager for the development of storm water retrofits along two and one-half miles of the I89 corridor in Williston, VT. To meet the projects aggressive schedule and budget VHB deployed UAV to collect high resolution imagery and a ground surface model in favor of the more time consuming and labor intensive conventional survey methods. Ryan's responsibilities included providing overall oversight of all field operations including both UAS and conventional on the ground survey services. Specifically he provided geodetic control and coordination for the UAV, quality analysis and control of the surface collected by the UAV, collection of features not accessible by the UAV, and mapping of the limited access right of way.

Statewide Parcel Mapping Program, Statewide, Vermont

Prior to joining VHB, Ryan served as the Contract and Project Manager for the Vermont Agency of Transportation's (VTrans) Statewide Parcel Mapping Program where he was responsible for the development of a Statewide Parcel dataset and supervising 10 contractors to ensure they meet performance expectations and standards. Ryan gathered information to define the needs, requirements, specifications and budget necessary for the project. Then presented that information to Agency leadership and State legislature in support of getting legislation passed for a Statewide Parcel Mapping program (ACT No. 158 - 2016).

Right-of-Way Data Modernization Project, Statewide, Vermont

Prior to joining VHB, Ryan served as the Contract and Project Manager for the Vermont Agency of Transportation's (VTrans) Statewide Right-of-Way Data Modernization Project. The project extracted information from disparate spatial and non-spatial data sets, transformed them to a common schema and loaded them to what is now known as the Right of Way Spatial Data Hub. The project mapped nearly eighty percent of the States 2700 miles of State owned right of way and integrated with project management and business databases. In this role, Ryan was directly responsible for overseeing the definition of needs of and the current business process of the right of way section with a focus on optimizing the ROW sections workflow, and increasing the sections effectiveness and efficiency. This project was recognized by AASHTO, with the AASHTO Innovation Initiative Award.

Kaitlin O'Shea

Preservation Planner

Education

MS, Historic Preservation, University of Vermont, 2011

BA, Historic Preservation, University of Mary Washington, 2006

Advisor, National Trust for Historic Preservation

President, UVM Historic Preservation Alumni Association

Kaitlin is a Preservation Planner with a strong background in and understanding of preservation principles and practices. Kaitlin provides expertise in regulatory process and compliance, particularly Section 106 review and Section 4(f) evaluations, as well as historic documentation, historic resource identification, and project management in the government framework. From national and statewide conference presentations to public meetings, she is skilled in stakeholder interaction and communication. Kaitlin meets the Secretary of the Interior's Professional Qualification Standards for an Architectural Historian and Historian (36 CFR 61).

13 years of professional experience

VTrans Historic Preservation Services On-Call Authorization, Vermont
As part of the General Environmental Services Contract #PS0448 between VTrans and VHB, an on-call authorization was established to provide various Historic Preservation Services, enabling VHB to complete work for the VTrans Historic Preservation Officer as needed. Under this authorization, Kaitlin has completed 12 reviews and documentation for Section 106 reviews and Section 4(f) evaluations as well as mitigation projects and Vermont Historic Sites and Structures Survey forms. Project types included bridges, roadways, sidewalks, streetscapes, rail trails, culverts, and buildings. Kaitlin drew upon her past experience as a VTrans Historic Preservation Specialist to craft efficient yet effective documents in accordance with VTrans' expectations. As of 2019, VHB is on retainer for Historic Preservation Consulting Services with VTrans.

Bridge No. 4 Replacement Historic Resource Documentation, Salisbury, VT
For the Town Salisbury, Kaitlin completed the research and photo-documentation for the replacement project for the Salisbury Bridge No. 4 carrying Maple Street over Leicester River. As part of a Town Highway Structures Grant, this work was performed in accordance with the Vermont Agency of Transportation (VTrans) and the Vermont Division for Historic Preservation (VDHP) specifications.

Various Projects, University of Vermont, Burlington, VT
Under contract with the University of Vermont, Kaitlin has completed a Historic Resource Documentation Package for 439 College Street, and has assisted UVM Campus Planning with preservation regulatory guidance and requested documentation on the Ira Allen Chapel and the Pierce-Spaulding House projects. VHB is currently under contract to complete the Determination of Effect letter for Act 250 for the UVM Music Recital Hall building.

VTrans, Brandon Historic Resources Support, Brandon, VT
Under contract with the Vermont Agency of Transportation (VTrans), Kaitlin provided historic resources services to support a Section 106 mitigation documents for a Historic Resource Documentation Package. She photographed the existing setting and features of two parks in Brandon and conducted historical research to document the changes in the historic district. The deliverable included a written report, photographic documentation, and maps keyed to photo locations.

Roy Schiff, PhD, PE, ASSOCIATE

Regional Manager, Water Resources

Dr. Schiff specializes in river and floodplain restoration, geomorphic and habitat assessment, flood mitigation, hydrology and hydraulics, and sediment transport analysis. In addition to applied restoration work such as channel creation, bank stabilization, and dam/levee removal, he has been involved in several research projects across Vermont and the region evaluating the economic impacts of living in floodplains, drafting best engineering practices to reduce future flood risks, improving protocols for habitat assessment, and creating guidelines for channel restoration. Other experience includes dam removal, dam failure analysis, culvert design, bridge scour analysis, floodplain management, and biomonitoring.

Great Brook Bridges Alternatives Analysis | Plainfield, VT
Managed all aspects of the project including data collection, hydraulic study, and bridge alternatives analysis. Performed field work and reporting. Collaborated with University of Vermont on a woody debris study.

Great Brook Fish Passage & Restoration | Plainfield, VT
Performed survey, alternatives analysis, design, permitting, and construction oversight for retrofits at three concrete box culverts. Following installation performed several rounds of evaluation monitoring to confirm fish passage was improved.

North Washington Street Bridge | Boston, MA
Technical lead for replacement of the North Washington Street Bridge over the Charles River, for the MASSDOT. Services included hydraulic modeling, scour analysis, and recommendations for scour countermeasures for the proposed structure. A two-dimensional hydrodynamic model was created to investigate water depth and velocity for several high flow scenarios.

Baker Bridge on Lincoln Road Bridge Inspection | Ripton, VT
Assisted with site assessment to inspect bridge and perform alternatives analysis for structure and road alignment. Considered structure condition, traffic flow, floodplains, river form and processes, hydraulics, erosion, stormwater runoff, and other environmental aspects of the area.

Vermont Route 116 Culvert Assessment AOP | Starksboro & Hinesburg, VT
Led project to assess all of the culverts passing under Route 116 to improve conveyance, geomorphic compatibility, and aquatic organism passage. Project tasks included assist with field data collection, alternatives analysis, assisted with hydrology and hydraulic modeling, and culvert prioritization.

Roaring Branch Floodplain Restoration | Bennington, VT
Conducted site assessment and sediment transport analysis to evaluate alternatives. Coordinated survey and assisted with hydraulic modeling to remap floodplains following flooding and flood recovery. Designed the floodplain restoration project, performed permitting, and oversaw construction.

YEARS EXPERIENCE

14 With This Firm

2 With Other Firms

EDUCATION

PhD, Stream Restoration & Aquatic Ecosystems
Yale School of Forestry & Environmental Studies

MS, Environmental Science & Engineering
University of Washington

BS, Engineering
University of Rochester

LICENSE & CERTIFICATIONS

Professional Engineer - VT

Certified Soil Evaluator University of Massachusetts

AFFILIATIONS

American Fisheries Society

American Rivers

American Society of Civil Engineers (ASCE)

American Water Resources Association (AWRA)

Trout Unlimited (TU) MadDog Chapter

Montpelier Conservation Commission

Brian M. Cote, PE, CFM

Lead Project Engineer, Water Resources

YEARS EXPERIENCE

22 With This Firm

EDUCATION

BS, Civil & Environmental Engineering
University of Vermont

LICENSE & CERTIFICATIONS

Professional Engineer - VT

Certified Floodplain Manager (CFM)

AFFILIATIONS

American Society of Civil Engineers

Association of State Dam Safety Officials

Association of State Floodplain Managers

Brian Cote specializes in hydrologic and hydraulic analysis and design. His project experience includes design and analysis of stormwater management and treatment systems using traditional as well as green stormwater infrastructure and best management practices. Additional project experience includes detention/water quality basin design; floodplain management; site development and layout; Low Impact Development (LID) design; sediment and erosion control measures; hydraulic analysis of stream channels, culverts, and bridges; dam safety assessment, modification, and removal; as well as the development of construction plans and project specifications.

Great Brook Bridge Alternative Analysis | Plainfield, VT
Conducted hydrologic and hydraulic analysis of the lower Great Brook in Plainfield, Vermont to evaluate vulnerabilities at two bridges prone to flood and erosion damages. Evaluated alternatives to reduce flood and erosion risks. Prepared concept plans of the preferred alternative.

Winooski Street Bridge Restriction/Flood Study | Waterbury, VT
Tasked with preparing hydrologic analysis and hydraulic modeling of the Winooski River study reach in the villages of Waterbury and Duxbury. Conducted an alternatives analysis to evaluate potential mitigation measures to reduce vulnerability in the most flood-prone areas. Prepared flood inundation and depth mapping and assisted with data collection.

North Washington Street Bridge | Boston, MA
Project team member responsible for assisting with and reviewing the hydraulic modeling and scour computations in support of proposed design for the tidally influenced bridge, locks, and pumping facility located on the Charles River just upstream of the North Washington Street Bridge.

Middlebury River Flood Mitigation Study | East Middlebury, VT
Served as design engineer for a flood management and floodplain restoration project along the Middlebury River corridor through a rural village setting. Tasks included field reconnaissance, hydraulic modeling and analysis, sediment transport modeling, and alternatives analysis. Assisted with design of repairs to an existing floodwall and proposed floodwall extension.

West Branch Little River Management Project | Stowe, VT
Tasked with preparing a hydraulic model of the West Branch Little River to evaluate flooding and sediment transport through the project reach that had experienced damage due to channel bank erosion. Evaluated alternatives to increase flood storage and sediment transport capacity. Prepared construction documents and conducted oversight during construction.

Woodward Packard Floodplain Feasibility Study & Analysis | Bennington, VT
Conducted hydraulic modeling and performed an alternatives analysis to explore several options for floodplain restoration along the Roaring Branch. Prepared summary of findings to guide potential river corridor protection project.

Jessica C. Louisos, MS, PE

Lead Project Engineer, Water Resources

Ms. Louisos is a water resource engineer specializing in geomorphological and bio-engineering designs for riverine systems and watersheds. She has designed numerous river restoration, dam removal, stormwater mitigation and green infrastructure, flood mitigation and recovery, bank and gully stabilization, culvert, bridge scour, and aquatic organism passage projects. She has managed projects and performed tasks at all project stages including project scoping, field data collection, modeling, design, permitting, cost estimating, and construction oversight for many projects. Ms. Louisos has broad field experience in geomorphic and habitat assessment, stormwater master planning, and construction observation. She has advanced river and watershed modeling experience including multiple hydrology models and one- and two-dimensional hydraulic modeling to inform flood mitigation, bridge scour and design, and restoration projects. Jessica was awarded the 2013 Vermont State Young Engineer of the Year Award.

Cambridge Greenway Trail / Railroad Bridge Replacement | Jeffersonville, VT
Identified a flood constriction during flood mitigation planning and designed a bridge replacement and floodplain restoration project to reduce backwatering in the Village. Completed hydraulic modeling, design plans, cost estimating, bid assistance, and construction oversight of this award-winning project.

Vermont 15 Bypass Culverts | Jeffersonville, VT
Completed advanced hydraulic modeling to verify a concept design for culverts under Vermont Route 15 in the Village of Jeffersonville, Vermont to allow floodwaters trapped on one side of the highway embankment to recede from the Village to the Lamoille River. Completed hydraulic modeling for a series of flow conditions, alternatives analysis to determine maximum flood reduction, concept design, and cost opinions. Completed final design, permitting, benefit-cost analysis, bid assistance, and construction oversight.

North Washington Bridge Two-Dimensional Modeling | Boston, MA
Created two-dimensional hydrodynamic hydraulic models to evaluate water depth and velocity, inform bridge scour analysis, and provide recommendations for scour countermeasures for a proposed new bridge. The modeling included mesh refinement and specification of boundary conditions for multiple scenarios representing tidal extremes and different hydraulic conditions of the Charles River, including representation of the New Charles River Dam, a complex flood control dam located immediately upstream of the project site.

Quinlan Bridge Vicinity Alternatives Analysis | Charlotte, VT
Performed field assessment, survey, and mapping to identify sources of flooding at a historic covered bridge. Created a hydraulic model and conducted an alternatives analysis to investigate options for reduction of flooding, ice jams, and erosion risks. Presented findings to watershed management group, public, and town.

YEARS EXPERIENCE

12 With This Firm

EDUCATION

MS, Environmental Engineering
University of Vermont

BS, Civil & Environmental Engineering
University of Vermont

LICENSE & CERTIFICATIONS

Professional Engineer - VT, NY

FEMA Benefit-Cost Analysis Certification

Vermont Natural Shoreland Erosion Control Certification

Vermont Rivers & Roads Training

AFFILIATIONS

American Society of Civil Engineers, Vermont Section, Past-President and Government Relations Chair

American Society of Civil Engineers, National Public Policy Committee

American Water Resources Association

American Society of Ecological Engineering

South Burlington Planning Commission, Chair

University of Vermont, School of Engineering, Board of Advisors

AWARDS

Vermont State Young Engineer of the Year, 2013

SHAWN P. KELLEY, PH.D., P.E.
Project Director

KEY AREAS OF PRACTICE

Geotechnical Engineering

In Situ Testing

Geotechnical Instrumentation

Geo-Environmental Engineering

EDUCATION

Ph.D., Civil Engineering (Geotechnical Specialization), University of Massachusetts, Amherst, 2003

M.S., Civil Engineering (Environmental Geotechnical Specialization), University of Massachusetts, Amherst, 1997

B.S., Civil Engineering, University of Massachusetts, Amherst, 1994

REGISTRATIONS

Professional Engineer - VT

PROFESSIONAL AFFILIATIONS

American Society of Civil Engineering (ASCE) – National Committee – Leadership Training Committee

American Council of Engineering Companies (ACEC)

Vermont Society of Engineers

Geo-Institute of ASCE

International Society of Soil Mechanics and Geotechnical Engineering

Association of State Dam Safety Officials

Chi Epsilon Civil Engineering Honor Society

Order of Engineer

Shawn has over 20 years of geotechnical engineering experience on a wide range of development projects. As a specialist in geotechnical engineering design, geotechnical instrumentation, and geotechnical soil testing, he has authored numerous publications, reports and presentations. In 2016, Shawn was named Vermont's Civil Engineer of the Year by the Vermont Section of American Society of Civil Engineering (VTASCE). In 2017, Shawn was named Engineer of the Year by the State of Vermont Engineer of the Year selection committee.

RELEVANT EXPERIENCE

Downtown Bridge Replacement &Rail Line Improvement Project, Middlebury, VT

Project Manager responsible for site investigation program and foundation design recommendations for removing two old bridges spanning over Vermont Railway (VTR) and replacing with a cut and cover tunnel in downtown Middlebury, VT. The project also consists of lowering over 3000 feet of railway to transport future double stack freight and provides improved surficial drainage to the railway and surrounding surface streets.

Stony Brook Road Bridge No. 5 , Stockbridge, VT

Project Manager responsible for site evaluation program, foundation design recommendations, and pile foundation observation and testing for the repair of a bridge over Stony Brook in Stockbridge, VT damaged by Tropical Storm Irene.

Tweed River Drive Bridge No. 11, Pittsfield, VT

Project Manager responsible for site evaluation program, foundation design recommendations, and pile foundation observation and testing for the repair of a bridge over the south branch of the Tweed River in Pittsfield, VT damaged by Tropical Storm Irene.

Ranney Road Bridge, Stockbridge, VT

Project Manager responsible for site evaluation program and foundation design recommendations for the repair of a bridge over Stony Brook in Stockbridge, VT damaged by Tropical Storm Irene.

River Brook Road Bridge No. 34, Rochester, VT

Project Manager responsible for site evaluation program and foundation design recommendations for the repair of a bridge over White River in Rochester, VT damaged by Tropical Storm Irene.

Crossett Hill Road Bridge No. 35, Duxbury, VT

Project Manager responsible for site evaluation program and foundation design recommendations for the repair of an open bottom culvert over Crossett Brook in Duxbury, VT damaged by heavy rains in April 2011 in Duxbury, VT.

Cross Street Bridge, Middlebury, VT

Project Manager responsible for site investigation program and foundation design recommendations for a new 3 span bridge over Otter Creek, Vermont Railroad, and a public parking lot in the center of Middlebury, VT.

JONATHAN H. GRACE, P.E.
Project Manager

KEY AREAS OF PRACTICE

Civil and Geotechnical Engineering

Construction Quality Assurance Services

Permit and Design Report Preparation

Renewable Energy

EDUCATION

B.S. Civil Engineering, Virginia Polytechnic Institute & State University, 2011

REGISTRATIONS

Professional Engineer- VT

PROFESSIONAL AFFILIATIONS

Tau Beta Pi Engineering Honor Society

Chi Epsilon Civil Engineering Honor Society

Jon provides geotechnical engineering, design, and permitting services for a variety of project types ranging from land development projects to large multi-structure developments and provides construction quality assurance services for large earthwork projects. Jon routinely prepares application and design packages that include geotechnical engineering reports, Act 250 Land Use Permits, Individual Construction Stormwater Discharge Permits, Stormwater Discharge Permits, Post-Closure Amendment Requests to support development projects.

RELEVANT EXPERIENCE

University of Vermont, Geotechnical Engineering for the On-Campus Multipurpose Center, Burlington, VT

Supervised the completion of a subsurface exploration program for the University's On-Campus Multipurpose Center, which includes the construction of a new event center located at the Patrick-Forbush Gutterson Athletic Complex (PFG) and expansions to the Gutterson Fieldhouse and Patrick Gymnasium. Successfully executed the exploration program without interrupting the athletic complex functions, which required daily coordination with the facility's personnel while meeting the project schedule deadlines.

Capitol Plaza Corporate Hotel and Parking Garage, Montpelier, VT

Supervised the completion of a subsurface exploration program for a proposed five-story steel framed hotel and a three-to-four-story precast standalone concrete parking garage. Obtained and reviewed previously completed subsurface explorations, coordinated the completion of subsurface surface shear wave velocity testing to develop a shear wave velocity profile to better evaluate the seismic site class at the site, and completed a geotechnical subsurface investigation for foundation and engineering recommendations.

Omya Inc., Tailings Management Facility Settlement Monitoring, Verpol Facility, Florence, VT

Responsible for monitoring the settlement of tailings beneath a tailings management facility (TMF) at Omya's Verpol Facility, which consists of installing and collecting location information of various manual settlement platforms located throughout the TMF and collecting pore water pressure, temperature, groundwater level and barometric data from on-site data collectors. Assisted with preparation of quarterly reports for the Waste Management & Prevention Division (WMPD). Also responsible for repairs to the settlement monitoring equipment, coordination with the client and contractors, review of survey information, and facility inspections.

Coventry Solar, New England Waste Services of Vermont, Inc., Coventry, VT

Involved in the preparation of various documents to support the development of a 2.2 MW DC solar PV array field on approximately 12.2 acres adjacent to the New England Waste Services of Vermont landfill. Assisted with the preparation of several construction related permits for the project, including the Individual Construction Stormwater Discharge Permit. Prepared the geotechnical engineering report, construction drawings, construction quality assurance services and various correspondences with the client, contractor and state regulators.

IAN P. DONOVAN, E.I.T.
Project Engineer

KEY AREAS OF PRACTICE
Geotechnical Engineering

Construction Quality Assurance

In-Situ Testing and Geotechnical Instrumentation

EDUCATION
M.S., Geological Engineering, Colorado School of Mines, 2014

B.S., Geology, University of Vermont, 2008

REGISTRATIONS
Engineer-In-Training - NH

PROFESSIONAL AFFILIATIONS
American Society of Civil Engineers

SANBORN HEAD
Since 2019

Ian is a geotechnical engineer with extensive experience in both soil and rock engineering projects. Ian has assisted with design and analysis of deep and shallow foundation systems, soil and rock slopes, dewatering and excavation support systems, and various underground construction projects. Ian's field experience includes performing complex geotechnical exploration programs and construction management for public and private sector clients.

RELEVANT EXPERIENCE

Commercial Developments

Burr and Burton Academy Academic Building, Geotechnical Engineering, Manchester, VT

Coordinated and performed subsurface exploration program consisting of soil borings, bedrock probes, and infiltration testing. Prepared geotechnical engineering report which provided recommendations for foundation design, excavation support, rock blasting, and other construction considerations.

Landfill Solar Projects, Design and Permitting Services, Various Locations, VT

Performed subsurface explorations at various landfills in Vermont to support installation of solar facilities. Performed ballast design, bearing capacity and settlement, and slope stability calculations for each project.

Cambria Hotel Project, Geotechnical Engineering and Environmental Services, Burlington, VT

Performed portion of subsurface exploration program to support design of new hotel in downtown Burlington. Subsurface exploration was performed for geotechnical and environmental analyses. Prepared boring logs and subsurface profiles, and provided recommendations for deep foundation and ground improvement systems.

The Prosper Valley School, Geotechnical Engineering Services, South Pomfret, VT

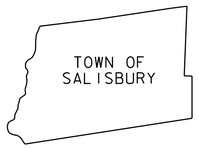
Assisted with a subsurface exploration program to evaluate causes of moisture in concrete floor slab. Performed hand auger explorations and drive cone penetrometer testing through building slab and installed monitoring wells. Provided recommendations for moisture remediation including sub slab depressurization system.

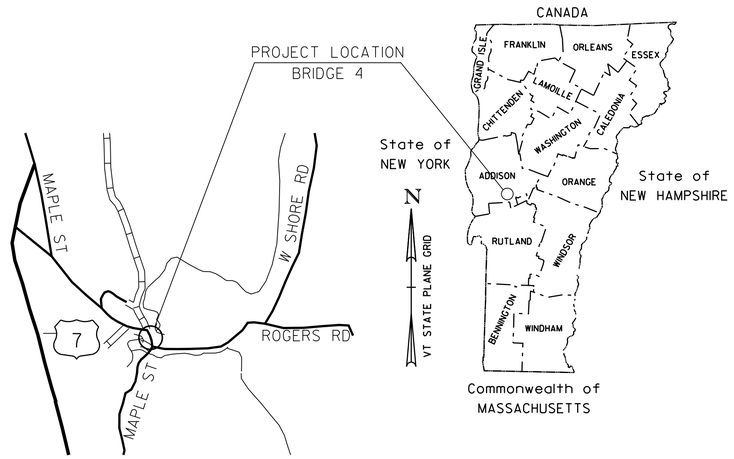
Mansion Street Apartments, Geotechnical Engineering Services, Winooski, VT

Performed foundation design calculations including evaluations of bearing capacity, settlement, earthwork requirements, and slope stability. Assisted with foundation selection and ground improvement alternatives.

Representative Work Sample

TOWN OF SALISBURY
COUNTY OF ADDISON



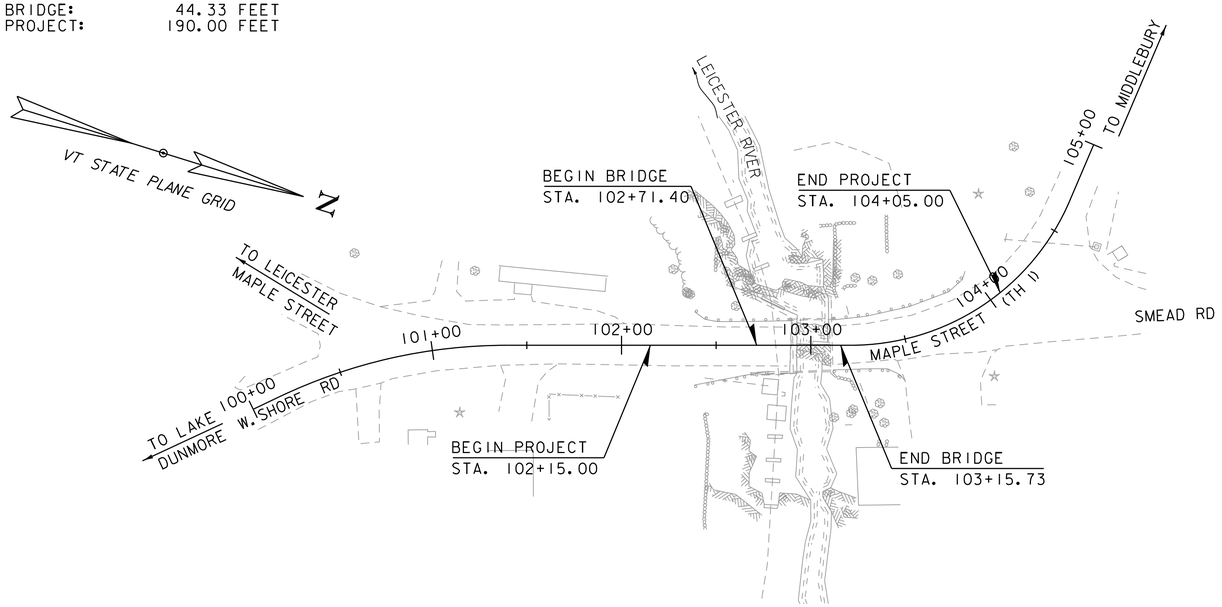


PROPOSED IMPROVEMENT
BRIDGE PROJECT
ROUTE: T.H. 01 (MAPLE ST) CLASS 2 RURAL MINOR COLLECTOR
BRIDGE #4

PROJECT LOCATION: LOCATED IN SALISBURY, VT AT A POINT 0.70 MILES SOUTHEASTERLY FROM THE INTERSECTION OF US ROUTE 7 AND T.H. 01 (MAPLE ST).

PROJECT DESCRIPTION: WORK TO BE PERFORMED UNDER THIS PROJECT INCLUDES REMOVAL AND REPLACEMENT OF BRIDGE #4, ON THE EXISTING ALIGNMENT, WITH ASSOCIATED CHANNEL, ROADWAY AND APPROACH WORK.

LENGTH OF ROADWAY:	145.67 FEET
LENGTH OF BRIDGE:	44.33 FEET
LENGTH OF PROJECT:	190.00 FEET



CONVENTIONAL SYMBOLS

COUNTY LINE
TOWN LINE
LIMITS OF ACCESS
POINT OF ACCESS
FENCE LINE
STONE WALL
TRAVELED WAY
GUARD RAIL
RAILROAD
SURVEY LINE
CULVERT
POWER POLE
TELEPHONE POLE
TREES
CONTROL OF ACCESS
PROPERTY LINE
R.O.W. TAKING LINE
SLOPE RIGHTS (SR SR SR)
TOP OF CUT
TOE OF SLOPE

SURVEYED BY : VHB
SURVEYED DATE : 11/16/2015

DATUM
VERTICAL NGVD 88
HORIZONTAL VT GRID (NAD 83) (2011)

SCALE 1" = 40'-0"
40 0 40

STATE OF VERMONT
SCOTT E. BURBANK
04-19-2016
No. 7686
Structural
LICENSED PROFESSIONAL ENGINEER

vhb

PROJECT MANAGER : SCOTT E. BURBANK, PE

PROJECT NAME : SALISBURY
PROJECT NUMBER : 57813.00

SHEET 1 OF 38 SHEETS

Version

PRELIMINARY INFORMATION SHEET (BRIDGE)

LRFD

INDEX OF SHEETS

PLAN SHEETS

STANDARDS LIST

B-71	STANDARD FOR RESIDENTIAL AND COMMERCIAL DRIVES	07-08-2005
E-121	STANDARD SIGN PLACEMENT - CONVENTIONAL ROAD	08-08-1995
E-193	PAVEMENT MARKING DETAILS	08-18-1995
S-352A	BRIDGE RAILING, GALVANIZED STEEL TUBING/CONCRETE COMBINATION	08-22-2012
S-352B	BRIDGE RAILING, GALVANIZED STEEL TUBING/CONCRETE COMBINATION	08-22-2012
S-352C	BRIDGE RAILING, GALVANIZED STEEL TUBING/CONCRETE COMBINATION	08-22-2012
S-352D	GUARDRAIL APPROACH SECTION TO CONCRETE COMBINATION BRIDGE RAILING, T	08-22-2012
T-1	TRAFFIC CONTROL GENERAL NOTES	08-06-2012
T-10	CONVENTIONAL ROADS CONSTRUCTION APPROACH SIGNING	08-06-2012
T-28	CONSTRUCTION SIGN DETAILS	08-06-2012
T-30	CONSTRUCTION SIGN DETAILS	08-06-2012
T-35	CONSTRUCTION ZONE LONGITUDNAL DROP-OFFS	08-06-2012
T-42	DELINEATORS AND MILEPOSTS	01-02-2013
T-45	SQUARE TUBE SIGN POST AND ANCHOR	01-02-2013
T-2	TRAFFIC SIGN GENERAL NOTES	02-12-2016
G-1Bm	BOX BEAM GUARDRAIL	06-13-1997

STRUCTURES DETAIL SHEETS

SD-501.00	CONCRETE DETAILS AND NOTES	2/9/2012
SD-502.00	CONCRETE DETAILS AND NOTES	10/10/2012

FINAL HYDRAULIC REPORT

HYDROLOGIC DATA

Date: 02/02/2016

DRAINAGE AREA : 22.1 square miles
CHARACTER OF TERRAIN : Hilly to mountainous - mostly forested
STREAM CHARACTERISTICS : Steep gradient, defined banks, dam-controlled upstream
NATURE OF STREAMBED : Gravel-cobble mix, some boulders and ledge at bridge

PEAK FLOW DATA

Q 2.33 =	256 cfs	Q 50 =	3185 cfs
Q 10 =	1963 cfs	Q 100 =	3763 cfs
Q 25 =	2674 cfs	Q 500 =	5632 cfs

DATE OF FLOOD OF RECORD: Unknown
ESTIMATED DISCHARGE: Unknown
WATER SURFACE ELEV.: Unknown
NATURAL STREAM VELOCITY : @ Q50 = 9.71 cfs
ICE CONDITIONS : Low
DEBRIS: Moderate
DOES THE STREAM REACH MAXIMUM HIGHWATER ELEV. RAPIDLY? Unknown
IS ORDINARY RISE RAPID? Unknown
IS STAGE AFFECTED BY UPSTREAM OR DOWNSTREAM CONDITIONS? Yes
IF YES, DESCRIBE: Streamflow is controlled by outlet structure in upstream reservoir, (Lake Dunmore)

WATERSHED STORAGE: 12%
HEADWATERS:
UNIFORM:
IMMEDIATELY ABOVE SITE: 1.80 miles

EXISTING STRUCTURE INFORMATION

STRUCTURE TYPE: Single-span, concrete T-beam
YEAR BUILT: 1919
CLEAR SPAN(NORMAL TO STREAM): 23 feet
VERTICAL CLEARANCE ABOVE STREAMBED: 12.7 feet (US); 18.5 feet (DS)
WATERWAY OF FULL OPENING: 248 square feet
DISPOSITION OF STRUCTURE: Removal and Replacement
TYPE OF MATERIAL UNDER SUBSTRUCTURE: Concrete abutments on ledge

WATER SURFACE ELEVATIONS AT:

Q2.33 =	405.55	VELOCITY =	14
Q10 =	412.95	"	24.0
Q25 =	417.89	"	26
Q50 =	419.01	"	15
Q100 =	419.55	"	16

LONG TERM STREAMBED CHANGES: Stable, ledge

IS THE ROADWAY OVERTOPPED BELOW Q100: Yes
FREQUENCY: Q50
RELIEF ELEVATION: 418.5 ft
DISCHARGE OVER ROAD @Q100: 614.3 cfs

UPSTREAM STRUCTURE

TOWN: Salisbury, VT — DISTANCE: 1.7 miles
HIGHWAY # : Town Highway 4 — STRUCTURE #: B3
CLEAR SPAN: Unk — CLEAR HEIGHT: Unk
YEAR BUILT: Unk — FULL WATERWAY: Unk
STRUCTURE TYPE: Unk

DOWNSTREAM STRUCTURE

TOWN: Leicester, VT — DISTANCE: 2,850 feet
HIGHWAY # : US Highway 7 — STRUCTURE #: B120
CLEAR SPAN: Unk — CLEAR HEIGHT: Unk
YEAR BUILT: Unk — FULL WATERWAY: Unk
STRUCTURE TYPE: Unk

PROPOSED STRUCTURE

STRUCTURE TYPE: Precast concrete arch bridge

CLEAR SPAN(NORMAL TO STREAM): 42 feet
VERTICAL CLEARANCE ABOVE STREAMBED: 14 feet
WATERWAY OF FULL OPENING: 384 square feet

WATER SURFACE ELEVATIONS AT:

Q2.33 =	405.5	VELOCITY=	12.4
Q10 =	408.01	"	19.6
Q25 =	412.22	"	16.6
Q50 =	414.37	"	17.4
Q100 =	414.71	"	18.1

IS THE ROADWAY OVERTOPPED BELOW Q100: No
FREQUENCY: N/A
RELIEF ELEVATION: 418.5 ft
DISCHARGE OVER ROAD @Q100: 0 cfs

AVERAGE LOW ELEVATION OF SUPERSTRUCTURE: 416.23
VERTICAL CLEARANCE: @ Q50 = 1.86

SCOUR: Contraction Scour @Q100 = 20.6*
Contraction Scour @Q100 = 25.7*
REQUIRED CHANNEL PROTECTION: * N/A on ledge

PERMIT INFORMATION

AVERAGE DAILY FLOW:	Unk	DEPTH OR ELEVATION:
ORDINARY LOW WATER:	Unk	
ORDINARY HIGH WATER:	256 cfs	404.79 ft

TEMPORARY BRIDGE REQUIREMENTS

STRUCTURE TYPE: N/A
CLEAR SPAN (NORMAL TO STREAM): N/A
VERTICAL CLEARANCE ABOVE STREAMBED: N/A
WATERWAY AREA OF FULL OPENING: N/A

ADDITIONAL INFORMATION

TRAFFIC MAINTENANCE NOTES

1. MAINTAIN TRAFFIC ON AN OFF SITE DETOUR.
2. TRAFFIC SIGNALS ARE NOT NECESSARY.
3. SIDEWALKS ARE NOT NECESSARY

DESIGN VALUES

1.	DESIGN LIVE LOAD		HL-93
2.	FUTURE PAVEMENT	d_p:	3.0 INCH
3.	DESIGN SPAN	L:	42.00 FT
4.	MIN. MID-SPAN POS. CAMBER @ RELEASE (PRESTRESSED UNITS)	Δ:	---
5.	PRESTRESSING STRAND	f_y:	---
6.	PRESTRESSED CONCRETE STRENGTH	f'_c:	---
7.	PRESTRESSED CONCRETE RELEASE STRENGTH	f'_{ci}:	---
8.	CONCRETE, HIGH PERFORMANCE CLASS AA	f'_c:	---
9.	CONCRETE, HIGH PERFORMANCE CLASS A	f'_c:	---
10.	CONCRETE, HIGH PERFORMANCE CLASS B	f'_c:	3.5 KSI
11.	CONCRETE, CLASS C	f'_c:	3.0 KSI
12.	REINFORCING STEEL	f_y:	60 KSI
13.	STRUCTURAL STEEL AASHTO M270	f_y:	---
14.	NOMINAL BEARING RESISTANCE OF SOIL	q_n:	---
15.	SOIL BEARING RESISTANCE FACTOR (REFER TO AASHTO LRFD)	ϕ:	---
16.	NOMINAL BEARING RESISTANCE OF ROCK	q_n:	15.0 KSF
17.	ROCK BEARING RESISTANCE FACTOR (REFER TO AASHTO LRFD)	ϕ:	0.45
18.	PILE RESISTANCE FACTOR	ϕ:	---
19.	LATERAL PILE DEFLECTION	Δ:	---
20.	BASIC WIND SPEED	V_{3s}:	---
21.	MINIMUM GROUND SNOW LOAD	p_g:	---
22.	SEISMIC DATA PGA: 0	S_s:	---
		S_1:	---
23.			---
24.			---
25.			---
26.			---

LRFR LOAD RATING FACTORS

LOADING LEVELS	TRUCK						
	H-20	HL-93	3S2	6 AXLE	3A. STR.	4A. STR.	5A. SEMI
TONNAGE	20	36	36	66	30	34.5	38
INVENTORY							
POSTING							
OPERATING							
COMMENTS:	TABLE TO BE COMPLETED BY CONTRACTOR'S DESIGNER.						

AS BUILT "REBAR" DETAIL

LEVEL I	LEVEL II	LEVEL III
TYPE:	TYPE:	TYPE:
GRADE:	GRADE:	GRADE:

TRAFFIC DATA

YEAR	ADT	DHV	% D	% T	ADTT
2008	270	0	0	0	0
2028	0	0	0	0	0

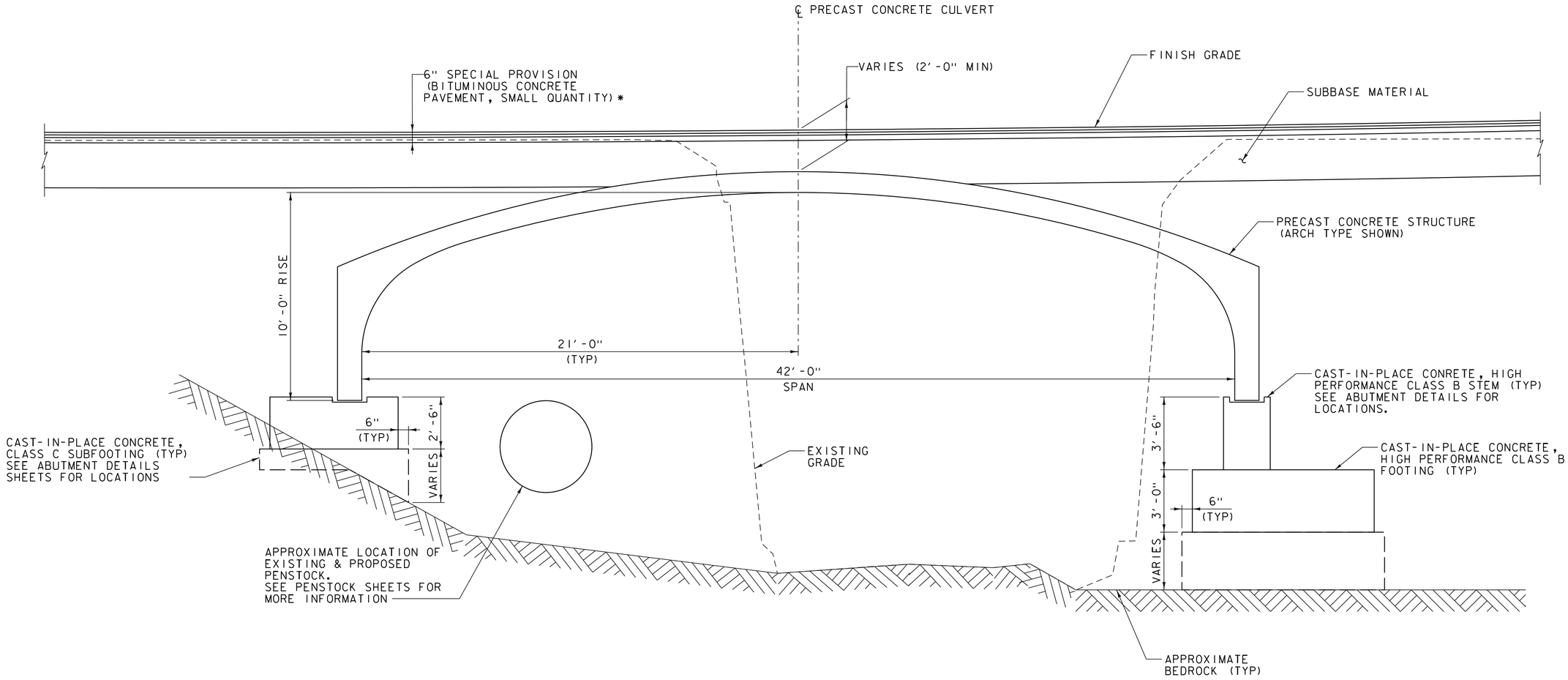
20 year ESAL for flexible pavement from 2008 to 2028 : 0
40 year ESAL for flexible pavement from 2008 to 2048 : 0
Design Speed : 25 mph

PROJECT NAME: **SALISBURY**
PROJECT NUMBER: **57813.00**

FILE NAME: **57813pi Sheet.xls**
PROJECT LEADER: **S.E. BURBANK**
DESIGNED BY: **VHB**
PRELIMINARY INFORMATION SHEET

PLOT DATE: 4/19/2016
DRAWN BY: **P.A. MILLER**
CHECKED BY: **E.F. LAWES**
SHEET 2 OF 38

VHB 57813



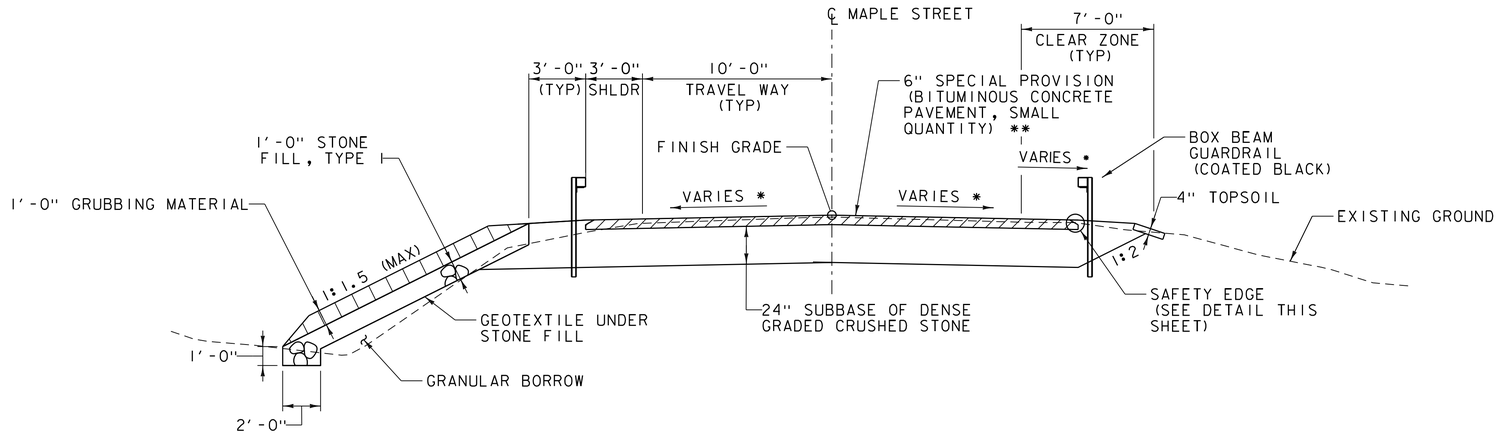
* (2) - 1½" LIFTS OF TYPE IVS OVER
(1) - 3" LIFT OF TYPE IIS

NOTE: ABUTMENT NO. 2 WITH STEM SHOWN.

TYPICAL PRECAST CONCRETE ARCH SECTION

SCALE ⅜" = 1'-0"

PROJECT NAME:	SALISBURY
PROJECT NUMBER:	57813.00
FILE NAME: 57813typ.dgn	PLOT DATE: 4/19/2016
PROJECT LEADER: S.E. BURBANK	DRAWN BY: E.F. LAWES
DESIGNED BY: E.F. LAWES	CHECKED BY: S.E. BURBANK
TYPICAL PRECAST STRUCTURE SECTION	SHEET 3 OF 38



* - SEE BANKING DIAGRAM

** - (2) - 1½" LIFTS OF TYPE IVS OVER
(1) - 3" LIFT OF TYPE IIS

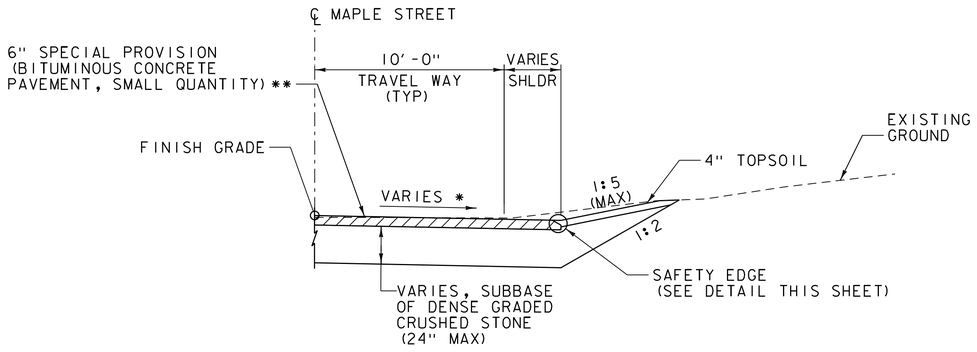
TYPICAL ROADWAY SECTION

SCALE ¼" = 1'-0"

MATERIAL TOLERANCES

(IF USED ON PROJECT)

SURFACE	
- PAVEMENT (TOTAL THICKNESS)	+/- ¼"
- AGGREGATE SURFACE COURSE	+/- ½"
SUBBASE	+/- 1"
SAND BORROW	+/- 1"

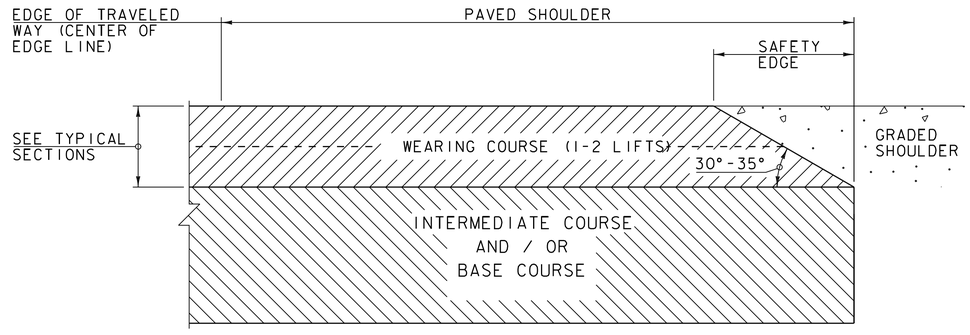


* - SEE BANKING DIAGRAM

** - (2) - 1½" LIFTS OF TYPE IVS OVER
(1) - 3" LIFT OF TYPE IIS

TYPICAL ROADWAY CUT SECTION

SCALE ¼" = 1'-0"



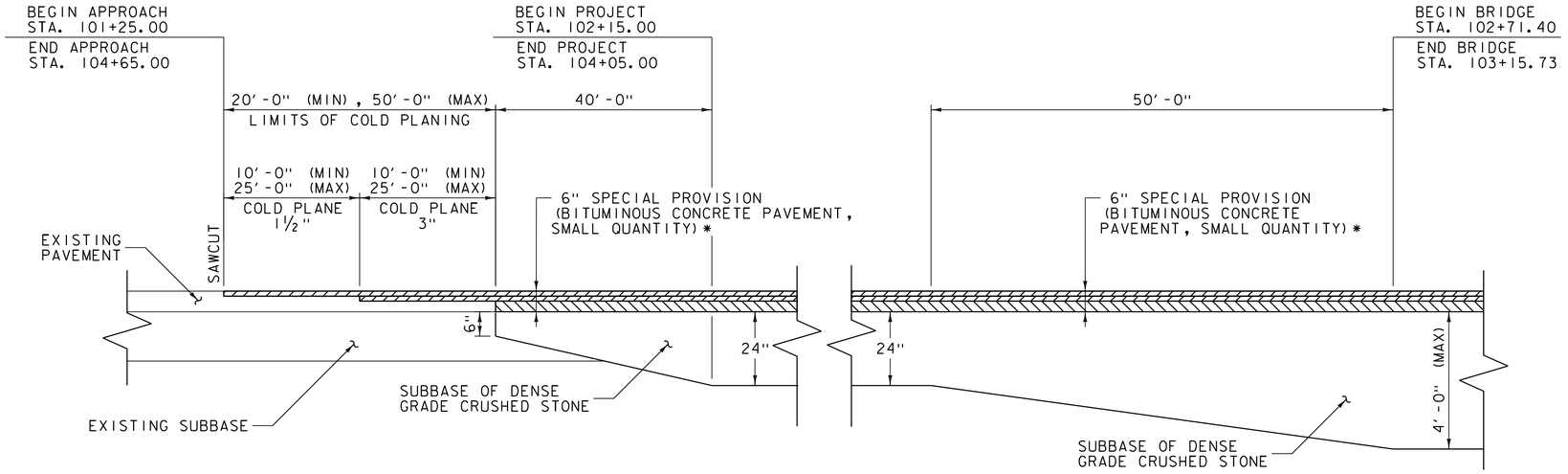
SAFETY EDGE DETAIL

NOT TO SCALE

1. THE EDGE OF PAVEMENT SHALL BE FORMED IN SUCH A WAY THAT THE BITUMINOUS CONCRETE PAVEMENT IS EXTRUDED OR COMPRESSED TO FORM THE 30 TO 35 DEGREE ANGLE. DEVICES THAT SIMPLY STRIKE-OFF THE MIX WITHOUT PROVIDING ANY COMPACTIVE EFFORT WILL NOT BE ALLOWED.
2. THE PAVED SHOULDER EXTENDS FROM THE EDGE OF TRAVELED WAY TO THE EDGE OF THE WEARING COURSE, INCLUDING THE "SAFETY EDGE".

vhb

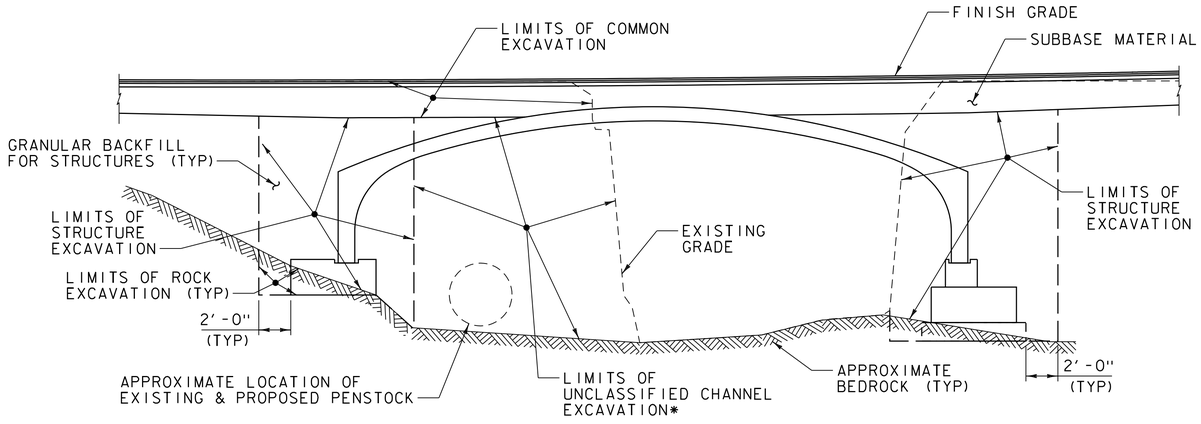
PROJECT NAME:	SALISBURY
PROJECT NUMBER:	57813.00
FILE NAME: 57813typ.dgn	PLOT DATE: 4/19/2016
PROJECT LEADER: S.E. BURBANK	DRAWN BY: P.A.. MILLER
DESIGNED BY: P.A. MILLER	CHECKED BY: E.F. LAWES
TYPICAL ROADWAY SECTIONS	SHEET 4 OF 38



* (2) - 1½" LIFTS OF TYPE IVS OVER
(1) - 3" LIFT OF TYPE IIS

NOTE: EMULSIFIED ASPHALT IS TO BE APPLIED AT A RATE OF 0.040 GAL/SY BETWEEN SUCCESSIVE COURSES OF BITUMINOUS CONCRETE PAVEMENT AT A RATE OF 0.080 GAL/SY ON ALL COLD PLANED SURFACES, AS DIRECTED BY THE ENGINEER.

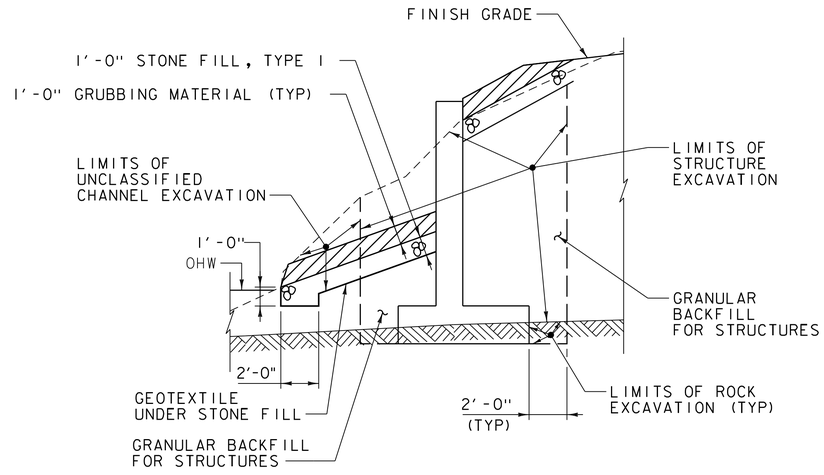
APPROACH SECTION
NOT TO SCALE



* LIMITS EXCLUDE EXISTING PENSTOCK AND EXISTING ABUTMENTS, WHICH SHALL BE BE PAID FOR UNDER ITEM 529.15, "REMOVAL OF STRUCTURE".

NOTE: ACTUAL STRUCTURE EXCAVATION LIMITS SHALL BE DETERMINED BY THE CONTRACTOR. HOWEVER, ONLY THE EXCAVATION BETWEEN THE LIMITS SHOWN FOR STRUCTURE EXCAVATION WILL BE PAID FOR UNDER ITEM 204.25 "STRUCTURE EXCAVATION". EXCAVATION OUTSIDE OF THESE LIMITS OR OUTSIDE OF THE UNCLASSIFIED CHANNEL EXCAVATION LIMITS WILL BE THE EXPENSE OF THE CONTRACTOR.

TYPICAL PRECAST CONCRETE ARCH EXCAVATION SECTION
NOT TO SCALE



TYPICAL WINGWALL EXCAVATION SECTION
NOT TO SCALE

PROJECT NAME:	SALISBURY
PROJECT NUMBER:	57813.00
FILE NAME: 57813typ.dgn	PLOT DATE: 4/19/2016
PROJECT LEADER: S.E. BURBANK	DRAWN BY: P.A.. MILLER
DESIGNED BY: P.A. MILLER	CHECKED BY: E.F. LAWES
APPROACH & TYPICAL EARTHWORK SECTIONS	SHEET 5 OF 38

VHB 57813

PROJECT NOTES

GENERAL

1. ALL MATERIALS AND CONSTRUCTION SHALL CONFORM TO THE STATE OF VERMONT AGENCY OF TRANSPORTATION STANDARD SPECIFICATIONS FOR CONSTRUCTION, DATED 2011, AND ITS LATEST REVISIONS, AND THE AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS, 6TH EDITION, AND ITS LATEST REVISIONS.

2. ALL DIMENSIONS ARE HORIZONTAL OR VERTICAL, AND ARE GIVEN AT 68 DEGREES FAHRENHEIT, UNLESS NOTED OTHERWISE.

3. ALL WORK AND ANY ASSOCIATED ACTIVITY ON THIS PROJECT SHALL BE PERFORMED WITHIN THE EXISTING RIGHT-OF-WAY LIMITS UNLESS NEGOTIATED BY THE CONTRACTOR WITH APPROPRIATE LANDOWNERS.

4. REMOVAL OF EXISTING BRIDGE PAVEMENT SHALL BE PAID AS ITEM 529.10, “REMOVAL OF BRIDGE PAVEMENT”.

5. ITEM 529.15, “REMOVAL OF STRUCTURE” IS FOR THE COMPLETE REMOVAL AND DISPOSAL OF THE EXISTING BRIDGE SUBSTRUCTURE AND SUPERSTRUCTURE WHEN NOT COVERED UNDER OTHER EXCAVATION ITEMS, INCLUDING ALL BRIDGE RAIL, BEARINGS, ANCHOR BOLTS, AND THE EXISTING PENSTOCK PIPE, WHERE THE REMOVAL IS OUTSIDE OF THE AREAS COVERED BY ANY OF THE EXCAVATION ITEMS.\

6. THE CONTRACTOR SHALL VERIFY THE LOCATION OF ALL BURIED AND AERIAL UTILITIES AND POLES PRIOR TO STARTING WORK. SOME UTILITIES HAVE BEEN RELOCATED DURING THE PREPARATION OF THE PLANS AND THE CONTRACTOR WILL NEED TO COORDINATE WITH ALL UTILITY OWNERS TO CONFIRM ACTUAL LOCATION PRIOR TO CONSTRUCTION.

7. A PRE-CLOSURE MEETING SHALL BE HELD ONE WEEK PRIOR TO THE BRIDGE CLOSURE. THE FOLLOWING INDIVIDUALS SHALL BE INVITED TO ATTEND THE PRE-CLOSURE MEETING: THE RESIDENT ENGINEER, CONTRACTOR, A TOWN REPRESENTATIVE, THE TOWN FOREMAN, PC CONSTRUCTION, GMP REPRESENTATIVES FOR THE PENSTOCK AND TRANSMISSION LINES, CHRISTINE AND STEVE PARKES, AND THE DESIGN CONSULTANT.

TRAFFIC MAINTENANCE DURING CONSTRUCTION

8. THE CONTRACTOR SHALL IMPLEMENT THE ROAD CLOSURE AS SHOWN ON THE PLANS.

9. THE CONTRACTOR SHALL NOTIFY THE TOWN A MINIMUM OF TWO (2) WEEKS PRIOR TO CLOSING THE ROAD.

10. FULL ACCESS TO ALL SIDE ROADS AND DRIVES WITHIN THE PROJECT LIMITS SHALL BE MAINTAINED AT ALL TIMES. THIS WORK SHALL BE CONSIDERED INCIDENTAL TO ITEM 641.10, “TRAFFIC CONTROL”.

11. ACCESS TO ALL DRIVES SHALL BE MAINTAINED AT ALL TIMES. THE CONTRACTOR SHALL COORDINATE WITH THE PARKES AND THE ENGINEER. THE PARKES SHALL BE NOTIFIED AT LEAST TWENTY-FOUR (24) HOURS PRIOR TO ANY WORK BEING PERFORMED ON THEIR DRIVEWAY. THIS WORK SHALL BE INCIDENTAL TO ITEM 641.10, “TRAFFIC CONTROL”.

12. THE DETOUR FOR THE BRIDGE CLOSURE IS THE RESPONSIBILITY OF THE TOWN.

13. UNLESS COVERED UNDER INDIVIDUAL PAY ITEMS OR NOTED OTHERWISE, ALL COSTS FOR WORK SHOWN ON THE TRAFFIC CONTROL SHEETS AND FOR TEMPORARY TRAFFIC CONTROL DEVICES WILL BE INCLUDED IN THE CONTRACT LUMP SUM PRICE FOR ITEM 641.10, "TRAFFIC CONTROL". THIS INCLUDES, BUT IS NOT LIMITED TO, THE FOLLOWING ITEMS:

    TEMPORARY TRAFFIC BARRIERS
    RETROREFLECTIVE DRUMS
    SIGNS
    SIGN POSTS
    BARRICADES

    TEMPORARY TRAFFIC BARRIER SHALL BE FURNISHED IN ACCORDANCE WITH SECTION 621.

14. IF THE CONTRACTOR’S SCHEDULE REQUIRES ALTERNATING ONE-WAY TRAFFIC ON THE CULVERT PRIOR TO FULL INSTALLATION, A PLAN SHALL BE SUBMITTED TO THE ENGINEER FOR APPROVAL. THE PLAN SHALL BE IN ACCORDANCE WITH THE VTRANS STD. SPECIFICATIONS, MUTCD, AND ALL OTHER APPLICABLE STANDARDS. PAYMENT FOR THE PLAN AND IMPLEMENTATION WILL BE INCIDENTAL ITEM 641.10, “TRAFFIC CONTROL”.

15. ALL SIGNS SHALL BE IN ACCORDANCE WITH THE CURRENT EDITIONS OF THE "MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES" (MUTCD) AND THE "STANDARD HIGHWAY SIGNS AND MARKINGS" BOOK (SHSM) PUBLISHED BY THE FEDERAL HIGHWAY ADMINISTRATION (FHWA).

EARTHWORK

16. THE HEIGHT OF FILL BEHIND ABUTMENTS WILL BE LIMITED TO THE PEDESTAL ELEVATION UNTIL THE PRECAST ARCH HAS BEEN SET AND THE GROUT CURING PERIOD IS UP.

17. TEMPORARY CONSTRUCTION FILLS WITHIN THE WATERCOURSE FOR ANY PURPOSE SHALL CONSIST OF CLEAN STONE FILL ONLY. NO OTHER FILLING IN THE STREAM SHALL OCCUR WITHOUT THE APPROVAL OF THE STREAM ALTERATION ENGINEER. ALL TEMPORARY AND PERMANENT FILLS SHALL BE IN ACCORDANCE WITH PROJECT PERMITS.

18. THE CONTRACTOR SHALL TAKE ALL PRECAUTIONS NECESSARY TO PREVENT SILTATION OR POLLUTION, ESPECIALLY THE DISCHARGE OF RAW CONCRETE, INTO ANY BROOK, STREAM, OR RIVER.

19. IN ACCORDANCE WITH SUBSECTION 204.01(b), TEMPORARY BRACING, SHEETING OR OTHER MEANS OF SUPPORTING THE EXCAVATION MAY BE REQUIRED FOR THE CONSTRUCTION OF THE SUBFOOTINGS, FOOTINGS/STEMS, AND WINGWALLS. THE COSTS SHALL BE INCLUDED IN THE UNIT PRICE BID FOR ITEM 204.25, “STRUCTURE EXCAVATION”.

20. THE EXISTING ARCHAEOLOGICAL STONE FOUNDATION ON THE NORTHWEST QUADRANT OF THE BRIDGE SHALL BE TEMPORARILY BRACED DURING CONSTRUCTION. ANY DISTURBANCE TO THE WALL SHALL BE REPAIRED AT THE CONTRACTOR’S EXPENSE AND TO THE SATISFACTION OF THE ENGINEER. COST FOR BRACING THE ARCHAEOLOGICAL STONE FOUNDATION SHALL BE INCIDENTAL TO ALL CONTRACT ITEMS.

21. ANY STONE FILL SHALL BE PLACED IN FRONT OF THE ABUTMENTS BEFORE THE NEW ARCH IS SET.

22. THE CONTRACTOR’S ATTENTION IS DIRECTED TO SUBSECTION 301.06 REGARDING THE COMPACTION OF THE SUBBASE MATERIAL.

CONCRETE

23. ITEM 514.10, “WATER REPELLENT, SILANE”, SHALL BE APPLIED TO ALL EXPOSED CONCRETE SURFACES, EXCEPT THE UNDERSIDE OF THE PRECAST CONCRETE ARCH.

24. CONCRETE FOR THE SUBSTRUCTURE CONCRETE SHALL BE ITEM 501.34, “CONCRETE, HIGH PERFORMANCE CLASS B” UNLESS OTHERWISE NOTED. CONCRETE FOR THE UNREINFORCED SUBFOOTING SHALL BE ITEM 541.30, “CONCRETE, CLASS C” UNLESS NOTED OTHERWISE.

25. THE KEY IN CONCRETE CONSTRUCTION JOINTS SHALL BE MONOLITHIC AND CONTINUOUS FOR THE FULL LENGTH OF THE JOINT.

26. ALL EXPOSED EDGES OF CONCRETE SHALL BE CHAMFERED 1” BY 1”.

27. JOINTS AND SCORE MARKS IN CONCRETE SHALL BE CONSTRUCTED AS INDICATED ON THE PLANS OR AS DIRECTED BY THE ENGINEER.

28. THE CONTRACTOR SHALL DETAIL REINFORCING IN ACCORDANCE WITH THESE DRAWINGS AND SHALL PROVIDE SHOP DRAWINGS PRIOR TO FABRICATION OR CONSTRUCTION IN ACCORDANCE WITH SUBSECTION 105.03.

29. ALL REINFORCING STEEL SHALL BE DETAILED AND FABRICATED USING PROCEDURES AND TOLERANCES IN ACCORDANCE WITH APPLICABLE PUBLICATIONS OF THE CONCRETE REINFORCING STEEL INSTITUTE (CRSI).

30. REINFORCING STEEL PLACEMENT TOLERANCES SHALL BE:
    SPACING ± 1”
    CLEARANCE ± ¼”

31. MINIMUM COVER FOR ALL REINFORCING STEEL SHALL BE 2” ALONG THE BACK FACES OF WALLS AGAINST EARTH AND 3” ELSEWHERE, UNLESS OTHERWISE NOTED.

32. REINFORCING FOR THE CAST-IN-PLACE SUBSTRUCTURE SHALL BE PLAIN BLACK STEEL AND PAID FOR UNDER ITEM 507.11, “REINFORCING STEEL, LEVEL I”.

33. ALL CONCRETE SHALL BE PLACED IN THE DRY. DEWATERING SHALL BE CONTINUOUS UNTIL THE FOOTINGS ARE BACKFILLED TO THE ELEVATION OF THE WATER. SUMPS AND TRENCHES THAT DIRECT WATER SHALL BE LOCATED TO PREVENT THE REMOVAL OF FINES BELOW THE FOOTINGS.

SUBSTRUCTURE ON LEDGE

34. FOOTINGS AND SUBFOOTINGS SHALL BE FOUNDED ON LEDGE WHICH HAS BEEN CLEANED OF ALL LOOSE ROCK AND DEBRIS TO ENSURE THAT SUBSTRUCTURES ARE PLACED ON COMPETENT ROCK.

35. THE ENGINEER SHALL NOTIFY THE PROJECT MANAGER UPON COMPLETION OF THE EXCAVATION FOR SUBSTRUCTURES FOUNDED ON BEDROCK AND PRIOR TO PLACING FORMWORK. THE ENGINEER WILL DETERMINE IF THE BEDROCK IS COMPETENT TO OBTAIN THE NOMINAL BEARING RESISTANCE AS SHOWN ON THE PLANS. THE CONTRACTOR SHALL NOTIFY THE ENGINEER 72 HOURS PRIOR TO WHEN THE ANALYSIS WILL BE NEEDED.

36. LEDGE THAT IS EXCAVATED FOR PLACEMENT OF FOOTINGS SHALL BE EXCAVATED TO PROVIDE A LEVEL SURFACE IN THE TRANSVERSE DIRECTION AND MATCH THE STEP ELEVATIONS AS SHOWN ON THE PLANS IN THE LONGITUDINAL DIRECTION, OR AS DIRECTED BY THE ENGINEER.

37. FOR THE FOOTINGS, A MAXIMUM OF 6” OVER BREAKAGE WILL BE REPLACED WITH “HIGH PERFORMANCE CLASS B CONCRETE”. FOR THE SUBFOOTINGS, A MAXIMUM OF 6” OVER BREAKAGE WILL BE REPLACED WITH “CONCRETE, CLASS C”. FOR THE SUBFOOTINGS AND FOOTINGS, OVER BREAKAGE BEYOND 6” SHALL BE REPLACED WITH “CONCRETE, CLASS C” AT THE EXPENSE OF THE CONTRACTOR.

38. THE LIMITS OF THE SUBFOOTING SHALL BE 6” OUTSIDE THE LIMITS OF THE FOOTING, UNLESS OTHERWISE NOTED.

39. THE SUBSTRUCTURE UNITS HAVE BEEN DESIGNED FOR THE ELEVATIONS SHOWN ON THE PLANS. IF THE LEDGE ELEVATION IS GREATER THAN 1’-0” BELOW THE DESIGN BOTTOM OF FOOTING, A SUBFOOTING SHALL BE POURED SO THAT THE DESIGN TOP OF FOOTING IS AT THE REQUIRED ELEVATION.

40. FOR ALL SUBSTRUCTURE UNITS WHERE LEDGE IS WITHIN ONE FOOT FROM THE BOTTOM OF THE FOOTING AS DESIGNED, THE FOOTING MAY BE POURED TO THE TOP OF THE LEDGE USING “CONCRETE, HIGH PERFORMANCE CLASS B”.

41. FOR ALL SUBSTRUCTURE UNITS WHERE LEDGE IS BELOW TOP OF FOOTING BY LESS THAN THE DEPTH OF FOOTING DETAILED IN THE PLANS, THE LEDGE SHALL BE EXCAVATED DOWN TO THE INDICATED BOTTOM OF FOOTING FOR THE FULL WIDTH (TOE TO HEEL) OF THE CONFIGURATION.

42. IF LEDGE IS ABOVE THE DESIGN TOP OF FOOTING, THE FOOTING MAY BE RAISED, EXCEPT FOR ABUTMENT 1 FOOTINGS. BEFORE ANY UPWARD ADJUSTMENT IS MADE IN FOOTING ELEVATION, THE PROJECT MANAGER SHALL BE CONTACTED AND PROVIDED WITH A LEDGE PROFILE. NO FURTHER WORK SHALL BE DONE UNTIL APPROVAL OF THE CONFIGURATION IS RECEIVED.

43. #8 DOWELS SHALL BE DRILLED AND GROUTED INTO THE LEDGE AS SHOWN ON THE PLANS. THE DOWELS SHALL HAVE A 2’-0” EMBEDMENT INTO THE LEDGE AND SHALL EXTEND INTO THE FOOTING A MINIMUM OF 2’-0”. IN AREAS WHERE A SUBFOOTING IS REQUIRED, #8 DOWELS WILL ALSO BE USED AT THE INTERFACE BETWEEN SUBFOOTING AND FOOTING. THE DRILLING AND GROUTING SHALL BE PAID FOR UNDER THE ITEM 507.16, “DRILLING AND GROUTING DOWELS”.
44. IF DEWATERING IS NEEDED DURING CONSTRUCTION OF THE ABUTMENTS AND SUBFOOTINGS, IT SHALL BE INCIDENTAL TO ITEM 204.10.

PRECAST CONCRETE STRUCTURE

45. THE DESIGN, CONSTRUCTION, HANDLING, AND ASSEMBLY OF THE PRECAST UNITS SHALL BE IN ACCORDANCE WITH SECTION 540. HANDLING AND INSTALLATION SHALL BE IN ACCORDANCE WITH THE MANUFACTURER’S RECOMMENDATIONS AS APPLICABLE.

46. THE PRECAST CONCRETE STRUCTURE SHALL BE DESIGNED TO SUPPORT CONSTRUCTION AND HL-93 LIVE LOADS.

47. REINFORCING STEEL SHALL CONFORM TO THE FOLLOWING:
    A. THE REINFORCING STEEL IN THE HEADWALLS SHALL BE “LEVEL II” OR HIGHER.
    B. THE REINFORCING STEEL IN ALL OTHER PRECAST UNITS SHALL BE “LEVEL I, EPOXY COATED REINFORCING STEEL” OR HIGHER.

48. REINFORCING CLEAR COVER SHALL BE IN ACCORDANCE WITH NOTE 31.

49. DESIGN VALUES: FABRICATOR TO VERIFY PRIOR TO CONSTRUCTION.

    DESIGN LIVE LOAD: HL-93
    DESIGN FILL OVER THE STRUCTURE: 2 FEET
    ACTUAL FILL (MIN=1’-11”±, MAX=2’-2”±)
    RETAINED SOIL PARAMETERS
    UNIT WEIGHT: 140 PCF
    FRICTION ANGLE: 34°

    UNFACTORED LOADS AT TOP OF CONCRETE ABUTMENTS:
    VERTICAL LOAD (PER ABUTMENT)
    DL = 19.4 KLF
    LL = 6.8 KLF
    HORIZONTAL LOAD (PER ABUTMENT)
    DL = 11.2 KLF
    LL = 6.3 KLF
    FACTORED BEARING RESISTANCE (FOOTING WIDTH):
    15 KSF (VARIES, 6’-2” MIN)

50. THE PRECAST CONCRETE STRUCTURE SHALL HAVE A MINIMUM CLEAR SPAN OF 42 FEET AND VERTICAL CLEAR HEIGHT OF 10’-0” MEASURED FROM CENTER OF THE SPAN TO THE TOP OF THE KEY IN THE PEDESTAL. THE LUMP SUM COST FOR ITEM 540.10 (ARCH TYPE) SHALL INCLUDE THE PRECAST ARCH UNIT, PRECAST HEADWALLS, REINFORCING STEEL, SHEET MEMBRANE WATERPROOFING, AND MECHANICAL CONNECTIONS.

51. THE USE OF EQUIPMENT AND THE METHOD OF BACKFILLING AROUND THE BURIED STRUCTURE SHALL BE IN ACCORDANCE WITH THE MANUFACTURER’S RECOMMENDATIONS. CARE SHALL BE TAKEN WHEN BACKFILLING AGAINST JOINT SEALING MATERIALS.

52. FABRICATION DRAWINGS FOR THE PRECAST CONCRETE UNIT SECTIONS SHALL INCLUDE A PLAN FOR SHIPPING AND LEVELING THE PRECAST CONCRETE ARCH.

53. THE CONTRACTOR IS RESPONSIBLE FOR PROPER FIT-UP OF THE PRECAST AND ANY CAST-IN-PLACE ELEMENTS, PER THE FABRICATOR’S RECOMMENDATIONS, APPROVED FABRICATION AND ENGINEERING DRAWINGS, AND TO THE SATISFACTION OF THE ENGINEER.

54. ALL PRECAST UNITS INCLUDING THE HEADWALLS SHALL BE DESIGNED BY THE FABRICATOR AND DESIGN CALCULATIONS & LOAD RATING SUBMITTED WITH FABRICATION DRAWINGS STAMPED BY A CIVIL OR STRUCTURAL ENGINEER REGISTERED IN THE STATE OF VERMONT. THE HEADWALLS SHALL BE DESIGNED TO ACCOMMODATE THE TL-3 RAILING IMPACT LOADS PER AASHTO LRFD SECTION 13.

55. INSTALL SHEET MEMBRANE, WATERPROOFING, TORCH APPLIED OVER THE TOP AND DOWN THE EXTERIOR SIDES OF THE PRECAST UNITS TO THE TOP OF THE FOOTING AND ALONG THE ENTIRE LENGTH, EXTENDING 1’ ONTO THE WINGWALLS. COST OF MEMBRANE WATERPROOFING IS INCIDENTAL TO THE PRECAST UNITS. TAKE CARE DURING BACKFILL OPERATIONS TO AVOID DAMAGE TO THE SHEET MEMBRANE WATERPROOFING.

56. THE FABRICATOR SHALL ACCOMMODATE DRAINAGE FOR THE ARCH TO THE SATISFACTION OF THE ENGINEER.

57. THE INLET/OUTLET STATIONS ARE APPROXIMATE, AND MAY CHANGE BASED ON THE MANUFACTURER’S DESIGN DIMENSIONS. THE BEGIN AND END BRIDGE STATIONS ALONG THE MAPLE STREET CENTERLINE SHALL BE AS SHOWN ON THESE PLANS.

58. IF VERTICAL CONSTRUCTION JOINTS ARE REQUIRED BY THE CONTRACTOR, THEN THE SECTIONS SHALL BE KEYED AND MATCH CAST. THE CONTRACTOR SHALL PROVIDE A JOINT DETAIL FOR APPROVAL BY THE ENGINEER. THE JOINT DETAIL SHALL BE SHOWN ON THE FABRICATION DRAWINGS.

vhb

PROJECT NAME: SALISBURY
PROJECT NUMBER: 57813.00

FILE NAME: 57813pn.dgn
PROJECT LEADER: S.E. BURBANK
DESIGNED BY: E.F. LAWES
PROJECT NOTES (1 OF 2)

PLOT DATE: 4/19/2016
DRAWN BY: E.F. LAWES
CHECKED BY: S.E. BURBANK
SHEET 6 OF 38

BRIDGE RAILING, GALVANIZED STEEL TUBING (COATED BLACK)

59. ALL WORK AND MATERIALS SHALL CONFORM TO SECTION 525.

60. PRIOR TO GALVANIZING THE ASSEMBLED POST, GRIND ALL EDGES TO A MINIMUM RADIUS OF 1/16".

61. ALL POSTS SHALL BE SET NORMAL TO GRADE.

62. SECTIONS OF RAIL TUBE SHALL BE ATTACHED TO A MINIMUM OF TWO BRIDGE POSTS AND PREFERABLE TO AT LEAST 4 POSTS.

63. HOLES IN RAILS FOR TUBE ATTACHMENT MAY BE FIELD DRILLED. HOLES SHALL BE COATED WITH AN APPROVED ZINC-RICH PAINT PRIOR TO INSTALLATION.

64. BOLTS SHALL BE TORQUED SNUG TIGHT (APPROXIMATELY 100 FT-LB).

65. RAIL TUBES SHALL BE ATTACHED USING ¾" FULL DIAMETER BODY ASTM A 449 (TYPE I) ROUND HEAD BOLTS INSERTED THROUGH THE FACE OF THE TUBE.

66. SEE STANDARD DRAWING G-1 FOR DETAILS OF DELINEATORS. A DELINEATOR SHALL BE INSTALLED AT 30 FOOT SPACING OR THE NEAREST POST. WHITE IS TO BE INSTALLED ON THE DRIVER'S RIGHT. PAYMENT FOR DELINEATORS SHALL BE INCIDENTAL TO OTHER ITEMS.

MISCELLANEOUS

67. CONTRACTOR SHALL SEE PENSTOCK SHEETS FOR ADDITIONAL NOTES AND WORK.

vhb

PROJECT NAME: SALISBURY
PROJECT NUMBER: 57813.00

FILE NAME: 57813pn.dgn
PROJECT LEADER: S.E. BURBANK
DESIGNED BY: E.F. LAWES
PROJECT NOTES (2 OF 2)

PLOT DATE: 4/19/2016
DRAWN BY: E.F. LAWES
CHECKED BY: S.E. BURBANK
SHEET 7 OF 38

STATE OF VERMONT
AGENCY OF TRANSPORTATION

QUANTITY SHEET 1

SUMMARY OF ESTIMATED QUANTITIES							TOTALS		DESCRIPTIONS				DETAILED SUMMARY OF QUANTITIES		
ROADWAY	EROSION CONTROL	UTILITIES	BRIDGE	FULL CE ITEMS	GRAND TOTAL	FINAL	UNIT	ITEMS	ITEM NUMBER	ROUND	QUANTITIES	UNIT	ITEMS
1					1		LS	CLEARING AND GRUBBING, INCLUDING INDIVIDUAL TREES AND STUMPS	201.10				
910					910		CY	COMMON EXCAVATION	203.15				
		19	65		84		CY	SOLID ROCK EXCAVATION	203.16				
			275		275		CY	UNCLASSIFIED CHANNEL EXCAVATION	203.27				
			1		1		CY	TRENCH EXCAVATION OF EARTH, EXPLORATORY (N.A.B.I.)	204.22				
			580		580		CY	STRUCTURE EXCAVATION	204.25				
			340		340		CY	GRANULAR BACKFILL FOR STRUCTURES	204.30				
355					355		SY	COLD PLANING, BITUMINOUS PAVEMENT	210.10				
785					785		CY	SUBBASE OF DENSE GRADED CRUSHED STONE	301.35				
25					25		CY	AGGREGATE SURFACE COURSE	401.10				
7					7		CWT	EMULSIFIED ASPHALT	404.65				
		53	170		223		CY	CONCRETE, HIGH PERFORMANCE CLASS B	501.34				
		8200	20250		28450		LB	REINFORCING STEEL, LEVEL I	507.11				
		54	190		244		LF	DRILLING AND GROUTING DOWELS	507.16				
			14		14		GAL	WATER REPELLENT, SILANE	514.10				
			62		62		SY	REMOVAL OF BRIDGE PAVEMENT	529.10				
			1		1		EACH	REMOVAL OF STRUCTURE (750 SF)	529.15				
			1		1		LS	PRECAST CONCRETE STRUCTURE (42'-0" L x 10'-0" H x 28'-0" W ARCH TYPE)	540.10				
			70		70		CY	CONCRETE, CLASS C	541.30				
1					1		MGAL	DUST CONTROL WITH WATER	609.10				
135					135		CY	STONE FILL, TYPE I	613.10				
41					41		LF	BOX BEAM GUARDRAIL (COATED BLACK)	621.30				
3					3		EACH	MANUFACTURED TERMINAL SECTION, TANGENT (COATED BLACK)	621.51				
215					215		LF	REMOVAL AND DISPOSAL OF GUARDRAIL	621.80				
80					80		HR	FLAGGERS	630.15				
				1	1		LS	TESTING EQUIPMENT, CONCRETE	631.16				
				1	1		LS	TESTING EQUIPMENT, BITUMINOUS	631.17				
1					1		LS	MOBILIZATION/DEMOBILIZATION	635.11				
1					1		LS	TRAFFIC CONTROL	641.10				
595					595		LF	4 INCH YELLOW LINE	646.21				
	345				345		SY	GEOTEXTILE UNDER STONE FILL	649.31				
	70				70		SY	GEOTEXTILE FOR SILT FENCE	649.51				
	6				6		LB	SEED	651.15				
	45				45		LB	FERTILIZER	651.18				
	0.2				0.2		TON	AGRICULTURAL LIMESTONE	651.20				
	0.2				0.2		TON	HAY MULCH	651.25				
	20				20		CY	TOPSOIL	651.35				
	310				310		SY	GRUBBING MATERIAL	651.40				
	1				1		LS	EPSC PLAN	652.10				
	40				40		HR	MONITORING EPSC PLAN	652.20				

PROJECT NAME: **SALISBURY**
PROJECT NUMBER: **57813.00**

FILE NAME: **57813qs.dgn**
PROJECT LEADER: **S.E. BURBANK**
DESIGNED BY: **E.F. LAWES**
QUANTITY SHEET #1

PLOT DATE: **04/19/2016**
DRAWN BY: **E.F. LAWES**
CHECKED BY: **S.E. BURBANK**
SHEET **8** OF **38**

STATE OF VERMONT
AGENCY OF TRANSPORTATION

QUANTITY SHEET 2

SUMMARY OF ESTIMATED QUANTITIES								TOTALS		DESCRIPTIONS				DETAILED SUMMARY OF QUANTITIES		
ROADWAY	EROSION CONTROL	UTILITIES	BRIDGE	FULL CE ITEMS				GRAND TOTAL	FINAL	UNIT	ITEMS	ITEM NUMBER	ROUND	QUANTITIES	UNIT	ITEMS
	1							1		LU	MAINTENANCE OF EPSC PLAN (N.A.B.I.)	652.30				
	30							30		CY	VEHICLE TRACKING PAD	653.35				
	130							130		LF	BARRIER FENCE	653.50				
	305							305		LF	PROJECT DEMARCATION FENCE	653.55				
2								2		EACH	REMOVING SIGNS	675.50				
1								1		LU	PRICE ADJUSTMENT, FUEL (N.A.B.I.)	690.50				
4								4		EACH	SPECIAL PROVISION (GUARDRAIL APPROACH SECTION, GALVANIZED 2 RAIL BOX BEAM)(COATED BLACK)	900.620				
		40						40		HR	SPECIAL PROVISION (CRANE RENTAL)	900.630				
			89					89		LF	SPECIAL PROVISION (BRIDGE RAILING, GALVANIZED STEEL TUBING/CONCRETE COMBINATION)(COATED BLACK)	900.640				
310								310		TON	SPECIAL PROVISION (BITUMINOUS CONCRETE PAVEMENT, SMALL QUANTITY)	900.680				

PROJECT NAME: SALISBURY
PROJECT NUMBER: 57813.00

FILE NAME: 57813qs.dgn
PROJECT LEADER: S.E. BURBANK
DESIGNED BY: E.F. LAWES
QUANTITY SHEET #2

PLOT DATE: 04/19/2016
DRAWN BY: E.F. LAWES
CHECKED BY: S.E. BURBANK
SHEET 9 OF 38

GPS CONTROL POINTS

TRAVERSE TIES

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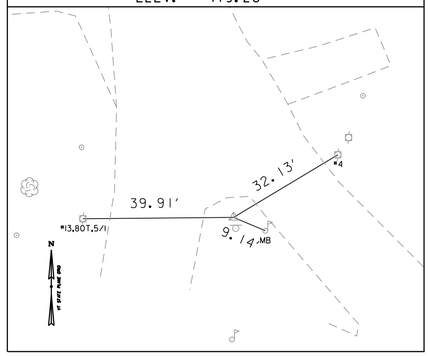
ELEV. = 419.26



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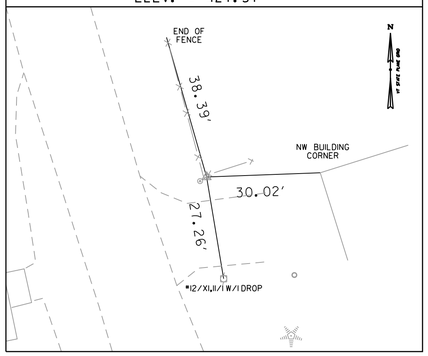

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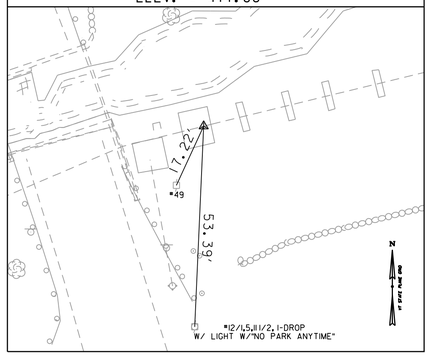

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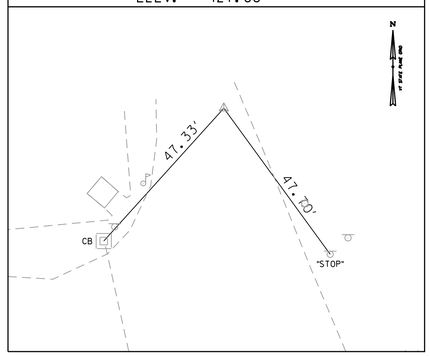

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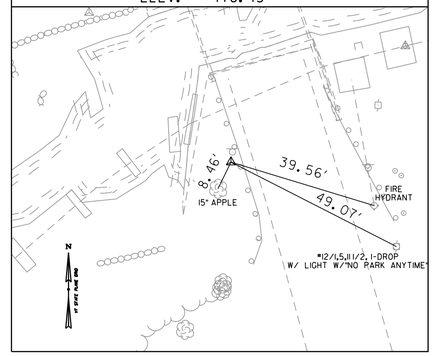

TRANSVERSE TIES

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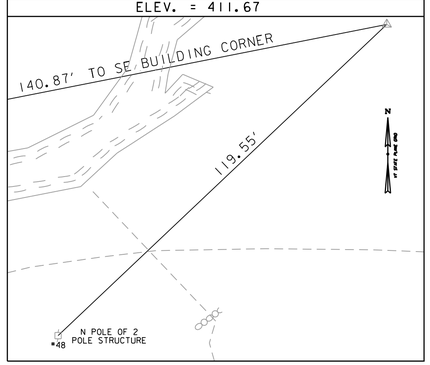

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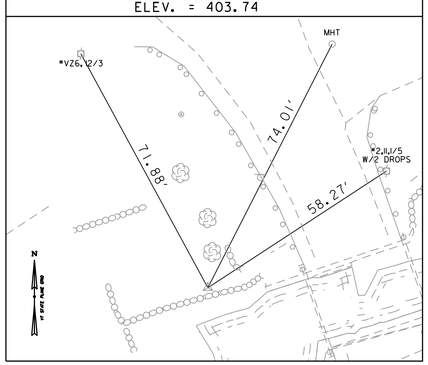

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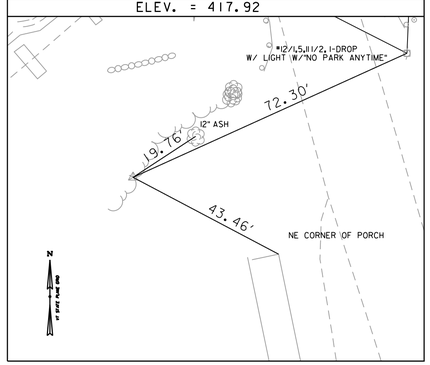


DATUM

VERTICAL NAVD 88

HORIZONTAL VT NAD 83 (2011)

ADJUSTMENT

PROJECT NAME: SALISBURY
PROJECT NUMBER: 57813.00

FILE NAME: 57813ti.dgn
PROJECT LEADER: S.E. BURBANK
DESIGNED BY: P.A. MILLER
TIE SHEET

PLOT DATE: 4/19/2016
DRAWN BY: P.A. MILLER
CHECKED BY: J.F. VEAR
SHEET 10 OF 38

VT STATE PLANE GRID

N

REMOVAL AND DISPOSAL OF GUARDRAIL
STA. 102+39 TO 102+90, LT
STA. 103+12 TO 103+98, LT
STA. 102+38 TO 102+78, RT
STA. 103+12 TO 103+46, RT

BOX BEAM GUARDRAIL (COATED BLACK)
STA. 103+43 - 103+44, RT
STA. 103+53 - 103+93, LT

SPECIAL PROVISION (GUARDRAIL APPROACH SECTION, GALVANIZED 2 RAIL BOX BEAM) (COATED BLACK)
STA. 102+37 - 102+71, LT & RT
STA. 103+16 - 103+43, RT
STA. 103+16 - 103+53, LT

MANUFACTURED TERMINAL SECTION, TANGENT (COATED BLACK)
STA. 102+23 - 102+37, LT & RT
STA. 103+93 - 104+09, LT

PAVED SLUICE (SEE NOTE 1)
STA. 102+64 - 102+66, LT & RT

SPECIAL PROVISION (BRIDGE RAILING, GAVANIZED STEEL TUBING/ CONCRETE COMBINATION) (COATED BLACK)
STA. 102+71 TO 103+16, LT & RT

LIMITS OF COLD PLANING
STA. 101+25 - 101+75, LT & RT
STA. 104+45 - 104+65, LT & RT
STA. 103+78 - 104+45, 17' RT (1.5" -SIDE ROAD)

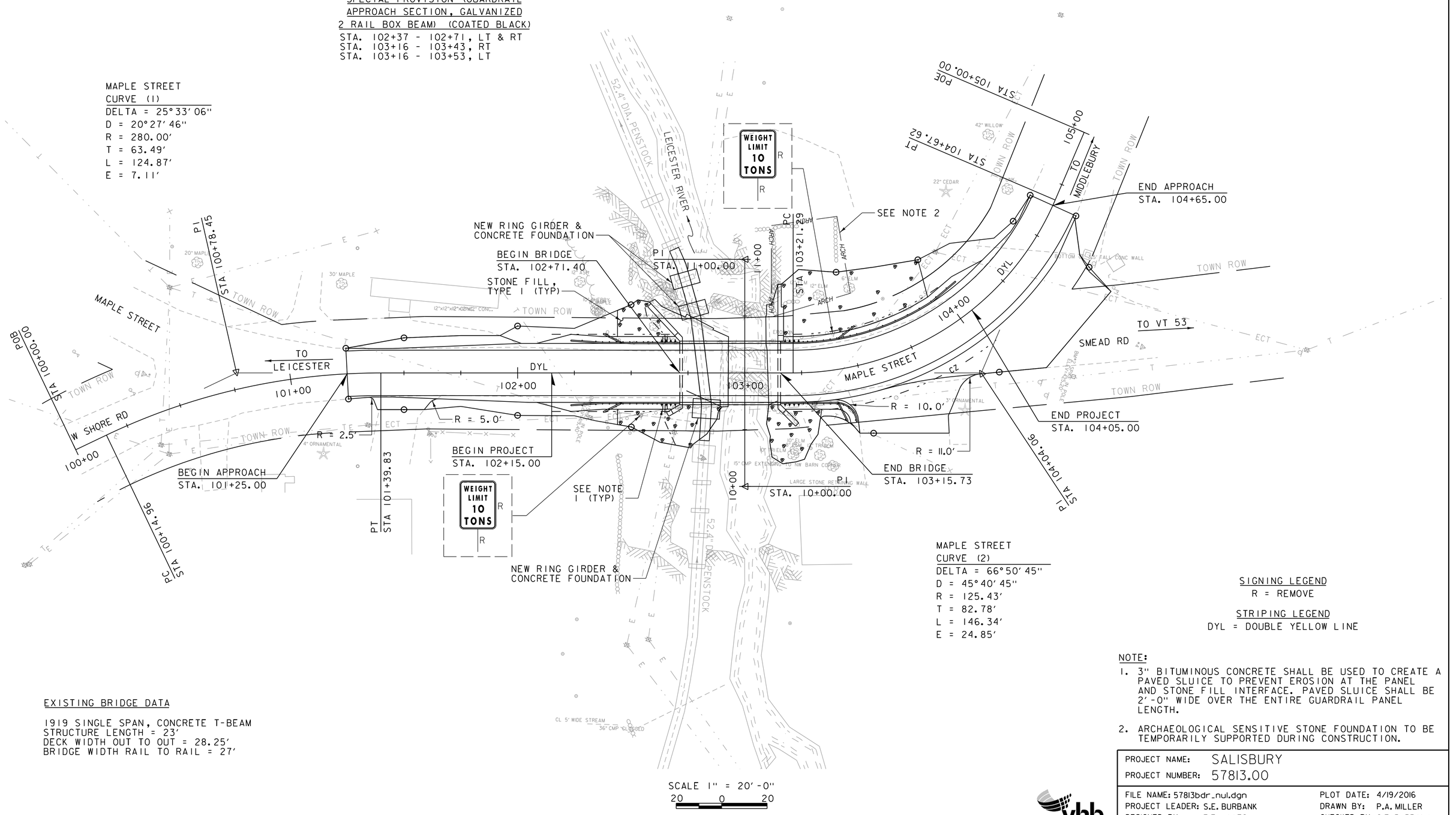
5' GRAVEL DRIVE
STA. 101+25 - 102+02, LT
STA. 101+36 - 101+64, RT

21'-6" GRAVEL DRIVE
STA. 103+41 - 103+92, RT

REMOVE SIGNS
STA. 102+54, RT
STA. 103+41, LT

4 INCH YELLOW LINE
STA. 101+25 - 104+00
STA. 104+45 - 104+65

MAPLE STREET
CURVE (1)
DELTA = 25°33'06"
D = 20°27'46"
R = 280.00'
T = 63.49'
L = 124.87'
E = 7.11'



MAPLE STREET
CURVE (2)
DELTA = 66°50'45"
D = 45°40'45"
R = 125.43'
T = 82.78'
L = 146.34'
E = 24.85'

SIGNING LEGEND
R = REMOVE

STRIPING LEGEND
DYL = DOUBLE YELLOW LINE

EXISTING BRIDGE DATA

1919 SINGLE SPAN, CONCRETE T-BEAM
STRUCTURE LENGTH = 23'
DECK WIDTH OUT TO OUT = 28.25'
BRIDGE WIDTH RAIL TO RAIL = 27'

SCALE 1" = 20'-0"
20 0 20

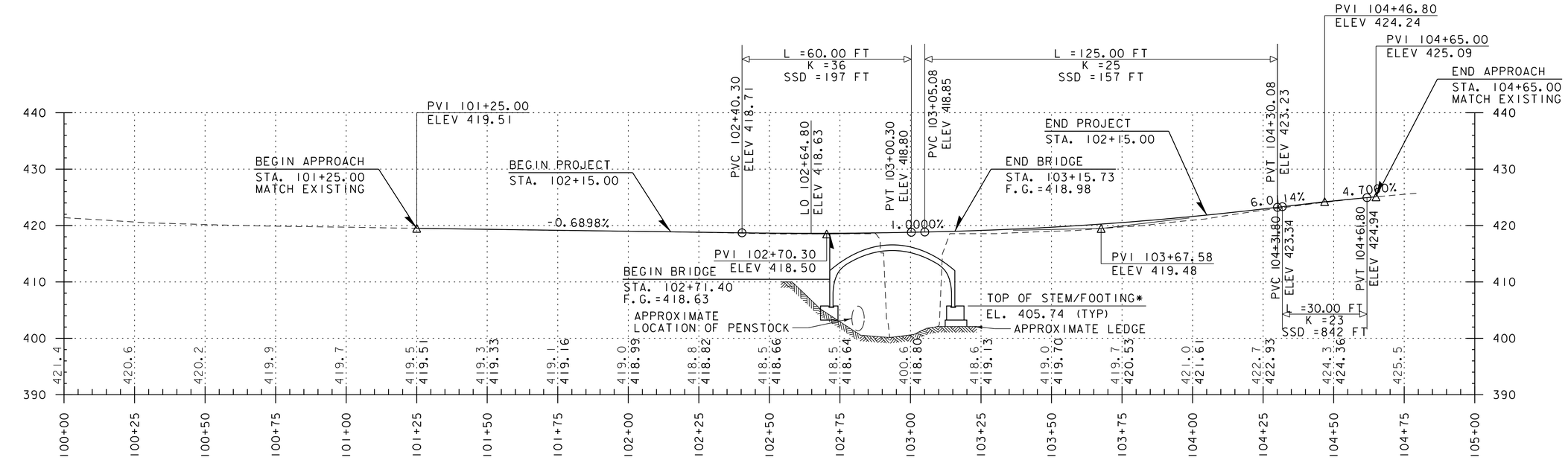
NOTE:

1. 3" BITUMINOUS CONCRETE SHALL BE USED TO CREATE A PAVED SLUICE TO PREVENT EROSION AT THE PANEL AND STONE FILL INTERFACE. PAVED SLUICE SHALL BE 2'-0" WIDE OVER THE ENTIRE GUARDRAIL PANEL LENGTH.
2. ARCHAEOLOGICAL SENSITIVE STONE FOUNDATION TO BE TEMPORARILY SUPPORTED DURING CONSTRUCTION.

PROJECT NAME: SALISBURY
PROJECT NUMBER: 57813.00

FILE NAME: 57813bdr_nul.dgn
PROJECT LEADER: S.E. BURBANK
DESIGNED BY: E.F. LAWES
LAYOUT SHEET

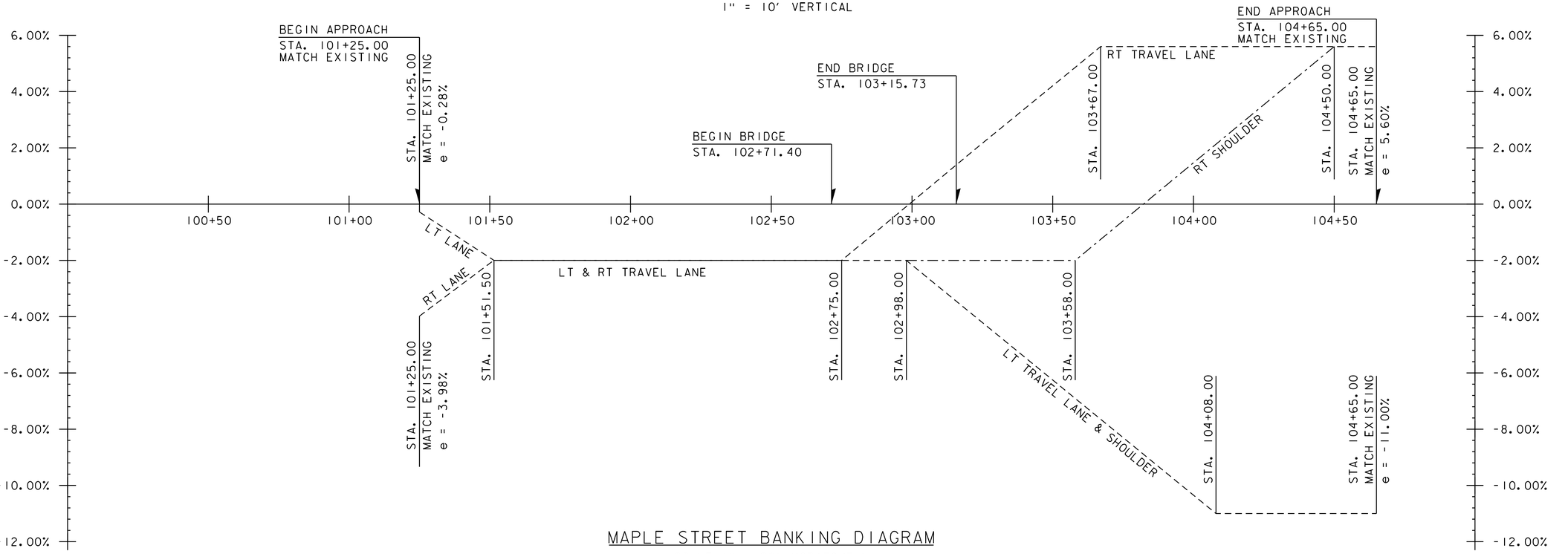
PLOT DATE: 4/19/2016
DRAWN BY: P.A. MILLER
CHECKED BY: S.E. BURBANK
SHEET 11 OF 38



MAPLE STREET PROFILE

SCALE 1" = 20' HORIZONTAL
1" = 10' VERTICAL

* - REFERS TO ELEVATION AT THE HIGHEST POINT ON THE ABUTMENT.



MAPLE STREET BANKING DIAGRAM

SCALE 1" = 20' HORIZONTAL
1" = 0.020 FT/FT VERTICAL

GRADES SHOWN TO THE NEAREST TENTH ARE THE ORIGINAL GROUND ELEVATIONS ALONG THE ROADWAY ALIGNMENT.

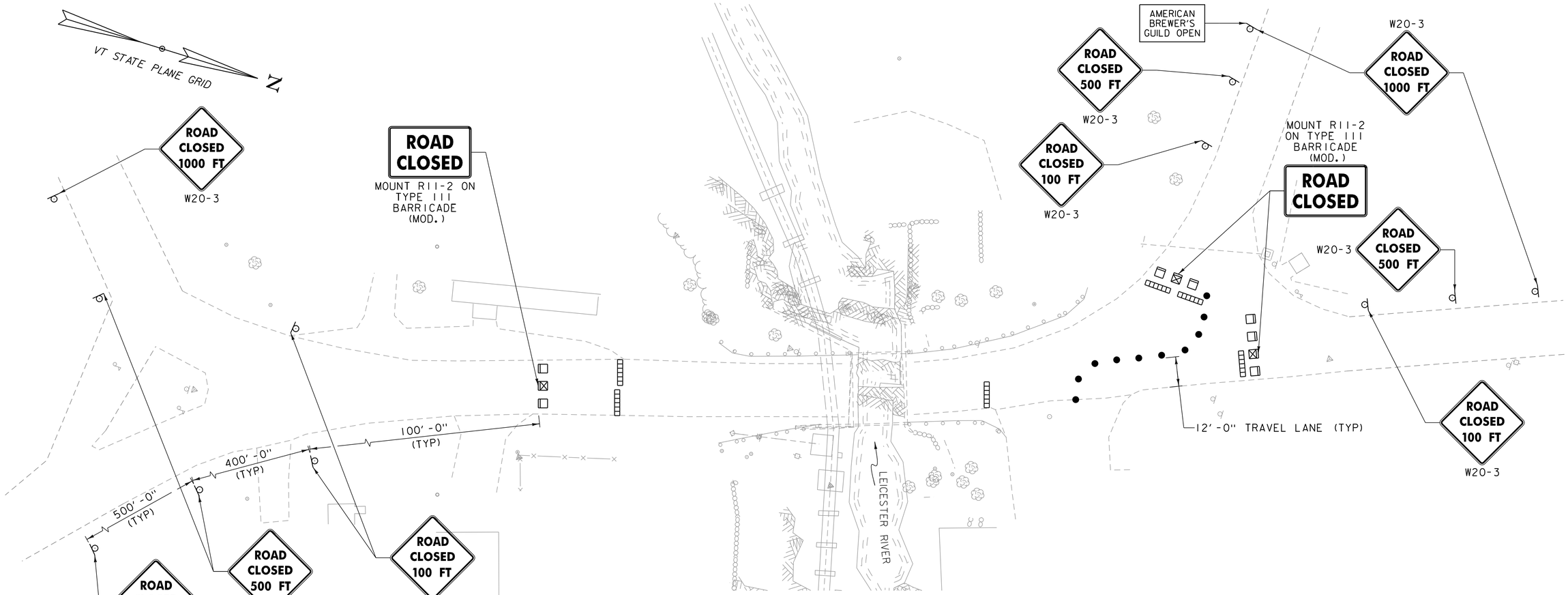
GRADES SHOWN TO THE NEAREST HUNDREDTH ARE THE PROPOSED FINAL GRADE ALONG THE ROADWAY ALIGNMENT.

vhb

PROJECT NAME: SALISBURY
PROJECT NUMBER: 57813.00

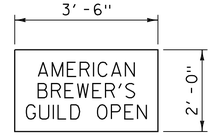
FILE NAME: 57813pro.dgn
PROJECT LEADER: S.E. BURBANK
DESIGNED BY: D.M. PECK
PROFILE AND BANKING DIAGRAM

PLOT DATE: 4/19/2016
DRAWN BY: P.A. MILLER
CHECKED BY: E.F. LAWES
SHEET 12 OF 38



TRAFFIC CONTROL PLAN - ROAD CLOSED TO TRAFFIC
NOT TO SCALE

IDENTIFICATION NUMBER	SIZE OF SIGN		TEXT	NUMBER OF SIGNS REQ'D	AREA (SQ FT)	TOTAL AREA (SQ FT)	REMARKS
	WIDTH (IN)	HEIGHT (IN)					
R11-2	48	30	ROAD CLOSED	3	10.00	30.00	MOUNT ON TYPE III BARRICADE (MOD.)
W20-3	36	36	ROAD CLOSED 100 FT	4	9.00	36.00	MOUNT ON TWO POSTS
W20-3	36	36	ROAD CLOSED 500 FT	4	9.00	36.00	MOUNT ON TWO POSTS
W20-3	36	36	ROAD CLOSED 1000 FT	4	9.00	36.00	MOUNT ON TWO POSTS
sp-1	42	24	AMERICAN BREWER'S GUILD OPEN	1	7.00	7.00	MOUNT ON TWO POSTS



SP-1
NOT TO SCALE

SIGN SHALL HAVE WHITE LETTERS WITH BLUE BACKGROUND

LEGEND

- REFLECTIVE PLASTIC DRUM
- TYPE III BARRICADE
- TYPE III BARRICADE (MOD.)
- CONCRETE MEDIAN BARRIER

NOTE: SEE THE PROJECT NOTES FOR MORE INFORMATION.

PROJECT NAME: SALISBURY
PROJECT NUMBER: 57813.00

FILE NAME: 57813tcp.dgn
PROJECT LEADER: S.E. BURBANK
DESIGNED BY: E.F. LAWES
TRAFFIC CONTROL PLAN

PLOT DATE: 4/19/2016
DRAWN BY: P.A. MILLER
CHECKED BY: S.E. BURBANK
SHEET 13 OF 38

SOIL CLASSIFICATION

AASHTO	
A1	Gravel and Sand
A3	Fine Sand
A2	Silty or Clayey Gravel and Sand
A4	Silty Soil - Low Compressibility
A5	Silty Soil - Highly Compressible
A6	Clayey Soil - Low Compressibility
A7	Clayey Soil - Highly Compressible

ROCK QUALITY DESIGNATION

R.Q.D. (%)	ROCK DESCRIPTION
<25	Very Poor
25 to 50	Poor
51 to 75	Fair
76 to 90	Good
>90	Excellent

SHEAR STRENGTH

UNDRAINED SHEAR STRENGTH IN P.S.F.	CONSISTENCY
<250	Very Soft
250-500	Soft
500-1000	Med. Stiff
1000-2000	Stiff
2000-4000	Very Stiff
>4000	Hard

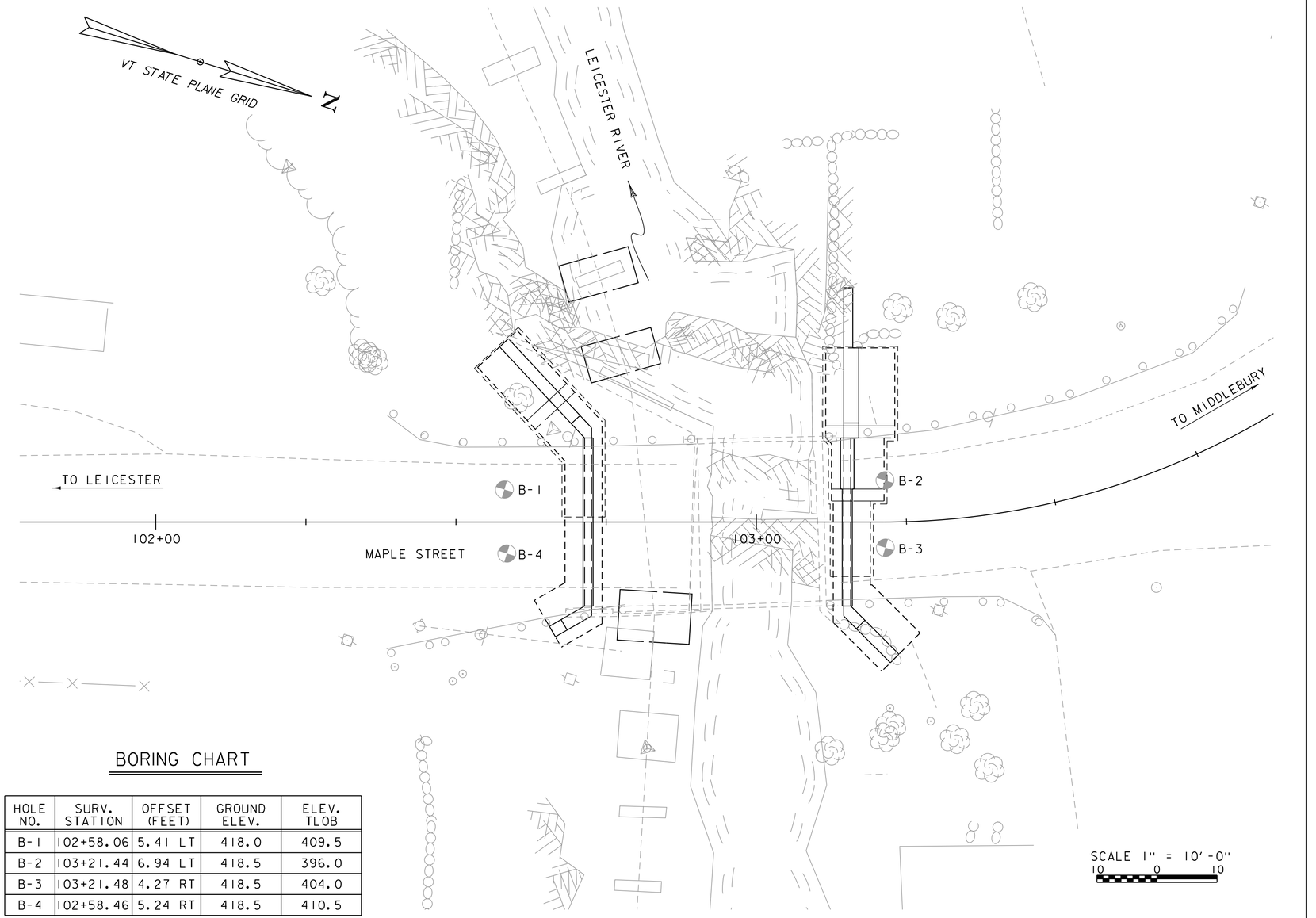
CORRELATION GUIDE OF "N" TO DENSITY/CONSISTENCY

DENSITY (GRANULAR SOILS)		CONSISTENCY (COHESIVE SOILS)	
N	DESCRIPTIVE TERM	N	DESCRIPTIVE TERM
<5	Very Loose	<2	Very Soft
5-10	Loose	2-4	Soft
11-24	Med. Dense	5-8	Med. Stiff
25-50	Dense	9-15	Stiff
>50	Very Dense	16-30	Very Stiff
		31-60	Hard
		>60	Very Hard

COMMONLY USED SYMBOLS

▼	Water Elevation
⊗	Standard Penetration Boring
⊕	Auger Boring
⊙	Rod Sounding
S	Sample
N	Standard Penetration Test Blow Count Per Foot For: 2" O.D. Sampler 1⅜" I.D. Sampler Hammer Weight Of 140 Lbs. Hammer Fall Of 30"
VS	Field Vane Shear Test
US	Undisturbed Soil Sample
B	Blast
DC	Diamond Core
MD	Mud Drill
WA	Wash Ahead
HSA	Hollow Stem Auger
AX	Core Size 1⅛"
BX	Core Size 1⅝"
NX	Core Size 2 ⅛"
M	Double Tube Core Barrel Used
LL	Liquid Limit
PL	Plastic Limit
PI	Plasticity Index
NP	Non Plastic
w	Moisture Content (Dry Wgt. Basis)
D	Dry
M	Moist
MTW	Moist To Wet
W	Wet
Sat	Saturated
Bo	Boulder
Gr	Gravel
Sa	Sand
Si	Silt
Cl	Clay
HP	Hardpan
Le	Ledge
NLTD	No Ledge To Depth
CNPF	Can Not Penetrate Further
TLOB	Top of Ledge Or Boulder
NR	No Recovery
Rec.	Recovery
%Rec.	Percent Recovery
RQD	Rock Quality Designation
CBR	California Bearing Ratio
<	Less Than
>	Greater Than
R	Refusal (N > 100)
VTSPG	NAD83 - See Note 7

COLOR			
blk	Black	pnk	Pink
bl	Blue	pu	Purple
brn	Brown	rd	Red
dk	Dark	tn	Tan
gry	Gray	wh	White
gn	Green	yel	Yellow
lt	Light	mltc	Multicolored
or	Orange		



BORING CHART

HOLE NO.	SURV. STATION	OFFSET (FEET)	GROUND ELEV.	ELEV. TLOB
B-1	102+58.06	5.41 LT	418.0	409.5
B-2	103+21.44	6.94 LT	418.5	396.0
B-3	103+21.48	4.27 RT	418.5	404.0
B-4	102+58.46	5.24 RT	418.5	410.5

DEFINITIONS (AASHTO)

BEDROCK (LEDGE) - Rock in its native location of indefinite thickness.

BOULDER - A rock fragment with an average dimension > 12 inches.

COBBLE - Rock fragments with an average dimension between 3 and 12 inches.

GRAVEL - Rounded particles of rock < 3" and > 0.0787" (#10 sieve).

SAND - Particles of rock < 0.0787" (#10 sieve) and > 0.0029" (#200 sieve).

SILT - Soil < 0.0029" (#200 sieve), non or slightly plastic and exhibits no strength when air-dried.

CLAY - Fine grained soil, exhibits plasticity when moist and considerable strength when air-dried.

VARVED - Alternate layers of silt and clay.

HARDPAN - Extremely dense soil, cemented layer, not softened when wet.

MUCK - Soft organic soil (containing > 10% organic material.

MOISTURE CONTENT - Weight of water divided by dry weight of soil.

FLOWING SAND - Granular soil so saturated (loose) that it flows into drill casing during extraction of wash rod.

STRIKE - Angle from magnetic north to line of intersection of bed with a horizontal plane.

DIP - Inclination of bed with a horizontal plane.

GENERAL NOTES

1. The subsurface explorations shown herein were made in September, 2015 by GeoDesign.
2. Soil and rock classifications, properties and descriptions are based on engineering interpretation from available subsurface information by GeoDesign and may not necessarily reflect actual variations in subsurface conditions that may be encountered between individual boring or sample locations.
3. Observed water levels and/or conditions indicated are as recorded at the time of exploration and may vary according to the prevailing rainfall, methods of exploration and other factors.
4. Engineering judgment was exercised in preparing the subsurface information presented herein. Analysis and interpretation of subsurface data was performed and interpreted for project design and estimating purposes. Presentation of the information in the Contract is intended to provide the Contractor access to the same data available to the VHB. The subsurface information is presented in good faith and is not intended as a substitute for personal investigation, independent interpretation, independent analysis or judgment by the Contractor.
5. Pictorial structure details shown on the boring plan layout or soils profile are for illustrative purposes only and may not accurately portray final contract details.
6. Terminology used on boring logs to describe the hardness, degree of weathering, and spacing of fractures, joints and other discontinuities in the bedrock is defined in the AASHTO Manual on Subsurface Investigations, 1988.
7. Northing and Easting coordinates are shown in Vermont State Plane Grid North American Datum 1983 in survey feet.

PROJECT NAME: SALISBURY
PROJECT NUMBER: 57813.00

FILE NAME: 57813bor.dgn
PROJECT LEADER: S.E. BURBANK
DESIGNED BY: E.F. LAWES
BORING INFORMATION SHEET

PLOT DATE: 4/19/2016
DRAWN BY: P.A. MILLER
CHECKED BY: E.F. LAWES
SHEET 14 OF 38

APPROXIMATE TOP OF SUBFOOTING
EL. 403.2

GEODESIGN INCORPORATED

Geotechnical / Construction / Environmental Engineers and Scientists
P.O. Box 699 — 40 Farrell Street
Windsor, VT 05089 — S. Burlington, VT 05403
Phone: 802-674-2033/Fax: 802-674-5943 — Phone: 802-652-5140

BORING LOG

Project Name: Maple St. Bridge, Salisbury, VT

Boring No.: B-1
Page No.: 1 of 1
File No.: 837-81
Checked By: SPK

Boring Company: QC/QA Laboratories, Inc.
Foreman: John Leonhardt
GeoDesign Rep.: Jacob Wimett
Date Started: September 24, 2015 — Date Finished: September 24, 2015
N. Coordinate: 509314 — E. Coordinate: 1482320
Ground Surface Elevation (feet): 418
Station: — Offset: ft

	Casing:	Sampler:
Type:	Flush	SS
I.D.:	4.0 in.	1.38 in.
Hammer Wt.:	140 lbs	140 lbs
Hammer Fall:	30 in.	30 in.
Rig Type:	CME 550 ATV	
Hammer Type:	Automatic	

Groundwater Observations			
Date	Depth (ft)	Elev. (ft)	Notes
▼ 9/23/15, 0:00	4.0	414.0	Wet Sample (See Notes)

Depth (ft)	Casing Blows/ft	Sample Number	Type	Penetration (inches)	Recovery (inches)	Depth (ft)	Blows / 6 inch Interval 0 - 6	6 - 12	12 - 18	18 - 24	Coring Time (min./ft)	Moisture Content (%)	Strata Description Depth & Elevation(feet)	Symbol	Sample Description Classification System: Burmister
		S1	SS	18	9	0.5	12	11	9				0.6 Asphalt Fill 417.4		S1) Medium dense, brown fine to coarse SAND and fine to coarse GRAVEL, little Asphalt, trace Silt, slightly moist.
		S2	SS	24	12	2	8	6	9	6					S2) Medium dense, brown fine to coarse SAND, some (-) Silt, little fine to coarse Gravel, trace Brick, moist.
5		S3	SS	24	5	4	5	5	4	4					S3) Loose/Stiff, dark brown CLAY & SILT and fine to medium SAND, little coarse Gravel, trace black Organic Matter (Decomposed), wet.
		S4	SS	17.5	7	6	10	5	50/5.5"				7.5		S4) Refusal, gray fine to coarse GRAVEL (fractured) and dark brown CLAY & SILT, little fine to coarse Sand, trace Organic Matter, trace white Fiberous Debris (inorganic), wet.
		C1	C	18	18	8.5	[REC= 100%; RQD= 0%]				6		8.5 Weathered Bedrock 410.5 Bedrock (Phyllite/ Quartzitic Gneiss) 409.5		
10		C2	C	48	48	10	[REC= 100%; RQD= 52%]				4				C1) Very poor quality, hard, closely jointed, fresh, tan with red streaks (top 6") to whitish gray (bottom 12") PHYLLITE. Fracture planes typically smooth to slickensided and 30-45 degrees from horizontal. Weakly foliated. No reaction to dilute HCl.
											3.5				
											NR				
											NR				
15		C3	C	60	57	14	[REC= 95%; RQD= 75%]				4				C2) Fair quality, moderately hard, very close to closely jointed, fresh surfaces darker greenish gray, PHYLLITE, with occasional quartz seams <1/2" thick. No reaction to dilute HCL (except along weathered whitish seams).
											4				
											4				
											5				
											5		19		C3) Good quality, hard, moderately jointed, fresh with occasional weathered joints and seams, light to dark greenish quartzitic GNEISS. No reaction to dilute HCl. Similar to C2 except harder, with fewer/weaker foliations and phyllitic composition, and contains more quartz and granular texture.
20													Bottom 399.0 of Exploration at 19.0 ft		
25															
30															

Remarks:
1) Borehole performed at soutwest corner of the bridge, 3' south of VHB premarked locton.
2) Augered to 0.5' deep through the asphalt prior to sampling.
3) Sample S2 was not performed in accordance with ASTM D 1586 proceedures (borehole was not cleared with the augers prior to sampling).
4) Samples performed below 4' deep may not accurately reflect insitu moisture conditions due to wash drive drilling methods.
5) Last 20 blows of sample S4 at 6' deep had no movement.
6) No water return observed throughout entirety of rock coring.
7) Core block encountered at 10' deep ending core run C1 after 1.5' of penetration. Core block at 14' deep ending core run C2 after 4' of penetration.

Notes:
1) Stratification Lines Represent Approximate Boundary Between Material Types, Transitions May Be Gradual.
2) Water Level Readings Have Been Made At Times And Under Conditions Stated, Fluctuations Of Groundwater May Occur Due To Other Factors Than Those Present At The Time Measurements Were Made.
A.C. = After coring; N.R. = Not Recorded.
3) Sample Type Coding: A=Auger; C=Core; D=Driven; G=Grab; PS=Piston Sampler; SS=Split Barrel (Split Spoon); ST=Shelby Tube; Geo=GeoProbe V=Vane;
WOR/H=Weight of Rod/Hammer
4) Proportions Used: Trace = 1-10%; Little = 10-20%; Some = 20-35%; And = 35-50%

Boring No.: B-1

SMALL REMARK FONT STANDARD 837-81 MAPLE ST. BRIDGE.GPJ GEODESIGN STANDARD.GDT 1/29/16

APPROXIMATE TOP OF SUBFOOTING
EL. 399.2

GEODESIGN INCORPORATED

Geotechnical / Construction / Environmental Engineers and Scientists
P.O. Box 699 — 40 Farrell Street
Windsor, VT 05089 — S. Burlington, VT 05403
Phone: 802-674-2033/Fax: 802-674-5943 — Phone: 802-652-5140

BORING LOG

Project Name: Maple St. Bridge, Salisbury, VT

Boring No.: B-2
Page No.: 1 of 2
File No.: 837-81
Checked By: SPK

Boring Company: QC/QA Laboratories, Inc.
Foreman: John Leonhardt
GeoDesign Rep.: Jacob Wimett
Date Started: September 24, 2015 — Date Finished: September 24, 2015
N. Coordinate: 509374 — E. Coordinate: 1482300
Ground Surface Elevation (feet): 418.5
Station: — Offset: ft

	Casing:	Sampler:
Type:	Flush	SS
I.D.:	4.0 in.	1.38 in.
Hammer Wt.:	140 lbs	140 lbs
Hammer Fall:	30 in.	30 in.
Rig Type:	CME 550 ATV	
Hammer Type:	Automatic	

Groundwater Observations			
Date	Depth (ft)	Elev. (ft)	Notes
▼ 9/23/15, 0:00	8.0	410.5	Wet Sample (See Notes)

Depth (ft)	Casing Blows/ft	Sample Number	Type	Penetration (inches)	Recovery (inches)	Depth (ft)	Blows / 6 inch Interval 0 - 6	6 - 12	12 - 18	18 - 24	Coring Time (min./ft)	Moisture Content (%)	Strata Description Depth & Elevation(feet)	Symbol	Sample Description Classification System: Burmister
		S1	SS	24	14	0	14	8	8	4			0.8 Asphalt 1.5 Reclaimed Asphalt 417.7 Fill 417.0		S1) Medium dense,
		S2	SS	24	9	4	8	7	7	7					S1A - Top 6": Black fine to coarse SAND, some fine Gravel, little Silt, dry. (Reclaimed Asphalt).
5		S3	SS	24	12	6	8	6	3	4					S1B - Bottom 8": Brown fine to coarse SAND, some fine to coarse Gravel, little Silt, slightly moist.
		S4	SS	24	6	8	1	1	1	2			8 ▼ Fill with Organics 410.5		S2) Medium dense, brown fine to medium SAND and fine to coarse GRAVEL, some Silt, moist.
10		S5	SS	18	8	10	1	1	1						S3) Loose/stiff, brown fine to medium SAND, some Silt & Clay, trace fine Gravel, trace Organic Fibers, moist.
		S6	SS	24	0	12	WOH	WOH	2	2					S4) Very loose/soft, dark brown with black fine to medium SAND and SILT & CLAY, little fine Gravel, trace Organic Fibers, wet.
15		S7	SS	24	8	14	2	WOH	WOH	2					S5) Very loose/soft, dark brown with black spots SILT & CLAY and fine to medium SAND, trace fine Gravel, trace Organic Matter, trace brick, wet.
		S8	SS	24	15	16	2	1	1	1					S6) Very loose/soft, no recovery.
		S9	SS	24	7	18	1	2	1	1					S7) Very loose/very soft, black with brown DECOMPOSED WOOD and ORGANIC SILT & CLAY, trace (+) fine to medium Sand, trace fine Gravel, trace Concrete, with organic fibers, wet.
20		S10	SS	24	18	20	2	10	11	4			20.5 Clayey Silt & Sand 398.0 22 Weathered Bedrock 396.5 Bedrock (Quartzitic Gneiss) 396.0		S8) Very loose/soft, black ORGANIC SILT & CLAY, some Decomposing Wood, trace fine to coarse Sand, trace Concrete Pieces, wet.
		C1	C	60	56	22.5	50/0"	[REC= 93%; RQD= 85%]			4				S9) Very loose/soft, blackish gray ORGANIC SILT & CLAY, little fine to medium Sand, little Organic Fibers, wet.
											4				
25											5.5				S10) Medium dense,
											3.5				S10A - Top 6": Black-brown DECOMPOSED WOOD, wet.
		C2	C	60	60	27.5	[REC= 100%; RQD= 30%]				4				S10B - Bottom 12": Gray mottled with orange SILT and fine to coarse SAND, some Silt & Clay, trace fine Gravel, trace Organic Fibers, wet.
											5				
30											5				C1) Good quality, moderately hard to hard, fresh with occasionally weathered joints, light gray with white streaks quartzitic GNEISS.

Remarks:
1) Performed at the northwest corner of the bridge at the location premarked by VHB.
2) Augered to 1' deep through 10" of asphalt prior to sampling.
3) With the exception of S1, moisture descriptions of samples may not accurately reflect insitu conditions due to wash drive drilling methods.
4) Sample S5 at 10' deep only driven 18" due to limited stroke on the rod stickup above casing.
5) Sample S10 at 20' deep was not performed in accordance with ASTM D 1586 (borehole was not cleared with the roller bit prior to sampling.
6) Flush joint casing refusal at 22' deep. Advance roller bit to 22.5' and attempt sample. No penetration or recovery after 50 blows. Set up to corebedrock at 22.5' deep.
7) Gray was water return throughout coring.
8) Borehole collapsed at 20' deep overnight. Dry to the bottom of the borehole.

Notes:
1) Stratification Lines Represent Approximate Boundary Between Material Types, Transitions May Be Gradual.
2) Water Level Readings Have Been Made At Times And Under Conditions Stated, Fluctuations Of Groundwater May Occur Due To Other Factors Than Those Present At The Time Measurements Were Made.
A.C. = After coring; N.R. = Not Recorded.
3) Sample Type Coding: A=Auger; C=Core; D=Driven; G=Grab; PS=Piston Sampler; SS=Split Barrel (Split Spoon); ST=Shelby Tube; Geo=GeoProbe V=Vane;
WOR/H=Weight of Rod/Hammer
4) Proportions Used: Trace = 1-10%; Little = 10-20%; Some = 20-35%; And = 35-50%

Boring No.: B-2

SMALL REMARK FONT STANDARD 837-81 MAPLE ST. BRIDGE.GPJ GEODESIGN STANDARD.GDT 1/29/16

GEODESIGN INCORPORATED

Geotechnical / Construction / Environmental Engineers and Scientists
P.O. Box 699 — 40 Farrell Street
Windsor, VT 05089 — S. Burlington, VT 05403
Phone: 802-674-2033/Fax: 802-674-5943 — Phone: 802-652-5140

BORING LOG

Project Name: Maple St. Bridge, Salisbury, VT

Boring No.: B-2
Page No.: 2 of 2
File No.: 837-81
Checked By: SPK

Boring Company: QC/QA Laboratories, Inc.
Foreman: John Leonhardt
GeoDesign Rep.: Jacob Wimett
Date Started: September 24, 2015 — Date Finished: September 24, 2015
N. Coordinate: 509374 — E. Coordinate: 1482300
Ground Surface Elevation (feet): 418.5
Station: — Offset: ft

	Casing:	Sampler:
Type:	Flush	SS
I.D.:	4.0 in.	1.38 in.
Hammer Wt.:	140 lbs	140 lbs
Hammer Fall:	30 in.	30 in.
Rig Type:	CME 550 ATV	
Hammer Type:	Automatic	

Groundwater Observations			
Date	Depth (ft)	Elev. (ft)	Notes
▼ 9/23/15, 0:00	8.0	410.5	Wet Sample (See Notes)

Depth (ft)	Casing Blows/ft	Sample Number	Type	Penetration (inches)	Recovery (inches)	Depth (ft)	Blows / 6 inch Interval 0 - 6	6 - 12	12 - 18	18 - 24	Coring Time (min./ft)	Moisture Content (%)	Strata Description Depth & Elevation(feet)	Symbol	Sample Description Classification System: Burmister
											6		Bedrock (Quartzitic Gneiss) *(Continued)*		Weakly foliated/banded. Fractures typically 45 degrees to horizontal. No reaction to dilute HCl.
											5		32.5		C2) Poor quality, moderately hard to hard, fresh with weathered joints, light gray with white streaks, quartzitic GNEISS. Fractures typically 45-60 degrees from horizontal. Weak/occasional reaction to dilute HCl.
											6		Bottom 386.0 of Exploration at 32.5 ft		
35															
40															
45															
50															
55															
60															

Remarks:

Notes:
1) Stratification Lines Represent Approximate Boundary Between Material Types, Transitions May Be Gradual.
2) Water Level Readings Have Been Made At Times And Under Conditions Stated, Fluctuations Of Groundwater May Occur Due To Other Factors Than Those Present At The Time Measurements Were Made.
A.C. = After coring; N.R. = Not Recorded.
3) Sample Type Coding: A=Auger; C=Core; D=Driven; G=Grab; PS=Piston Sampler; SS=Split Barrel (Split Spoon); ST=Shelby Tube; Geo=GeoProbe V=Vane;
WOR/H=Weight of Rod/Hammer
4) Proportions Used: Trace = 1-10%; Little = 10-20%; Some = 20-35%; And = 35-50%

Boring No.: B-2

vhb

PROJECT NAME: SALISBURY
PROJECT NUMBER: 57813.00

FILE NAME: 57813borlogs.dgn
PROJECT LEADER: S.E. BURBANK
DESIGNED BY: GEODESIGN
BORING LOGS (1 OF 2)

PLOT DATE: 4/19/2016
DRAWN BY: P.A. MILLER
CHECKED BY: E.F. LAWES
SHEET 15 OF 38

APPROXIMATE TOP OF SUBFOOTING
EL. 403.2

GEODESIGN INCORPORATED

Geotechnical / Construction / Environmental Engineers and Scientists

P.O. Box 699 — Windsor, VT 05089 — Phone: 802-674-2033/Fax: 802-674-5943

40 Farrell Street — S. Burlington, VT 05403 — Phone: 802-652-5140

BORING LOG

Project Name: Maple St. Bridge — Salisbury, VT

Boring No.: **B-3** | Page No.: 1 of 2 | File No.: 837-81 | Checked By: SPK

Boring Company:	QC/QA Laboratories, Inc.		Casing:	Sampler:	Groundwater Observations
Foreman:	John Leonhardt	Type:	Flush	Dbl.	Date / Depth (ft) / Elev. (ft) / Notes
GeoDesign Rep.:	Jacob Wimett	I.D.:	4.0 in.	2.0 in.	
Date Started:	September 25, 2015	Date Finished:	September 25, 2015	Hammer Wt.:	140 lbs
N. Coordinate:	509377	E. Coordinate:	1482311	Hammer Fall:	30 in.
Ground Surface Elevation (feet):	418.5			Rig Type:	CME 550 ATV
Station:	Offset: ft			Hammer Type:	Automatic

Depth (ft)	Casing Blows/ft	Sample Info: Number	Type	Penetration (inches)	Recovery (inches)	Depth (ft)	Blows / 6 inch Interval: 0 - 6	6 - 12	12 - 18	18 - 24	Coring Time (min./ft)	Moisture Content (%)	Strata Description: Depth & Elevation(feet)	Symbol	Sample Description: Classification System: Burmister
0													0.8 Asphalt		
													Inferred Fill. No sampling performed. Refer to boring B-2 for soil strata on north side of bridge. 17.7		
5															
10															
14													Weathered Bedrock 404.5		
15		C1	C	18	18	14.5	[REC= 100%; RQD= 0%]						Bedrock (Quartzitic Gneiss) 404.0		C1) Very poor quality, moderately hard to hard, very closely jointed, slightly weathered with weathered joints, light tannish gray to dark gray with white bands, quartzitic GNEISS. Fractures typically 30-45 degrees from horizontal. Weak/occasional reaction to dilute HCl when powdered.
		C2	C	36	34	16	[REC= 94%; RQD= 25%]								
20		C3	C	18	15	19	[REC= 83%; RQD= 0%]								C2) Poor quality, hard, slightly weathered (with one highly weathered seam), closely jointed, light tannish gray, quartzitic GNEISS. Fractures typically 30-85 degrees from horizontal. No reaction to dilute HCl. Similar to C1 except with higher quartz content, harder, more crystalline, with weaker banding.
		C4	C	24	23	20.5	[REC= 96%; RQD= 20%]								
22.5													Bottom of Exploration at 22.5 ft 396.0		C3) Very poor quality, hard, fresh, closely jointed, light tannish gray to darker gray, quartzitic GNEISS. Fractures typically <30 degrees from horizontal. No reaction to dilute HCl. Similar to C2 (e.g., higher quartz content, harder, more crystalline, with weaker banding than C1.
25															C4) Very poor quality, hard, fresh, closely
30															

Remarks

1) Performed on NE corner of bridge at location pre-marked by VHB.
2) Augered to 1' deep through asphalt (10") prior to switching to casing. Drive and wash casing to top of bedrock at 14.5' deep prior to sampling.
3) C1 ended in core blockage after 18" at 16' deep. C2 ended in core blockage after 36" at 19' deep. C3 ended in core blockage after 18" at 20.5' deep. C4 ended in core blockage after 24" at 22.5' deep. Note the bedrock surface visible in the river under the northeast corner of the bridge to be close jointed (typically less than 4" beds) and jointed greater than 45 degrees, likely leading to the frequent core blocks encountered.

Notes:

1) Stratification Lines Represent Approximate Boundary Between Material Types, Transitions May Be Gradual.
2) Water Level Readings Have Been Made At Times And Under Conditions Stated, Fluctuations Of Groundwater May Occur Due To Other Factors Than Those Present At The Time Measurements Were Made.
A.C. = After coring; N.R. = Not Recorded.
3) Sample Type Coding: A=Auger; C=Core; D=Driven; G=Grab; PS=Piston Sampler; SS=Split Barrel (Split Spoon); ST=Shelby Tube; Geo=GeoProbe V=Vane;
WOR/H=Weight of Rod/Hammer
4) Proportions Used: Trace = 1-10%; Little = 10-20%; Some = 20-35%; And = 35-50%

Boring No.: **B-3**

SMALL REMARK FONT STANDARD 837-81 MAPLE ST BRIDGE.GPJ GEODESIGN STANDARD.GDT 1/29/16

GEODESIGN INCORPORATED

Geotechnical / Construction / Environmental Engineers and Scientists

P.O. Box 699 — Windsor, VT 05089 — Phone: 802-674-2033/Fax: 802-674-5943

40 Farrell Street — S. Burlington, VT 05403 — Phone: 802-652-5140

BORING LOG

Project Name: Maple St. Bridge — Salisbury, VT

Boring No.: **B-3** | Page No.: 2 of 2 | File No.: 837-81 | Checked By: SPK

Boring Company:	QC/QA Laboratories, Inc.		Casing:	Sampler:	Groundwater Observations
Foreman:	John Leonhardt	Type:	Flush	Dbl.	Date / Depth (ft) / Elev. (ft) / Notes
GeoDesign Rep.:	Jacob Wimett	I.D.:	4.0 in.	2.0 in.	
Date Started:	September 25, 2015	Date Finished:	September 25, 2015	Hammer Wt.:	140 lbs
N. Coordinate:	509377	E. Coordinate:	1482311	Hammer Fall:	30 in.
Ground Surface Elevation (feet):	418.5			Rig Type:	CME 550 ATV
Station:	Offset: ft			Hammer Type:	Automatic

Depth (ft)	Casing Blows/ft	Sample Info: Number	Type	Penetration (inches)	Recovery (inches)	Depth (ft)	Blows / 6 inch Interval: 0 - 6	6 - 12	12 - 18	18 - 24	Coring Time (min./ft)	Moisture Content (%)	Strata Description: Depth & Elevation(feet)	Symbol	Sample Description: Classification System: Burmister
35															jointed, light tannish gray to darker gray, quartzitic GNEISS. Fractures typically <30 degrees from horizontal. No reaction to dilute HCl. Similar to C2 (e.g., higher quartz content, harder, more crystalline, with weaker banding than C1.
40															
45															
50															
55															
60															

Remarks

Notes:

1) Stratification Lines Represent Approximate Boundary Between Material Types, Transitions May Be Gradual.
2) Water Level Readings Have Been Made At Times And Under Conditions Stated, Fluctuations Of Groundwater May Occur Due To Other Factors Than Those Present At The Time Measurements Were Made.
A.C. = After coring; N.R. = Not Recorded.
3) Sample Type Coding: A=Auger; C=Core; D=Driven; G=Grab; PS=Piston Sampler; SS=Split Barrel (Split Spoon); ST=Shelby Tube; Geo=GeoProbe V=Vane;
WOR/H=Weight of Rod/Hammer
4) Proportions Used: Trace = 1-10%; Little = 10-20%; Some = 20-35%; And = 35-50%

Boring No.: **B-3**

APPROXIMATE TOP OF FOOTING
EL. 405.7

GEODESIGN INCORPORATED

Geotechnical / Construction / Environmental Engineers and Scientists

P.O. Box 699 — Windsor, VT 05089 — Phone: 802-674-2033/Fax: 802-674-5943

40 Farrell Street — S. Burlington, VT 05403 — Phone: 802-652-5140

BORING LOG

Project Name: Maple St. Bridge — Salisbury, VT

Boring No.: **B-4** | Page No.: 1 of 1 | File No.: 837-81 | Checked By: SPK

Boring Company:	QC/QA Laboratories, Inc.		Casing:	Sampler:	Groundwater Observations
Foreman:	John Leonhardt	Type:	Flush	Dbl.	Date / Depth (ft) / Elev. (ft) / Notes
GeoDesign Rep.:	Jacob Wimett	I.D.:	4.0 in.	2.0 in.	
Date Started:	September 25, 2015	Date Finished:	September 25, 2015	Hammer Wt.:	140 lbs
N. Coordinate:	509317	E. Coordinate:	1482330	Hammer Fall:	30 in.
Ground Surface Elevation (feet):	418.5			Rig Type:	CME 550 ATV
Station:	Offset: ft			Hammer Type:	Automatic

Depth (ft)	Casing Blows/ft	Sample Info: Number	Type	Penetration (inches)	Recovery (inches)	Depth (ft)	Blows / 6 inch Interval: 0 - 6	6 - 12	12 - 18	18 - 24	Coring Time (min./ft)	Moisture Content (%)	Strata Description: Depth & Elevation(feet)	Symbol	Sample Description: Classification System: Burmister
0													0.6 Asphalt		
													Inferred Fill. No sampling performed. Refer to boring B1 for soil strata on south side of bridge. 17.9		
5															
7.5													Weathered Bedrock 408.0		
10		C1	C	42	42	8	[REC= 100%; RQD= 48%]						Bedrock (Quartzite) 410.5		C1) Poor quality, hard, fresh with slightly weathered joints, closely jointed to shattered (bottom 6"), light tannish gray to reddish pink QUARTZITE. Fractures typically 30-45 degrees from horizontal. Very weak reaction to dilute HCl (fracture surfaces only).
		C2	C	18	18	11.5	[REC= 100%; RQD= 0%]								
13													Bottom of Exploration at 13.0 ft 405.5		C2) Very poor quality, very closely jointed, hard, fresh with slightly weathered joints, interbedded light tannish gray to reddish pink, QUARTZITE. Fractures typically 30-45 degrees from horizontal. Very weak reaction to dilute HCl (fracture surfaces only).
15															
20															
25															
30															

Remarks

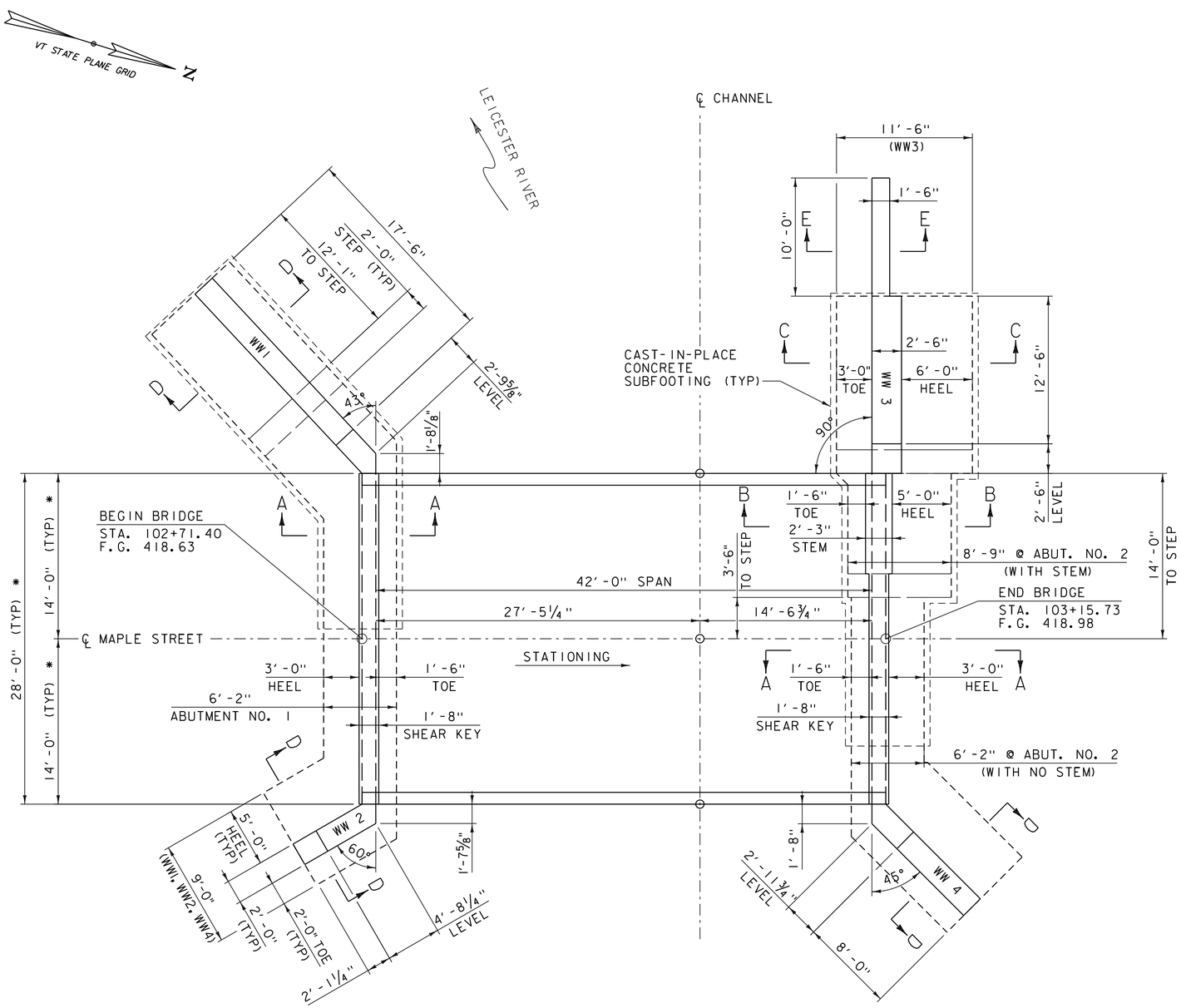
1) Performed on SE corner of bridge, 3' south of the location pre-marked by VHB.
2) Augered to 1' deep through asphalt (7") prior to switching to casing. Drive and wash casing to top of bedrock at 8' deep prior to sampling.
3) Core C1 ended in core blockage after 42" at 11.5' deep. Core run C2 ended in core blockage after 18" at 13' deep.
4) Driller attempted advancing core barrel prior to removing C2 and rods immediately bound up. Driller unable to continue hole. Upon removing casing note that a piece of steel had broken off the cutting shoe and fallen into the hole. Likely fell into the core hole causing the rods to bind when attempting to advance past 13' deep.

Notes:

1) Stratification Lines Represent Approximate Boundary Between Material Types, Transitions May Be Gradual.
2) Water Level Readings Have Been Made At Times And Under Conditions Stated, Fluctuations Of Groundwater May Occur Due To Other Factors Than Those Present At The Time Measurements Were Made.
A.C. = After coring; N.R. = Not Recorded.
3) Sample Type Coding: A=Auger; C=Core; D=Driven; G=Grab; PS=Piston Sampler; SS=Split Barrel (Split Spoon); ST=Shelby Tube; Geo=GeoProbe V=Vane;
WOR/H=Weight of Rod/Hammer
4) Proportions Used: Trace = 1-10%; Little = 10-20%; Some = 20-35%; And = 35-50%

Boring No.: **B-4**

PROJECT NAME:	SALISBURY
PROJECT NUMBER:	57813.00
FILE NAME: 57813borlogs.dgn	PLOT DATE: 4/19/2016
PROJECT LEADER: S.E. BURBANK	DRAWN BY: P.A. MILLER
DESIGNED BY: GEODESIGN	CHECKED BY: E.F. LAWES
BORING LOGS (2 OF 2)	SHEET 16 OF 38

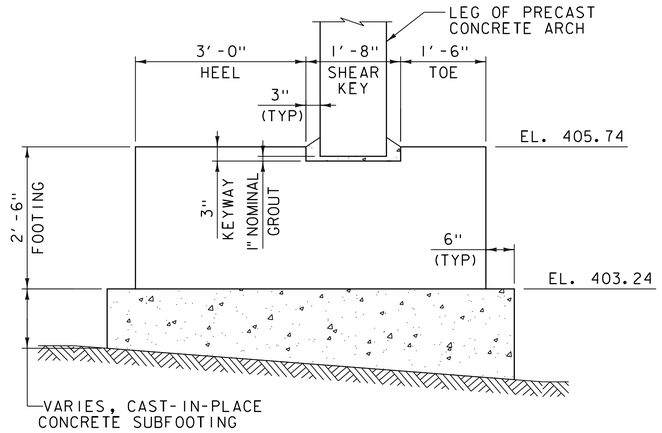


* - FOR ESTIMATING PURPOSES ONLY. ACTUAL DIMENSIONS SHALL BE DETERMINED BY THE FABRICATOR.

FOOTING & PRECAST STRUCTURE PLAN

SCALE 3/16" = 1'-0"

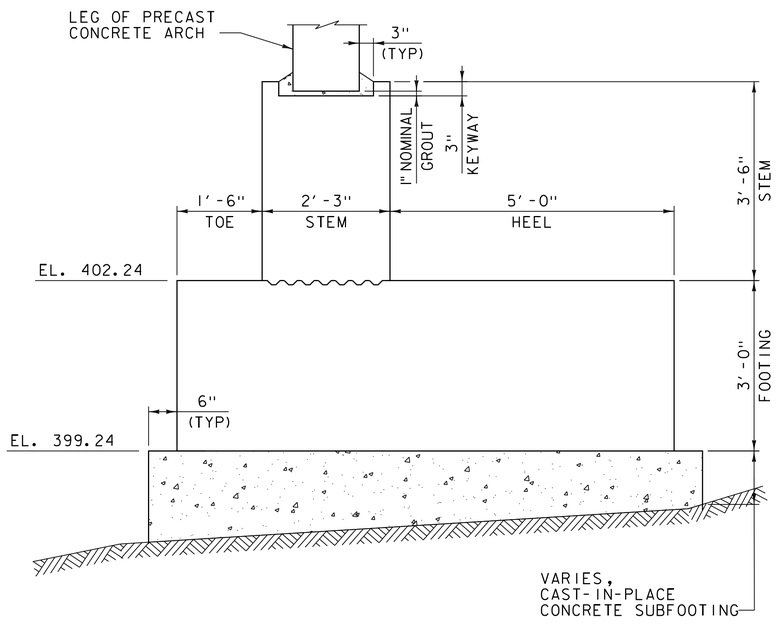
NOTE: SEE SHEETS 19-22 FOR ADDITIONAL SECTIONS AND INFORMATION NOT SHOWN.



SECTION A-A
ABUTMENT NO. 1 & NO. 2 SECTION

SCALE 3/4" = 1'-0"

NOTE: SEE FOOTING PLAN FOR SUBFOOTING LOCATIONS. SUBFOOTING IS NOT LOCATED UNDER ALL AREAS OF FOOTING.



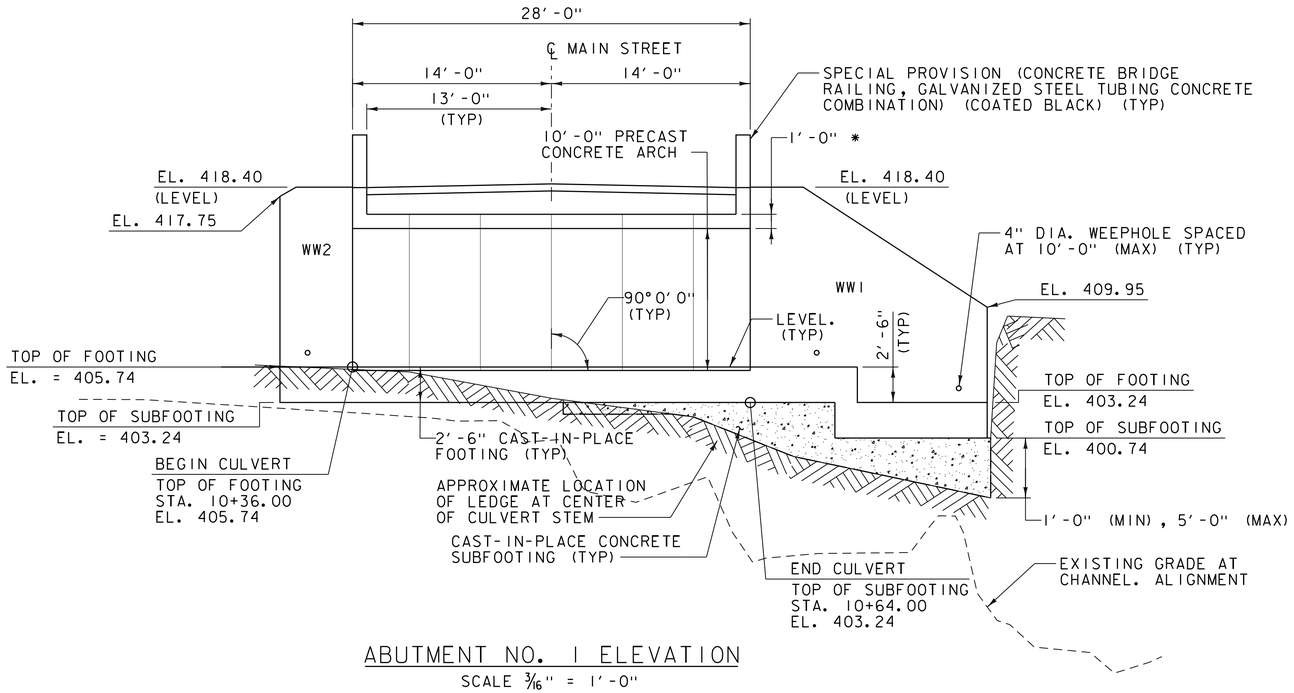
SECTION B-B
ABUTMENT NO. 2 SECTION

SCALE 3/4" = 1'-0"

NOTE: CONTRACTOR TO VERIFY KEY AND STEM DIMENSIONS WITH FABRICATOR PRIOR TO CONSTRUCTION.

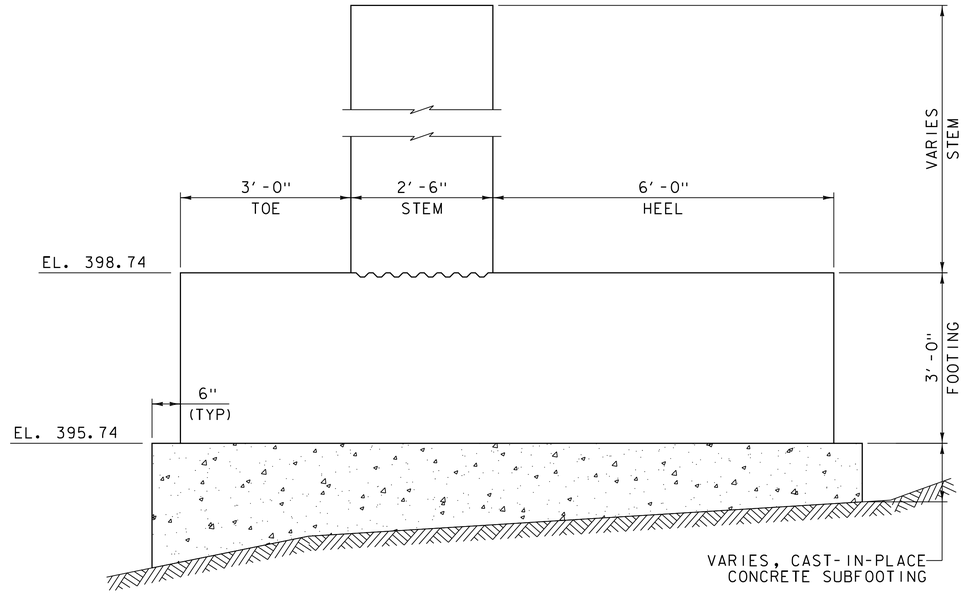
PROJECT NAME:	SALISBURY
PROJECT NUMBER:	57813.00

FILE NAME: 57813sub.dgn	PLOT DATE: 4/19/2016
PROJECT LEADER: S.E. BURBANK	DRAWN BY: E.F. LAWES
DESIGNED BY: E.F. LAWES	CHECKED BY: R.H. BARNES
ABUTMENT DETAILS (1 OF 2)	SHEET 17 OF 38



ABUTMENT NO. 1 ELEVATION

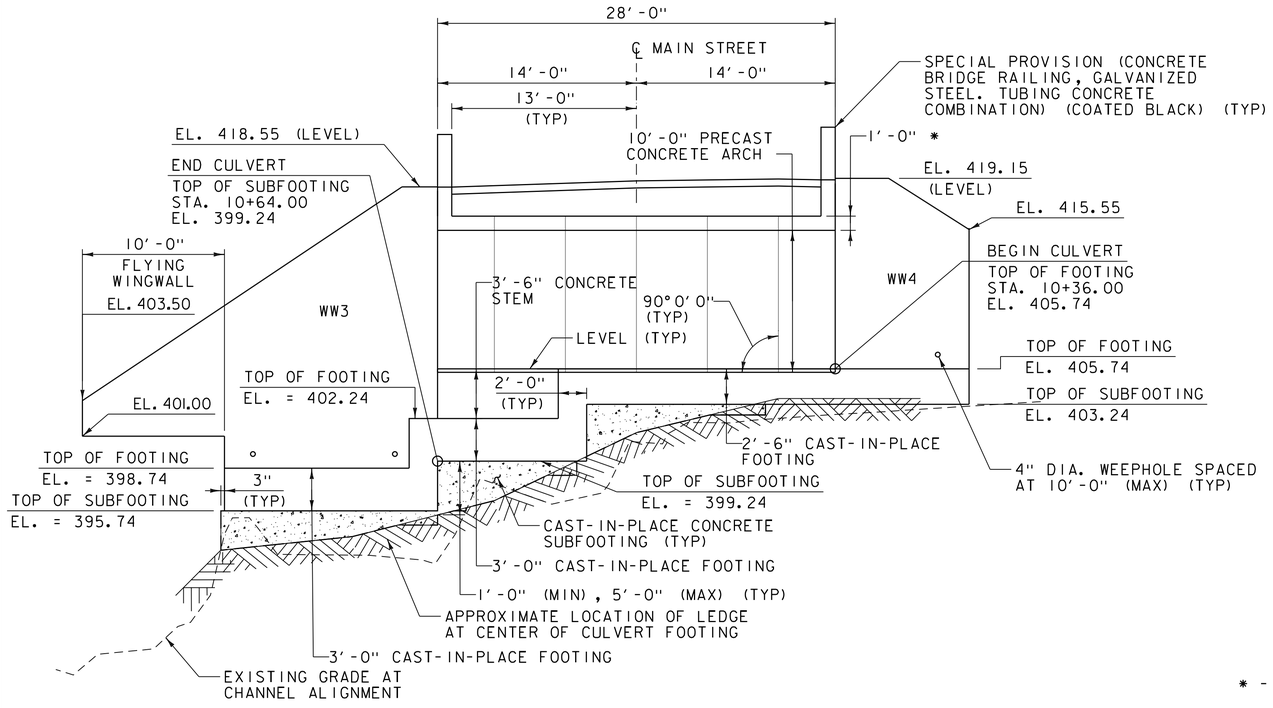
SCALE 3/16" = 1'-0"



SECTION C-C

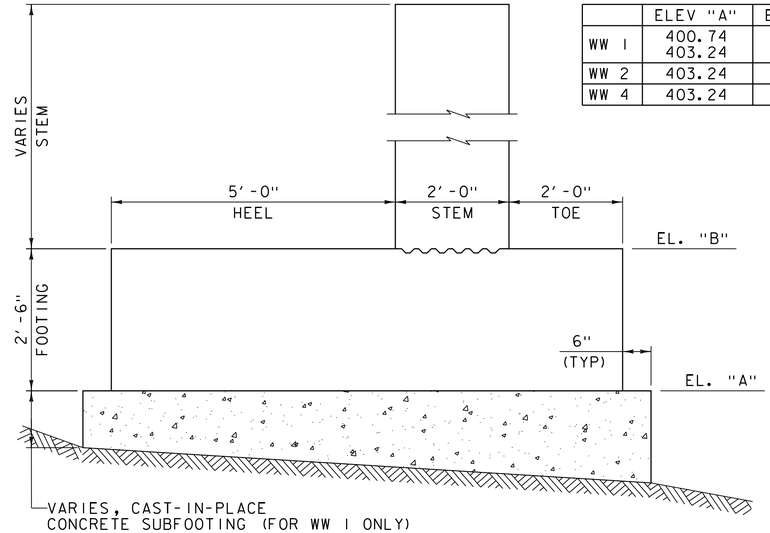
WINGWALL NO. 3 SECTION

SCALE 3/4" = 1'-0"



ABUTMENT NO. 2 ELEVATION

SCALE 3/16" = 1'-0"



	ELEV "A"	ELEV "B"
WW 1	400.74 403.24	403.24 405.74
WW 2	403.24	405.74
WW 4	403.24	405.74

SECTION D-D

WINGWALL NO. 1, 2, & 4 SECTION

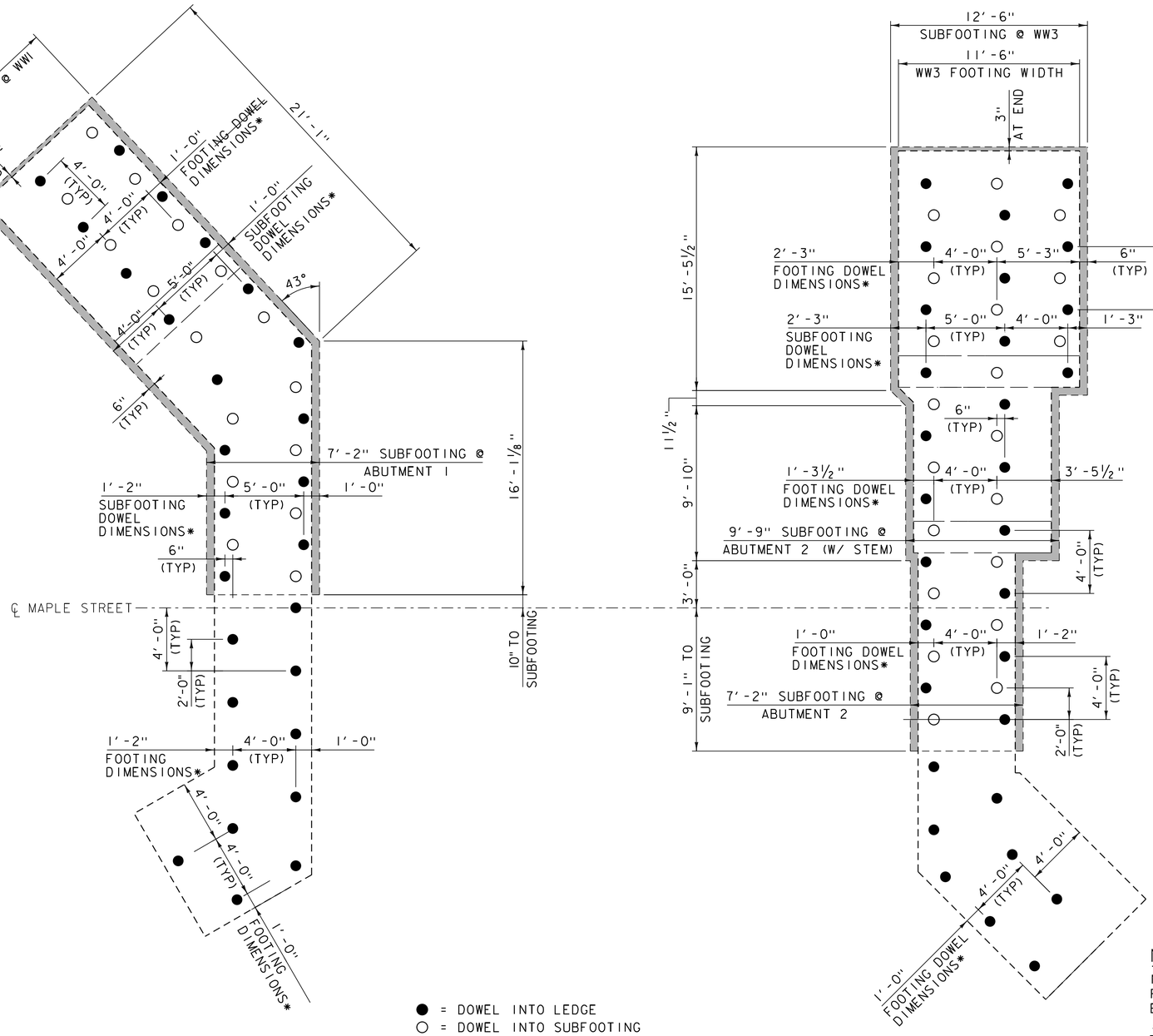
SCALE 3/4" = 1'-0"

* - FOR ESTIMATING PURPOSED ONLY. ACTUAL DIMENSIONS SHALL BE DETERMINED BY THE FABRICATOR.

PROJECT NAME: SALISBURY
PROJECT NUMBER: 57813.00

FILE NAME: 57813sub.dgn
PROJECT LEADER: S.E. BURBANK
DESIGNED BY: E.F. LAWES
ABUTMENT DETAILS (2 OF 2)

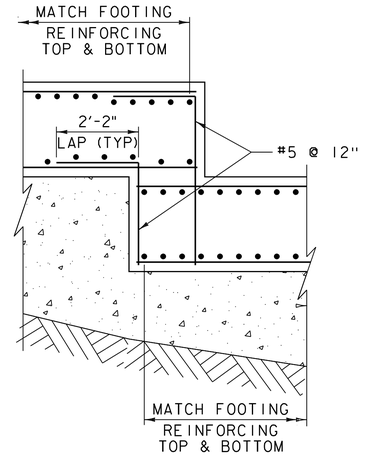
PLOT DATE: 4/19/2016
DRAWN BY: E.F. LAWES
CHECKED BY: R.H. BARNES
SHEET 18 OF 38



● = DOWEL INTO LEDGE
○ = DOWEL INTO SUBFOOTING

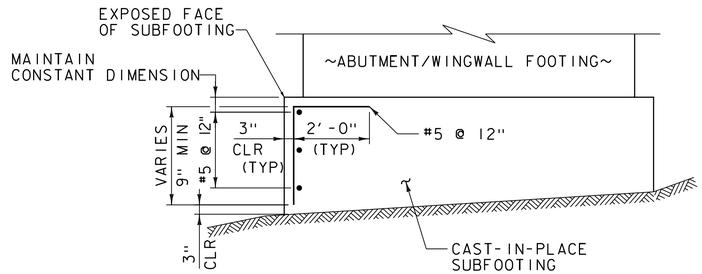
* - DIMENSIONS ARE FROM FACE OF FOOTING/SUBFOOTING TO DOWELS.

SUBFOOTING & DOWEL LAYOUT
SCALE ¼" = 1'-0"



NOTE: FOR INFORMATION NOT SHOWN SEE SUBSTRUCTURE REINFORCING DETAILS.

TYPICAL STEP FOOTING REBAR
SCALE ½" = 1'-0"

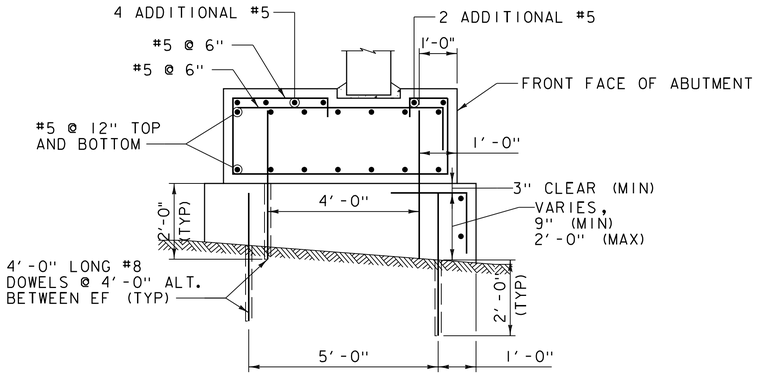


NOTE: FOR INFORMATION NOT SHOWN SEE SUBSTRUCTURE REINFORCING DETAILS.

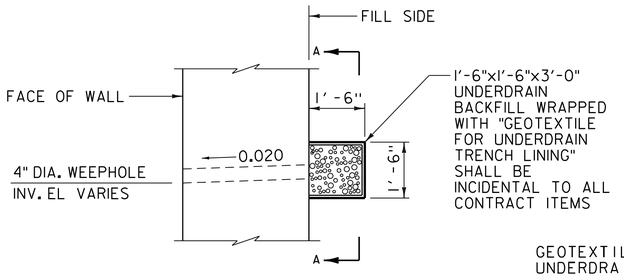
TYPICAL SUBFOOTING REINFORCING
SCALE ½" = 1'-0"

NOTE:
NF = NEAR FACE
FF = FAR FACE
EF = EACH FACE
▲ = CUT TO FIT IN FIELD
3" CLEAR, UNLESS OTHERWISE SPECIFIED ON THE PLANS.
2'-2" BAR LAP UNLESS OTHERWISE SPECIFIED ON THE PLANS.

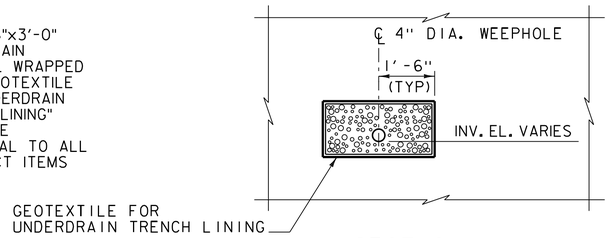
PROJECT NAME:	SALISBURY
PROJECT NUMBER:	57813.00
FILE NAME: 57813sub2.dgn	PLOT DATE: 4/19/2016
PROJECT LEADER: S.E. BURBANK	DRAWN BY: E.F. LAWES
DESIGNED BY: E.F. LAWES	CHECKED BY: R.H. BARNES
SUBFOOTING PLAN	SHEET 19 OF 38



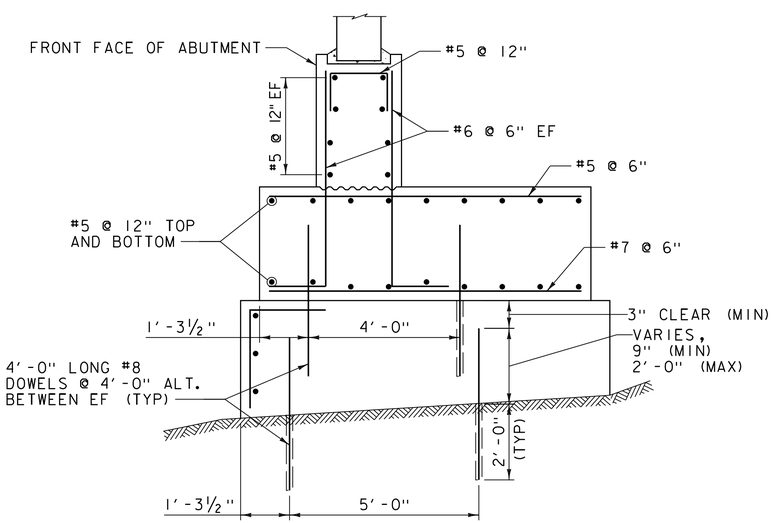
SECTION A-A
ABUTMENT NO. 1 & NO. 2 REINFORCING
SCALE ½" = 1'-0"



TYPICAL WEEPHOLE DETAIL
NOT TO SCALE



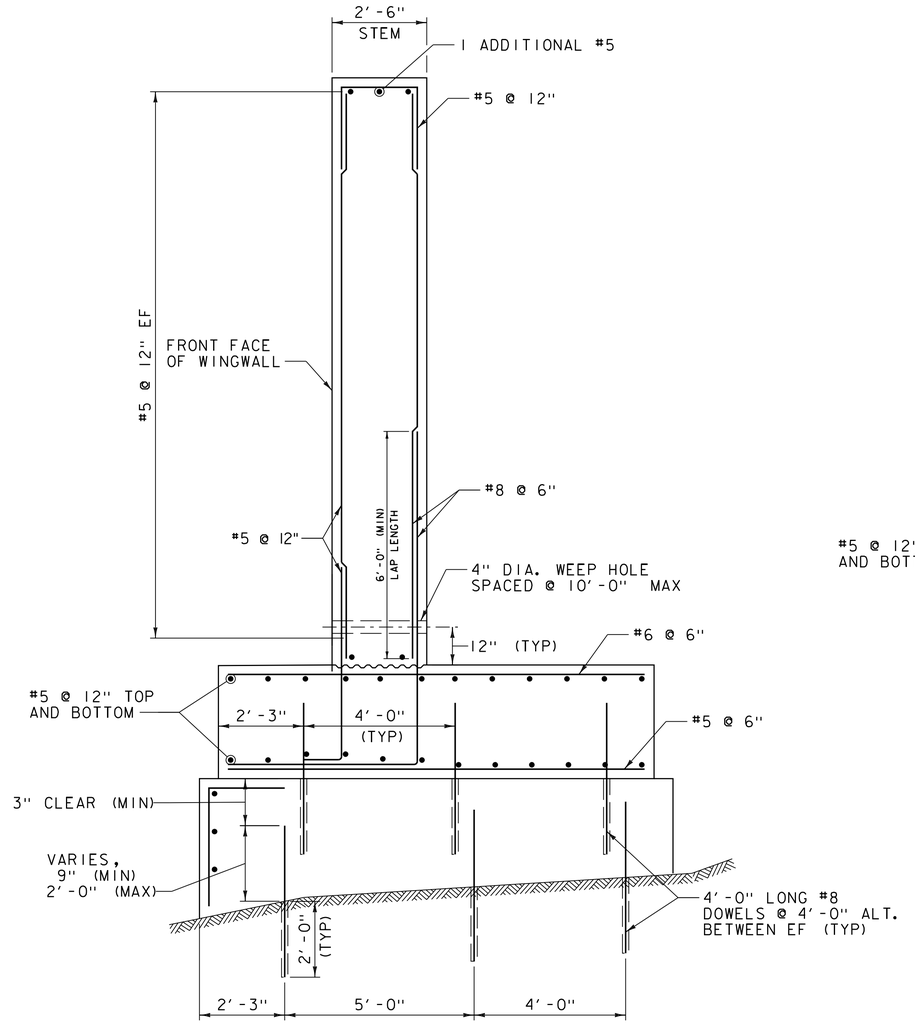
SECTION A-A
NOT TO SCALE



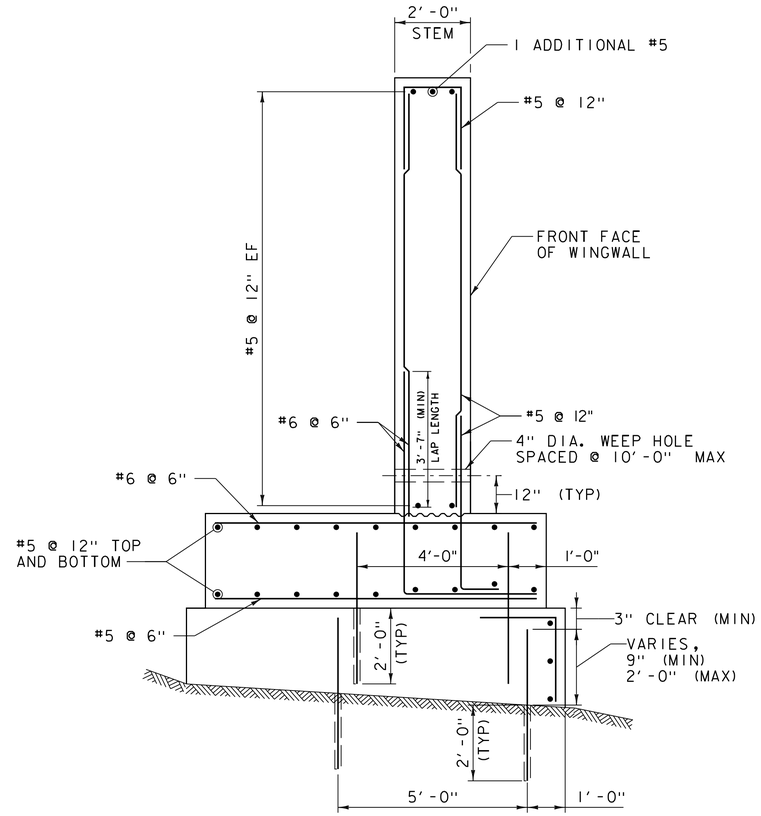
SECTION B-B
ABUTMENT NO. 2 REINFORCING
SCALE ½" = 1'-0"

NOTE:

NF = NEAR FACE
FF = FAR FACE
EF = EACH FACE
▲ = CUT TO FIT IN FIELD
3" CLEAR, UNLESS OTHERWISE
SPECIFIED ON THE PLANS.
2'-2" BAR LAP UNLESS OTHERWISE
SPECIFIED ON THE PLANS.



SECTION C-C
WINGWALL NO. 3 REINFORCING
SCALE ½" = 1'-0"

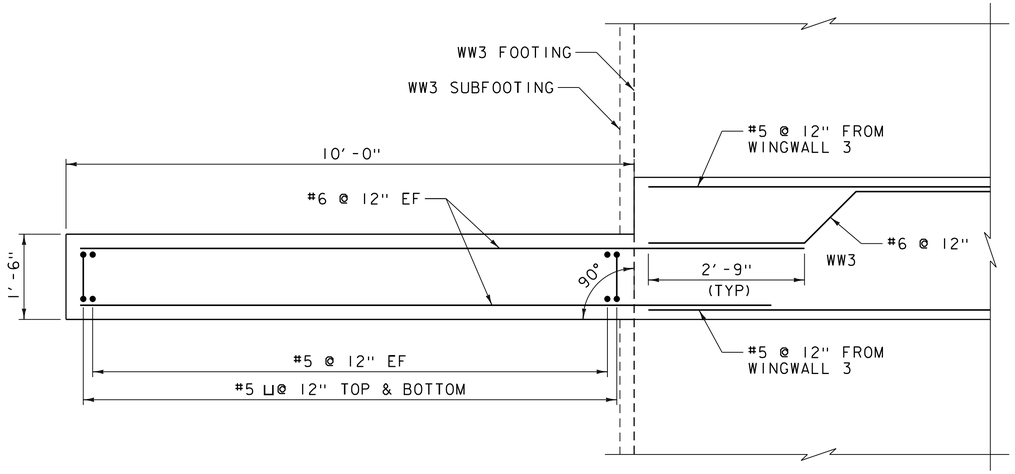


SECTION D-D W/ SUBFOOTING
WINGWALL NO. 1, 2, & 4 REINFORCING
SCALE ½" = 1'-0"
(SUBFOOTING SHOWN, SECTION WITHOUT SUBFOOTING SIMILAR)

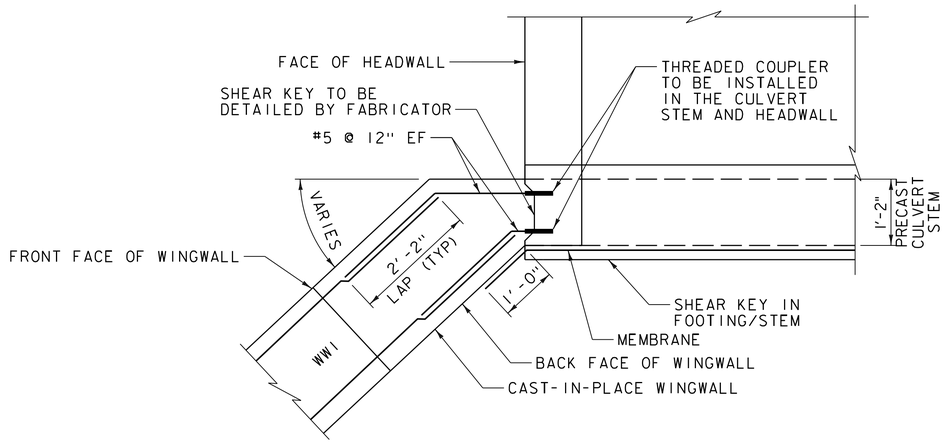
NOTE: THE CONTRACTOR IS RESPONSIBLE FOR DETERMINING THE LENGTHS OF REINFORCING BAR BENDS BASED ON THESE DRAWINGS.

PROJECT NAME: SALISBURY	
PROJECT NUMBER: 57813.00	
FILE NAME: 57813sub.dgn	PLOT DATE: 4/19/2016
PROJECT LEADER: S.E. BURBANK	DRAWN BY: E.F. LAWES
DESIGNED BY: E.F. LAWES	CHECKED BY: R.H. BARNES
SUBSTRUCTURE REINFORCING DETAILS (1 OF 2)	SHEET 20 OF 38

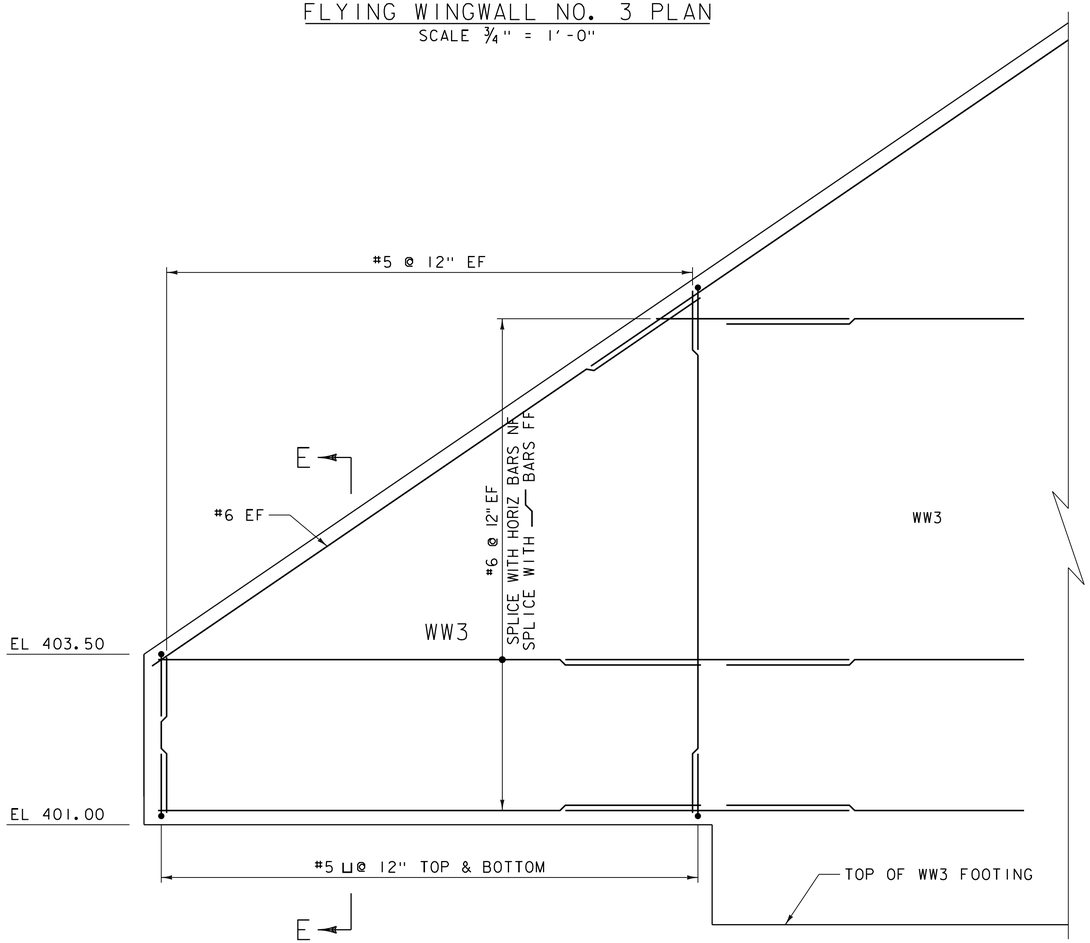
VHB 57813



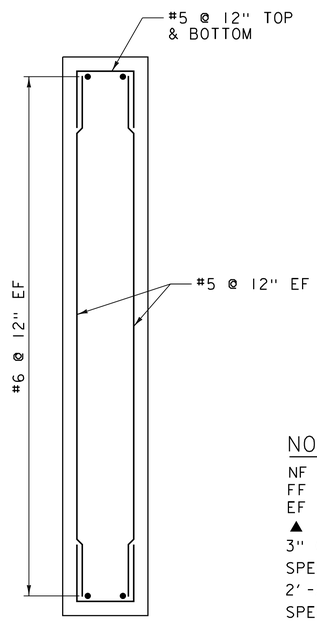
FLYING WINGWALL NO. 3 PLAN
SCALE 3/4" = 1'-0"



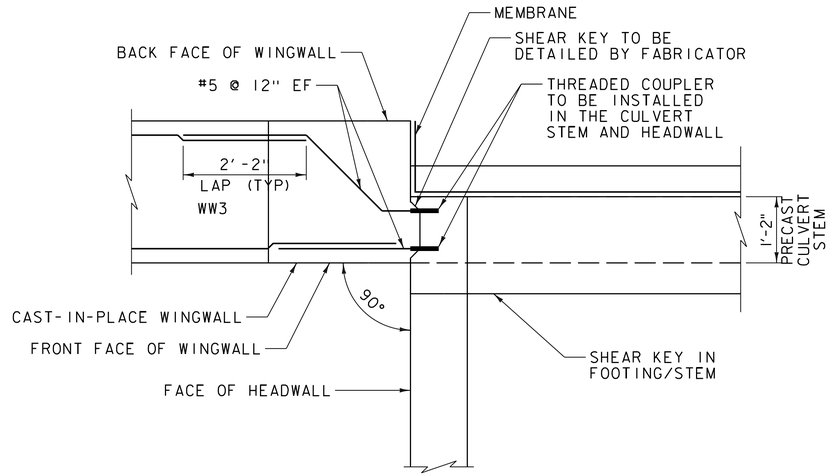
WINGWALL NO. 1
CONNECTION DETAIL
(WINGWALL NO. 2 & 4 SIMILAR)
SCALE 3/4" = 1'-0"



FLYING WINGWALL NO. 3 ELEVATION
SCALE 3/4" = 1'-0"



SECTION E-E
SCALE 3/4" = 1'-0"



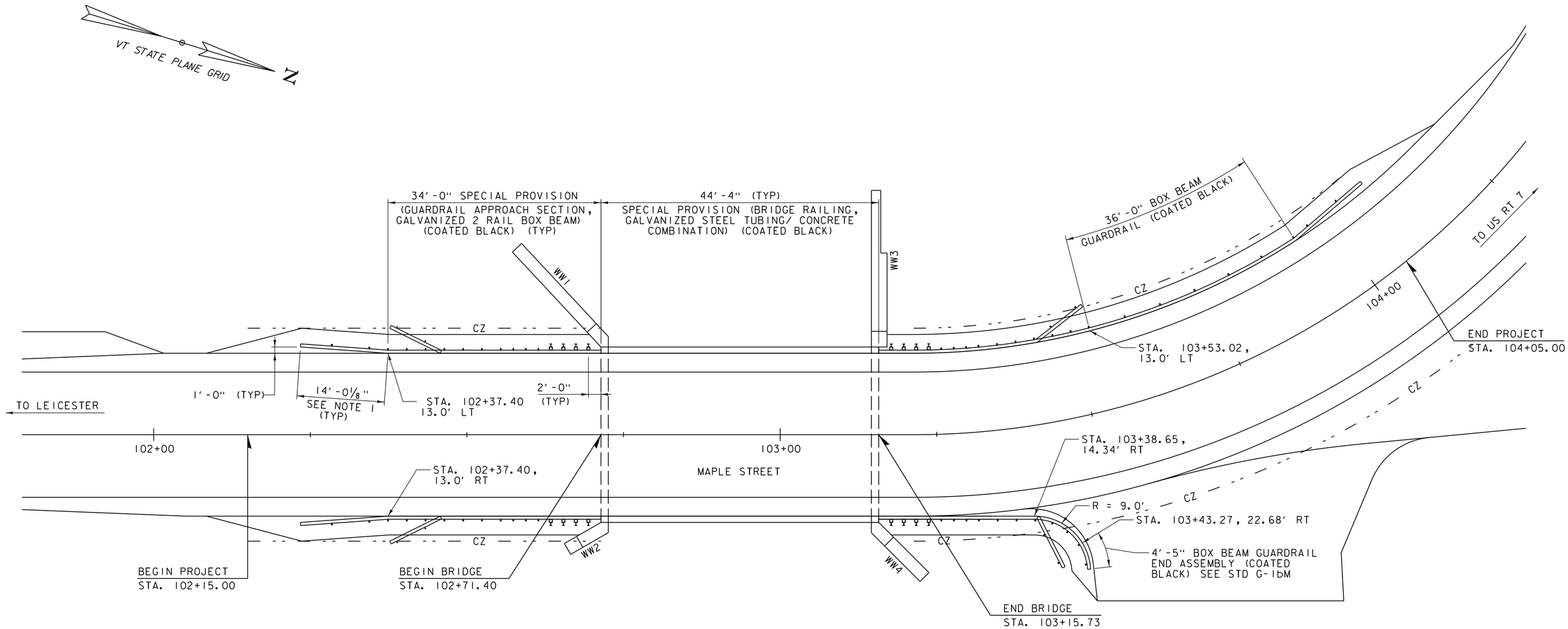
WINGWALL NO. 3
CONNECTION DETAIL
SCALE 3/4" = 1'-0"

NOTE:
NF = NEAR FACE
FF = FAR FACE
EF = EACH FACE
▲ = CUT TO FIT IN FIELD
3" CLEAR, UNLESS OTHERWISE SPECIFIED ON THE PLANS.
2'-2" BAR LAP UNLESS OTHERWISE SPECIFIED ON THE PLANS.

NOTE: THE CONTRACTOR IS RESPONSIBLE FOR DETERMINING THE LENGTHS AND REINFORCING BAR BENDS BASED ON THESE DRAWINGS.

PROJECT NAME:	SALISBURY
PROJECT NUMBER:	57813.00
FILE NAME: 57813sub.dgn	PLOT DATE: 4/19/2016
PROJECT LEADER: S.E. BURBANK	DRAWN BY: E.F. LAWES
DESIGNED BY: E.F. LAWES	CHECKED BY: R.H. BARNES
SUBSTRUCTURE REINFORCING DETAILS (2 OF 2)	SHEET 21 OF 38

VHB 57813



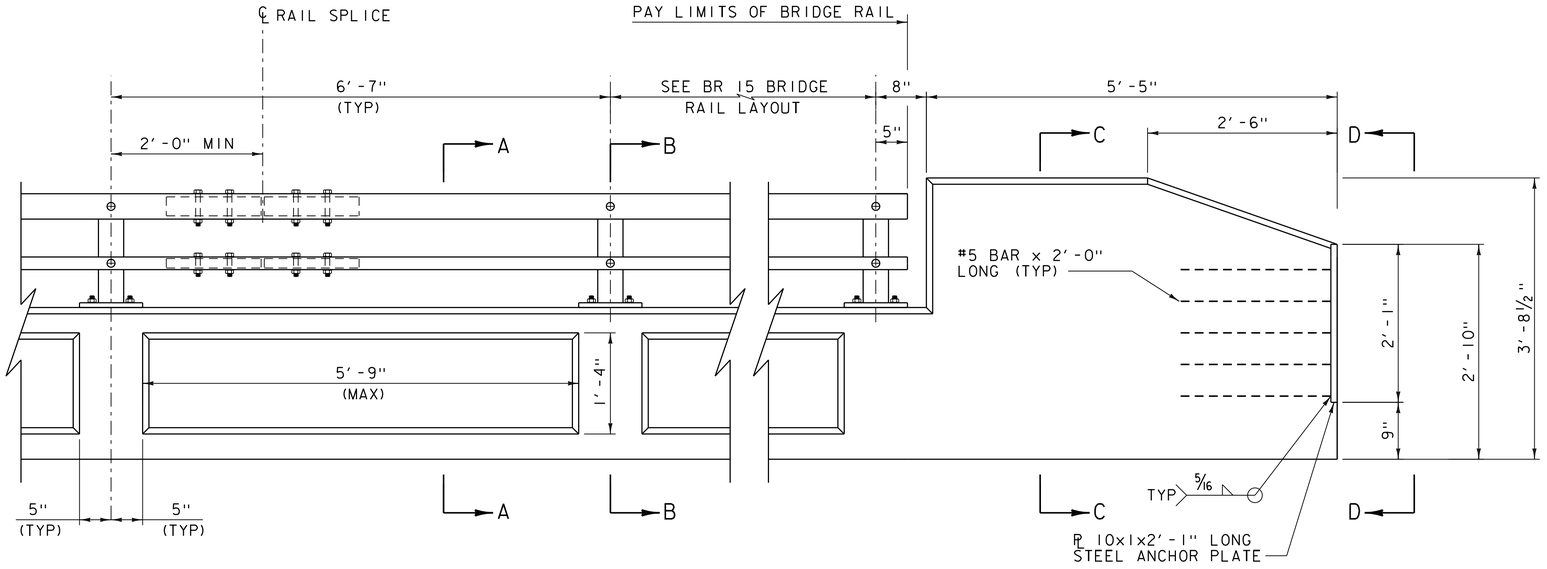
RAIL LAYOUT PLAN

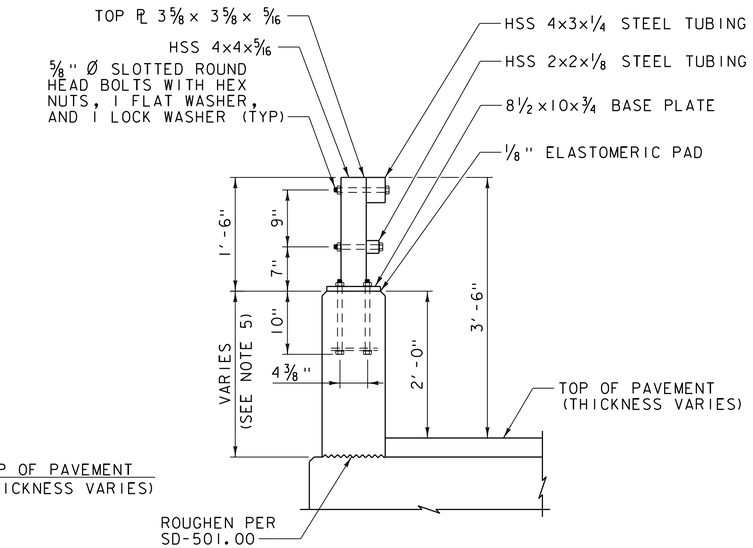
SCALE 1/8" = 1'-0"

NOTES:

1. 14'-0 1/8" MANUFACTURED TERMINAL SECTION, TANGENT (COATED BLACK).
2. SEE STANDARD G1-Bm FOR BOX BEAM DETAILS.
3. THE CONTRACTOR'S ATTENTION IS CALLED TO THE SUPERELEVATION ON THE BRIDGE. THE BRIDGE RAIL SHALL MAINTAIN THE PROPER HEIGHT FROM THE TOP OF PAVEMENT TO THE TOP OF THE RAILING.

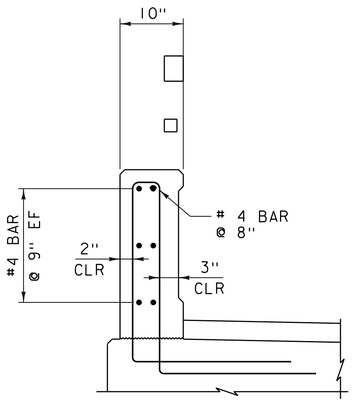
PROJECT NAME: SALISBURY	
PROJECT NUMBER: 57813.00	
FILE NAME: 57813brail.dgn	PLOT DATE: 4/19/2016
PROJECT LEADER: S.E. BURBANK	DRAWN BY: E.F. LAWES
DESIGNED BY: E.F. LAWES	CHECKED BY: S.E. BURBANK
RAIL LAYOUT SHEET	SHEET 22 OF 38



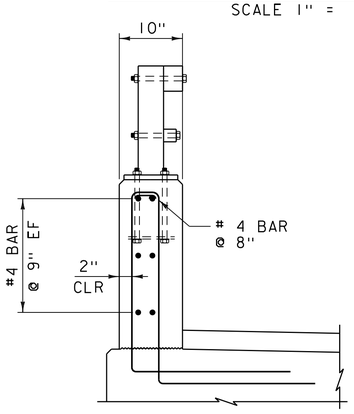


RAIL TYPICAL SECTION
SCALE 1" = 1'-0"

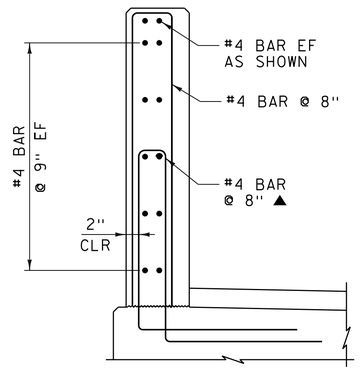
RAILING & END WALL APPROACH
SCALE 1" = 1'-0"



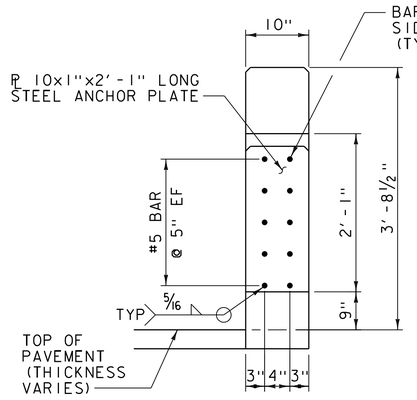
SECTION A-A
SCALE 1" = 1'-0"



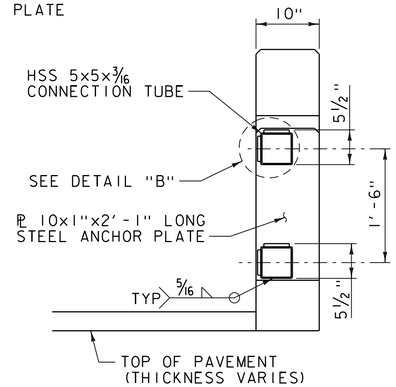
SECTION B-B
SCALE 1" = 1'-0"



SECTION C-C
SCALE 1" = 1'-0"



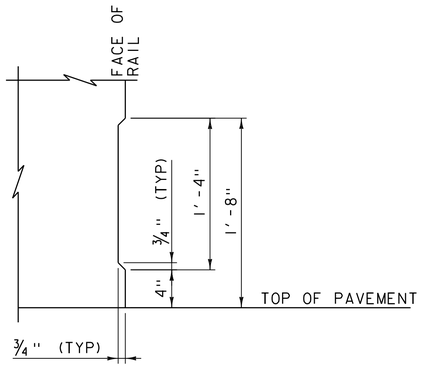
SHOWING EMBEDDED REBAR



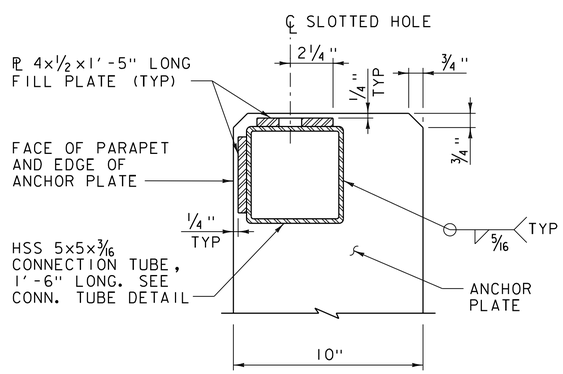
WITH HSS CONNECTOR TUBE

NOTE:

NF = NEAR FACE
FF = FAR FACE
EF = EACH FACE
▲ = CUT TO FIT IN FIELD
3" CLEAR, UNLESS OTHERWISE SPECIFIED ON THE PLANS.
2'-2" BAR LAP UNLESS OTHERWISE SPECIFIED ON THE PLANS.

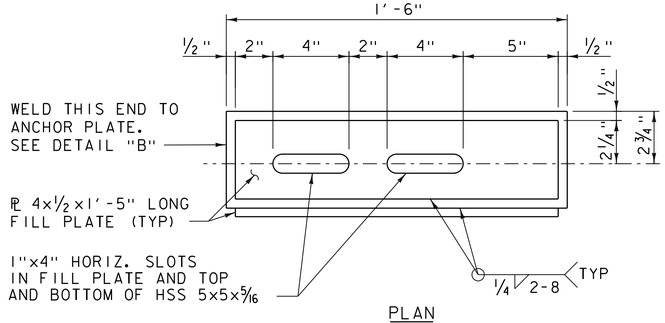


ASTHETIC TREATMENT DETAIL
SCALE 1½" = 1'-0"



DETAIL B
SCALE 3" = 1'-0"

VIEW D-D



PLAN

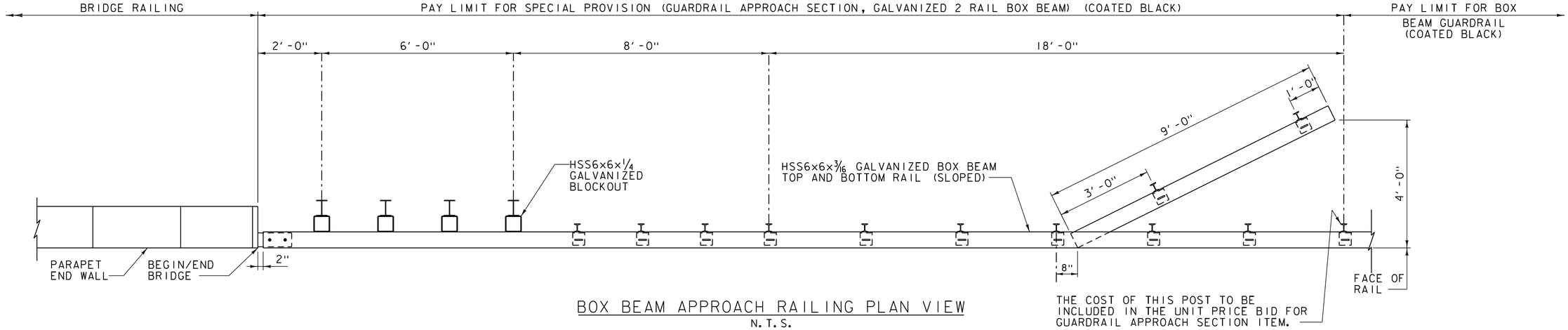
CONNECTION TUBE DETAIL
SCALE 3" = 1'-0"

NOTES:

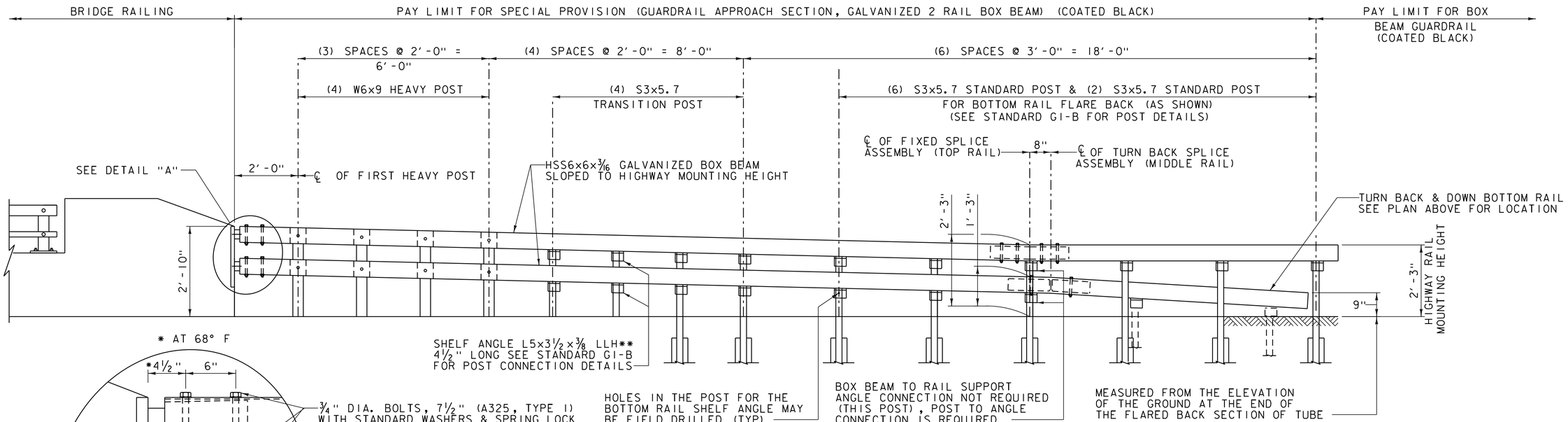
1. PARAPET SHALL HAVE A RUBBED FINISH IN ACCORDANCE WITH SECTION 501.
2. HOLES AND RECESSES ARE TO BE FORMED OR CORED, PERCUSSION DRILLING IS NOT ALLOWED.
3. ALL STEEL COMPONENTS SHALL BE POWDER COATED BLACK AFTER GALVANIZING IN ACCORDANCE WITH THE SPECIAL PROVISION.
4. SEE PROJECT NOTES SHEET FOR BRIDGE RAILING NOTES.
5. SEE STANDARDS S-352B & S-352C FOR STEEL TUBING SPLICE DETAILS AND RAIL POST BASE PLATE DETAILS.

PROJECT NAME: SALISBURY	
PROJECT NUMBER: 57813.00	
FILE NAME: 57813brail_dt.dgn	PLOT DATE: 4/19/2016
PROJECT LEADER: S.E. BURBANK	DRAWN BY: J.L. LEMIEUX
DESIGNED BY: VTRANS	CHECKED BY: VHB
BRIDGE RAIL DETAILS (1 OF 2)	SHEET 23 OF 38

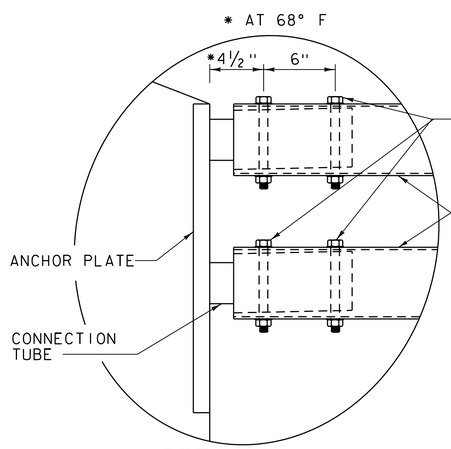
VHB 57813



BOX BEAM APPROACH RAILING PLAN VIEW
N.T.S.



BOX BEAM APPROACH RAILING ELEVATION
N.T.S.



DETAIL "A"
N.T.S.

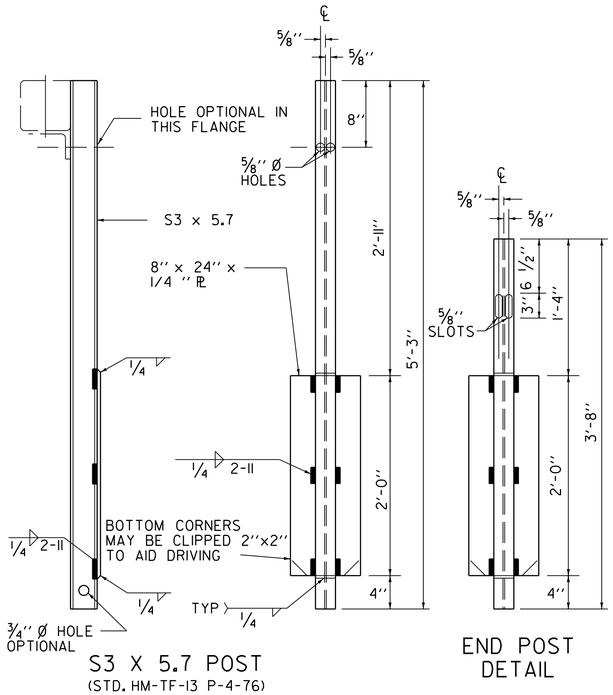
**LONG LEG HORIZONTAL

NOTES:

1. ALL STEEL COMPONENTS TO BE COLOR GALVANIZED OR POWDER COATED BLACK AFTER GALVANIZING IN ACCORDANCE WITH THE SPECIAL PROVISION.
2. SEE BRIDGE RAIL DETAILS (1 OF 2) FOR ANCHOR PLATE AND CONNECTION TUBE DETAILS.
3. SEE STANDARD G-1Bm FOR RAIL POST DETAILS AND BOX BEAM RAIL DETAILS.

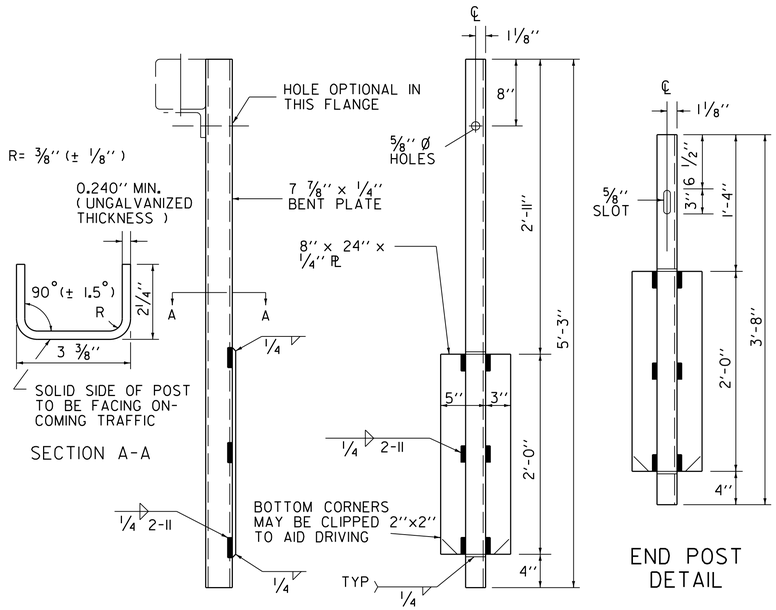
PROJECT NAME: SALISBURY	
PROJECT NUMBER: 57813.00	
FILE NAME: 57813brail_dt.dgn	PLOT DATE: 4/19/2016
PROJECT LEADER: S.E. BURBANK	DRAWN BY: J.L. LEMIEUX
DESIGNED BY: VTRANS	CHECKED BY: VHB
BRIDGE RAIL DETAILS (2 OF 2)	SHEET 24 OF 38

VHB 57813



S3 X 5.7 POST
(STD. HM-TF-13 P-4-76)

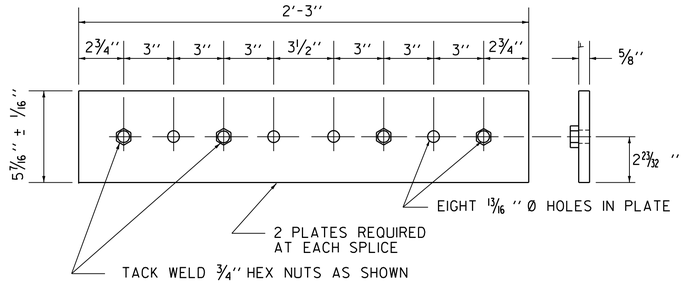
END POST DETAIL



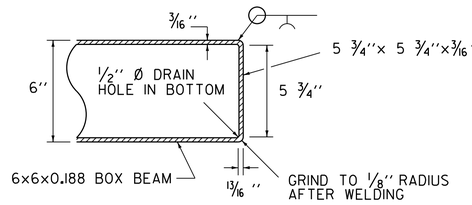
SECTION A-A

ALTERNATE POST (BENT PLATE)
(STD. HM-TF-13 P-49-76)

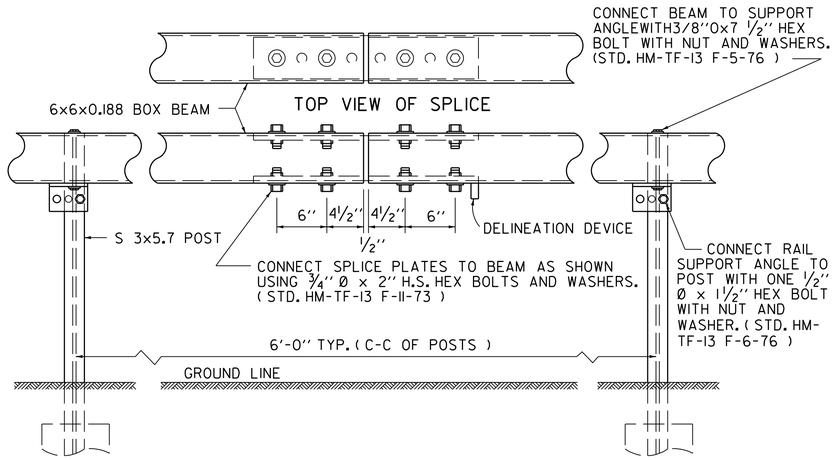
END POST DETAIL



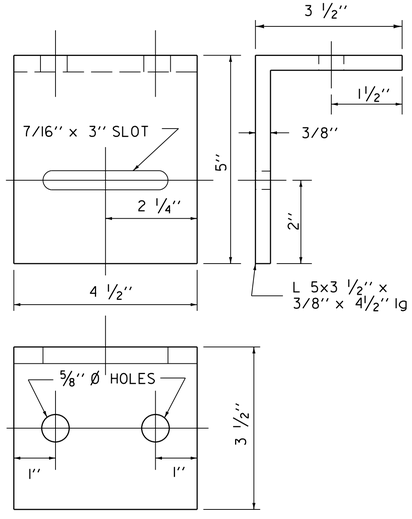
SPLICE PLATE DETAIL
(STD. HM-TF-13 RE-11-73)



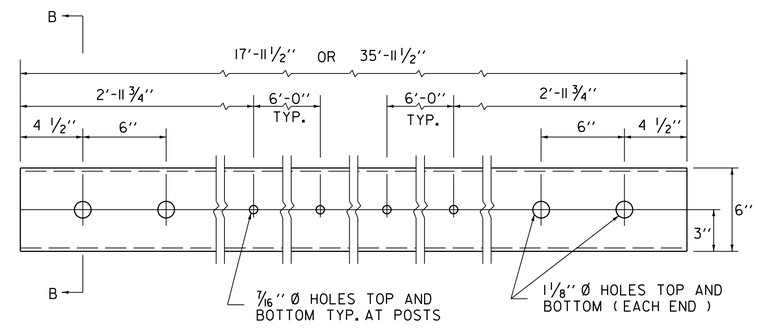
END COVER PLATE DETAIL



TYPICAL INSTALLATION SHOWING SPLICE DETAIL

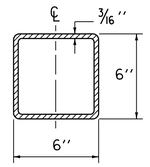


RAIL SUPPORT ANGLE
(STD. HM-TF-13 P-5-76)



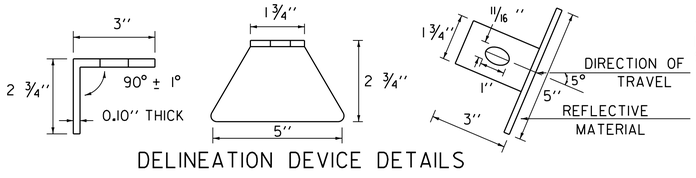
NOTES:

1. RAIL SECTIONS FOR TANGENT RUNS WILL BE EITHER 17'-11 1/2'' OR 35'-11 1/2'' IN LENGTH.
2. ON CURVES, CHORD LENGTHS WILL BE NO LESS THAN 12 FEET.
3. FOR CURVES GREATER THAN 8°, RAIL SECTIONS SHALL BE SHOPFORMED TO THE REQUIRED CURVATURE. PAYMENT OF SUCH SHOP WORK WILL BE CONSIDERED TO BE SUBSIDIARY TO BOX BEAM GUARD RAIL.
4. WELD OR GALVANIZING PROTRUSIONS WILL NOT BE PERMITTED ON TOP OR BOTTOM INSIDE WALLS IN SPLICE AREA.



SECTION B-B

6x6x0.188 BOX BEAM RAIL ELEMENT
(STD. HM-TF-13 RE-10-76)



DELINEATION DEVICE DETAILS

THIS REFLECTORIZED ALUMINUM DELINEATION DEVICE IS TO BE ERECTED EVERY 36 FEET, AT SPLICES. DELINEATOR SHALL MEET SPECIFICAITON REQUIRMENTS FOR ASTM B209 ALLOY 5052-H32.

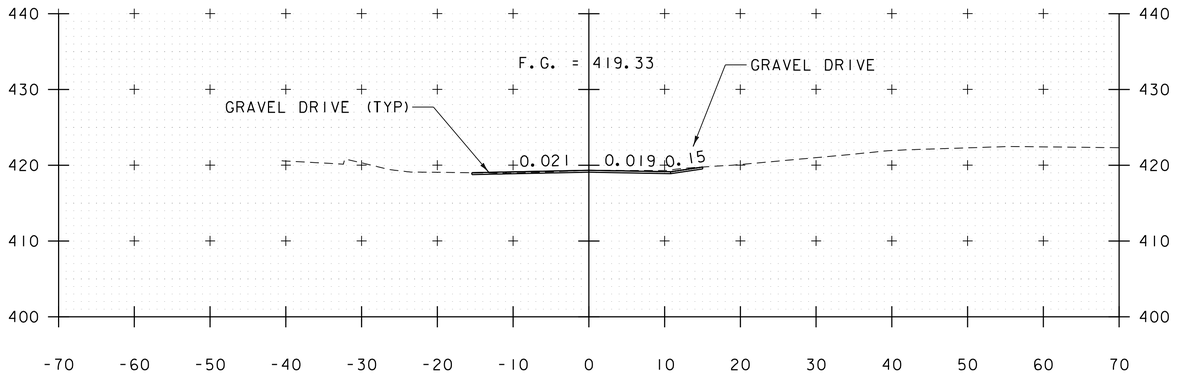
REFLECTIVE MATERIAL SHALL MEET THE REQUIREMENTS OF SUBSECTION 750.09 AND SHALL BE OF ENCAPSULATED LENS SILVER OR AMBER. AMBER IS TO BE INSTALLED ON THE LEFT OR MEDIAN SIDE OF INTERSTATE ROADWAYS OR RAMPS.

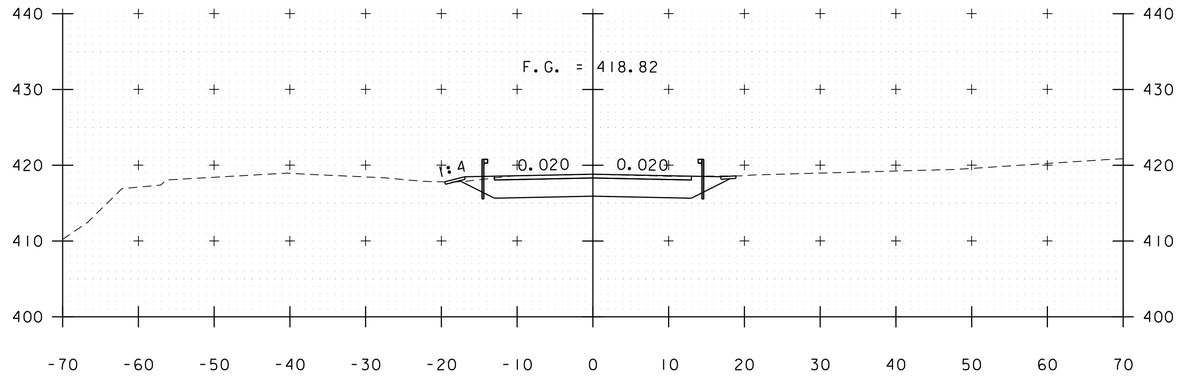
BOX BEAM GUARD RAIL DETAILS

NOT TO SCALE

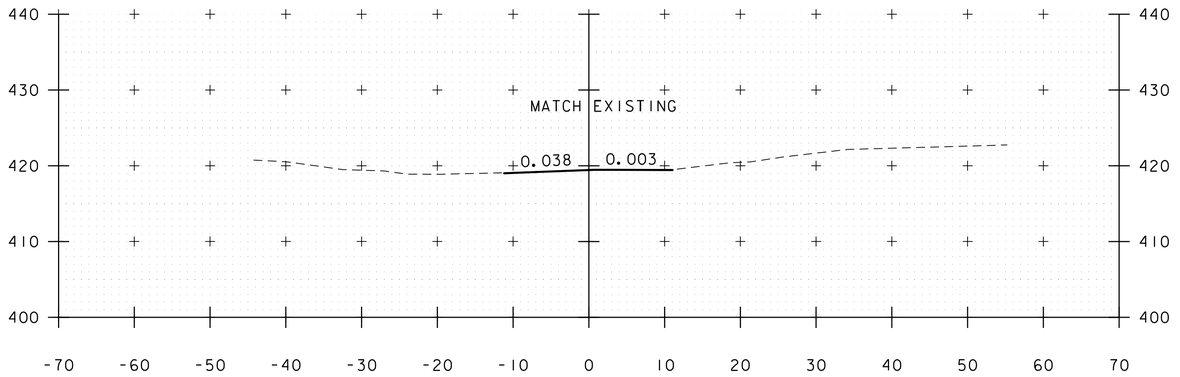
PROJECT NAME:	SALISBURY
PROJECT NUMBER:	57813.00
FILE NAME: 57813brail_dt.dgn	PLOT DATE: 4/19/2016
PROJECT LEADER: S.E. BURBANK	DRAWN BY: K.C. BARRY
DESIGNED BY: K.C. BARRY	CHECKED BY: S.E. BURBANK
BOX BEAM GUARD RAIL DETAILS	SHEET 25 OF 38

VHB 57813

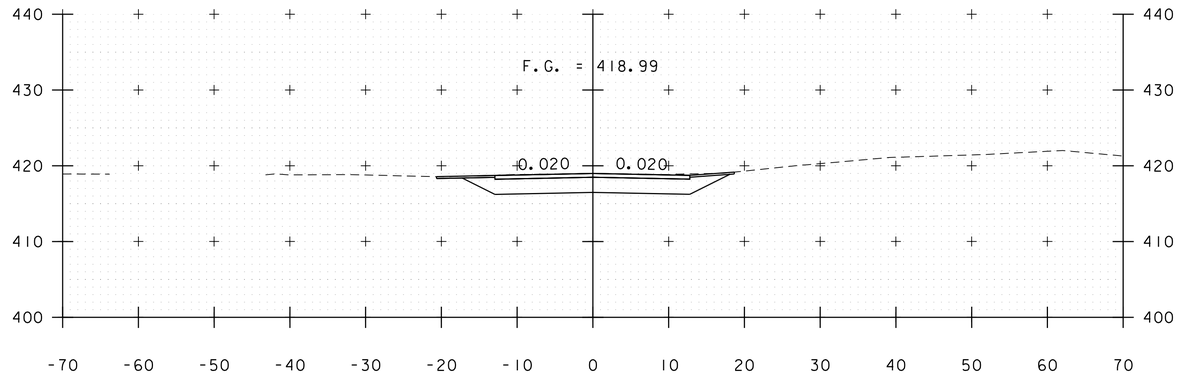




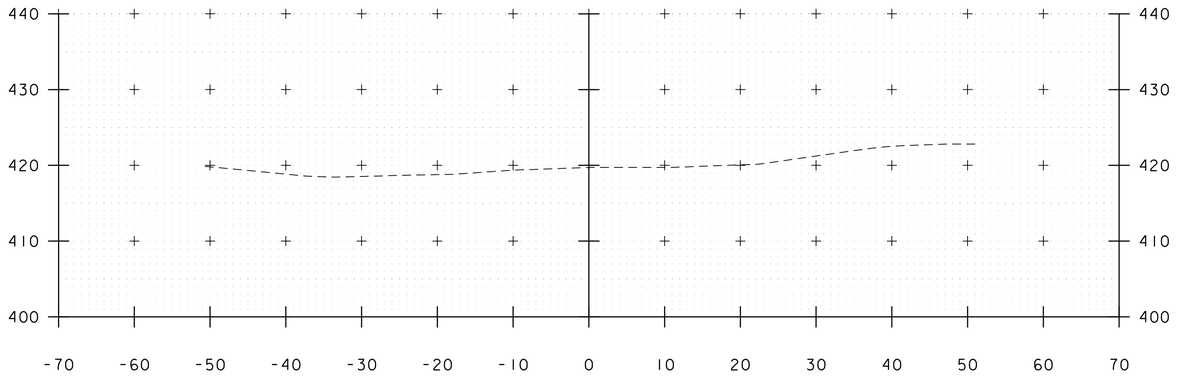
101+50



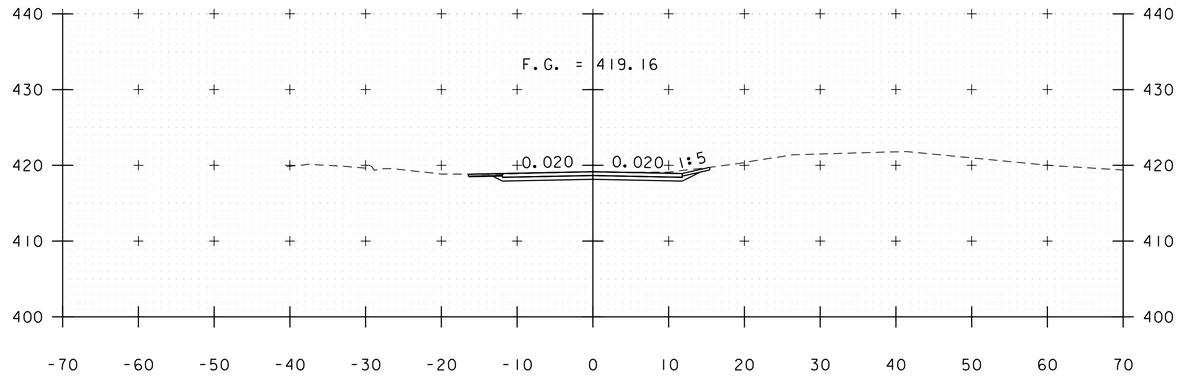
102+25
BEGIN PROJECT
STA. 102+15.00



101+25
BEGIN APPROACH
STA. 101+25.00



102+00



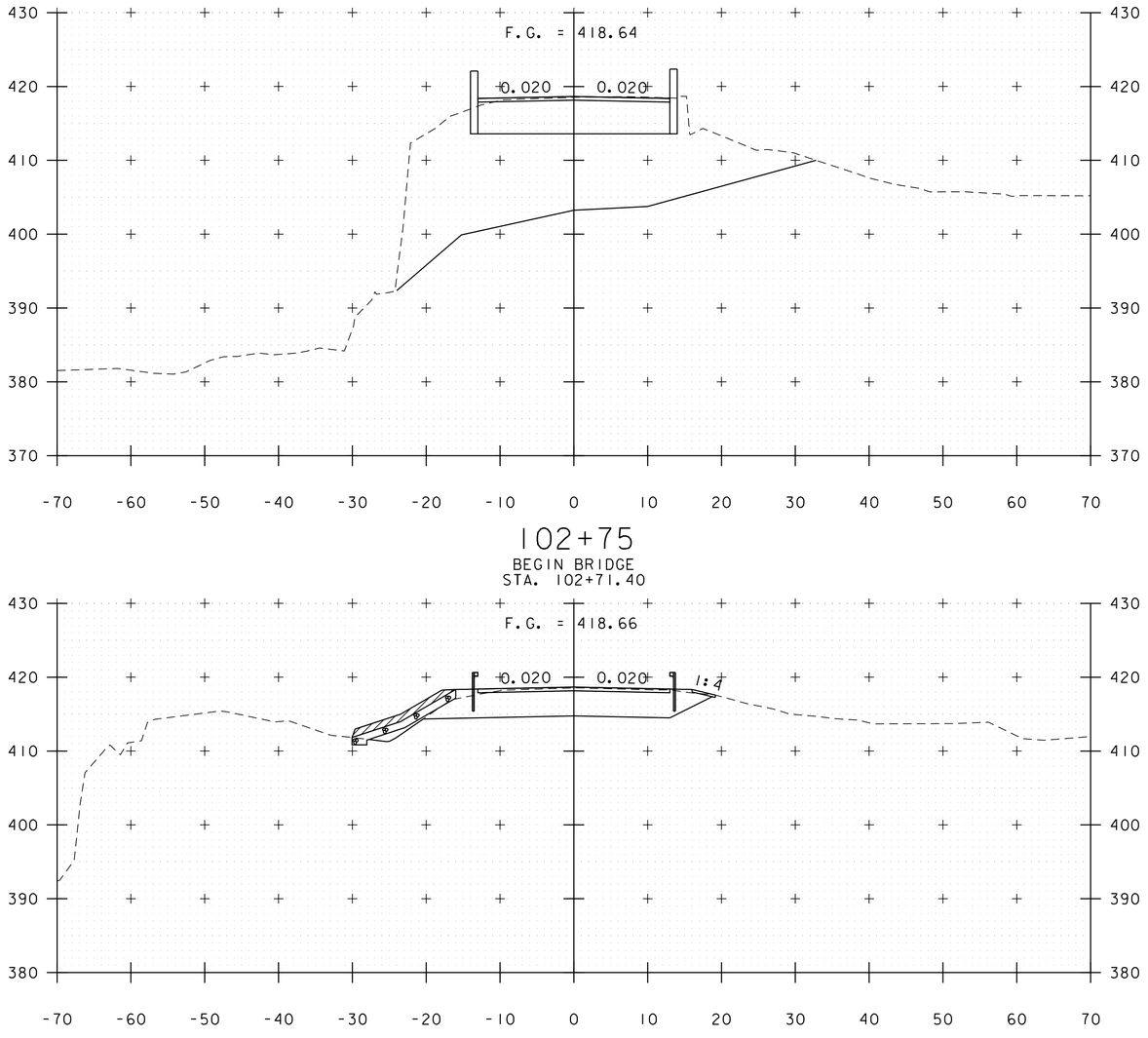
101+00

101+75

ROADWAY CROSS SECTIONS

STA. 101+00 - 102+25
SCALE 1" = 10-0'

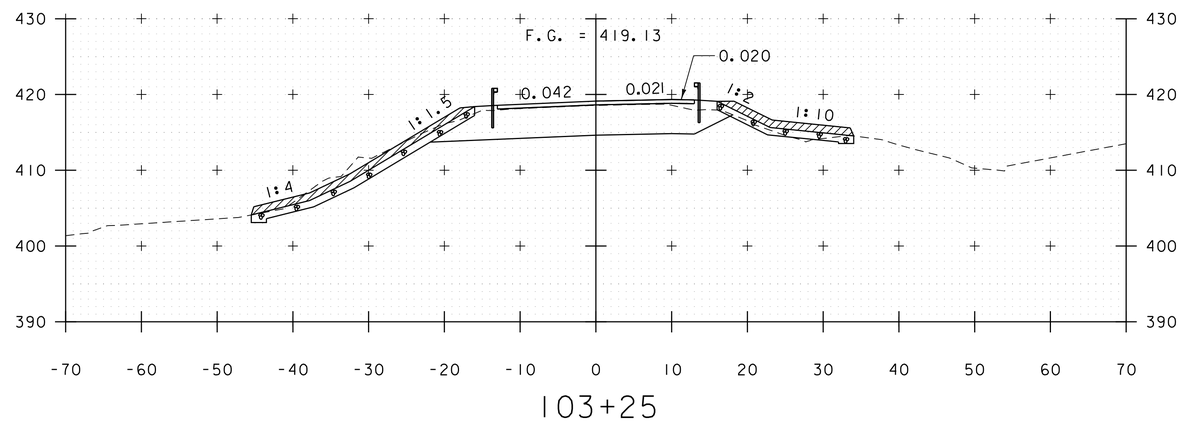
PROJECT NAME:	SALISBURY
PROJECT NUMBER:	57813.00
FILE NAME: 57813xs.dgn	PLOT DATE: 4/19/2016
PROJECT LEADER: S.E. BURBANK	DRAWN BY: P.A. MILLER
DESIGNED BY: P.A. MILLER	CHECKED BY: E.F. LAWES
ROADWAY CROSS SECTIONS (1 OF 4)	SHEET 26 OF 38



102+75

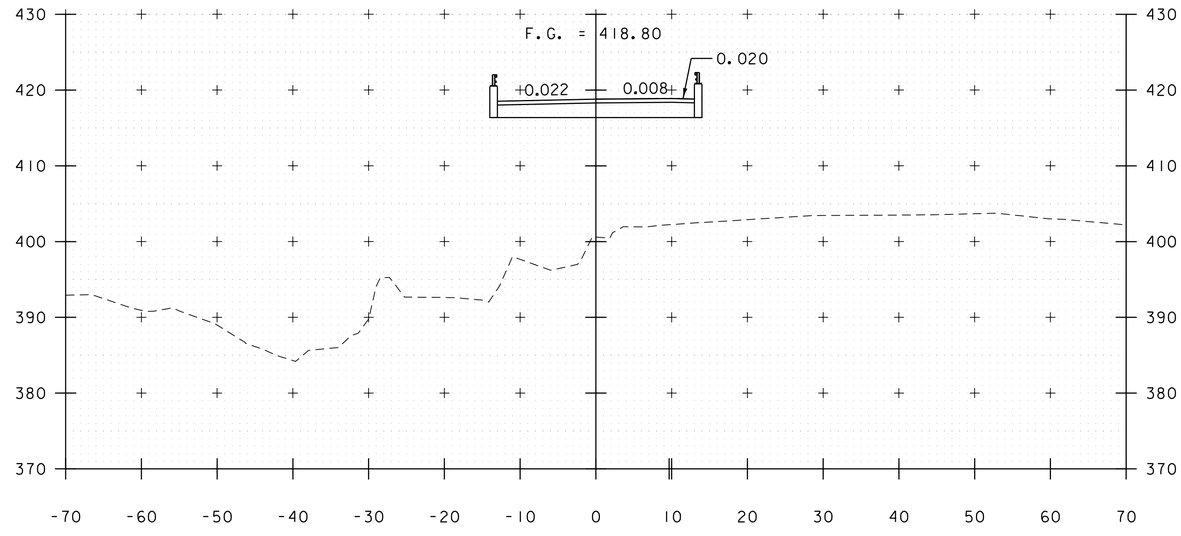
BEGIN BRIDGE
STA. 102+71.40

102+50



103+25

END BRIDGE
STA. 103+15.73

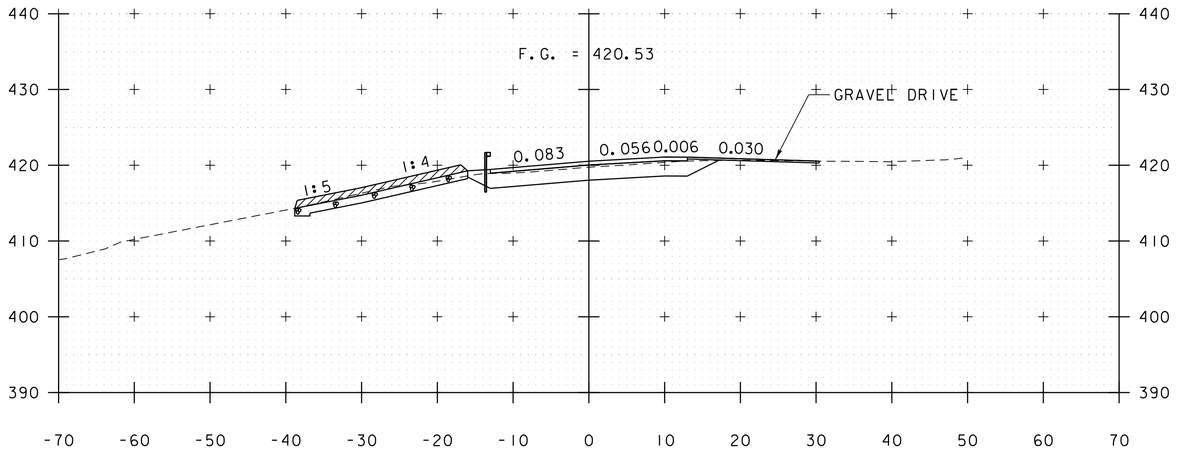


103+00

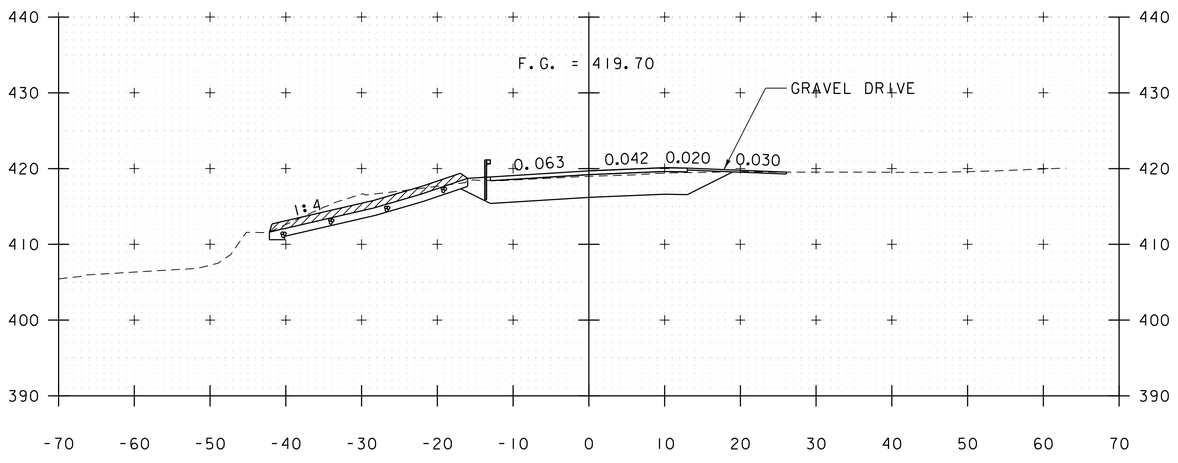
ROADWAY CROSS SECTIONS

STA. 102+50 - 103+25
SCALE 1" = 10-0'

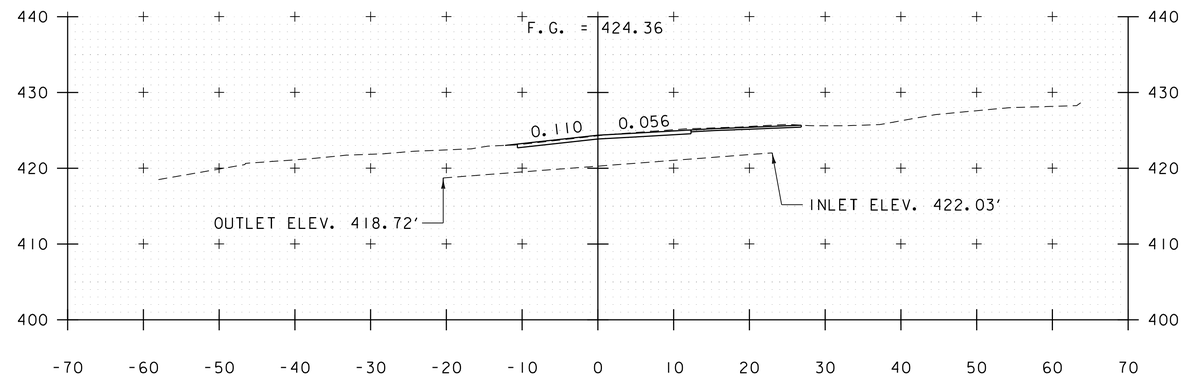
PROJECT NAME:	SALISBURY
PROJECT NUMBER:	57813.00
FILE NAME: 57813xs.dgn	PLOT DATE: 4/19/2016
PROJECT LEADER: S.E. BURBANK	DRAWN BY: P.A. MILLER
DESIGNED BY: P.A. MILLER	CHECKED BY: E.F. LAWES
ROADWAY CROSS SECTIONS (2 OF 4)	SHEET 27 OF 38



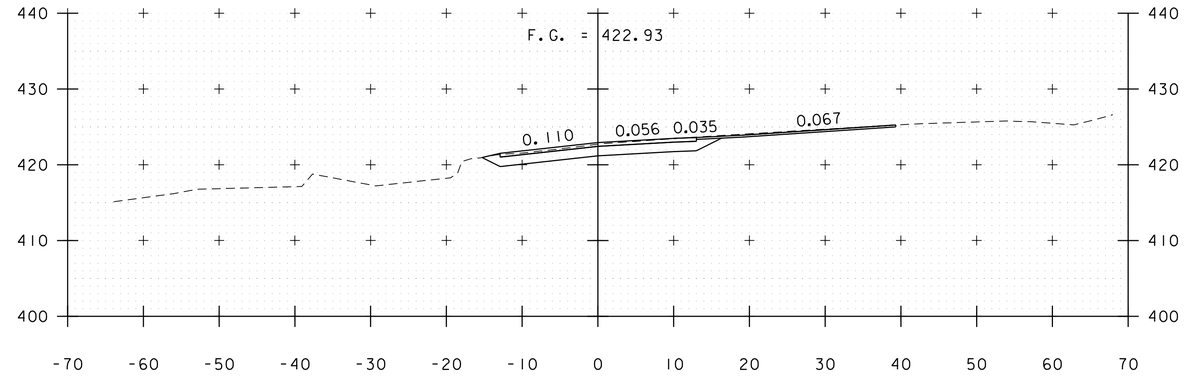
103+75



103+50

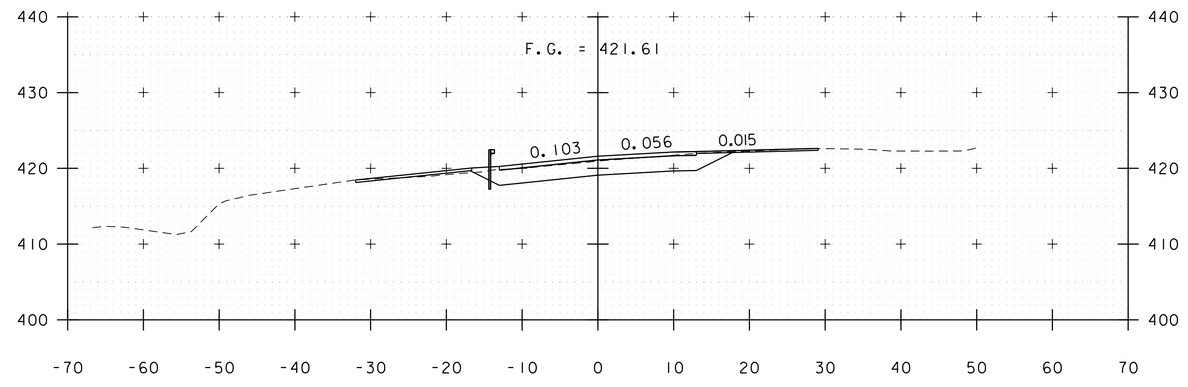


104+50



104+25

END PROJECT
STA. 104+05.00



104+00

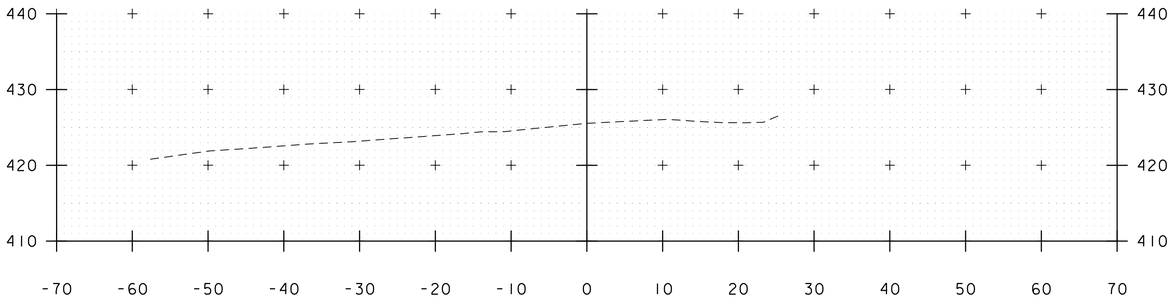
ROADWAY CROSS SECTIONS

STA. 103+50 - 104+50
SCALE 1" = 10-0'

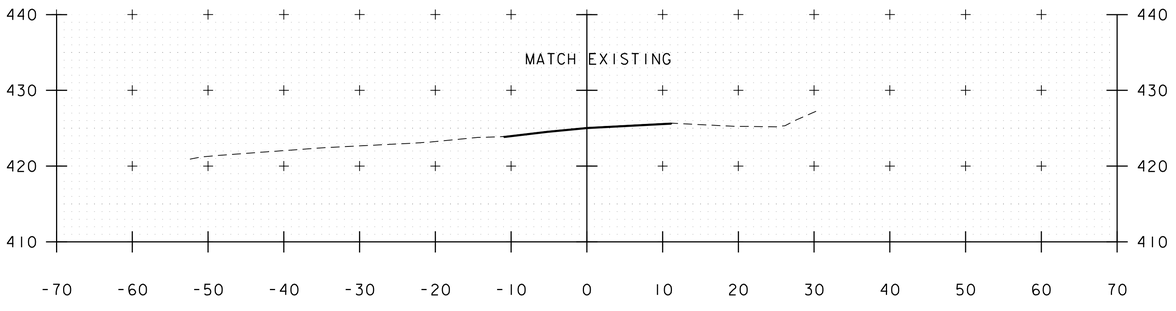
vhb

PROJECT NAME:	SALISBURY
PROJECT NUMBER:	57813.00
FILE NAME: 57813xs.dgn	PLOT DATE: 4/19/2016
PROJECT LEADER: S.E. BURBANK	DRAWN BY: P.A. MILLER
DESIGNED BY: P.A. MILLER	CHECKED BY: E.F. LAWES
ROADWAY CROSS SECTIONS (3 OF 4)	SHEET 28 OF 38

VHB 57813.00



104+75

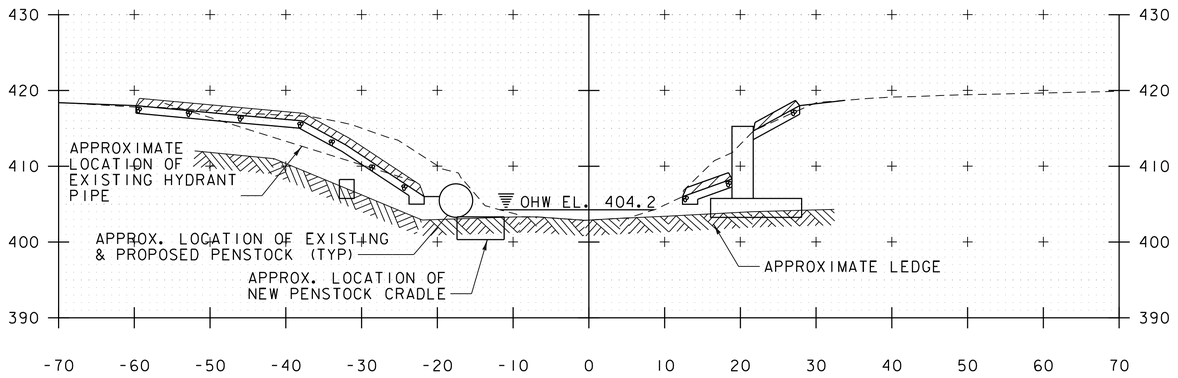


104+65
END APPROACH
STA. 104+65.00

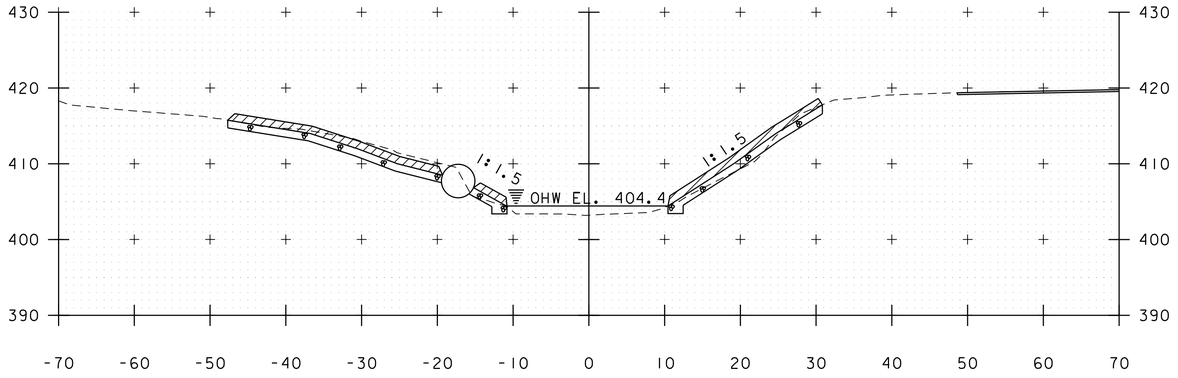
ROADWAY CROSS SECTIONS

STA. 104+65 - 106+75
SCALE 1" = 10-0'

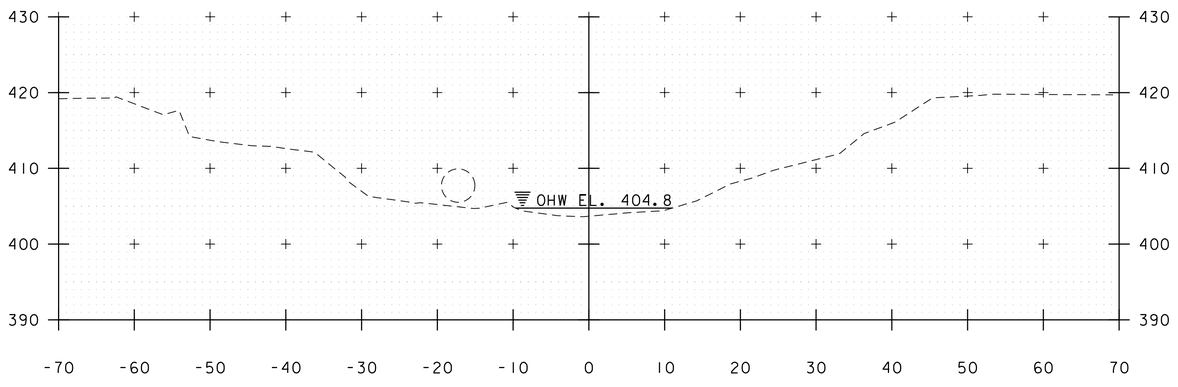
PROJECT NAME: SALISBURY	
PROJECT NUMBER: 57813.00	
FILE NAME: 57813xs.dgn	PLOT DATE: 4/19/2016
PROJECT LEADER: S.E. BURBANK	DRAWN BY: P.A. MILLER
DESIGNED BY: P.A. MILLER	CHECKED BY: E.F. LAWES
ROADWAY CROSS SECTIONS (4 OF 4)	SHEET 29 OF 38



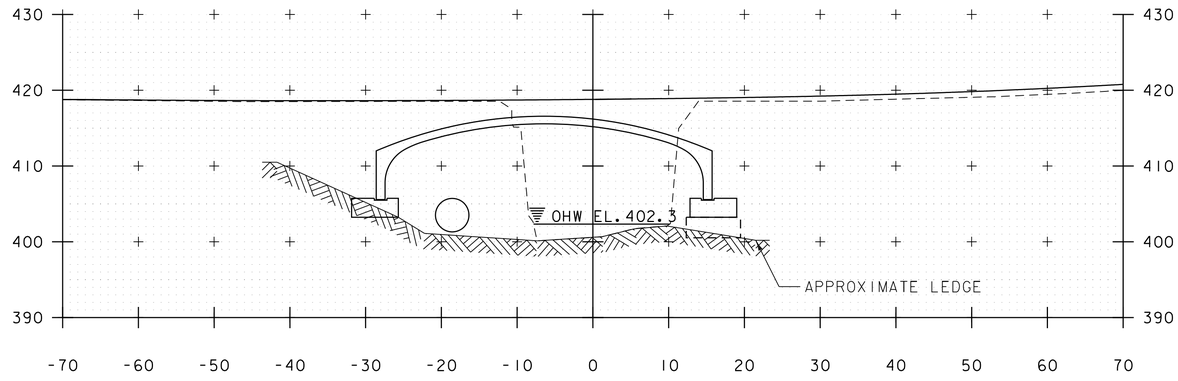
10+30



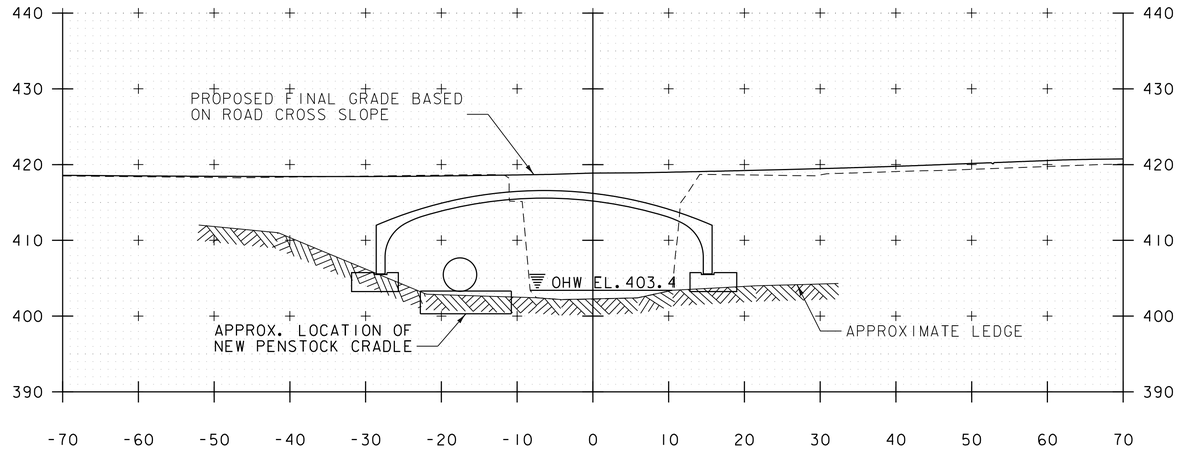
10+25



10+00



10+50



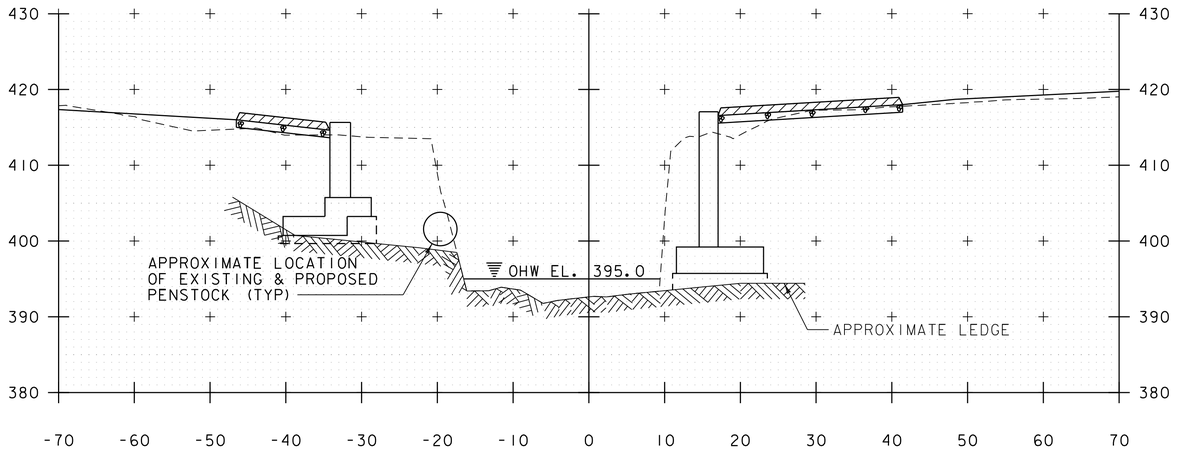
10+40

CHANNEL CROSS SECTIONS

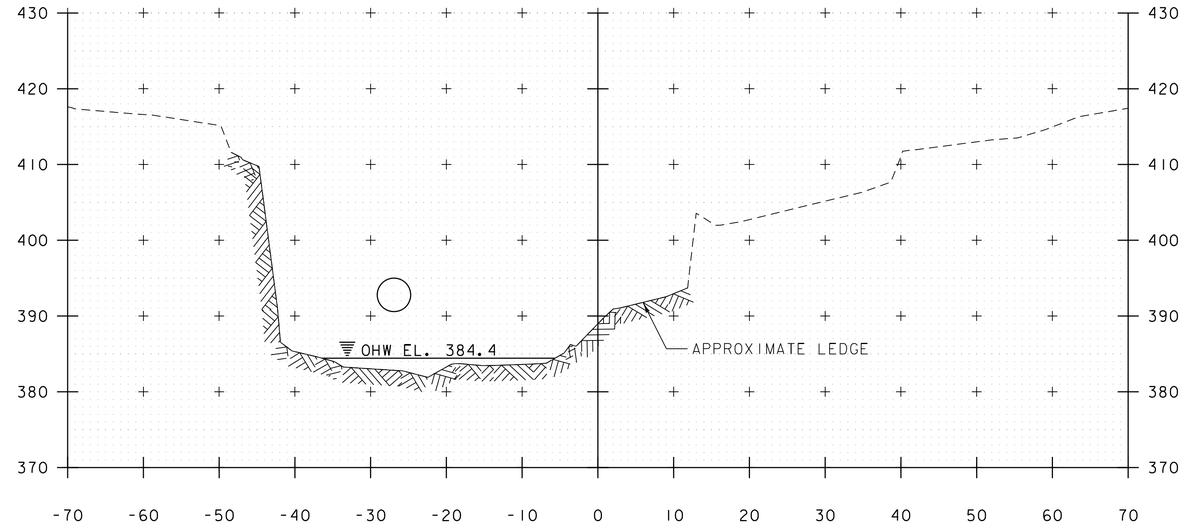
STA. 10+00 - 10+50

SCALE 1" = 10-0'

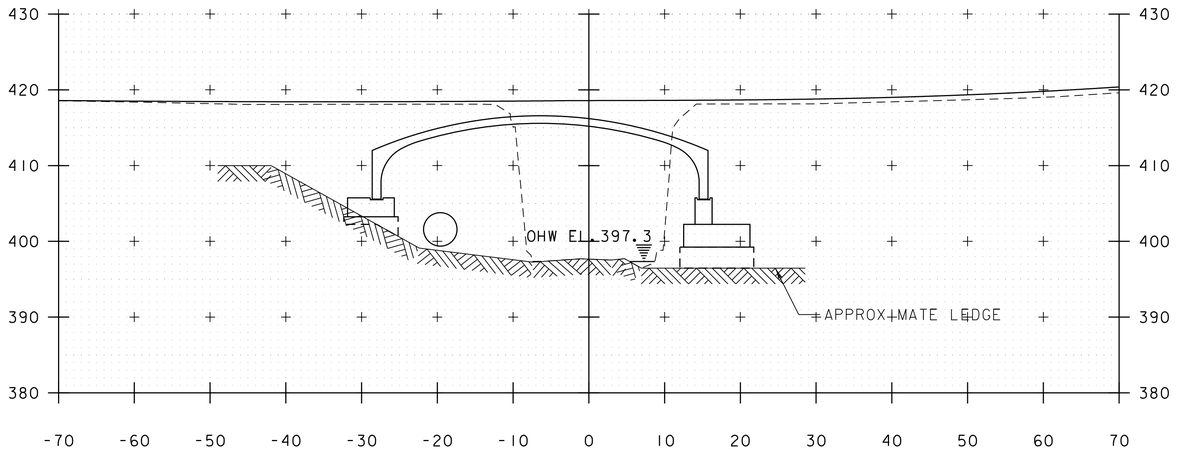
PROJECT NAME:	SALISBURY
PROJECT NUMBER:	57813.00
FILE NAME: 57813xs.dgn	PLOT DATE: 4/19/2016
PROJECT LEADER: S.E. BURBANK	DRAWN BY: P.A. MILLER
DESIGNED BY: E.F. LAWES	CHECKED BY: E.F. LAWES
CHANNEL CROSS SECTIONS (1 OF 2)	SHEET 30 OF 38



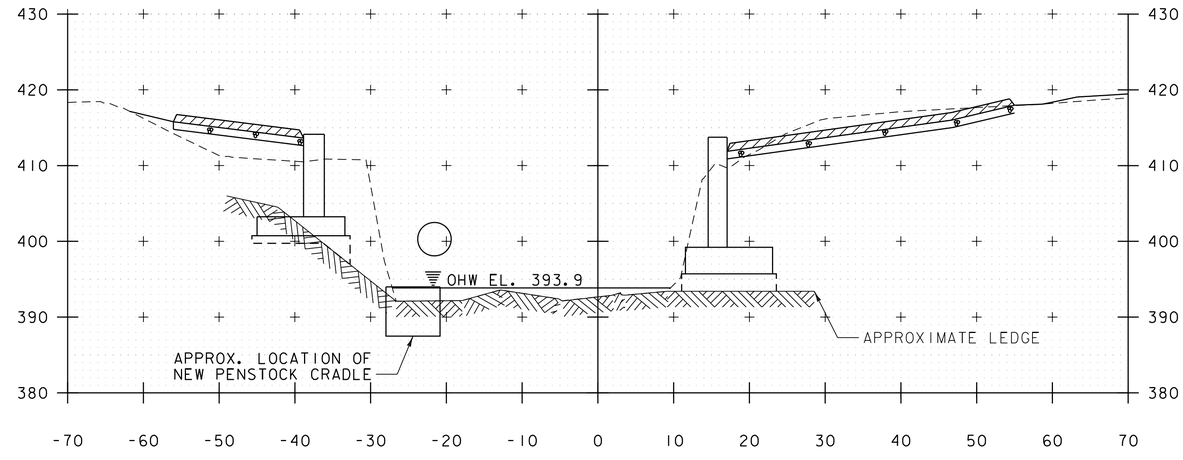
10+70



11+00



10+60



10+75

CHANNEL CROSS SECTIONS

STA. 10+60 - 11+00

SCALE 1" = 10-0'

PROJECT NAME:	SALISBURY
PROJECT NUMBER:	57813.00
FILE NAME: 57813xs.dgn	PLOT DATE: 4/19/2016
PROJECT LEADER: S.E. BURBANK	DRAWN BY: P.A. MILLER
DESIGNED BY: E.F. LAWES	CHECKED BY: E.F. LAWES
CHANNEL CROSS SECTIONS (2 OF 2)	SHEET 31 OF 38

EPSC PLAN NARRATIVE

1.1 PROJECT DESCRIPTION

THIS PROJECT INVOLVES THE REMOVAL AND REPLACEMENT OF THE EXISTING CONCRETE T-BEAMS AND ABUTMENTS OF BRIDGE NO. 4 WITH RELATED APPROACH WORK. THIS PROJECT IS LOCATED ON MAPLE STREET (T.H. 1) OVER THE LEICESTER RIVER, APPROXIMATELY 0.70 MILES SOUTHEASTERLY FROM THE INTERSECTION OF US ROUTE 7 AND MAPLE STREET IN THE TOWN OF SALISBURY. DURING CONSTRUCTION TRAFFIC WILL BE MAINTAINED ON AN OFF-SITE DETOUR. THE EXISTING BRIDGE HAS A 23'-0" SPAN AND IS 26'-0" WIDE.

THE BRIDGE REPLACEMENT INCLUDES THE REMOVAL OF THE EXISTING STRUCTURE IN ITS ENTIRETY AND THE CONSTRUCTION OF A NEW 42-FT SPAN PRECAST CONCRETE ARCH WITH CAST-IN-PLACE CONCRETE FOOTINGS TO CREATE A NEW BRIDGE WIDTH OF 28'-0". THE NEW ABUTMENTS WILL BE DOWELED INTO LEDGE. ASSOCIATED ROADWAY APPROACH WORK INCLUDES NEW GUARDRAIL AND SUBBASE & PAVING.

NOTE: AREA OF DISTURBANCE INCLUDES LIMITS OF EARTH DISTURBANCE WITHIN THE PROJECT AREA, AS WELL AS WASTE, BORROW AND STAGING AREAS, AND OTHER EARTH DISTURBING ACTIVITIES WITHIN OR DIRECTLY ADJACENT TO THE PROJECT LIMITS AS SHOWN ON THE ATTACHED EPSC PLAN.

TOTAL AREA OF DISTURBANCE AS SHOWN ON THE ATTACHED EPSC PLAN IS APPROXIMATELY 0.45 ACRES.

IT IS ANTICIPATED THAT THIS PROJECT WILL LAST ONE CONSTRUCTION SEASON.

1.2 SITE INVENTORY

1.2.1 TOPOGRAPHY

THE TOPOGRAPHY OF THE AREA CONSISTS OF MULTIPLE SLOPES. THE EAST SIDE OF MAPLE STREET IS FLAT AND THE WEST SIDE DROPS DOWN SIGNIFICANTLY WITH VISIBLE LEDGE OUTCROPPINGS. THERE ARE DWELLINGS LOCATED ADJACENT TO MAPLE STREET ON ALL FOUR CORNERS OF THE PROJECT WITH GRASS AND TREE BUFFERS.

1.2.2 DRAINAGE, WATERWAYS, BODIES OF WATER, AND PROXIMITY TO NATURAL OR MAN-MADE WATER FEATURES

THE LEICESTER RIVER IS THE ONLY WATER SOURCE ON THE PROJECT SITE, WITH A PENSTOCK, OWNED BY GREEN MOUNTAIN POWER, RUNNING THROUGH THE EXISTING SOUTH ABUTMENT AND GOES TO THE SALISBURY HYDROELECTRIC POWER LOCATED DOWNSTREAM. THE LEICESTER RIVER IS STEEP AND NARROW, AND THE STREAMBED FLOWS OVER LEDGE AND LARGE BOULDERS. THERE IS A CULVERT THAT DRAINS WATER FROM THE ROAD DOWN TO THE RIVER.

1.2.3 VEGETATION

THE VEGETATION IN THE PROJECT AREA CONSISTS OF HARDWOOD TREES LOCATED ON STEEP SLOPES. THE IMPACT TO VEGETATION WILL BE LIMITED TO THAT WHICH IS DIRECTLY AFFECTED BY REPLACEMENT OF THE EXISTING BRIDGE. UPON PROJECT COMPLETION, THE CHANNEL WILL BE OPENED UP ALONG THE BOTTOM TO FOLLOW THE LEDGE PROFILE AND THE BANKS LEADING UP TO THE ROAD WILL BE ARMORED WITH STONE FILL, TYPE I AS SPECIFIED ON THE PLANS. DISTURBED VEGETATION WILL BE REESTABLISHED WITH STANDARD SEED AND MULCH PRACTICES.

1.2.4 SOILS

ALL SOIL DATA CAME FROM THE U.S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE FOR THE COUNTY OF ADDISON, VERMONT. SOILS ON THE PROJECT SITE ARE BERKSHIRE AND MARLOW EXTREMELY STONY LOAMS, 20% TO 50% SLOPES, "K FACTOR" = 0.28 AND BERKSHIRE AND MARLOW STONY LOAMS, 12% TO 25% SLOPES, "K FACTOR" = 0.28. THE SOIL IS CONSIDERED MODERATELY ERODIBLE DUE TO MODERATE SLOPES.

NOTE: K-VALUES GENERALLY INDICATE THE FOLLOWING:
0.0-0.23 = LOW EROSION POTENTIAL
0.24-0.36 = MODERATE EROSION POTENTIAL
0.37 AND HIGHER = HIGH EROSION POTENTIAL

1.2.5 SENSITIVE RESOURCE AREAS

CRITICAL HABITATS: NO
HISTORICAL OR ARCHEOLOGICAL AREAS: YES, THE BRIDGE IS IN THE SALISBURY HISTORIC DISTRICT AND THERE IS AN ARCHEOLOGICAL RESOURCE IN THE NORTHWEST QUADRANT OF THE PROJECT; A GRIST MILL DATING BACK TO THE 1800s.
PRIME AGRICULTURAL LAND: NO
THREATENED AND ENDANGERED SPECIES: SUBJECT TO NLEB REVIEW
WATER RESOURCE: LEICESTER RIVER
WETLANDS: NO

1.3 RISK EVALUATION

THIS PROJECT DOES NOT FALL UNDER THE JURISDICTION OF GENERAL PERMIT 3-9020 FOR STORMWATER RUNOFF FROM CONSTRUCTION SITES. SHOULD CHANGES PRIOR TO OR DURING CONSTRUCTION RESULT IN ONE OR MORE ACRES OF EARTH DISTURBANCE OR SHOULD THE PROJECT BECOME PART OF A LARGER PLAN OF DEVELOPMENT, THE CONTRACTOR WILL BE RESPONSIBLE FOR ANY ADDITIONAL PERMITTING.

1.4 EROSION PREVENTION AND SEDIMENT CONTROL

THE EROSION CONTROL PLANS ARE MEANT AS A GUIDELINE FOR PREVENTING EROSION AND CONTROLLING SEDIMENT TRANSPORT. THE PRINCIPLES OUTLINED IN THIS NARRATIVE CONSIST OF APPLYING MEASURES THROUGHOUT CONSTRUCTION OF THE PROJECT IN ORDER TO MINIMIZE SEDIMENT TRANSPORT TO THE RECEIVING WATERS. THE MEASURES INCLUDE STABILIZATION AND STRUCTURAL PRACTICES, STORM WATER CONTROLS AND OTHER POLLUTION PREVENTION PRACTICES. THEY HAVE BEEN PROPOSED BY THE DESIGNER AS A BASIS FOR PROTECTING RESOURCES AND WILL NEED TO BE BUILT UPON BASED ON THE SPECIFIC MEANS AND METHODS OF THE CONTRACTOR. REFER TO THE LOW RISK SITE HANDBOOK AND APPROPRIATE DETAIL SHEETS FOR SPECIFIC GUIDANCE AND CONSTRUCTION DETAILING.

ALL MEASURES SHALL BE REGULARLY MAINTAINED AND SHALL BE CHECKED FOR SEDIMENT BUILD-UP. SEDIMENT SHALL BE DISPOSED OF AT AN APPROVED SITE WHERE IT WILL NOT BE SUBJECT TO EROSION.

1.4.1 MARK SITE BOUNDARIES

SITE BOUNDARIES AND AREAS CONSTRUCTION EQUIPMENT CAN ACCESS SHALL BE DELINEATED.

PROJECT DEMARCATION FENCING (PDF) SHALL BE USED TO PHYSICALLY MARK SITE BOUNDARIES. BARRIER FENCE SHALL BE USED ALONG THE NORTHWEST QUADRANT TO PROTECT THE ARCHEOLOGICAL RESOURCE.

1.4.2 LIMIT DISTURBANCE AREA

PREVENTING INITIAL SOIL EROSION BY MINIMIZING THE EXPOSED AREA IS MUCH MORE EFFECTIVE THAN TREATING ERODED SEDIMENT. EARTH DISTURBANCE CAN BE MINIMIZED THROUGH CONSTRUCTION PHASING BY ONLY OPENING UP EARTH AS NECESSARY. THIS CAN LIMIT THE AREA THAT WILL BE DISTURBED AND EXPOSED TO EROSION. EMPLOY TEMPORARY CONSTRUCTION STABILIZATION PRACTICES IN INCREMENTAL STAGES AS PHASES CHANGE. FOR PROJECTS WHICH FALL UNDER THE CONSTRUCTION GENERAL PERMIT, ONLY THE ACREAGE LISTED ON THE PERMIT AUTHORIZATION MAY BE EXPOSED AT ANY GIVEN TIME.

MAINTAINING VEGETATED BUFFERS ALONG STREAM BANKS, WETLANDS OR OTHER SENSITIVE AREAS IS A CRUCIAL EROSION AND SEDIMENT CONTROL MEASURE THAT SHOULD BE ESTABLISHED WHEREVER POSSIBLE.

1.4.3 SITE ENTRANCE/EXIT STABILIZATION

TRACKING OF SEDIMENT ONTO PUBLIC HIGHWAYS SHALL BE MINIMIZED TO REDUCE THE POTENTIAL FOR RUNOFF ENTERING RECEIVING WATERS. INSTALLATION SHALL COINCIDE WITH THE CONTRACTORS PROGRESS SCHEDULE.

STABILIZED CONSTRUCTION ENTRANCES SHALL BE INSTALLED AS PROPOSED ON THE EPSC PLAN AND ANYWHERE EQUIPMENT WILL BE GOING FROM AREAS OF EXPOSED SOILS TO PAVED SURFACES.

1.4.4 INSTALL SEDIMENT BARRIERS

SEDIMENT BARRIERS SHALL BE UTILIZED TO INTERCEPT RUNOFF AND ALLOW SUSPENDED SEDIMENT TO SETTLE OUT. THEY SHALL BE INSTALLED PRIOR TO ANY UP SLOPE WORK.

SILT FENCE WILL BE INSTALLED AS PROPOSED ON THE EPSC PLAN.

FILTER CURTAIN WILL BE INSTALLED AS PROPOSED ON THE EPSC PLAN. ADDITIONALLY, GRAVEL BAGS SHALL BE INSTALLED IN FRONT OF THE EXISTING ABUTMENTS PRIOR TO REMOVAL OF THE ABUTMENTS AND CAN BE REMOVED ONCE THE EXISTING ABUTMENTS HAVE BEEN COMPLETELY REMOVED.

1.4.5 DIVERT UPLAND RUNOFF

DIVERSIONARY MEASURES SHALL BE USED TO INTERCEPT RUNOFF FROM ABOVE THE CONSTRUCTION AND DIRECT IT AROUND THE DISTURBED AREA SO THAT CLEAN WATER DOES NOT BECOME MUDDIED WHILE TRAVELING OVER EXPOSED SOILS ON THE CONSTRUCTION SITE.

1.4.6 SLOW DOWN CHANNELIZED RUNOFF

CHECK STRUCTURES SHALL BE UTILIZED TO REDUCE THE VELOCITY, AND THUS THE EROSIVE POTENTIAL, OF CONCENTRATED FLOW IN CHANNELS.

STONE CHECK DAMS ARE NOT ANTICIPATED FOR THIS PROJECT.

1.4.7 CONSTRUCT PERMANENT CONTROLS

PERMANENT EROSION CONTROL STRUCTURES ARE NOT ANTICIPATED FOR THIS PROJECT.

1.4.8 STABILIZE EXPOSED SOILS DURING CONSTRUCTION

ALL AREAS OF DISTURBANCE MUST HAVE TEMPORARY STABILIZATION IN PLACE WITHIN 48 HOURS OF DISTURBANCE OR IN ACCORDANCE WITH THE CONSTRUCTION GENERAL PERMIT 3-9020 AUTHORIZATION.

SURFACE ROUGHENING OF ALL EXPOSED SLOPES, COMBINED WITH TEMPORARY MULCHING, SHALL BE UTILIZED ON A REGULAR BASIS. BIODEGRADABLE EROSION CONTROL MATTING OR AN EQUIVALENT SHALL BE USED TO STABILIZE ALL SLOPES STEEPER THAN 1:3.

THE FORECAST OF RAINFALL EVENTS SHALL TRIGGER IMMEDIATE PROTECTION OF EXPOSED SOILS.

1.4.9 WINTER STABILIZATION

VARIOUS MEASURES SPECIFIC TO WINTER MAY BE NECESSARY SHOULD THE PROJECT EXTEND INTO WINTER (OCTOBER 15 THROUGH APRIL 15). REFER TO THE LOW RISK SITE HANDBOOK FOR GUIDANCE.

1.4.10 STABILIZE SOIL AT FINAL GRADE

EXPOSED SOIL MUST BE STABILIZED WITHIN 48 HOURS OF REACHING FINAL GRADE.

SEED, MULCH, FERTILIZER AND LIME SHALL BE USED TO ESTABLISH PERMANENT VEGETATION. FOR SLOPES STEEPER THAN 1:3, BIODEGRADABLE EROSION CONTROL MATTING OR AN EQUIVALENT SHALL BE USED INSTEAD OF MULCH.

1.4.11 DE-WATERING ACTIVITIES

DISCHARGE FROM DEWATERING ACTIVITIES THAT FLOWS OFF OF THE CONSTRUCTION SITE MUST NOT CAUSE OR CONTRIBUTE TO A VIOLATION OF THE VERMONT WATER QUALITY STANDARDS.

TREATMENT OF DEWATERING COFFERDAM IS ANTICIPATED. A LOCATION FOR THE TREATMENT HAS BEEN PROPOSED AND IS SHOWN ON THE PLANS. HOWEVER, THE SPECIFIC MEANS FOR TREATMENT OF DISCHARGE SHALL BE PROVIDED BY THE CONTRACTOR.

1.4.12 INSPECT YOUR SITE

INSPECT THE PROJECT SITE BASED ON SPECIAL PROVISION REQUIREMENTS OR CONSTRUCTION GENERAL PERMIT AUTHORIZATION STIPULATIONS.

1.5 SEQUENCE AND STAGING

THIS SECTION WILL BE DEVELOPED BY THE CONTRACTOR USING THE GUIDANCE OUTLINED IN THE VTRANS EPSC PLAN CONTRACTOR CHECKLIST.

1.5.1 OFF-SITE ACTIVITIES

IN ADDITION TO THE CONTRACTOR CHECKLIST ANY ACTIVITIES OUTSIDE THE CONSTRUCTION LIMITS SHALL FOLLOW SPECIFICATION 105.25- 105.29 OF THE STANDARD SPECIFICATIONS FOR CONSTRUCTION.

VT STATE PLANE GRID

N

SOIL CLASSIFICATION
BERKSHIRE AND MARLOW
EXTREMELY STONY LOAMS
12% - 15% SLOPES
MODERATE EROSION POTENTIAL
K = 0.28

SOIL CLASSIFICATION
BERKSHIRE AND MARLOW
EXTREMELY STONY LOAMS
20% - 50% SLOPES
MODERATE EROSION POTENTIAL
K = 0.28

N/F
JOHN D & SANDRA HOOKER
1044 MAPLE ST

N/F
CENTRAL VERMONT PUBLIC
SERVICE CORPORATION
1084 MAPLE ST
BOOK 17, PAGE 217

N/F
PETERSON FAMILY TRUST
968 MAPLE ST

N/F
JAMES & MARIA
PROVENCHER
949 MAPLE ST

N/F
JASON CRAM &
JESSICA L. DIKE
1057 MAPLE ST
BOOK 48, PAGE 409

N/F
CENTRAL VERMONT PUBLIC
SERVICE CORPORATION
1084 MAPLE ST
BOOK 17, PAGE 217

N/F
STEPHEN & CHRISTINE PARKES
1001 MAPLE ST
BOOK 53, PAGE 48

LEICESTER RIVER

RIPARIAN BUFFER

NEW RING GIRDER &
CONCRETE FOUNDATION

BEGIN BRIDGE
STA. 102+71.40

END BRIDGE
STA. 103+15.73

NEW RING GIRDER
CONCRETE FOUNDATION

MAPLE STREET

TOWN ROW

TO
LEICESTER

TO
MIDDLEBURY

TO VT 53

SMEAD RD

W SHORE RD

BEGIN APPROACH
STA. 101+25.00

BEGIN PROJECT
STA. 102+15.00

END APPROACH
STA. 104+65.00

END PROJECT
STA. 104+05.00

CONFIGURATION OF SAND OR GRAVEL BAGS AS NECESSARY TO PROTECT THE WORK AREA AND MINIMIZE RELEASE OF SEDIMENT OR DEBRIS TO THE STREAM.

LEGEND

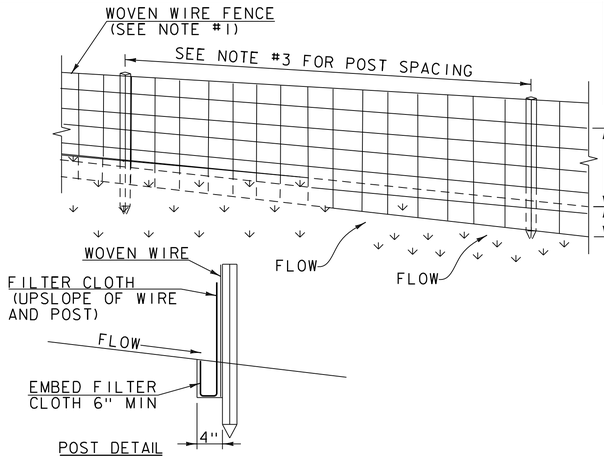
- OHW — ORDINARY HIGH WATER
- PDF — PROJECT DEMARCATION FENCE
- BF — BARRIER FENCE
- SILT FENCE
- DISTURBED AREAS REQUIRING RE-VEGETATION
- STABILIZED CONSTRUCTION ENTRANCE
- FILTER BAG
- GRAVEL BAGS
- SAND BAGS
- DROP INLET PROTECTION

PROJECT NAME: SALISBURY
PROJECT NUMBER: 57813.00

FILE NAME: 57813bdr_ero.dgn
PROJECT LEADER: S.E. BURBANK
DESIGNED BY: P.A. MILLER
EPSC SITE PLAN

PLOT DATE: 4/19/2016
DRAWN BY: P.A. MILLER
CHECKED BY: E.F. LAWES
SHEET 33 OF 38

vhb



SYMBOL

SILT FENCE

SILT FENCE WOVEN WIRE

NOT TO SCALE

CONSTRUCTION SPECIFICATIONS

1. WOVEN WIRE REINFORCED FENCE IS REQUIRED WITHIN 100' UPSLOPE OF RECEIVING WATERS WHEN THE PROJECT FALLS UNDER A CONSTRUCTION STORMWATER PERMIT. WOVEN WIRE SHALL BE A MIN. 14 GAUGE WITH A 6" MAX. MESH OPENING.
2. FILTER CLOTH SHALL BE EITHER FILTER X, MIRAFI100X, STABILINKA T140N OR APPROVED EQUIVALENT.
3. POST SPACING FOR WIRE-BACKED FENCE SHALL BE 10' MAXIMUM. FOR FILTER-CLOTH FENCE, WHEN ELONGATION IS >50%, POST SPACING SHALL NOT EXCEED 4' AND WHEN ELONGATION IS <50%, POST SPACING SHALL NOT EXCEED 6'.
4. WOVEN WIRE FENCE IS TO BE FASTENED SECURELY TO FENCE POSTS WITH WIRE TIES. FILTER CLOTH IS TO BE FASTENED SECURELY TO WOVEN WIRE FENCE WITH TIES SPACED EVERY 24" AT TOP AND MID SECTION.
5. WHEN TWO SECTIONS OF FILTER CLOTH ADJOIN EACH OTHER THEY SHALL BE OVER-LAPPED BY 6" AND FOLDED.
6. MAINTENANCE SHALL BE PERFORMED AS NEEDED AND MATERIAL REMOVED WHEN SEDIMENT REACHES HALF OF FABRIC HEIGHT.

ADAPTED FROM DETAILS PROVIDED BY: NEW YORK STATE DEC ORIGINALLY DEVELOPED BY USDA-NRCS VERMONT DEPARTMENT OF ENVIRONMENTAL CONSERVATION

SILT FENCE

NOTES:
REFER TO "THE VERMONT STANDARDS & SPECIFICATIONS FOR EROSION PREVENTION & SEDIMENT CONTROL -2006- "FROM THE VT AGENCY OF NATURAL RESOURCES FOR ADDITIONAL GUIDANCE.

THIS WORK SHALL BE PERFORMED IN ACCORDANCE WITH SECTION 649 AND AS SHOWN IN THE PLANS FOR GEOTEXTILE FOR SILT FENCE (PAY ITEM 649.51) OR GEOTEXTILE FOR SILT FENCE, WOVEN WIRE REINFORCED (PAY ITEM 649.515).

REVISIONS	
MARCH 21, 2008	WHF
DECEMBER 11, 2008	WHF
JANUARY 13, 2009	WHF

VAOT LOW GROW/FINE FESCUE MIX

LBS/AC						
WEIGHT	BROADCAST	HYDROSEED	NAME	LATIN NAME	GERM	PURITY
38%	57	95	CREEPING RED FESCUE	FESTUCA RUBRA VAR. RUBRA	90%	98%
29%	43.5	72.5	HARD FESCUE	FESTUCA LONGIFOLIA	85%	95%
15%	22.5	37.5	CHEWINGS FESCUE	FESTUCA RUBRA VAR. COMMUTATA	87%	95%
15%	22.5	37.5	ANNUAL RYEGRASS	LOLIUM MULTIFLORUM	90%	95%
3%	4.5	7.5	INERTS			
100%	150	250				

VAOT RURAL AREA MIX

LBS/AC						
WEIGHT	BROADCAST	HYDROSEED	NAME	LATIN NAME	GERM	PURITY
37.5%	22.5	45	CREEPING RED FESCUE	FESTUCA RUBRA VAR. RUBRA	85%	98%
37.5%	22.5	45	TALL FESCUE	FESTUCA ARUNDINACEA	90%	95%
5.0%	3	6	RED TOP	AGROSTIS GIGANTEA	90%	95%
15.0%	9	18	WHITE FIELD CLOVER	TRIFOLIUM REPENS	85%	98%
5.0%	3	6	ANNUAL RYE GRASS	LOLIUM MULTIFLORUM	85%	95%
100%	60	120				

GENERAL AMENDMENT GUIDANCE		
FERTILIZER	LIME	
10/20/10	AG LIME	PELLITIZED
500 LBS/AC	2 TONS/AC	1 TONS/AC

CONSTRUCTION GUIDANCE

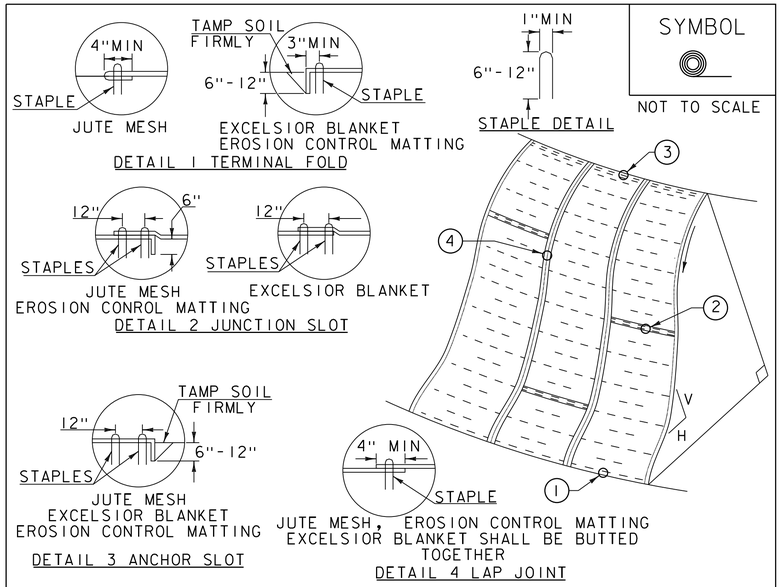
1. SEED MIX: THE CONTRACTOR SHALL COORDINATE WITH THE RESIDENT ENGINEER ON WHICH SEED MIX TO USE.
2. SEED MIX: USE AS INDICATED IN THE PLANS AND/OR FOR ALL ESTABLISHED UPLAND (NON WETLAND) AREAS DISTURBED BY THE CONTRACTOR.
3. ALL SEED MIXTURES: SHALL NOT HAVE A WEED CONTENT EXCEEDING 0.40% BY WEIGHT AND SHALL BE FREE OF ALL NOXIOUS SEED.
4. FERTILIZER AND LIMESTONE: SHALL FOLLOW RATES SHOWN ON PLAN OR AS DIRECTED BY THE ENGINEER.
5. HAY MULCH: TO BE PLACED ON EARTH SLOPES AT THE RATE OF 2 TONS/ACRE, ACHIEVE 90% GROUND COVER OR AS DIRECTED BY THE ENGINEER.
6. HYDROSEEDING: ALTHOUGH GUIDANCE IS GIVEN ABOVE THE SITE CONDITIONS AND THE TYPE OF HYDROSEED PROPOSED FOR USE WILL ULTIMATELY DICTATE THE AMOUNTS AND TYPES OF SOIL AMENDMENTS TO BE APPLIED.
7. TURF ESTABLISHMENT: PLACING SEED, FERTILIZER, LIME AND MULCH PRIOR TO SEPTEMBER 15 AND AFTER APRIL 15 CAN BETTER ENSURE A VIGOROUS GROWTH OF GRASS.

ADAPTED FROM VTRANS TECHNICAL LANDSCAPE MANUAL FOR ROADWAYS AND TRANSPORTATION FACILITIES

TURF ESTABLISHMENT

THIS WORK SHALL BE PERFORMED IN ACCORDANCE WITH SECTION 651 FOR SEED (PAY ITEM 651.15)

REVISIONS	
JANUARY 12, 2015	WHF



SYMBOL

NOT TO SCALE

CONSTRUCTION SPECIFICATIONS

1. APPLY TO SLOPES GREATER THAN 3H:1V OR WHERE NECESSARY TO AID IN ESTABLISHING VEGETATION.
2. APPLY FERTILIZER, LIME SEED PRIOR TO PLACING MATTING.
3. STAPLES ARE TO BE PLACED ALTERNATELY, IN COLUMNS APPROXIMATELY 2' APART AND IN ROWS APPROXIMATELY 3' APART. APPROXIMATELY 175 STAPLES ARE REQUIRED PER 4'X225' ROLL OF MATERIAL AND 125 STAPLES ARE REQUIRED PER 4'X150' ROLL OF MATERIAL.
4. DISTURBED AREAS SHALL BE SMOOTHLY GRADED. EROSION CONTROL MATERIAL SHALL BE PLACED LOOSELY OVER GROUND SURFACE. DO NOT STRETCH.
5. ALL TERMINAL ENDS AND TRANSVERSE LAPS SHALL BE STAPLED AT APPROXIMATELY 12" INTERVALS.

ADAPTED FROM DETAILS PROVIDED BY: NEW YORK STATE DEC ORIGINALLY DEVELOPED BY USDA-NRCS VERMONT DEPARTMENT OF ENVIRONMENTAL CONSERVATION

ROLLED EROSION CONTROL PRODUCT (RECP) SIDE SLOPE

NOTES:
REFER TO "THE VERMONT STANDARDS & SPECIFICATIONS FOR EROSION PREVENTION & SEDIMENT CONTROL -2006- "FROM THE VT AGENCY OF NATURAL RESOURCES FOR ADDITIONAL GUIDANCE.
THIS WORK SHALL BE PERFORMED IN ACCORDANCE WITH SECTION 653 AND AS SHOWN IN THE PLANS FOR TEMPORARY EROSION MATTING (PAY ITEM 653.20) OR PERMANENT EROSION MATTING (PAY ITEM 653.21).

REVISIONS	
APRIL 16, 2007	JMF
JANUARY 13, 2009	WHF

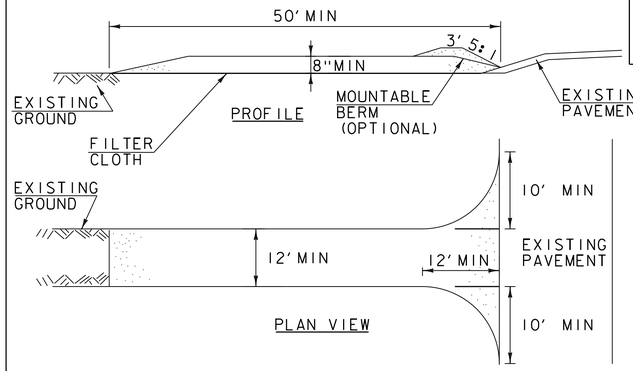
PROJECT NAME: SALISBURY
PROJECT NUMBER: 57813.00

FILE NAME: 57813details ero.dgn
PROJECT LEADER: S.E. BURBANK
DESIGNED BY: P.A. MILLER
EROSION CONTROL DETAILS (1 OF 2)

PLOT DATE: 4/19/2016
DRAWN BY: P.A. MILLER
CHECKED BY: E.F. LAWES
SHEET 34 OF 38

SYMBOL

NOT TO SCALE



CONSTRUCTION SPECIFICATIONS

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

ADAPTED FROM DETAILS PROVIDED BY: NEW YORK STATE DEC
ORIGINALLY DEVELOPED BY USDA-NRCS
VERMONT DEPARTMENT OF ENVIRONMENTAL CONSERVATION

STABILIZED CONSTRUCTION ENTRANCE

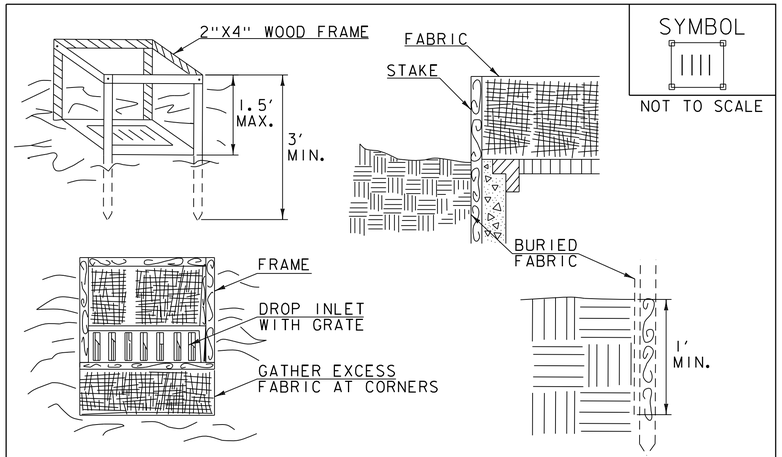
NOTES:
REFER TO "THE VERMONT STANDARDS & SPECIFICATIONS FOR EROSION PREVENTION & SEDIMENT CONTROL -2006- "FROM THE VT AGENCY OF NATURAL RESOURCES FOR ADDITIONAL GUIDANCE.

THIS WORK SHALL BE PERFORMED IN ACCORDANCE WITH SECTION 653 FOR VEHICLE TRACKING PAD (PAY ITEM 653.35) OR AS SPECIFIED IN THE CONTRACT.

REVISIONS	
MARCH 24, 2008	WHF
JANUARY 13, 2009	WHF

SYMBOL

NOT TO SCALE



CONSTRUCTION SPECIFICATIONS

1. FILTER FABRIC SHALL HAVE AN APPARENT OPENING SIZE OF 40-85. BURLAP MAY BE USED FOR SHORT TERM APPLICATIONS.
2. CUT FABRIC FROM A CONTINUOUS ROLL TO ELIMINATE JOINTS. IF JOINTS ARE NEEDED THEY WILL BE OVERLAPPED TO THE NEXT STAKE.
3. STAKE MATERIALS WILL BE STANDARD 2"x 4" WOOD OR EQUIVALENT METAL WITH A MINIMUM LENGTH OF 3'.
4. SPACE STAKES EVENLY AROUND INLET 3' APART AND DRIVE A MINIMUM 18" DEEP. SPANS GREATER THAN 3' MAY BE BRIDGED WITH THE USE OF WIRE MESH BEHIND THE FILTER FABRIC FOR SUPPORT.
5. FABRIC SHALL BE EMBEDDED 1' MINIMUM BELOW GROUND AND BACKFILLED. IT SHALL BE SECURELY FASTENED TO THE STAKES AND FRAME.
6. A 2" x 4" WOOD FRAME SHALL BE COMPLETED AROUND THE CREST OF THE FABRIC FOR OVER FLOW STABILITY.
7. MAXIMUM DRAINAGE AREA 1 ACRE

ADAPTED FROM DETAILS PROVIDED BY: NEW YORK STATE DEC
ORIGINALLY DEVELOPED BY USDA-NRCS
VERMONT DEPARTMENT OF ENVIRONMENTAL CONSERVATION

FILTER FABRIC DROP INLET PROTECTION

NOTES:
REFER TO "THE VERMONT STANDARDS & SPECIFICATIONS FOR EROSION PREVENTION & SEDIMENT CONTROL -2006- "FROM THE VT AGENCY OF NATURAL RESOURCES FOR ADDITIONAL GUIDANCE.

THIS WORK SHALL BE PERFORMED IN ACCORDANCE WITH SECTION 653 FOR INLET PROTECTION DEVICE, TYPE I(PAY ITEM 653.40).

REVISIONS	
MARCH 7, 2008	WHF
JANUARY 13, 2009	WHF

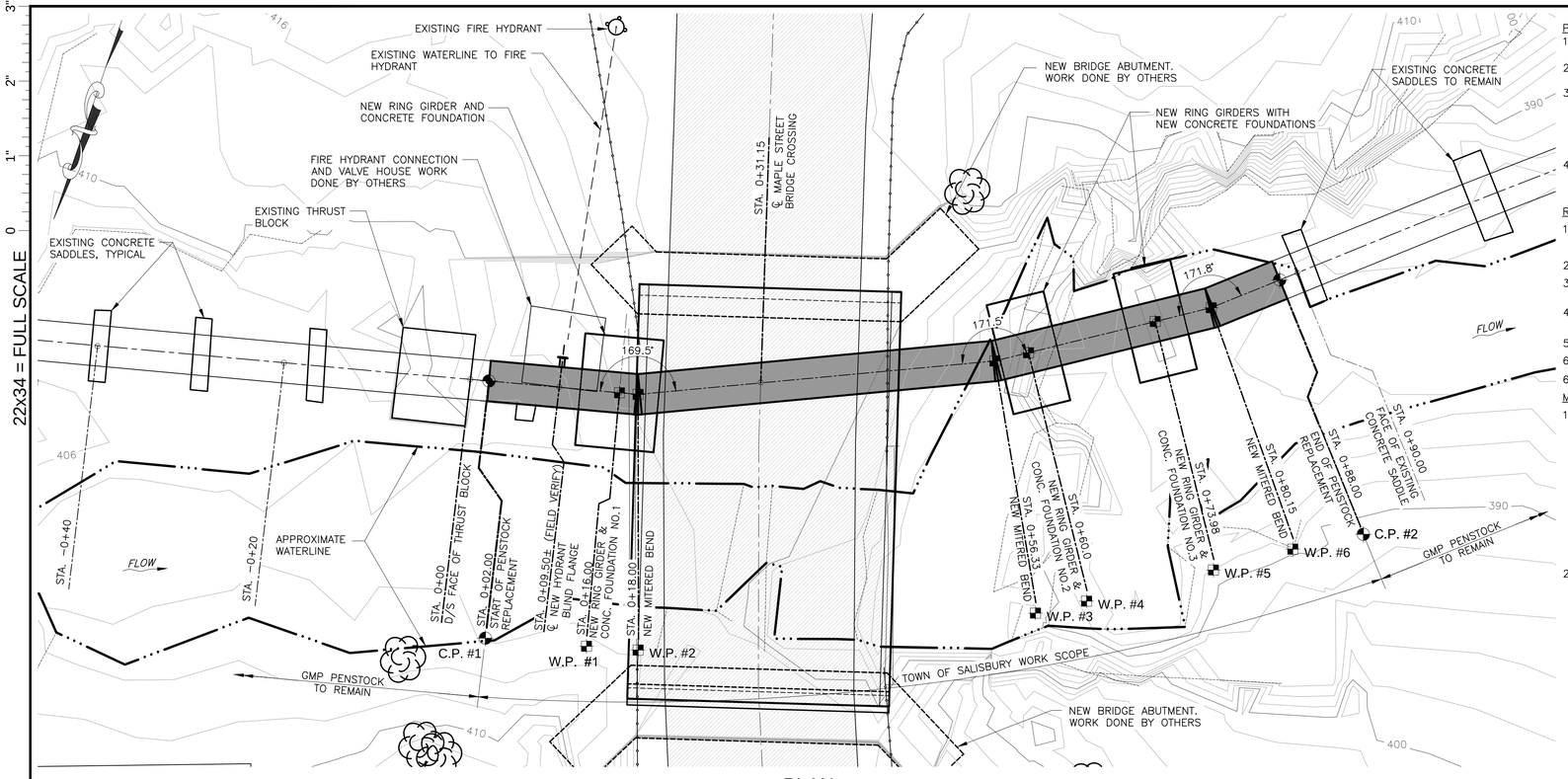
vhb

PROJECT NAME: SALISBURY
PROJECT NUMBER: 57813.00

FILE NAME: 57813details ero.dgn
PROJECT LEADER: S.E. BURBANK
DESIGNED BY: P.A. MILLER
EROSION CONTROL DETAILS (2 OF 2)

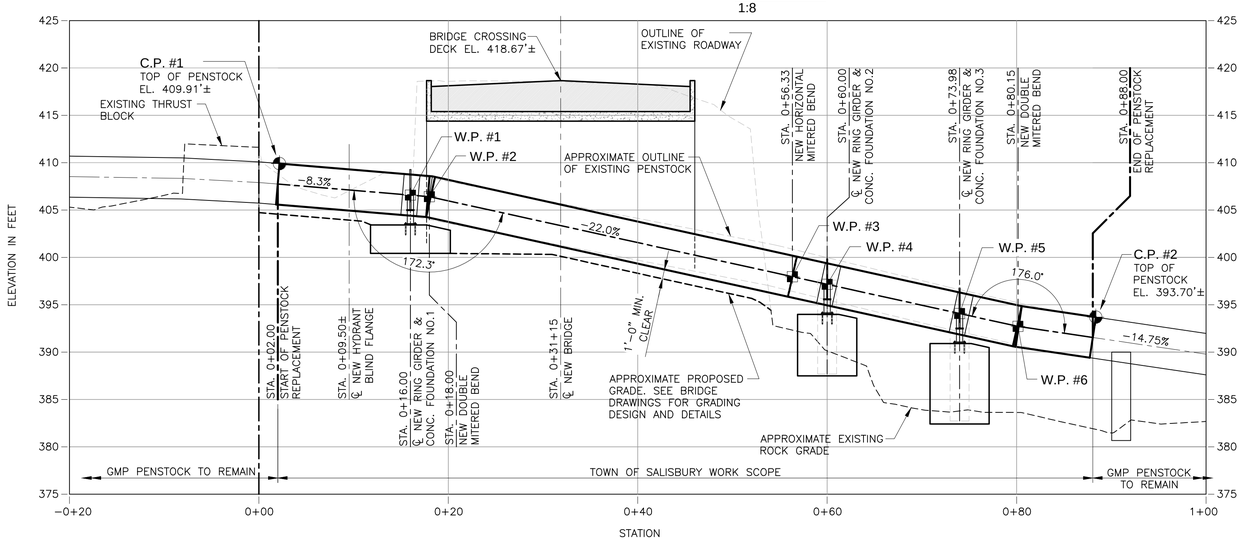
PLOT DATE: 4/19/2016
DRAWN BY: P.A. MILLER
CHECKED BY: E.F. LAWES
SHEET 35 OF 38

22x34 = FULL SCALE



PLAN

1:8



PENSTOCK PROFILE ALONG CENTERLINE

1:8

8 0 8 16

SCALE IN FEET

PROJECT NOTES:

1. THESE ARE STANDARD NOTES APPLYING TO ALL PENSTOCK WORK. SPECIFIC NOTES SHOWN ON OTHER DRAWINGS OR STATED IN THE TECHNICAL SPECIFICATIONS SHALL TAKE PRECEDENCE.
2. GMP'S PENSTOCK CURRENTLY RUNS THROUGH THE CONCRETE FOOTINGS IN THE BRIDGE. TOWN OF SALISBURY IS REPLACING THE BRIDGE STRUCTURES AND GMP IS REPLACING THE PENSTOCK STRUCTURES.
3. GMP AND TOWN OF SALISBURY SHALL ENTER INTO SEPARATE CONTRACTS FOR THEIR RESPECTIVE WORK SCOPES:
   A. TOWN OF SALISBURY WORK SCOPE SHALL ENCOMPASS DEMOLITION AND REBUILDING OF THE MAPLE STREET BRIDGE. TOWN OF SALISBURY IS RESPONSIBLE FOR ALL PERMITS RELATING TO BRIDGE AND PENSTOCK WORK.
   B. GMP WORK SCOPE SHALL ENCOMPASS DEMOLITION AND REPLACEMENT OF THE GMP PENSTOCK AND FABRICATING AND INSTALLING FOUNDATIONS FOR NEW PENSTOCK.
4. PENSTOCK CONTRACTOR WILL BE PROVIDED WITH DETAILS AND DRAWINGS THAT DESCRIBE AGREED UPON WORK SCOPES AND TIMELINES THAT NEED TO BE OBSERVED AND INCORPORATED INTO THE BRIDGE PROJECT.

REPLACEMENT PENSTOCK:

1. REFERENCE SPECIFICATIONS FOR DETAILS:
   A. SECTION 05 52 01.00 KA – STEEL PENSTOCK INSTALLATION
   B. SECTION 05 75 01 KA – STEEL PENSTOCK FABRICATION
2. NEW SHELL SHALL BE 52" I.D. BY 3/8" WALL THICKNESS.
3. THE NEW REPLACEMENT SECTIONS OF THE PENSTOCK SHALL CONNECT TO THE EXISTING PENSTOCK PROTRUDING FROM THE EXISTING THRUST BLOCK AT STATION 0+02 AND TO THE EXISTING PENSTOCK AT STATION 0+88.
4. AN EXTRA 2 FEET OF PIPE SHALL BE PROVIDED AT ONE END OF A SECTION, OF THE STRAIGHT RUN REPLACEMENT PIPE BETWEEN STATIONS 0+15 AND 0+60 SECTION TO ALLOW FOR FINAL FIELD ADJUSTMENTS (OR AN APPROVED ALTERNATIVE APPROACH).
5. GMP WILL DEWATER PENSTOCK AFTER CLOSING INTAKE GATE.
6. CONTRACTOR SHALL CONFORM TO ALL GMP SAFETY AND DEWATERING TAGOUT PROCEDURES.
6. CONTRACTOR SHALL NOT BEGIN ANY PENSTOCK DEMOLITION UNTIL AFTER RECEIVING WRITTEN AUTHORIZATION FROM GMP'S PROJECT MANAGER.

MATERIALS:

1. STEEL
   A. PENSTOCK SHELL SHALL BE ASTM A–139 GRADE C OR APPROVED EQUIVALENT ASTM A20 OR AWWA C200 GRADE MATERIAL WITH A MINIMUM FY=42 KSI AND TENSILE STRESS FU=60 KSI.
   B. BLIND FLANGE SHALL MEET ANSI/AWWA C207 SPECIFICATION FOR A 6" CLASS B BLIND FLANGE
   C. STRUCTURAL W SHAPES: SHALL BE ASTM A992, MINIMUM FY=50 KSI AND FU=65 KSI.
   D. OTHER STEEL SHAPES SUCH AS CHANNELS, PLATES, BARS, ANGLES, STIFFENERS AND MISCELLANEOUS ITEMS SHALL BE ASTM A36 WITH MINIMUM FY =36 KSI AND FU=58 KSI OR APPROVED EQUIVALENT. STRUCTURAL TUBING SHAPES SHALL BE ASTM A 500 GRADE B.
   E. ANCHOR BOLTS: HAS–E ISO 898 CLASS 5.8
   F. BOLTS, NUTS, AND WASHERS SHALL BE ASTM A325 HOT DIPPED GALVANIZED PER ASTM A153.
2. COATINGS
   A. PENSTOCK INTERIOR COATINGS

SURFACE PREPARATION:

THE INTERIOR SURFACES SHALL BE CLEANED IN ACCORDANCE WITH THE SOCIETY FOR PROTECTIVE COATINGS (SSPC) SP–10 STANDARDS, "NEAR WHITE METAL BLAST". MINIMUM 2 MIL ANCHOR PROFILE IS REQUIRED.

PRIMER COAT:

TNEMEC 94–H20 HYDRO–ZINC OR APPROVED EQUAL MEETING THE REQUIREMENTS OF ANSI/NSF STANDARD 61 FOR USE IN POTABLE WATER SYSTEMS. TOTAL DRY FILM THICKNESS OF 2.5 TO 3.5 MILS THICKNESS.

STRIPE COAT:

TNEMEC 94–H20 HYDRO–ZINC OR TNEMEC SERIES N140 F OR APPROVED EQUAL MEETING THE REQUIREMENTS OF ANSI/NSF STANDARD 61 FOR USE IN POTABLE WATER SYSTEMS. STRIPE COAT SHALL BE APPLIED AT ALL WELD SEAMS. TOTAL DRY FILM THICKNESS OF 2.5 TO 3.0 MILS THICKNESS.

FINISH COAT:

ONE COAT OF TNEMEC SERIES 22 OR TNEMEC SERIES EPOXOLINE OR APPROVED EQUAL MEETING THE REQUIREMENTS OF ANSI/NSF STANDARD 61 FOR USE IN POTABLE WATER SYSTEMS. TOTAL DRY FILM THICKNESS OF 25 TO 30 MILS. DO NOT EXCEED 30 MILS THICKNESS; THIS WILL CAUSE THE COATING TO DELAMINATE. COLOR SHALL BE AN APPROVED LIGHT COLOR.

EDGES OF COATING NEAR JOINTS SHALL BE FEATHERED.

EDGES OF FIELD INTERIOR COATINGS SHALL BE FEATHERED AND APPLIED AS DIRECTED BY MANUFACTURER

B. EXTERIOR – PENSTOCK SHELL ABOVE GROUND

SURFACE PREPARATION:

THE EXTERIOR SURFACES SHALL BE CLEANED IN ACCORDANCE WITH THE SSPC SP–6 STANDARDS, "COMMERCIAL BLAST CLEANING". MINIMUM 1.5 MIL ANCHOR PROFILE.

PRIMER COAT:

TNEMEC 94–H20 HYDRO–ZINC OR APPROVED EQUAL MEETING THE REQUIREMENTS OF ANSI/NSF STANDARD 61 FOR USE IN POTABLE WATER SYSTEMS. TOTAL DRY FILM THICKNESS OF 2.5 TO 3.5 MILS THICKNESS.

STRIPE COAT:

TNEMEC 94–H20 HYDRO–ZINC OR TNEMEC SERIES N140 F OR APPROVED EQUAL MEETING THE REQUIREMENTS OF ANSI/NSF STANDARD 61 FOR USE IN POTABLE WATER SYSTEMS. STRIPE COAT SHALL BE APPLIED AT ALL WELD SEAMS. TOTAL DRY FILM THICKNESS OF 2.5 TO 3.0 MILS THICKNESS.

FINISH COAT:

TNEMEC SERIES 73 ENDURA–SHIELD OR APPROVED EQUAL MEETING THE REQUIREMENTS OF ANSI/NSF STANDARD 61 FOR USE IN POTABLE WATER SYSTEMS. TOTAL DRY FILM THICKNESS OF 4 TO 5 MILS. FOR SPRAY APPLICATION, ONE COAT IS REQUIRED. FOR BRUSH AND ROLLER APPLICATION, TWO COATS ARE REQUIRED. DO NOT EXCEED 5 MILS THICKNESS; THIS WILL CAUSE THE COATING TO DELAMINATE. COLOR SHALL BE AN APPROVED DARK COLOR.

C. DO NOT SHOP PAINT WITHIN 2" OF ANY FIELD WELD. PAINT SHALL BE FREE OF ALL RUNS, DRIPS AND HOLIDAYS.

D. TOUCH–UP COATING: CLEAN FIELD WELDS, BOLTED CONNECTIONS, AND ABRADED AREAS OF SHOP APPLIED COATING, AND PROVIDE THESE AREAS WITH THE APPROPRIATE PRECEDING COATING APPLICATION.

E. EXTERIOR ALTERNATIVE COATINGS MUST PROVIDE AT LEAST THE FOLLOWING MINIMUM PERFORMANCE CHARACTERISTICS:

1.) ABRASION TEST (ASTM D4060) CS–17 WHEEL, 1000 GRAM 1000 CYCLES MAXIMUM 130 MG OR LESS LOSS.

2.) ADHESION TO STEEL (ASTM 4541) MINIMUM 900–1100 PSI

3.) SALT FOG RESISTANCE (ASTM B117) MINIMUM 2500 HOURS

3. CONCRETE – SEE SHEET 03

FIELD TESTING

1. JOINT LAP PRESSURE TEST ALL CIRCUMFERENCES AT FIELD JOINTS AFTER WELDING.
2. THE COMPLETED PENSTOCK SHALL BE FIELD HYDROSTATIC TESTED PER SPECIFICATION SECTION 05 52 01.00 KA.
3. ALL JOINTS SHALL BE EXPOSED AROUND THEIR FULL PERIMETER DURING PRESSURE TESTING.

STATE OF VERMONT ADAM B. HASKELL No. 98042 CIV LICENSED PROFESSIONAL ENGINEER 3/29/16

NOT FOR CONSTRUCTION

CONTROL POINT & WORK POINT SCHEDULE

POINT NAME	NORTHING	EASTING	CENTERLINE ELEVATION	LOCATION DESCRIPTION	STATION
C.P.#1	509347.03	1482346.78	407.75'	START OF PENSTOCK REPLACEMENT	0+02.00
C.P.#2	509309.38	1482270.32	391.56'	END OF PENSTOCK REPLACEMENT	0+88.00
W.P.#1	509343.70	1482333.18	406.58'	RING GIRDER NO. 1	0+16.00
W.P.#2	509343.22	1482331.24	406.42'	DOUBLE MITERED BEND	0+18.00
W.P.#3	509327.45	1482296.31	397.97'	HORIZONTAL MITERED BEND	0+56.33
W.P.#4	509325.45	1482293.21	397.16'	RING GIRDER NO. 2	0+60.00
W.P.#5	509317.90	1482281.47	394.08'	RING GIRDER NO. 3	0+73.98
W.P.#6	509314.56	1482276.28	392.72'	DOUBLE MITERED BEND	0+80.15

No.	Revision	Date	Drawn	Checked
C	CLIENT REVIEW	03-29-16	CFT	JLD
B	CLIENT REVIEW	03-23-16	CFT	JLD
A	ISSUED FOR PIPE PROCUREMENT	02-16-15	CFT	ABH

GREEN MOUNTAIN POWER CORP.
RUTLAND, VERMONT

SALISBURY STATION
PENSTOCK REPLACEMENT AT TOWN OF SALISBURY BRIDGE

PROPOSED CONDITIONS
PENSTOCK PLAN AND PROFILE

Kleinschmidt
888-224-5942
KleinschmidtGroup.com

Designed	Drawn	Checked	Project No.	Date Revised	Drawing No.
BZ	CFT	JLD	012-140	03-29-16	SHT 01

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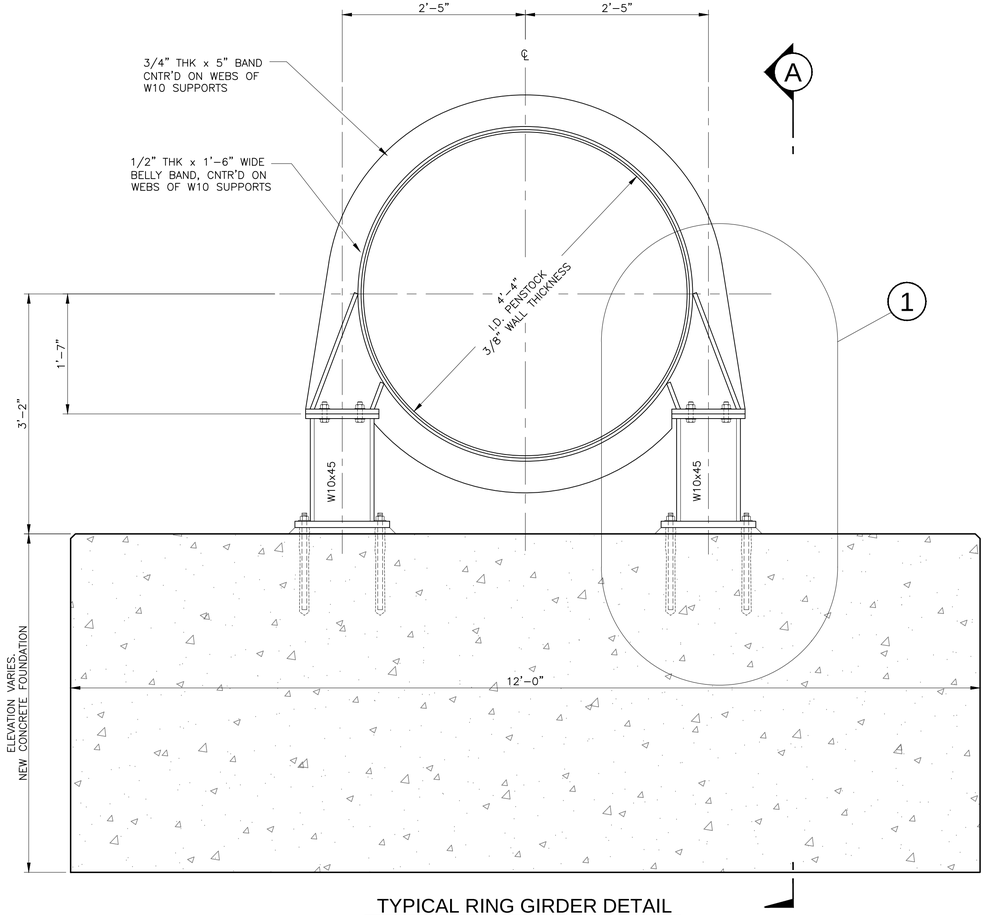
22x34 = FULL SCALE



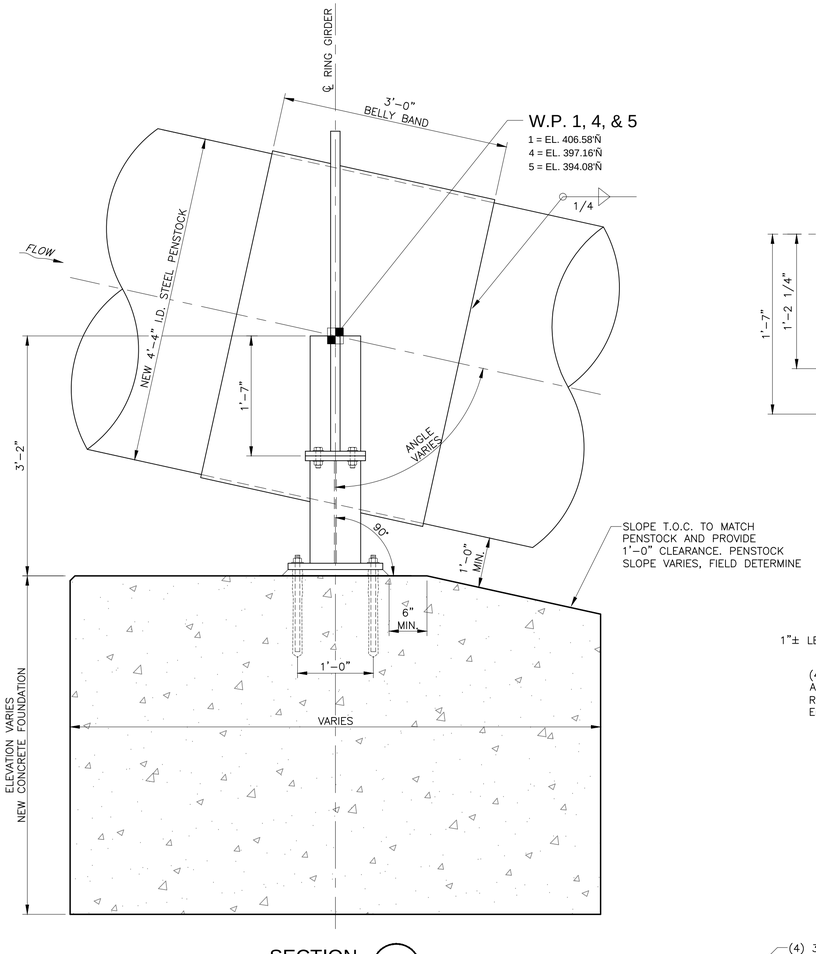
TYPICAL RING GIRDER DETAIL

1"= 1'-0"

NOTE:
REBAR/ANCHORS NOT SHOWN FOR CLARITY

1 0 1 2

SCALE IN FEET



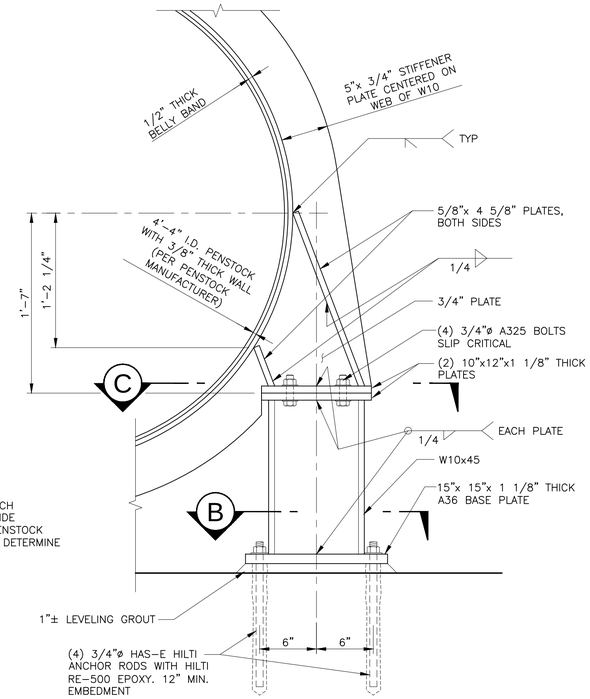
SECTION A

1"= 1'-0"

NOTE:
REBAR/ANCHORS NOT SHOWN FOR CLARITY

1 0 1 2

SCALE IN FEET

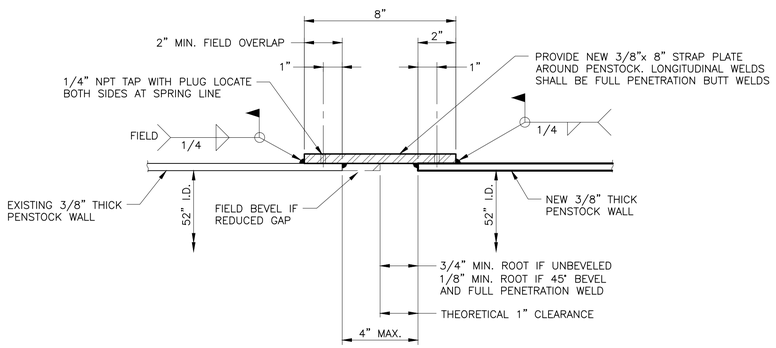


DETAIL 1

1 1/2"= 1'-0"

8 0 8 16

SCALE IN INCHES



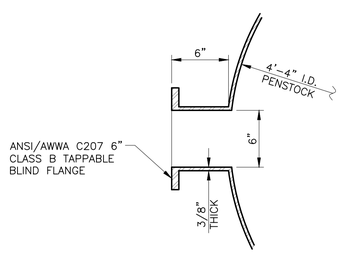
✳ CONNECTION DETAIL LOCATED AT C.P.#1. CONNECTION AT C.P.#2, SIMILAR

TYPICAL BANDED STEEL PIPE FIELD JOINT CONNECTION DETAIL

3"= 1'-0"

3 0 3 6 9

SCALE IN INCHES



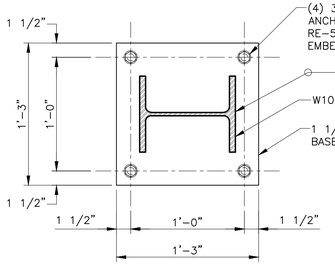
HYDRANT FEED BLIND FLANGE DETAIL

1 1/2"= 1'-0"

DETAIL LOCATED AT STA. 0+09.50± (FIELD VERIFY)
DETAIL LOOKING DOWNSTREAM

8 0 8 16

SCALE IN INCHES



SECTION B

1 1/2"= 1'-0"

8 0 8 16

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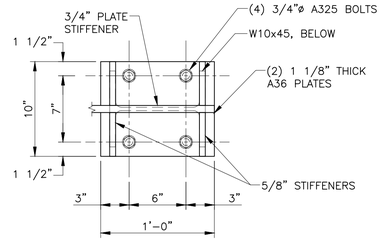

SECTION C

1 1/2"= 1'-0"

8 0 8 16

SCALE IN INCHES

STATE OF VERMONT
ADAM B. HASKELL
No. 98042
CIV
LICENSED
PROFESSIONAL ENGINEER
5/23/16

NOT FOR CONSTRUCTION

No.	Revision	Date	Drawn	Checked
C	CLIENT REVIEW	03-29-16	CFT	JLD
B	CLIENT REVIEW	03-23-16	CFT	JLD
A	ISSUED FOR PIPE PROCUREMENT	02-16-16	CFT	ABH

GREEN MOUNTAIN POWER CORP.
RUTLAND, VERMONT

SALISBURY STATION
PENSTOCK REPLACEMENT AT TOWN OF SALISBURY BRIDGE

PROPOSED CONDITIONS
RING GIRDER & PENSTOCK CONNECTION DETAILS

Kleinschmidt
888-224-5942
KleinschmidtGroup.com

Designed	Drawn	Checked	Project No.	Date Revised	Drawing No.
BZ	CFT	JLD	012-140	03-29-16	SHT 02

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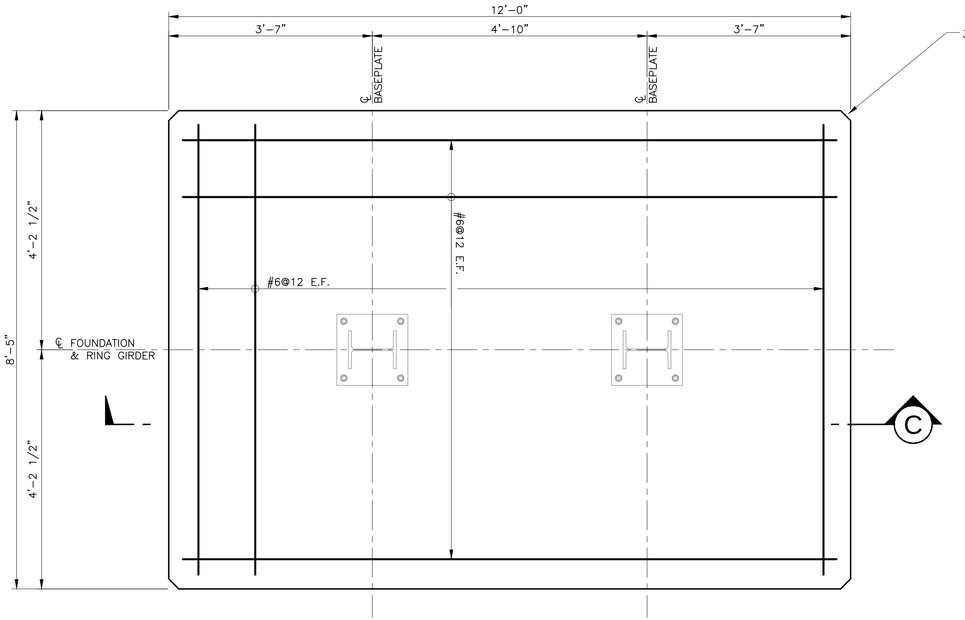
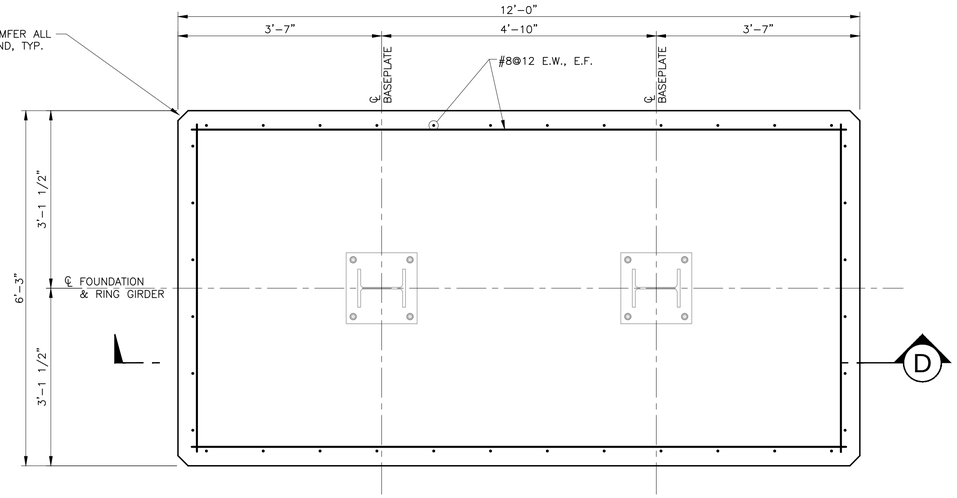


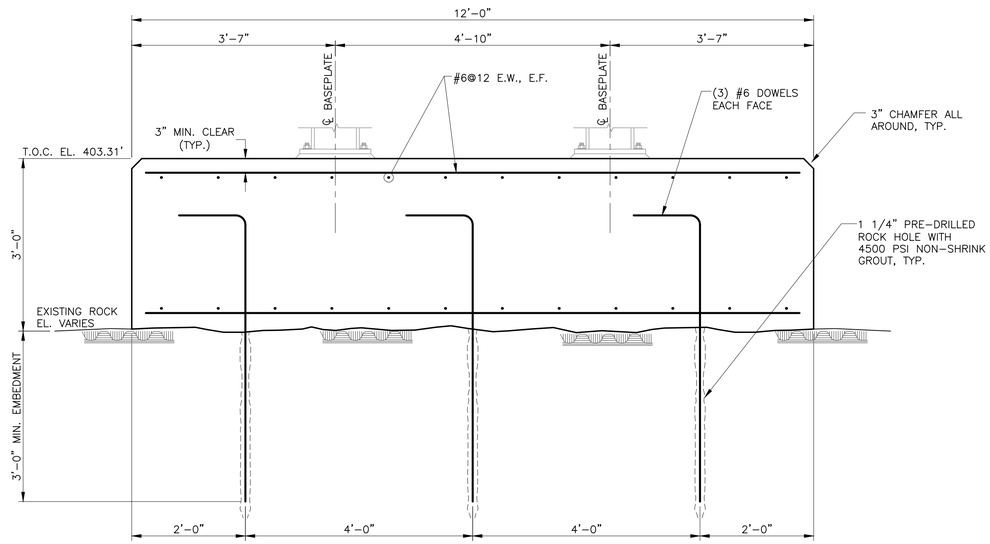
FOUNDATION NO.1 PLAN VIEW

3/4"= 1'-0"



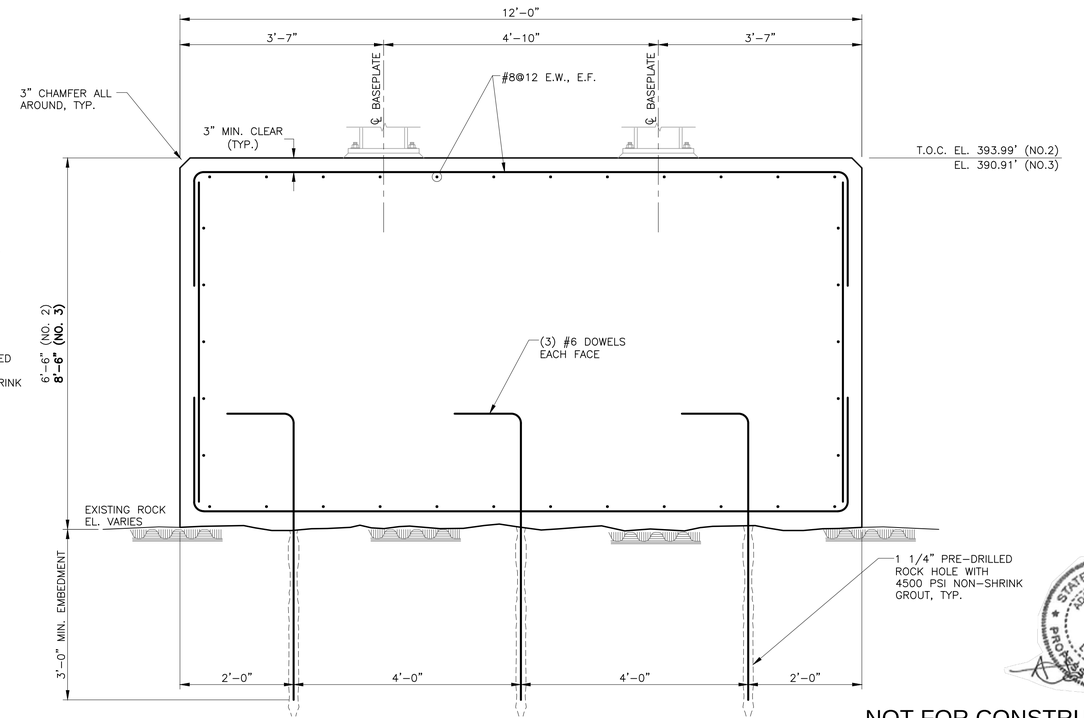
FOUNDATION NO.2 & NO. 3 PLAN VIEW

3/4"= 1'-0"



SECTION C

3/4"= 1'-0"



SECTION D

3/4"= 1'-0"

CONCRETE NOTES:

SUBMIT CONCRETE MIX DESIGN FOR OWNER APPROVAL:

1. HIGH PERFORMANCE CLASS B
2. MINIMUM 28 DAM COMPRESSIVE STRENGTH F'c=3,500PSI
3. MAX W/C RATIO 0.49
4. SLUMP: 7" MAX.
5. AIR ENTRAINMENT 7% +/- 1.5%
6. REINFORCEMENT 60 KSI, ASTM A615, CLASS B SPLICES

1 0 1 2 3

SCALE IN FEET

STATE OF VERMONT
ADAM B. HASSELL
No. 98042
CIV
LICENSED
PROFESSIONAL ENGINEER
3/29/16

NOT FOR CONSTRUCTION

No.	Revision	Date	Drawn	Checked
B	CLIENT REVIEW	03-29-16	CFT	JLD
A	CLIENT REVIEW	03-23-16	CFT	JLD

GREEN MOUNTAIN POWER CORP.
RUTLAND, VERMONT

SALISBURY STATION
PENSTOCK REPLACEMENT AT TOWN OF SALISBURY BRIDGE

PROPOSED CONDITIONS
RING GIRDER FOUNDATION DETAILS

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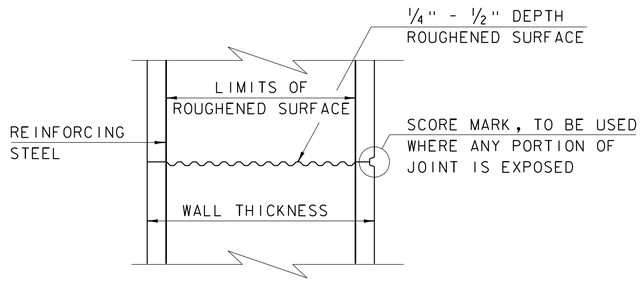
888-224-5942
KleinschmidtGroup.com

Designed	Drawn	Checked	Project No.	Date Revised	Drawing No.
BZ	CFT	JLD	012-140	03-29-16	SHT 03

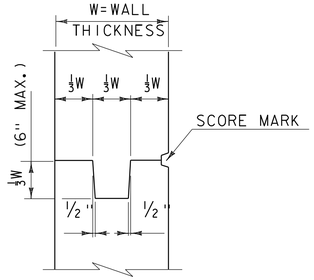
CONCRETE GENERAL NOTES

1. ALL EXPOSED EDGES OF CONCRETE SHALL BE CHAMFERED 1" x 1"
2. REINFORCING STEEL SIZE AND SPACING SHOWN IN THE PLANS IS BASED ON 60 KSI STEEL, UNLESS NOTED OTHERWISE. WITH THE ENGINEER'S PERMISSION, BAR SIZE AND SPACING MAY BE MODIFIED ACCORDING TO THE LATEST AASHTO LRFD BRIDGE DESIGN SPECIFICATION AND STRUCTURES DESIGN MANUAL WHEN USING HIGHER STRENGTH STEEL.

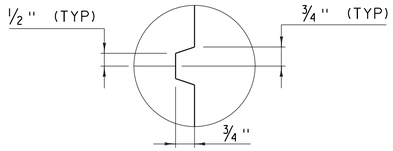


TYPICAL HORIZONTAL CONSTRUCTION JOINT
(NOT TO SCALE)

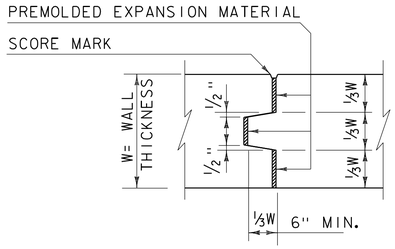
1. THE SURFACE OF THE CONCRETE CONSTRUCTION JOINTS SHALL BE CLEANED AND FREE OF LAITANCE.
2. IMMEDIATELY BEFORE NEW CONCRETE IS PLACED, ALL CONSTRUCTION JOINTS SHALL BE WETTED AND STANDING WATER REMOVED.



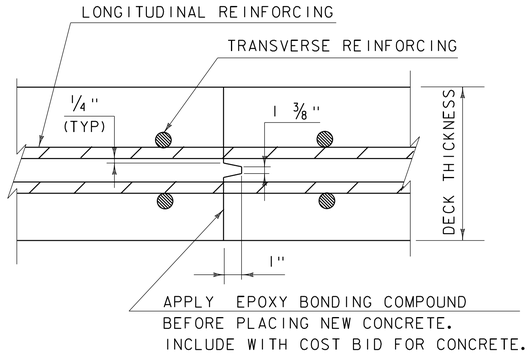
TYPICAL CONCRETE CONSTRUCTION JOINT
(NOT TO SCALE)



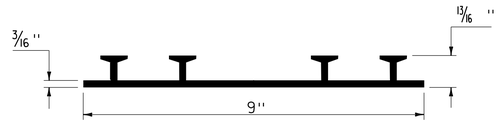
SCORE MARK DETAIL
(NOT TO SCALE)



TYPICAL CONCRETE EXPANSION JOINT
(NOT TO SCALE)



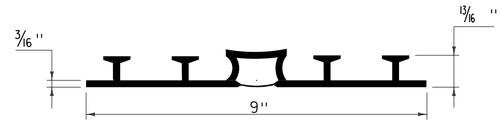
TRANSVERSE BRIDGE SLAB CONSTRUCTION JOINT DETAILS
(NOT TO SCALE)



P.V.C. WATERSTOP FOR CONSTRUCTION JOINTS
(NOT TO SCALE)

PAYMENT FOR THE P.V.C. WATERSTOP SHALL BE INCIDENTAL TO THE UNIT BID PRICE FOR THE ADJACENT CONCRETE.

OTHER CONFIGURATIONS OF WATERSTOP MAY BE USED UPON APPROVAL OF THE ENGINEER.



P.V.C. WATERSTOP FOR EXPANSION JOINTS
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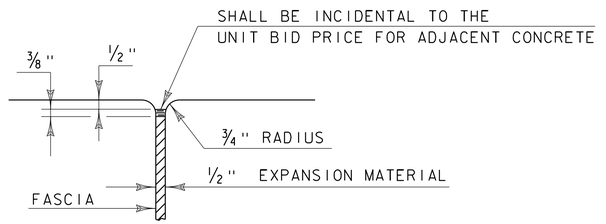


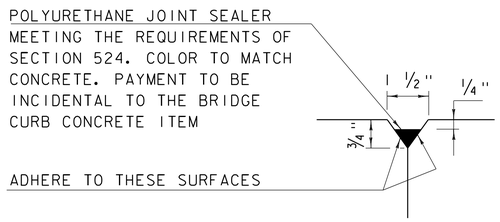
JOINT BETWEEN FASCIA AND WINGWALL
(NOT TO SCALE)

REVISIONS	
MAY 7, 2010	APPROVED FOR USE BY VAOT STRUCTURES SECTION
FEBRUARY 9, 2012	REBAR SUBSTITUTION ALLOWANCE ADDED TO CONCRETE GENERAL NOTES.

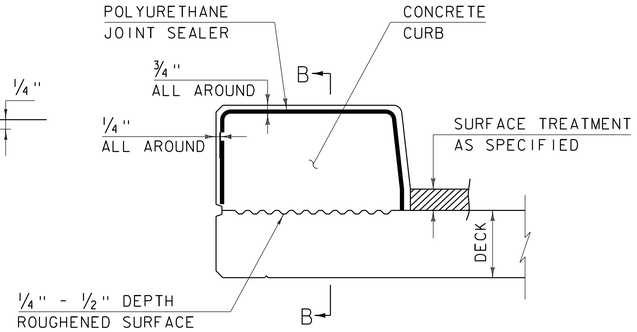
CONCRETE DETAILS AND NOTES

VERMONT AGENCY OF TRANSPORTATION
STRUCTURES - SECTION

STRUCTURES DETAIL
SD-501.00

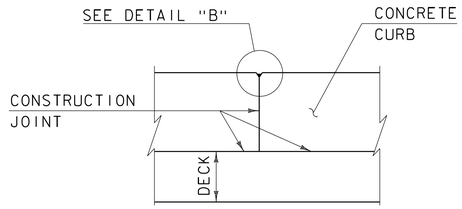


DETAIL "B"
(NOT TO SCALE)

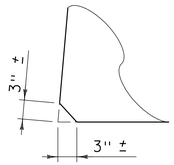


CONCRETE CURB JOINT SECTION
(NOT TO SCALE)

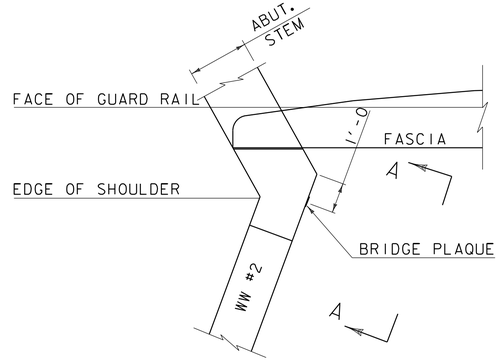
1. SEE TYPICAL HORIZONTAL CONSTRUCTION JOINT DETAIL FOR ADDITIONAL INFORMATION



SECTION B - B
(NOT TO SCALE)



ACUTE ANGLE CLIP DETAIL
(NOT TO SCALE)



PLAN

CONCRETE CURB JOINT NOTES

1. CONCRETE CURBS MAY BE PLACED IN ONE CONTINUOUS OPERATION IF AN APPROVED SHRINKAGE REDUCING ADMIXTURE LISTED IN THE SPECIAL PROVISIONS IS USED WITH THE CONCRETE MIX DESIGN. PAYMENT FOR THE SHRINKAGE REDUCING ADMIXTURE WILL BE INCIDENTAL TO THE BRIDGE CURB CONCRETE ITEM.

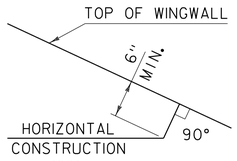
2. IF THE CONTRACTOR CHOOSES NOT TO USE AN APPROVED SHRINKAGE REDUCING ADMIXTURE, THE CURBS SHALL BE CONSTRUCTED WITH CONSTRUCTION JOINTS SPACED AT A MAXIMUM OF 15'-0" CENTER TO CENTER AND 2'-0" MINIMUM FROM THE CENTER OF NEAREST BRIDGE RAILING POST.

3. ON MULTI-SPAN CONTINUOUS SUPERSTRUCTURES, REGARDLESS OF WHETHER APPROVED SHRINKAGE REDUCING ADMIXTURE IS USED, CURB JOINTS SHALL BE LOCATED OVER THE CENTERLINE OF PIERS AND 7'-0" EACH SIDE OF THE CENTERLINE OF EACH PIER.

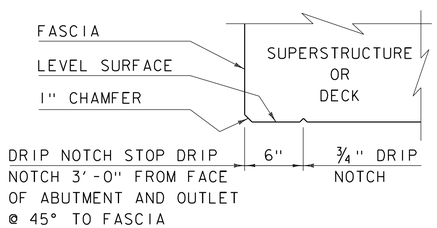
4. WHEN CURB JOINTS ARE USED THE CURBS SHALL BE PLACED IN ALTERNATE SECTIONS WITH A MINIMUM OF 48 HOUR DELAY BETWEEN ADJACENT PLACEMENTS.

5. LONGITUDINAL REINFORCING SHALL BE CONTINUOUS THROUGH CURB CONSTRUCTION JOINTS. CURB STIRRUP BARS SHALL BE TURNED AS NECESSARY TO MAINTAIN COVER IN THE FLARED CURB ENDS.

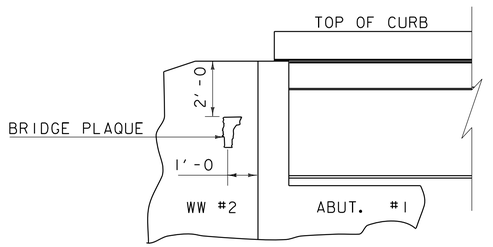
6. THE JOINT SPACING AND DETAILS SHOWN SHALL APPLY TO SIDEWALKS WHEN SHOWN IN THE PLANS.



HORIZONTAL WINGWALL CONSTRUCTION JOINT
(NOT TO SCALE)



DRIP NOTCH DETAIL
(NOT TO SCALE)



VIEW "A - A"

BRIDGE PLAQUE
(NOT TO SCALE)

THE BRIDGE PLAQUE WILL BE SUPPLIED BY THE AGENCY OF TRANSPORTATION AND SHALL BE INSTALLED BY THE CONTRACTOR AT ABUTMENT #1 ON THE RIGHT SIDE AS SHOWN OR AS DIRECTED BY THE ENGINEER.

PAYMENT FOR INSTALLATION OF THE BRIDGE PLAQUE SHALL BE INCIDENTAL TO THE ADJACENT CONCRETE.

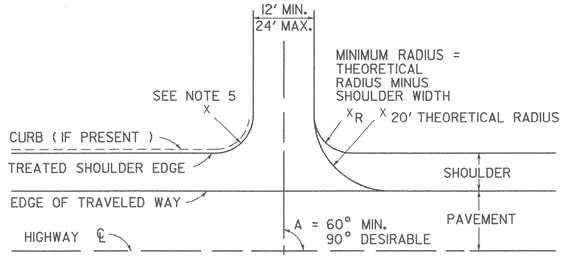
REVISIONS	
MAY 7, 2010	APPROVED FOR USE BY VAOT STRUCTURES SECTION
JUNE 4, 2010	MODIFIED AND ADDED TWO DETAILS
OCTOBER 10, 2012	MODIFIED HORZ. JOINT WINGWALL ADD 6" MIN. DIMENSION

CONCRETE DETAILS AND NOTES

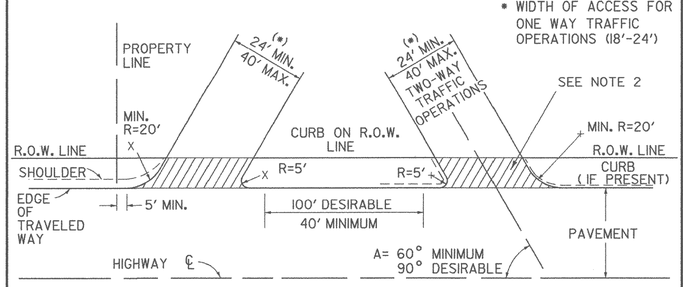
VERMONT AGENCY OF TRANSPORTATION
STRUCTURES - SECTION

STRUCTURES DETAIL SD-502.00

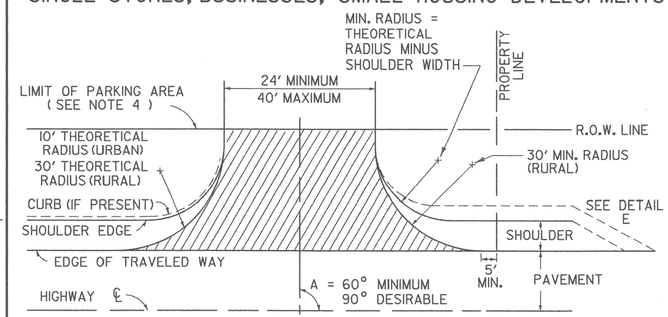
DETAIL A — RESIDENTIAL DRIVE



DETAIL B — DUAL COMMERCIAL DRIVE TO BE USED ONLY UNDER SPECIAL CONDITIONS

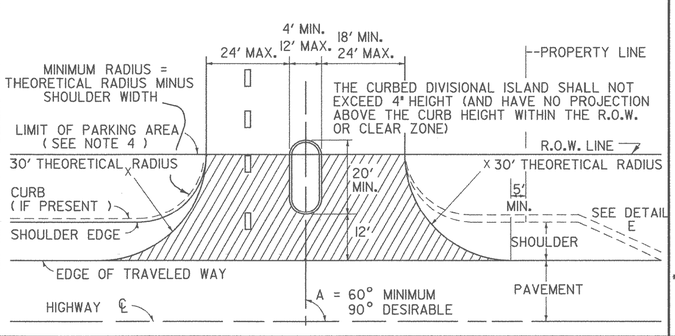


DETAIL C — TWO-WAY UNDIVIDED COMMERCIAL DRIVE FOR SINGLE STORES, BUSINESSES, SMALL HOUSING DEVELOPMENTS

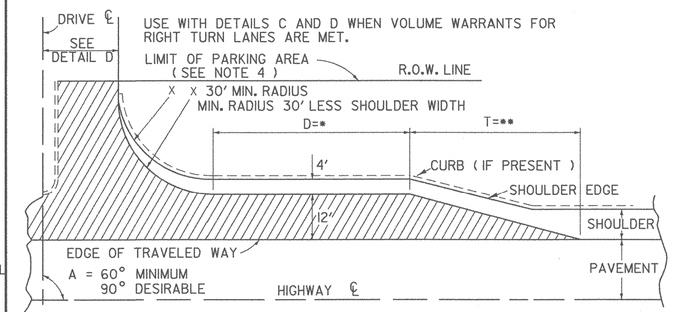


THIS DETAIL WILL ALSO APPLY TO COMMERCIAL SERVICE DRIVES, WHEN AUTHORIZED, HAVING A MAXIMUM WIDTH OF 20'. THE SERVICE DRIVE WILL HAVE A "SERVICE VEHICLES ONLY" SIGN PLACED AT THE HIGHWAY ROW LINE. SIGN SHALL BE 18"X 24" AS PRESCRIBED IN THE "STANDARD HIGHWAY SIGNS BOOK", A SUPPLEMENTAL PUBLICATION TO MUTCD.

DETAIL D — TWO-WAY COMMERCIAL DRIVE WITH DIVISIONAL ISLAND FOR SHOPPING CENTERS, LARGE HOUSING DEVELOPMENTS, INDUSTRIAL PLANTS AND SERVICE STATIONS



DETAIL E — RIGHT TURN LANE FOR COMMERCIAL DRIVE (UNSIGNALIZED INTERSECTIONS ONLY)

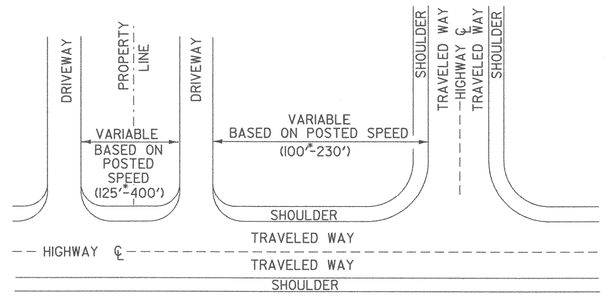


* STORAGE LENGTH IS VARIABLE DEPENDING ON TRAFFIC VOLUME AND MUST BE ADJUSTED TO PROVIDE PROPER DECELERATION LENGTH. REFER TO VAOT STANDARD E-192

TAPERS

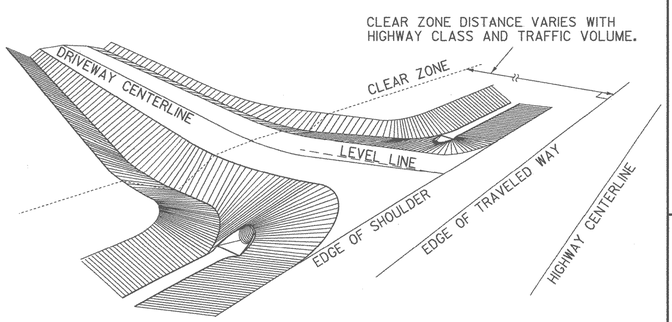
SPEED (MPH)	30	35	40	50
**LENGTH (MIN)(FT)(T)	100	120	140	180
RATE	8:1	10:1	12:1	15:1

DETAIL F — MINIMUM HORIZONTAL SEPARATION BETWEEN DRIVEWAYS AND INTERSECTING SIDEROADS

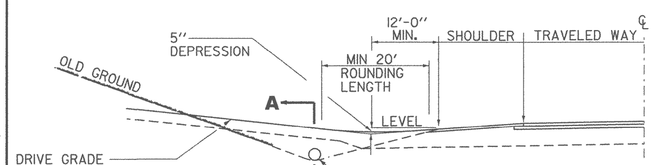


* MINIMUM UNLESS NO OTHER REASONABLE ACCESS IS AVAILABLE AND PRIOR APPROVAL IS GRANTED BY THE VAOT ITEMS SUCH AS TRAFFIC SIGNALS, HIGH TRAFFIC VOLUMES, OR FUNCTIONAL CLASS OF HIGHWAY SHOULD BE CONSIDERED WHEN DETERMINING APPROPRIATE SEPARATION DISTANCE. WHEN CURRENT RECOMMENDED SEPARATION DISTANCE CANNOT BE OBTAINED RESTRICTION OF TURNING MOVEMENTS MAY BE REQUIRED.

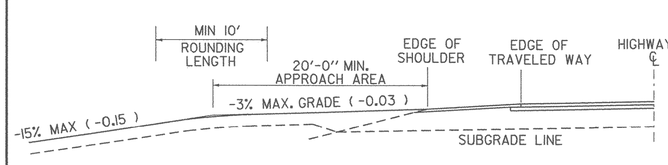
DETAIL G — PERSPECTIVE SKETCH OF DRIVE INTERSECTION SHOWING DEPRESSION



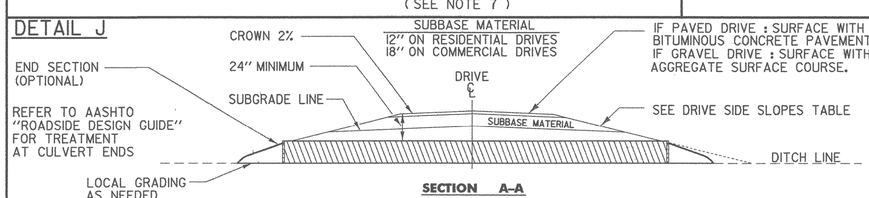
DETAIL H — PROFILE OF DRIVE INTERSECTION SHOWING 5" DEPRESSION (CUT SECTION)



DETAIL I — PROFILE OF DRIVE INTERSECTION (FILL SECTION)



DETAIL J



DRIVE SIDE SLOPES

LOCATION OF SLOPE	SLOPE RATE
V > 40 MPH	1:6 OR FLATTER
URBAN AREAS, OR V ≤ 40 MPH	1:4 DESIRABLE 1:2 ALLOWABLE
OUTSIDE CLEAR ZONE	1:2 OR FLATTER

NOTES:

1. THIS SHEET IS INTENDED FOR USE BY DESIGNERS ON HIGHWAY PROJECTS AND IN CONJUNCTION WITH A PERMIT FOR WORK WITHIN HIGHWAY RIGHTS OF WAY (FORM TA 210). ALL CONSTRUCTION REQUIRED BY THE PERMIT AND INDICATED ON THIS SHEET SHALL BE THE RESPONSIBILITY OF THE APPLICANT AND IS SUBJECT TO THE APPROVAL OF THE VT. AGENCY OF TRANSPORTATION. WHEN USED WITH THE PLANS FOR A HIGHWAY CONSTRUCTION PROJECT. THIS SHEET IS INTENDED TO BE A GUIDE FOR THE DESIGNER CONCERNING DRIVE WIDTHS, HORIZONTAL, VERTICAL AND GEOMETRIC CHARACTERISTICS.
2. ALL COMMERCIAL DRIVES SHALL BE PAVED FROM THE EDGE OF THE TRAVELED WAY TO THE HIGHWAY RIGHT-OF-WAY, TO THE FARTHEST POINT OF CURVATURE ON THE DRIVEWAY EDGE OR AS DIRECTED BY THE DISTRICT TRANSPORTATION ADMINISTRATOR. THIS PAVING IS INDICATED IN DETAILS (B THRU E) BY HATCHING.
3. DEPTH OF SUBBASE AND PAVEMENT TO BE THE SAME AS HIGHWAY OR AS SHOWN IN DETAIL J WITHIN THE LIMITS OF THE HIGHWAY RIGHT-OF-WAY.
4. VEHICULAR ACCESS FROM PARKING AREAS TO THE RIGHT-OF-WAY AT OTHER THAN APPROVED ACCESS POINTS WILL BE PREVENTED BY THE CONSTRUCTION OF CURBING OR OTHER SUITABLE PHYSICAL BARRIER.
5. IF CURB IS PRESENT, SEE APPROPRIATE CURB DETAIL STANDARD OR MATCH TOWN/CITY STANDARD CURB TREATMENT.
6. WHERE TRAFFIC VOLUME FOR A PROJECT IS SUBSTANTIAL THE AGENCY MAY REQUIRE SPECIAL LANES FOR TURNING, SIGNALS OR OTHER MODIFICATIONS. BASED ON TRAFFIC STUDIES THE AGENCY WILL DETERMINE SPECIFIC TREATMENT TO BE USED. ON DEVELOPER PROJECTS THE AGENCY WILL WORK WITH THE APPLICANT TO IMPLEMENT CHANGES TO THE STATE HIGHWAY.
7. CIRCULAR DRAINAGE CULVERTS UNDER DRIVES SHALL HAVE A MINIMUM INSIDE DIAMETER (I.D.) OF 15". PIPE ARCHES USED UNDER DRIVES SHALL HAVE A MINIMUM INSIDE CROSS-SECTIONAL AREA EQUIVALENT TO THAT PROVIDED BY A 15" CIRCULAR PIPE.
8. THE OFFSET BETWEEN THE PROPERTY LINE AND THE EDGE OF THE DRIVEWAY MAY BE GOVERNED BY LOCAL ZONING LAWS. DRIVEWAY WIDTH RESTRICTIONS SHOWN PERTAIN ONLY TO THE AREA WITHIN THE HIGHWAY R.O.W. OR THE END OF THE TURNING RADIUS WHICHEVER IS GREATEST.
9. DRIVEWAY GRADES STEEPER THAN THOSE SHOWN MAY BE ALLOWED AS LONG AS A 20' APPROACH AREA IS ACHIEVED FOR THE VEHICLE TO PAUSE BEFORE ENTERING THE HIGHWAY. (WHERE CURB & SIDEWALKS EXIST, SEE STANDARDS C-2A & C-2B)
10. INTERSECTION SIGHT DISTANCES, EQUAL TO OR GREATER THAN THOSE SHOWN BELOW, SHOULD BE PROVIDED IN BOTH DIRECTIONS FOR ALL DRIVES ENTERING ON PUBLIC HIGHWAYS, UNLESS OTHERWISE APPROVED BY THE AGENCY OF TRANSPORTATION. INTERSECTION SIGHT DISTANCE IS MEASURED FROM A POINT ON THE DRIVE AT LEAST 15 FEET FROM THE EDGE OF TRAVELED WAY OF THE ADJACENT ROADWAY AND MEASURED FROM A HEIGHT OF EYE OF 3.5 FEET ON THE DRIVE TO A HEIGHT OF 3.50 FEET ON THE ROADWAY.

SIGHT DISTANCE CHART

POSTED SPEED OR DESIGN SPEED (M.P.H.)	MINIMUM STOPPING SIGHT DISTANCE (FT)	MINIMUM INTERSECTION SIGHT DISTANCE * (FT)
25	155	280
30	200	335
35	250	390
40	305	445
45	360	500
50	425	555
55	495	610
60	570	665
65	645	720

THE ABOVE VALUES ARE TAKEN FROM THE 2004 AASHTO "A POLICY ON GEOMETRIC DESIGN OF HIGHWAYS & STREETS."

NOTE : ADVANCE WARNING SIGNS WILL BE REQUIRED IF OBTAINABLE INTERSECTION SIGHT DISTANCES ARE BELOW MINIMUM STOPPING SIGHT DISTANCES.

THE CHART IS ENTERED TO SELECT DESIGN VALUES BASED ON THE POSTED SPEED LIMIT IN MPH. VALUES FOR DESIGN ARE CALCULATED BASED ON THE DESIGN SPEED IN MPH.

* ASSUMES A GAP OF 7.5 SECONDS IN THE TRAFFIC STREAM ON THE HIGHWAY MAINLINE BASED ON THE HIGHWAY DESIGN SPEED IN MPH. THIS ALLOWS A STOPPED PASSENGER VEHICLE TO ENTER THE MAINLINE FROM THE DRIVE WITHOUT UNDULY INTERFERING WITH THE HIGHWAY OPERATIONS.

REVISIONS AND CORRECTIONS

DEC. 11, 1992 - THIS STANDARD SUPERCEDES B-71 (7/23/80R), B-71A (3/12/90), AND B-13 (12/14/71).
JUNE 1, 1994 - REISSUED, WITHOUT CHANGE, UNDER NEW SIGNATURES.
MAR. 10, 1995 - REISSUED, WITHOUT CHANGE, UNDER NEW SIGNATURES.
NOV. 16, 2000 - CHANGES MADE TO CONFORM WITH LANGUAGE AND DIMENSIONS IN ACCESS MANAGEMENT PROGRAM GUIDELINES.
FEB 1, 2004 - CHANGES MADE TO SIGHT DISTANCE CHART TO CONFORM WITH NEWEST AASHTO CRITERIA.
JULY 8, 2005 - CHANGE MADE TO OBJECT HEIGHT TO CONFORM WITH NEWEST AASHTO CRITERIA

APPROVED

Richard Tetreault
DIRECTOR OF PROGRAM DEVELOPMENT

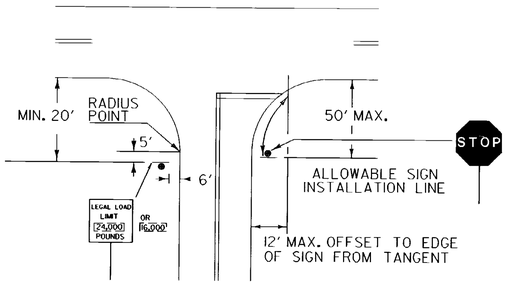
Craig S. Keller
CHIEF OF UTILITIES AND PERMITS

Michael Conway
FEDERAL HIGHWAY ADMINISTRATION

STANDARDS FOR RESIDENTIAL AND COMMERCIAL DRIVES

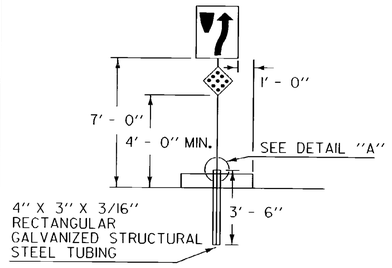
VERMONT AGENCY OF TRANSPORTATION

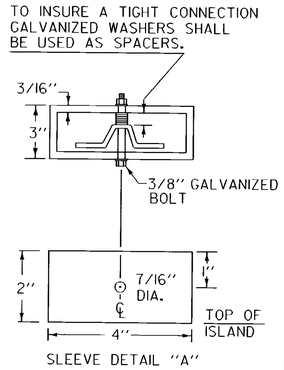
STANDARD B-71



STOP SIGN SHALL BE PLACED ON DRIVERS RIGHT. MAINTAINING MAXIMUM VISIBLITY. CLEARANCE SHALL BE A MINIMUM OF 6' AND A MAXIMUM OF 50' FROM EDGE LINE OF INTERSECTING ROADWAY AND DOES NOT HAVE TO BE ADJACENT TO THE STOP BAR.

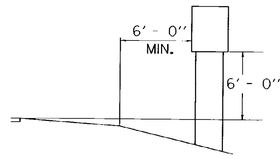
LEGAL LOAD LIMIT AND STOP SIGNS AT INTERSECTIONS WITH TOWN HIGHWAYS

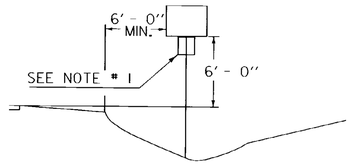


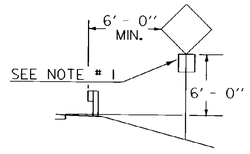


SIGNS ON MEDIAN ISLANDS IN THE LINE OF TRAFFIC

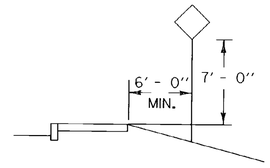
INCREASE VERTICAL CLEARANCE TO 7' IN AREAS OF FREQUENT ROADSIDE PARKING OR PEDESTRIAN ACTIVITY

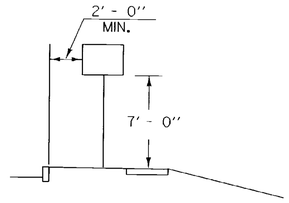




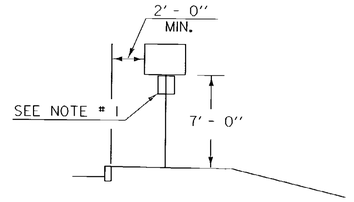


RURAL





IF SUFFICIENT CLEARANCE IS NOT AVAILABLE BETWEEN CURB AND SIDEWALK MOUNT SIGN BEHIND SIDEWALK AS SHOWN AT TOP. CHECK FOR ADEQUATE R.O.W..



URBAN

NOTES:

1. IN BOTH RURAL AND URBAN LOCATIONS, IF A SECONDARY SIGN IS MOUNTED BELOW ANOTHER SIGN, THE MINIMUM CLEARANCE MAY BE REDUCED BY ONE FOOT.
2. IN RURAL AREAS WITH NO OR MINIMAL SHOULDER, THE LATERAL CLEARANCE TO THE EDGE OF A SIGN SHOULD BE A MINIMUM OF 12' FROM THE EDGE OF THE TRAVELED WAY.
3. ALSO SEE OTHER STANDARD SHEETS FOR MOUNTING CLEARANCE AND SPACING OF DESTINATION AND ROUTE MARKER ASSEMBLIES AND TOWN LINE SIGNS.

POST REFERENCE:

REFER TO THE DETAILS ON THE APPROPRIATE STANDARD DRAWING FOR INFORMATION CONCERNING THE PROPER MOUNTING OF SIGNS ON APPROPRIATE POSTS.

OTHER STDS. REQUIRED: **E-160** **E-161** **E-162** **E-163** **E-164**

REVISIONS AND CORRECTIONS

JAN. 23, 1995 - DATE OF ORIGINAL ISSUE

AUG. 08, 1995 - VARIOUS MINOR NOTE REVISIONS

APPROVED FOR THIS PROJECT AND/OR DESIGN IMPLEMENTATION. FHWA FINAL APPROVAL PENDING.

APPROVED

DIRECTOR OF ENGINFERING

TRAFFIC AND SAFETY ENGINEER

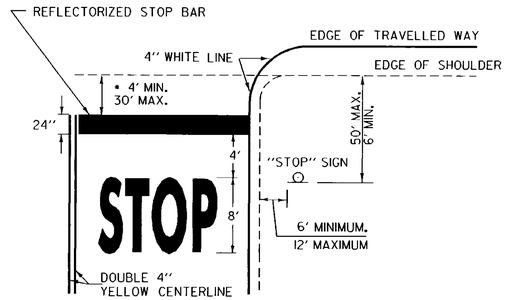
STANDARD SIGN PLACEMENT CONVENTIONAL ROAD

/traf/std/stdel21.dgn : stdel21.i

VERMONT AGENCY OF TRANSPORTATION

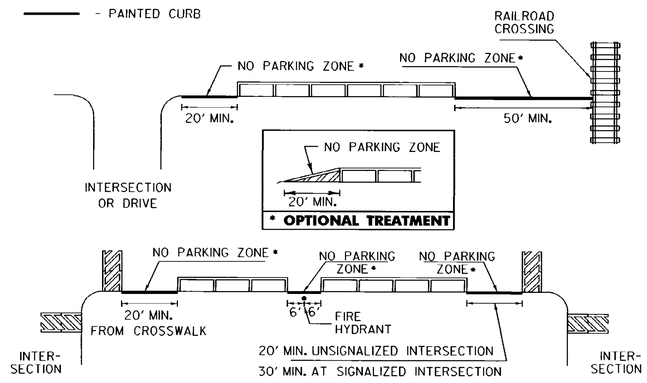
STANDARD

E-121

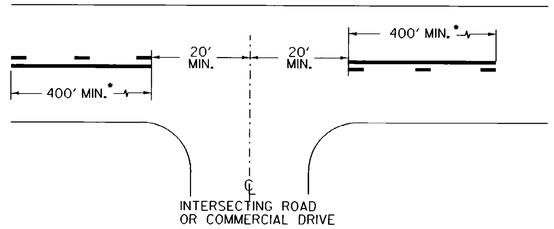


• THE "DESIRED STOPPING POINT" IS THE LOCATION BASED ON SITE CONDITIONS THAT BEST ALLOWS THE STOPPED VEHICLE TO VIEW THE APPROACHING TRAFFIC.

STOP BAR LAYOUT



NO PARKING LAYOUT DETAILS



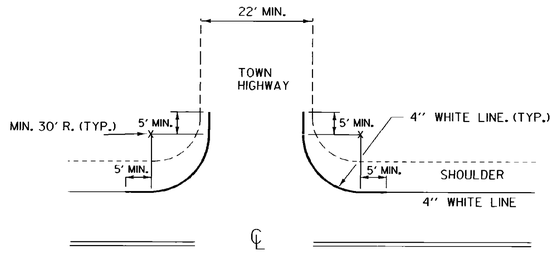
• THE SOLID LINE SHALL BE PAIRED WITH EITHER A SOLID OR DASHED LINE DEPENDING ON SIGHT DISTANCE AVAILABILITY IN THE OPPOSING DIRECTION. ADJUSTMENTS TO THE 40 FOOT CENTERLINE OPENING MAY BE MADE TO ACCOMMODATE SKEWED INTERSECTIONS.

CENTERLINE BREAKES:

A. AT ALL STATE HIGHWAYS AND TOWN HIGHWAYS, INCLUDING CLASS 4 TH'S. THAT HAVE STOP AND LEGAL LOAD LIMIT SIGNS INSTALLED

B. COMMERCIAL DRIVES:
   1. WHERE A SEPERATE TURN LANE EXISTS ON THE MAIN LINE (LT. OR RT.)
   2. SIGNIFICANT TRAFFIC VOLUMES EXISTS.
   3. IF MOTORISTS NEED ASSISTANCE TO DEFINE ENTRANCE POINTS.

CENTERLINE LAYOUT

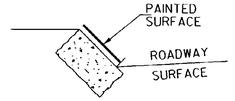


EDGELINES SHALL BE APPLIED TO ALL STATE HIGHWAYS AND SHOULD BE MAINTAINED AT A CONSTANT DISTANCE FROM THE CENTERLINE UNLESS PAVEMENT WIDTH INCREASES TO ALLOW WIDER LANES.

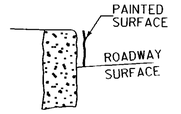
APPLY EDGELINE AS DETAILED ON ALL PAVED CLASS 1 & CLASS 2 TOWN HIGHWAYS AND ANY CLASS 3 TOWN HIGHWAY 22 FEET OR MORE IN WIDTH.

IF MIN. 30 FOOT RADIUS CANNOT BE OBTAINED, OR THE TOWN HIGHWAY IS NOT PAVED, BREAK THE EDGELINE USING AN 80 FOOT GAP AT INTERSECTION.

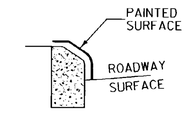
EDGELINE LAYOUTS



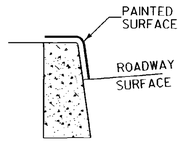
GRANITE SLOPE EDGING



VERTICAL GRANITE CURB

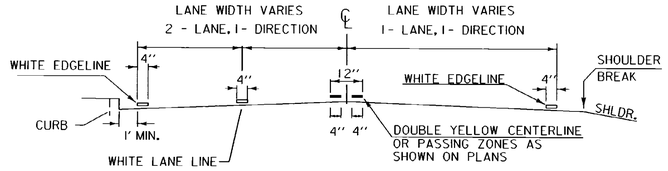


TYPE A (CONCRETE)

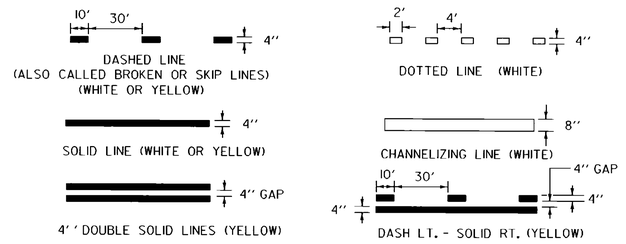


TYPE B (CONCRETE)

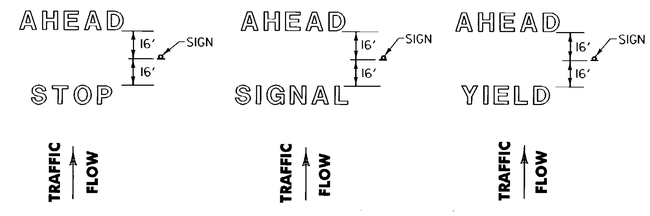
PAINTED CURB



PAVEMENT MARKING PLACEMENT DETAIL

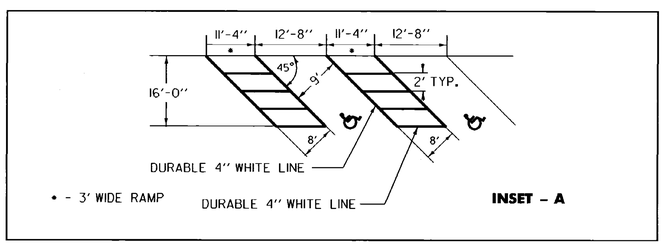


PAVEMENT MARKING LINE DETAILS



LETTER IN WORD MARKING SPACING DETAIL

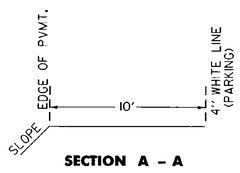
NOTE: SINGLE WORDS CENTERED ON SIGN ie: SCHOOL OR YIELD



INSET - A

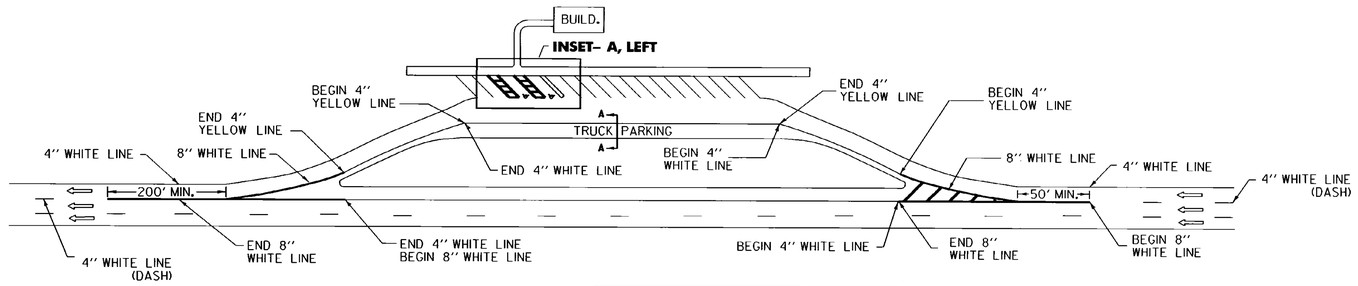
NOTE:

SEE STANDARD SHEET E-191 FOR HANDICAP SYMBOL POSITIONING AND DETAIL.



SECTION A - A

TRUCK PARKING DETAIL



REST AREA PARKING DETAILS

THIS SHEET IS NOT TO SCALE

OTHER STDS. E - 191, E - 192 REQUIRED

REVISIONS AND CORRECTIONS

AUG. 18, 1995 - DATE OF ORIGINAL ISSUE

APPROVED FOR THIS PROJECT AND/OR DESIGN IMPLEMENTATION. FHWA FINAL APPROVAL PENDING.

APPROVED

DIRECTOR OF ENGINEERING

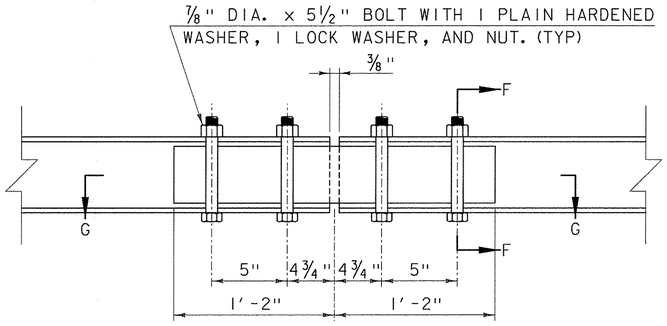
TRAFFIC AND SAFETY ENGINEER

PAVEMENT MARKING DETAILS

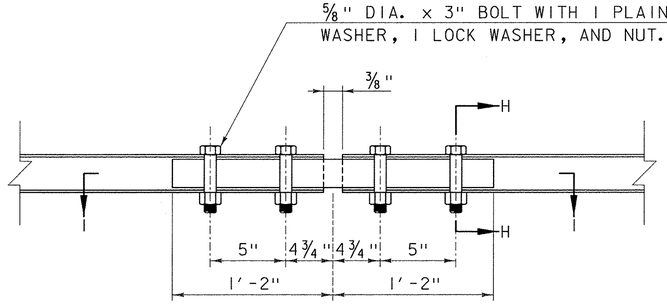
/traf/std/stdel93.dgn/stdel93.i

VERMONT AGENCY OF TRANSPORTATION

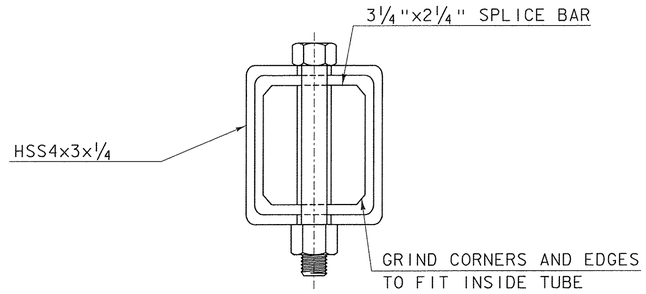
STANDARD E-193



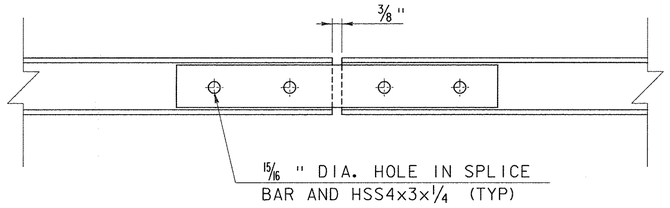
TOP RAIL FIXED SPLICE DETAIL



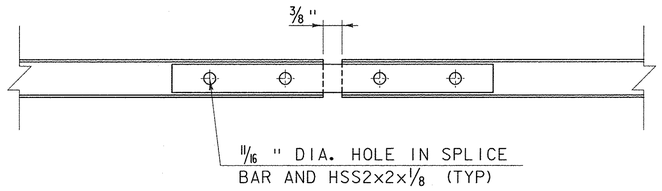
BOTTOM RAIL FIXED SPLICE DETAIL



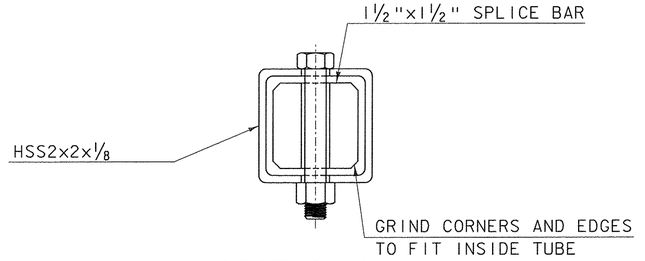
SECTION F-F



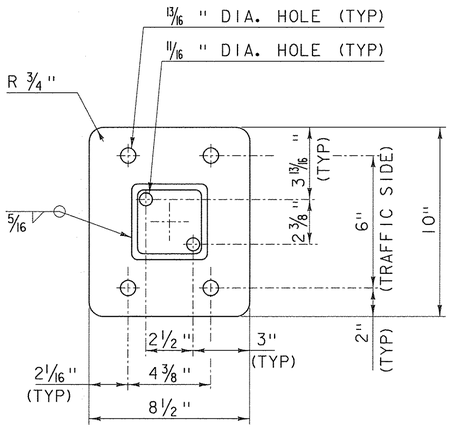
SECTION G-G



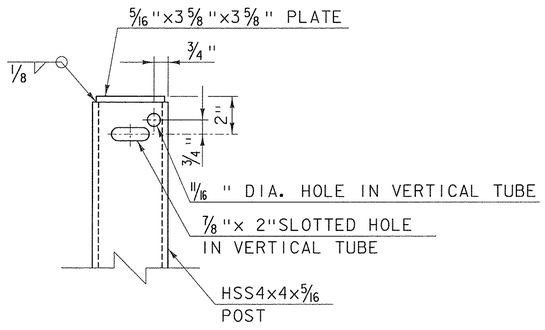
SECTION I-I



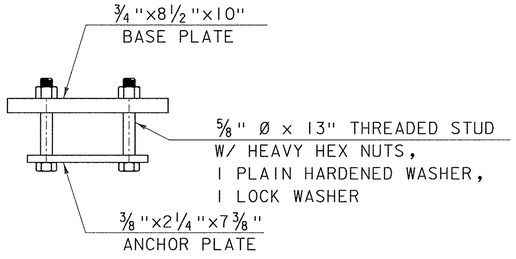
SECTION H-H



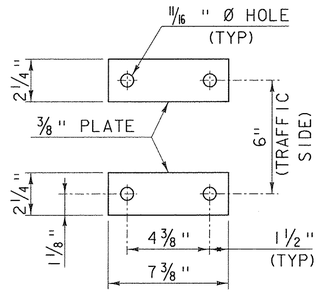
BASE PLATE



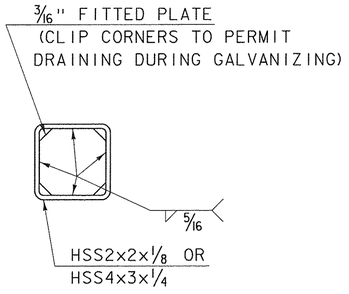
VERTICAL TUBE DETAIL
(FRONT VIEW)



RAIL POST ANCHORAGE



ANCHOR PLATES



END OF RAIL DETAIL

OTHER STDS. REQUIRED: G-1

REVISIONS AND CORRECTIONS

AUGUST 22, 2012 - ORIGINAL APPROVAL

APPROVED

Wm. Michael Hedges
STRUCTURES ENGINEER

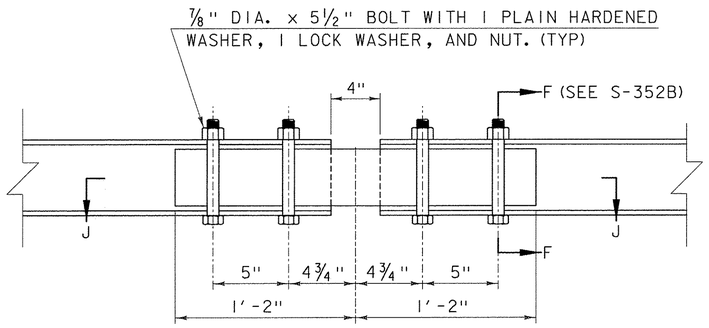
Richard Fetterolf
DIRECTOR OF PROGRAM DEVELOPMENT

Mark D. Richter
FEDERAL HIGHWAY ADMINISTRATION

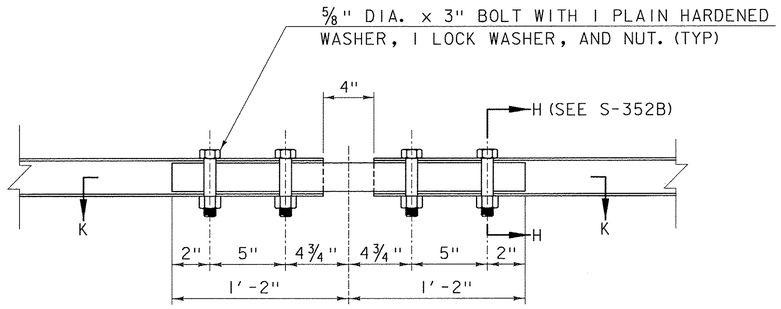
BRIDGE RAILING, GALVANIZED STEEL TUBING / CONCRETE COMBINATION

VERMONT AGENCY OF TRANSPORTATION

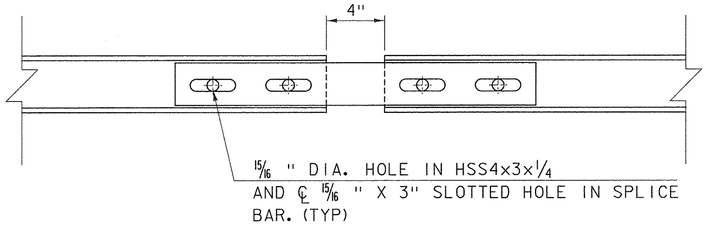
STANDARD S-352B



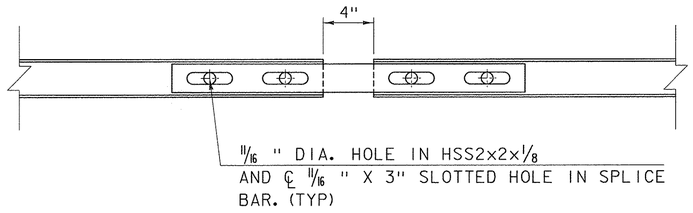
TOP RAIL EXPANSION SPLICE DETAIL



BOTTOM RAIL EXPANSION SPLICE DETAIL



SECTION J-J



SECTION K-K

OTHER STDS. REQUIRED: G-1

REVISIONS AND CORRECTIONS

AUGUST 22, 2012 - ORIGINAL APPROVAL

APPROVED

STRUCTURES ENGINEER

DIRECTOR OF PROGRAM DEVELOPMENT

FEDERAL HIGHWAY ADMINISTRATION

BRIDGE RAILING, GALVANIZED STEEL TUBING / CONCRETE COMBINATION

VERMONT AGENCY OF TRANSPORTATION

STANDARD S-352C

1. TRAFFIC CONTROL DEVICES NOT DETAILED IN THE VERMONT AGENCY OF TRANSPORTATION (VAOT) ''STANDARD DRAWINGS'' OR THE PROJECT PLANS SHALL BE IN ACCORDANCE WITH THE "MANUAL ON TRAFFIC CONTROL DEVICES" (MUTCD) AND THE ''STANDARD HIGHWAY SIGNS AND MARKINGS'' BOOK (SHSM) PUBLISHED BY THE FEDERAL HIGHWAY ADMINISTRATION (FHWA).

2. CONSTRUCTION SIGNS SHALL BE ERECTED BEFORE THE START OF ANY WORK AND SHALL BE COVERED UNTIL WORK COMMENCES, DURING PERIODS OF INACTIVITY OR UPON COMPLETION OF THE WORK. EACH SIGN SHALL BE ERECTED IN A NEAT AND WORKMANLIKE MANNER.

3. CONSTRUCTION SIGN COVERS SHALL CONSIST OF A PANEL, PAINTED FLAT BLACK, THE SAME SIZE AS THE SIGN IT COVERS. THE PANEL SHALL BE OF WOOD, PLYWOOD, HARDBOARD OR ANY MATERIAL SATISFACTORY TO THE ENGINEER. NO MATERIAL WILL BE APPROVED THAT WILL DETERIORATE BY EXPOSURE TO THE WEATHER DURING THE PROJECT. MOUNTING OF THE PANEL SHALL BE DONE IN SUCH A WAY AS NOT TO DAMAGE THE SIGN FACE MATERIAL.

4. SIGNS SHALL BE MAINTAINED IN A CLEAN AND LEGIBLE CONDITION SATISFACTORY TO THE ENGINEER. THEY SHALL BE KEPT PLUMB AND LEVEL, AND ALWAYS PRESENT A NEAT APPEARANCE. DAMAGED, DEFACED OR DIRTY SIGNS SHALL BE REPAIRED, CLEANED OR REPLACED AS ORDERED BY THE ENGINEER.

5. NO CROSS-BRACING OR BACK-BRACING TO KEEP POSTS PLUMB WILL BE ALLOWED. CONCRETE FOUNDATIONS, COLLARS OR SOIL BEARING PLATES ARE NOT PERMITTED. CONSTRUCTION SIGNS SHALL BE PLACED ON TWO POSTS.

6. CONSTRUCTION SIGNS INSTALLED ON POSTS SHALL BE SET SECURELY IN THE GROUND. THE BOTTOM OF A SIGN SHALL BE AT LEAST FIVE FEET ABOVE THE EDGE OF PAVEMENT AND THE NEAREST EDGE OF A SIGN SHALL BE AT LEAST SIX FEET OUTSIDE THE SHOULDER POINT, FOUR FEET OUTSIDE GUARDRAIL, OR TWO FEET OUTSIDE CURBING OR SIDEWALK. THE INSTALLATION OF SIGNS SHALL BE SUBJECT TO APPROVAL OF THE ENGINEER. IN URBAN AREAS, THE BOTTOM OF THE SIGN SHALL BE AT LEAST SEVEN FEET ABOVE THE SIDEWALK OR EDGE OF PAVEMENT, WHICHEVER IS HIGHER.

7. PORTABLE SIGNS SHALL BE PLACED ON THE EDGE OF ROADWAY AND A MINIMUM OF ONE FOOT ABOVE THE TRAVELED WAY. ALL VEGETATION THAT INTERFERES WITH VISIBILITY OF THE SIGNS SHALL BE REMOVED. WHEN PLACED BEHIND GUARDRAIL, THE BOTTOM OF THE SIGN FACE SHALL BE ABOVE THE TOP OF THE GUARDRAIL.

8. SIGNS SHALL BE REMOVED UPON COMPLETION OF THE WORK AT THE DISCRETION OF THE ENGINEER.

9. ROLL UP CONSTRUCTION SIGNS SHALL HAVE RETROREFLECTIVE SHEETING EQUAL TO OR EXCEEDING THE "AMERICAN ASSOCIATION OF STATE HIGHWAY AND TRANSPORTATION OFFICIALS" (AASHTO) M 268 ["AMERICAN SOCIETY FOR TESTING AND MATERIALS" (ASTM) D 4956] TYPE VI AND TYPE VII UNLESS OTHERWISE NOTED.

10. SOLID SUBSTRATE CONSTRUCTION SIGNS SHALL HAVE RETROREFLECTIVE SHEETING EQUAL TO OR EXCEEDING THE "AMERICAN ASSOCIATION OF STATE HIGHWAY AND TRANSPORTATION OFFICIALS" (AASHTO) M 268 ["AMERICAN SOCIETY FOR TESTING AND MATERIALS" (ASTM) D 4956] TYPE VIII OR IX REQUIREMENTS UNLESS OTHERWISE NOTED.

11. WHERE CONSTRUCTION SIGN INSTALLATIONS ARE NOT PROTECTED BY GUARDRAIL OR OTHER APPROVED TRAFFIC BARRIERS, ALL SIGN STANDS AND POST INSTALLATIONS SHALL MEET "NATIONAL COOPERATIVE HIGHWAY RESEARCH PROGRAM" (NCHRP) REPORT 350 OR THE AASHTO "MANUAL FOR ASSESSING SAFETY HARDWARE" (MASH). THE APPROPRIATE RESOURCE SHALL BE DETERMINED AS DESCRIBED IN THE MASH PUBLICATION. NO SIGN POSTS SHALL EXTEND OVER THE TOP OF THE SIGN INSTALLED ON SAID POSTS. WHEN ANCHORS ARE INSTALLED, STUBS SHALL NOT BE GREATER THAN FOUR INCHES ABOVE EXISTING GROUND.

12. ROADWAY AND SHOULDER WIDTHS DEPICTED ON THE STANDARD DRAWINGS MAY VARY.

13. THESE STANDARD DRAWINGS ARE INTENDED TO SERVE AS VTRANS STANDARD OPERATING PROCEDURE. IT IS NOTED THAT COMPONENT PARTS OF A TEMPORARY TRAFFIC CONTROL WORK ZONE MAY BE MODIFIED DUE TO FIELD CONDITIONS, AT THE DISCRETION OF THE ENGINEER.

OTHER STDS. REQUIRED: **NONE**

REVISIONS AND CORRECTIONS

AUG. 6, 2012 - ORIGINAL APPROVAL DATE

APPROVED

HIGHWAY SAFETY & DESIGN ENGINEER

DIRECTOR OF PROGRAM DEVELOPMENT

Mark D. Richter

FEDERAL HIGHWAY ADMINISTRATION

TRAFFIC CONTROL GENERAL NOTES

VERMONT AGENCY OF TRANSPORTATION

STANDARD

T-1

VERMONT WARNING SIGN NOTES:

1. UNLESS OTHERWISE SPECIFIED, VERMONT WARNING SIGNS SHALL BE BLACK LEGEND AND BORDER ON YELLOW RETROREFLECTIVE SHEETING EQUAL TO OR EXCEEDING THE "AMERICAN ASSOCIATION OF STATE HIGHWAY AND TRANSPORTATION OFFICIALS" (AASHTO) M 268 ["AMERICAN SOCIETY FOR TESTING AND MATERIALS" (ASTM) D 4956] TYPE IV.

VERMONT REGULATORY SIGN NOTES:

1. UNLESS OTHERWISE SPECIFIED, VERMONT REGULATORY SIGNS SHALL BE BLACK LEGEND AND BORDER ON WHITE RETROREFLECTIVE SHEETING EQUAL TO OR EXCEEDING THE "AMERICAN ASSOCIATION OF STATE HIGHWAY AND TRANSPORTATION OFFICIALS" (AASHTO) M 268 ["AMERICAN SOCIETY FOR TESTING AND MATERIALS" (ASTM) D 4956] TYPE IV.

GENERAL NOTES:

1. SIGN BASE MATERIAL FOR TRAFFIC SIGN, TYPE A SHALL BE FLAT SHEET ALUMINUM MEETING THE FLAT SHEET ALUMINUM THICKNESS CHART ON THIS SHEET.
2. SIGN BASE MATERIAL FOR TRAFFIC SIGN, TYPE B SHALL BE EXTRUDED ALUMINUM PANELS.
3. ALL SIGN TEXT SHALL BE IN ACCORDANCE WITH THE RESPECTIVE ALPHABET AS IDENTIFIED IN THE CURRENT "STANDARD HIGHWAY SIGNS AND MARKINGS" (SHSM) BOOK, AND ITS LATEST REVISIONS.
4. COLORS SHALL MEET THE REQUIREMENTS AS IDENTIFIED IN THE CURRENT MUTCD, AND ITS LATEST REVISIONS.
5. ALL DIMENSIONS SHOWN IN INCHES.

FLAT SHEET ALUMINUM THICKNESS CHART

THICKNESS	0.080	0.100	0.125
SIGN SIZE	12 X 12	36 X 12	48 X 18
	18 X 18	36 X 15	48 X 24
	21 X 15	36 X 18	48 X 30
	24 X 8	36 X 24	48 X 42
	24 X 10	36 X 36	48 X 48
	24 X 12	36 X 42	48 X 60
	24 X 18	36 X 45	72 X 10
	24 X 24	36 X 48	72 X 12
	24 X 30	36 X 54	72 X 20
	30 X 15		
	30 X 18		
	30 X 24		
	30 X 30		
	30 X 42		

REV.	DATE	DESCRIPTION
0	FEB. 12, 2016	ORIGINAL APPROVAL

OTHER STANDARDS REQUIRED: NONE

VTRANS AND FHWA APPROVAL ON FILE WITH CONTRACT ADMINISTRATION

TRAFFIC SIGN GENERAL NOTES

VTrans Working to Get You There
VERMONT AGENCY OF TRANSPORTATION

STANDARD
T-2

LEGEND

(A) ROAD WORK AHEAD — W20-1

(B) ROAD WORK 500 FT — W20-1

(C) SIDE ROAD WORK AHEAD — VC-869

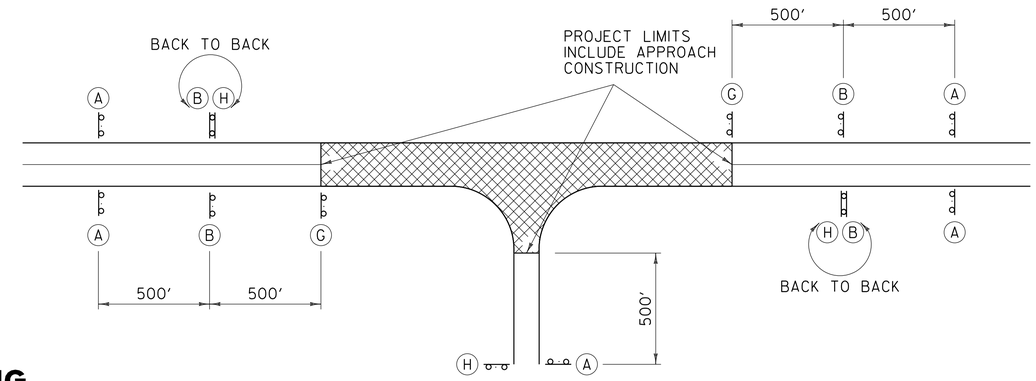
(D) SIDE ROAD WORK 500 FT — VC-869

(E) SIDE ROAD WORK LEFT — VC-869

(F) SIDE ROAD WORK RIGHT — VC-869

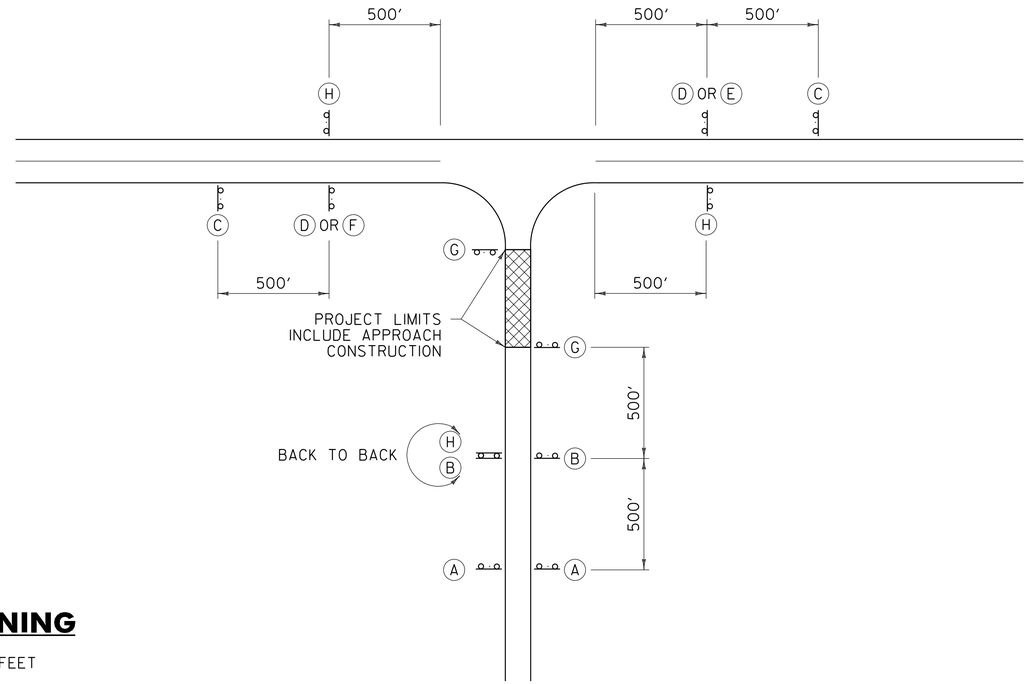
(G) ROAD WORK NEXT XX MILES — G20-1

(H) END ROAD WORK — G20-2



TYPICAL APPROACH SIGNING

FIELD CONDITIONS MAY DICTATE THE ACTUAL PLACEMENT.



SIDE ROAD APPROACH SIGNING

TO BE USED WHEN CONSTRUCTION IS UP TO 1000 FEET FROM THE INTERSECTION. FIELD CONDITIONS MAY DICTATE THE ACTUAL PLACEMENT.

GENERAL NOTES:

1. SIGNS SHOWN ON THIS SHEET ARE INTENDED FOR USE IN PROVIDING ADVANCE WARNING AND INFORMATION ON CONSTRUCTION PROJECTS OVER WHICH TRAFFIC WILL BE MAINTAINED. WHEN ADDITIONAL APPROACH SIGNS OR OTHER TYPES OF ADVANCE SIGNING OR CONTROL ARE NECESSARY, THE PLANS AND/OR THE SPECIFICATIONS FOR THAT PROJECT WILL GIVE THE DETAILS OF THE SIGNS AND DEVICES REQUIRED. FOR ON-PROJECT CONSTRUCTION SIGNS, REFER TO APPROPRIATE STANDARD SHEETS.
2. THE ''ROAD WORK NEXT XX MILES'' SIGN (G20-1) SHALL BE INSTALLED IN ADVANCE OF TEMPORARY TRAFFIC CONTROL ZONES THAT ARE MORE THAN TWO MILES IN LENGTH OR AS DIRECTED BY THE ENGINEER. DISTANCES SHALL BE STATED TO THE NEAREST WHOLE MILE.
3. SIGNS SHALL BE LOCATED AS DETAILED ON THIS SHEET OR AS OTHERWISE SHOWN ON THE PLANS. THEY SHALL APPEAR AT EACH END OF THE HIGHWAY UNDER CONSTRUCTION AND ON ALL INTERSECTING PUBLIC HIGHWAYS. THE ENGINEER SHALL DETERMINE THE EXACT LOCATIONS.

OTHER STDS. REQUIRED: **T–1, T–28**

REVISIONS AND CORRECTIONS

AUG. 6, 2012 - ORIGINAL APPROVAL DATE

APPROVED

HIGHWAY SAFETY & DESIGN ENGINEER

DIRECTOR OF PROGRAM DEVELOPMENT

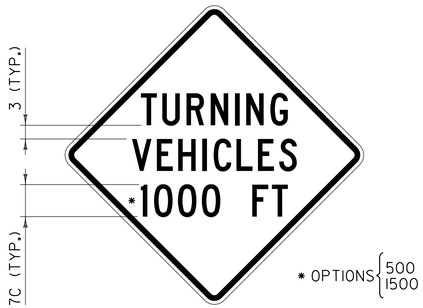
Mark D. Richter

FEDERAL HIGHWAY ADMINISTRATION

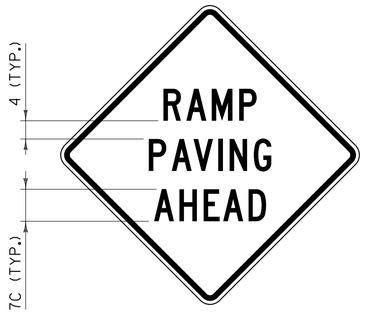
CONVENTIONAL ROADS CONSTRUCTION APPROACH SIGNING

VERMONT AGENCY OF TRANSPORTATION

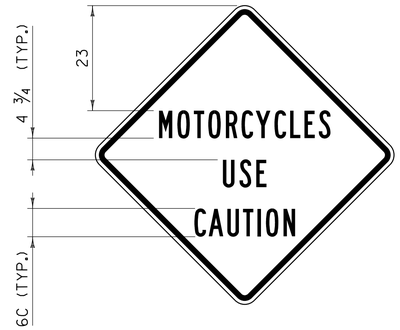
STANDARD T-10



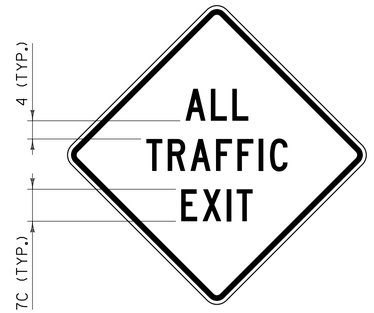
VC–001



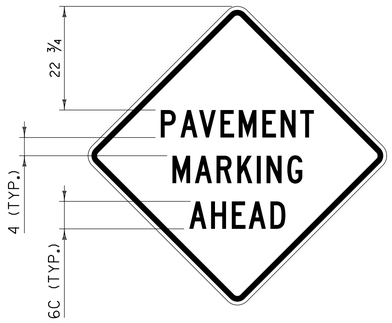
VC–003



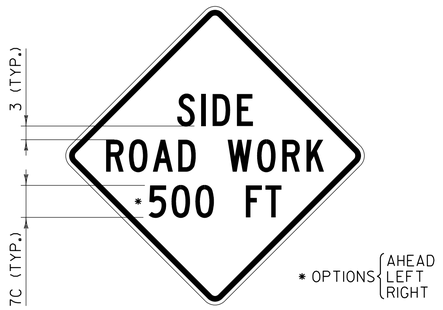
VC–004



VC–008



VC–813



VC–869

VC–874

GENERAL NOTES:

1. COLORS FOR SIGNS SHALL BE BLACK LEGEND AND BORDER ON FLUORESCENT ORANGE BACKGROUND.
2. CONSTRUCTION SIGNS SHALL BE 48 INCH BY 48 INCH. IF SOLID SUBSTRATE SIGNS ARE USED, SIGNS SHALL HAVE CORNERS ROUNDED TO A THREE INCH RADIUS.
3. SIGNS SHALL HAVE 1 1/4 INCH WIDE BORDERS THAT ARE INDENTED 3/4 INCH FROM THE EDGE OF THE SIGN.
4. SIGNS SHALL HAVE THE LEGEND CENTERED HORIZONTALLY AND VERTICALLY ON THE SIGN UNLESS OTHERWISE INDICATED.
5. ALL DIMENSIONS SHOWN IN INCHES.

OTHER STDS. REQUIRED: **T–1**

REVISIONS AND CORRECTIONS

AUG. 6, 2012 - ORIGINAL APPROVAL DATE

APPROVED

HIGHWAY SAFETY & DESIGN ENGINEER

DIRECTOR OF PROGRAM DEVELOPMENT

Mark D. Richter

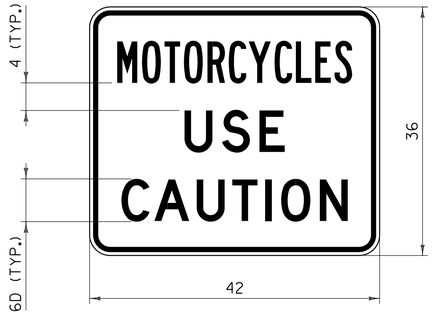
FEDERAL HIGHWAY ADMINISTRATION

CONSTRUCTION SIGN DETAILS

VERMONT AGENCY OF TRANSPORTATION

STANDARD

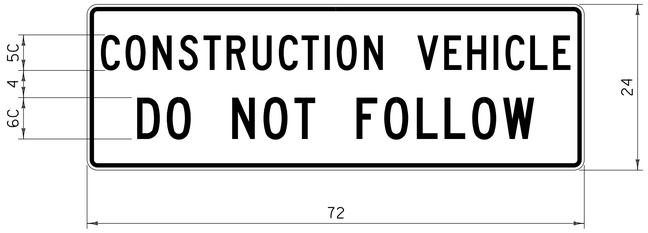
T-28



VC-004P

NOTES:

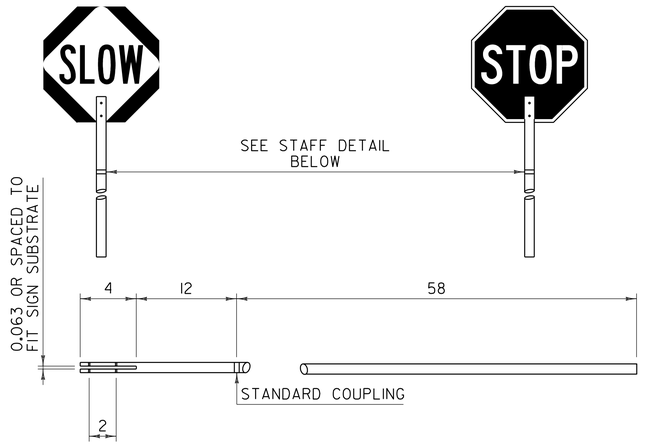
1. CORNERS SHALL BE ROUNDED TO A THREE INCH RADIUS.
2. THE BORDER SHALL BE 3/4 INCH WIDE WITH A 1/2 INCH INDENT FROM THE EDGE OF THE SIGN.
3. "MOTORCYCLES" SHALL HAVE A SPECIFIED WIDTH OF 34 INCHES.
4. "USE" SHALL HAVE A SPECIFIED WIDTH OF 14 1/2 INCHES.
5. "CAUTION" SHALL HAVE A SPECIFIED WIDTH OF 32 3/4 INCHES.
6. SIGN SHALL ONLY BE INSTALLED AS A SUPPLEMENTAL TO A PARENT WARNING SIGN AND SHALL NOT BE INSTALLED BY ITSELF.



VC-007

NOTES:

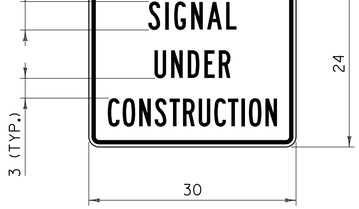
1. CORNERS SHALL BE ROUNDED TO A 1 1/2 INCH RADIUS.
2. THE BORDER SHALL BE 5/8 INCH WIDE WITH A 3/8 INCH INDENT FROM THE EDGE OF THE SIGN.
3. "CONSTRUCTION VEHICLE" SHALL HAVE A SPECIFIED WIDTH OF 68 INCHES.
4. "DO NOT FOLLOW" SHALL HAVE A SPECIFIED WIDTH OF 57 1/2 INCHES.
5. SIGN SHALL BE MOUNTED IN A CONSPICUOUS LOCATION ON THE REAR OF THE CONSTRUCTION VEHICLE.
6. THE SIGN SHALL BE MOUNTED AS NOT TO INTERFERE WITH THE VISIBILITY OF DIRECTIONAL SIGNALS OR TAIL LIGHTS AS REQUIRED BY LAW.
7. SIGN SHALL BE COVERED OR REMOVED WHEN NOT IN USE.



STOP-SLOW PADDLE & STAFF DETAIL

NOTES:

1. REFER TO THE "STANDARD HIGHWAY SIGNS AND MARKINGS" BOOK (SHSM) "TEMPORARY TRAFFIC CONTROL - WARNING SIGNS" FOR THE STOP-SLOW PADDLE DESIGN.
2. COLORS FOR THE SLOW SIDE OF THE PADDLE SHALL BE BLACK LEGEND AND BORDER ON A FLUORESCENT ORANGE DIAMOND WITH RETROREFLECTIVE SHEETING EQUAL TO OR EXCEEDING AASHTO M 268 [ASTM D 4956] TYPE VII, VIII OR IX REQUIREMENTS.
3. COLORS FOR THE STOP SIDE OF THE PADDLE SHALL BE WHITE RETROREFLECTIVE LEGEND AND BORDER ON A RED RETROREFLECTIVE OCTAGON. BOTH COLORS SHALL HAVE RETROREFLECTIVE SHEETING EQUAL TO OR EXCEEDING AASHTO M 268 [ASTM D 4956] TYPE III.
4. SIGN SUBSTRATE MATERIALS SHALL BE ALUMINUM, ACRYLONITRILE BUTADIENE STYRENE (ABS) PLASTIC OR EQUIVALENT.
5. THE STAFF MAY BE RIGID ABS PLASTIC OR WOOD WITH A ONE TO 1 1/2 INCH DIAMETER.
6. SIGNS SHALL BE MAINTAINED IN A CLEAN AND LEGIBLE CONDITION SATISFACTORY TO THE ENGINEER. THEY SHALL BE COMPLETELY VISIBLE TO APPROACHING TRAFFIC AT ALL TIMES. THEY SHALL BE KEPT PLUMB AND LEVEL, AND ALWAYS PRESENT A NEAT APPEARANCE. DAMAGED, DEFACED OR DIRTY SIGNS SHALL BE REPAIRED, CLEANED OR REPLACED AS ORDERED BY THE ENGINEER.



VC-820

NOTES:

1. CORNERS SHALL BE ROUNDED TO A 1 1/2 INCH RADIUS.
2. THE BORDER SHALL BE 5/8 INCH WIDE WITH A 3/8 INCH INDENT FROM THE EDGE OF THE SIGN.
3. "SIGNAL" SHALL HAVE A SPECIFIED WIDTH OF 12 3/4 INCHES.
4. "UNDER" SHALL HAVE A SPECIFIED WIDTH OF 11 INCHES.
5. "CONSTRUCTION" SHALL HAVE A SPECIFIED WIDTH OF 24 1/2 INCHES.
6. SIGN SHALL ONLY BE INSTALLED AS A SUPPLEMENTAL TO A PARENT WARNING SIGN AND SHALL NOT BE INSTALLED BY ITSELF.

GENERAL NOTES:

1. ALL LEGEND SHALL BE CENTERED VERTICALLY AND HORIZONTALLY UNLESS OTHERWISE NOTED.
2. COLORS FOR SIGNS SHALL BE BLACK LEGEND AND BORDER ON FLUORESCENT ORANGE BACKGROUND UNLESS OTHERWISE NOTED.
3. ALL DIMENSIONS IN INCHES.

OTHER STDS. REQUIRED: T-1

REVISIONS AND CORRECTIONS

AUG. 6, 2012 - ORIGINAL APPROVAL DATE

APPROVED

HIGHWAY SAFETY & DESIGN ENGINEER

DIRECTOR OF PROGRAM DEVELOPMENT

Mark D. Richter

FEDERAL HIGHWAY ADMINISTRATION

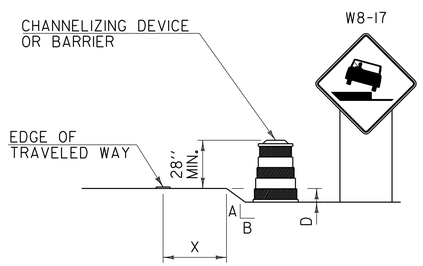
CONSTRUCTION SIGN DETAILS

VERMONT AGENCY OF TRANSPORTATION

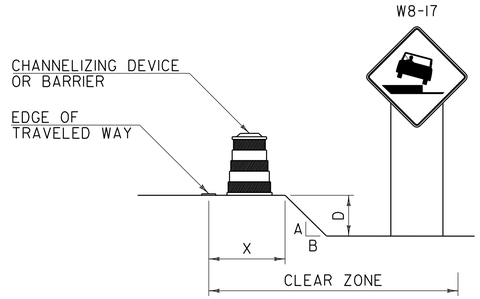
STANDARD

T-30

DROP-OFF ADJACENT TO TRAVELED WAY



TYPE 1

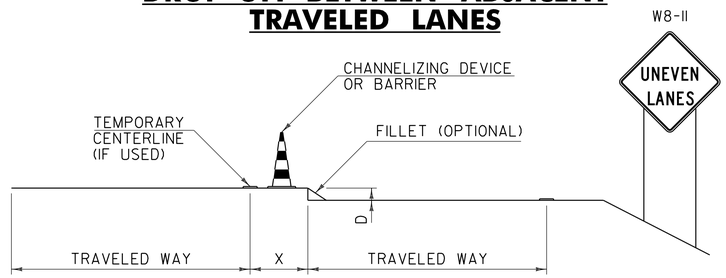


TYPE 2

NOTES:

1. CHANNELIZING DEVICES OR BARRIER SHOULD BE PLACED TO MAXIMIZE THE WIDTH OF THE TRAVELED WAY.
2. SEE CHART "A" FOR SPECIFIC REQUIREMENTS.
3. IF THE DROP-OFF REQUIRES CHANNELIZING DEVICES TO REMAIN IN PLACE OVERNIGHT, THEN "SHOULDER DROP-OFF SYMBOL" (W8-17) SIGNS SHOULD BE INSTALLED.

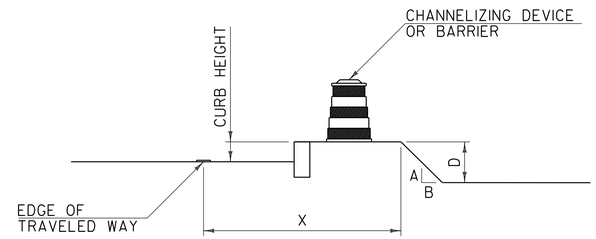
DROP-OFF BETWEEN ADJACENT TRAVELED LANES



NOTES:

1. WHENEVER A LONGITUDINAL DROP-OFF BETWEEN ADJACENT TRAVELED LANES IS TO BE LEFT OVERNIGHT, THEN "UNEVEN LANES" (W8-11) SIGNS AND CHANNELIZING DEVICES SHOULD BE INSTALLED.
2. IF REQUIRED, THE CHANNELIZING DEVICES USED SHOULD BE THOSE WHICH MAXIMIZE THE WIDTH OF THE TRAVELED LANE (I.E. CONES, VERTICAL PANELS OR TUBULAR MARKERS).
3. A BITUMINOUS CONCRETE FILLET WITH A 1.5:1 SLOPE MAY BE USED IN PLACE OF CHANNELIZING DEVICES, HOWEVER THE "UNEVEN LANES" (W8-11) SIGNS SHOULD STILL BE INSTALLED.
4. SEE CHART "A" FOR SPECIFIC REQUIREMENTS.

DROP-OFF BEYOND SHOULDER OR CURB



NOTES:

1. USE CHART "A" FOR VERTICAL CURBS UNDER SIX INCHES, MOUNTABLE CURBS OR ROADWAYS WITH A POSTED SPEED ABOVE 40 MPH.
2. USE CHART "B" FOR VERTICAL CURBS SIX INCHES OR GREATER.

CHART "A"
ALL SPEEDS WITH NO CURB OR MOUNTABLE CURB

X (FEET)	DROP (D) (INCHES)	A:B SLOPE	RECOMMENDED DEVICE
0 TO 4'	LESS THAN 2"	ANY	NONE
	2" TO 6"	1:1.5 OR FLATTER	NONE
		STEEPER THAN 1:1.5	CHANNELIZING DEVICE
	GREATER THAN 6"	1:3 OR FLATTER	NONE
		STEEPER THAN 1:3	BARRIER
4' TO 10'	LESS THAN 6"	ANY	NONE
	6" TO 12"	1:3 OR FLATTER	NONE
		STEEPER THAN 1:3	BARRIER
	GREATER THAN 12"	1:3 OR FLATTER	NONE
		STEEPER THAN 1:3	BARRIER
10' TO CZ	LESS THAN OR EQUAL TO 12"	ANY	NONE
	GREATER THAN 12"	1:3 OR FLATTER	NONE
		STEEPER THAN 1:3	BARRIER

NOTES:

1. THE MINIMUM CLEAR ZONE FOR FREEWAYS IS TO BE DETERMINED PER THE CURRENT AASHTO ROADSIDE DESIGN GUIDE. ALL OTHER HIGHWAYS WILL BE DETERMINED PER THE CURRENT "VERMONT STATE STANDARDS" BOOK.
2. CHANNELIZING DEVICES MAY BE USED INSTEAD OF BARRIER FOR SHORT TERM OPERATIONS.
3. ON BORDERLINE CONDITIONS, THE ENGINEER SHOULD DETERMINE WHICH TREATMENT IS ADEQUATE FOR THE EXISTING CONDITIONS.

CHART "B"
40 MPH OR LESS WITH VERTICAL CURB

X (FEET)	DROP (D) (INCHES)	DEVICE REQUIRED
0-10'	LESS THAN OR EQUAL TO 12"	NONE
0-10'	GREATER THAN 12"	CHANNELIZING DEVICE
GREATER THAN 10'	ANY	NONE

GENERAL NOTES:

1. THESE CONDITIONS AND TREATMENTS ARE ONLY PART OF THE TRAFFIC CONTROL SYSTEM AND SHOULD BE USED IN ADDITION TO THE PROPER WORK ZONE SIGNING.
2. THE FOLLOWING ARE "MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES" (MUTCD) COMPLIANT CHANNELIZING DEVICES:

   A. VERTICAL PANEL
   B. TYPE I OR TYPE II BARRICADE
   C. PLASTIC DRUM
   D. CONE - WHERE APPLICABLE
   E. TUBULAR MARKERS

   IF CHANNELIZING DEVICES ARE REQUIRED TO STAY IN PLACE DURING NIGHTTIME HOURS, THEY SHALL BE STABILIZED WHILE UNATTENDED IN ACCORDANCE WITH THE MUTCD.
3. WHERE BARRIER IS NECESSARY, THE BARRIER SHALL BE TAPERED BEYOND THE CLEAR ZONE. WHEN THE BARRIER CANNOT BE TAPERED BEYOND THE CLEAR ZONE, A MUTCD COMPLIANT END TREATMENT SHALL BE USED. BARRIER AND END TREATMENT SHALL MEET "NATIONAL COOPERATIVE HIGHWAY RESEARCH PROGRAM" (NCHRP) REPORT 350 OR THE "AMERICAN ASSOCIATION OF STATE HIGHWAY AND TRANSPORTATION OFFICIALS" (AASHTO) "MANUAL FOR ASSESSING SAFETY HARDWARE" (MASH). THE APPROPRIATE RESOURCE SHALL BE DETERMINED AS DESCRIBED IN THE MASH PUBLICATION.
4. CHANNELIZING DEVICE SPACING ALONG A LONGITUDINAL DROP-OFF (TANGENT) SHALL BE AS FOLLOWS:

   TANGENT - CHANNELIZING DEVICES SHALL BE SPACED "2S" ("S" IS EQUAL TO THE POSTED SPEED LIMIT IN FEET) APART.
5. "LOW SHOULDER" (W8-9) AND "SHOULDER DROP-OFF SYMBOL" (W8-17) SIGNS, WHEN USED, SHOULD BEGIN PRIOR TO THE DROP-OFF CONDITION AND SHOULD BE REPEATED EVERY 1500 FEET.

OTHER STDS. REQUIRED: **T-1**

REVISIONS AND CORRECTIONS

AUG. 6, 2012 - ORIGINAL APPROVAL DATE

APPROVED

HIGHWAY SAFETY & DESIGN ENGINEER

DIRECTOR OF PROGRAM DEVELOPMENT

Mark D. Richter

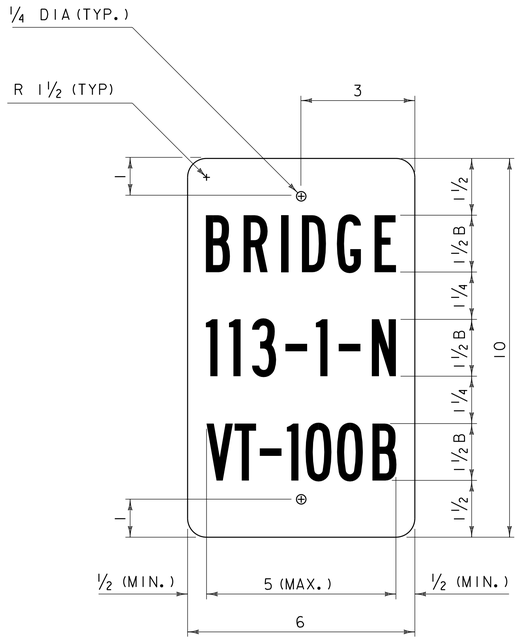
FEDERAL HIGHWAY ADMINISTRATION

CONSTRUCTION ZONE LONGITUDINAL DROP-OFFS

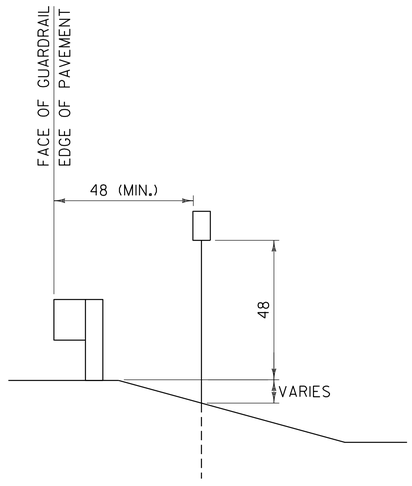
VERMONT AGENCY OF TRANSPORTATION

STANDARD

T-35



VD-701



VD-701 INSTALLATION DETAIL

GENERAL NOTES:

1. BRIDGE NUMBER PLAQUES ARE TO BE INSTALLED ALONG THE FEDERAL AID HIGHWAY SYSTEM INCLUDING ALL STATE HIGHWAYS AND TOWN HIGHWAYS ON THE FEDERAL AID HIGHWAY SYSTEM.
2. BRIDGE NUMBER PLAQUES SHALL BE LOCATED ON BOTH BRIDGE APPROACHES AT THE NEAREST VISIBLE LOCATION.
3. THE SIGN BASE MATERIAL SHALL BE 0.063 INCH FLAT SHEET ALUMINUM.
4. THE SIGN SHALL BE WHITE RETROREFLECTIVE LEGEND ON A GREEN RETROREFLECTIVE BACKGROUND, BOTH SHALL HAVE RETROREFLECTIVE SHEETING EQUAL TO OR EXCEEDING "AMERICAN ASSOCIATION OF STATE HIGHWAY AND TRANSPORTATION OFFICIALS" (AASHTO) M 268 ["AMERICAN SOCIETY FOR TESTING AND MATERIALS" (ASTM) D 4956] TYPE III.
5. THE SECOND LINE OF TEXT INDICATES THE BRIDGE NUMBER. THE BRIDGE NUMBER CAN BE OBTAINED USING THE VERMONT AGENCY OF TRANSPORTATION (VAOT) ROUTE LOGS OR BY CONSULTING WITH THE VAOT STRUCTURES SECTION.
6. THE THIRD LINE OF TEXT INDICATES THE STATE ROUTE NUMBER. IN ALL CASES THIS WILL BE DEPICTED USING THE LETTER ABBREVIATION, FOLLOWED BY A HYPHEN, FOLLOWED BY THE ROUTE NUMBER. FOR EXAMPLE US ROUTE 2 WOULD BE IDENTIFIED USING US-2.
7. THE SECOND AND THIRD LINES OF TEXT SHALL BE CENTERED HORIZONTALLY AND SHALL BE AS DEFINED IN THE PLANS.
8. A SINGLE 14 GAGE, 1.75 INCH SQUARE STEEL POST AND 12 GAGE, TWO INCH SQUARE ANCHOR SHALL BE USED FOR INSTALLATION. THE ANCHOR SHALL BE A MINIMUM OF 30 INCHES IN LENGTH.
9. ALL DIMENSIONS SHOWN IN INCHES.

OTHER STDS. REQUIRED: **T-45**

REVISIONS AND CORRECTIONS

APRIL 9, 2014 - ORIGINAL APPROVAL DATE

APPROVED

HIGHWAY SAFETY & DESIGN ENGINEER

DIRECTOR OF PROGRAM DEVELOPMENT

Mark D. Richter

FEDERAL HIGHWAY ADMINISTRATION

BRIDGE NUMBER PLAQUE

VERMONT AGENCY OF TRANSPORTATION

STANDARD

T-42

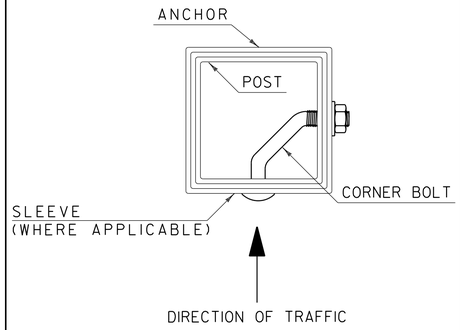
POST AND ANCHOR SELECTION CHART

POST SIZE (IN.)	POST THICKNESS (IN.)	POST WEIGHT (LBS/FT.)	POST GAGE	SECTION MODULUS (IN.³)	ONE POST SV	TWO POST SV	THREE POST SV	POSTS PERMITTED IN 8' PATH	ANCHOR SIZE (IN.)	ANCHOR GAGE	MINIMUM ANCHOR LENGTH
1.75	.083	1.88	14	0.222	45	90	135	TWO	2.00	12	30
2.00	.109	2.42	12	0.393	80	160	240	TWO	2.25	12	48
2.50	.109	3.35	12	0.673	137	274	411	ONE	3.00	7	48

NOTES:

1. ALL SIGN POSTS SHALL HAVE 7/16 INCH HOLES EVERY ONE INCH ON CENTER (ALL FOUR SIDES).
2. THE NUMBER OF SIGN POSTS PERMITTED WITHIN AN EIGHT FOOT PATH ASSUMES THAT THE SIGN ASSEMBLY IS NOT PROTECTED BY GUARDRAIL OR IS LOCATED WITHIN A GUARDRAIL'S DEFLECTION DISTANCE DETERMINED PER THE CURRENT "AMERICAN ASSOCIATION OF STATE HIGHWAY AND TRANSPORTATION OFFICIALS" (AASHTO) ROADSIDE DESIGN GUIDE. ADDITIONAL POSTS MAY BE INSTALLED USING SLIP BASES THAT MEET "NATIONAL COOPERATIVE HIGHWAY RESEARCH PROGRAM" (NCHRP) REPORT 350 OR THE AASHTO "MANUAL FOR ASSESSING SAFETY HARDWARE" (MASH). THE APPROPRIATE RESOURCE SHALL BE DETERMINED AS DESCRIBED IN THE MASH PUBLICATION.
3. TO USE THE SELECTION VALUE (SV) COLUMNS IN THE TABLE ABOVE, MULTIPLY A SIGN'S SURFACE AREA IN SQUARE FEET (H x L) BY THE SIGN'S HEIGHT IN FEET MEASURED FROM THE GROUND TO THE CENTROID OF THE SIGN ASSEMBLY (h). THIS RESULT MUST BE LESS THAN OR EQUAL TO THE CORRESPONDING SELECTION VALUE. NOTE THAT FOR SIGNS WITH MULTIPLE POSTS, THE LARGEST HEIGHT DIMENSION SHALL BE USED TO CALCULATE THE POST SELECTION VALUE.
4. THE DESIGN CRITERIA UTILIZED IN SIGN POST AND ANCHOR SELECTION IS AS FOLLOWS: WIND SPEED OF 70 MPH (10 YEAR MEAN RECURRENCE INTERVAL), WIND PRESSURE OF 19 PSF, STEEL MINIMUM YIELD OF 55,000 PSI, AND AN ALLOWABLE STRESS OF 1.4 (0.60 FY).

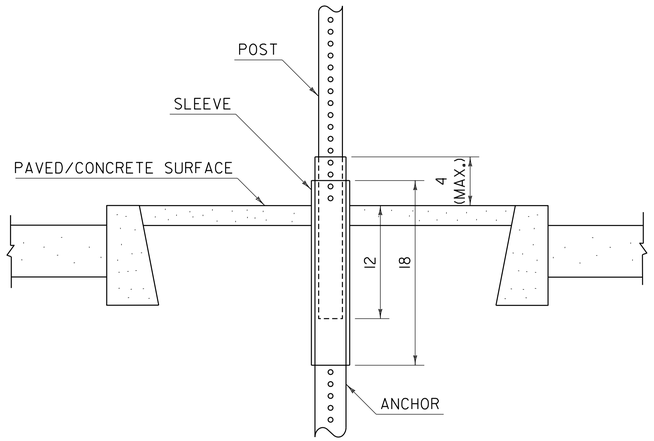
CORNER BOLT INSTALLATION DETAIL



NOTES:

1. CORNER BOLTS SHALL BE 5/16 INCH DIAMETER WITH 18 THREADS PER INCH AND DIMENSIONS SHALL BE DETERMINED BASED ON THE OUTERMOST DIMENSION OF THE SLEEVE, ANCHOR OR POST. THREAD EXPOSURE MUST EXCEED THE CORRESPONDING NUT WIDTH. THE CORNER BOLT AND CORRESPONDING HARDWARE SHALL BE ZINC PLATED, MEETING OR EXCEEDING THE REQUIREMENTS OF THE "AMERICAN SOCIETY FOR TESTING AND MATERIALS" (ASTM) A307.

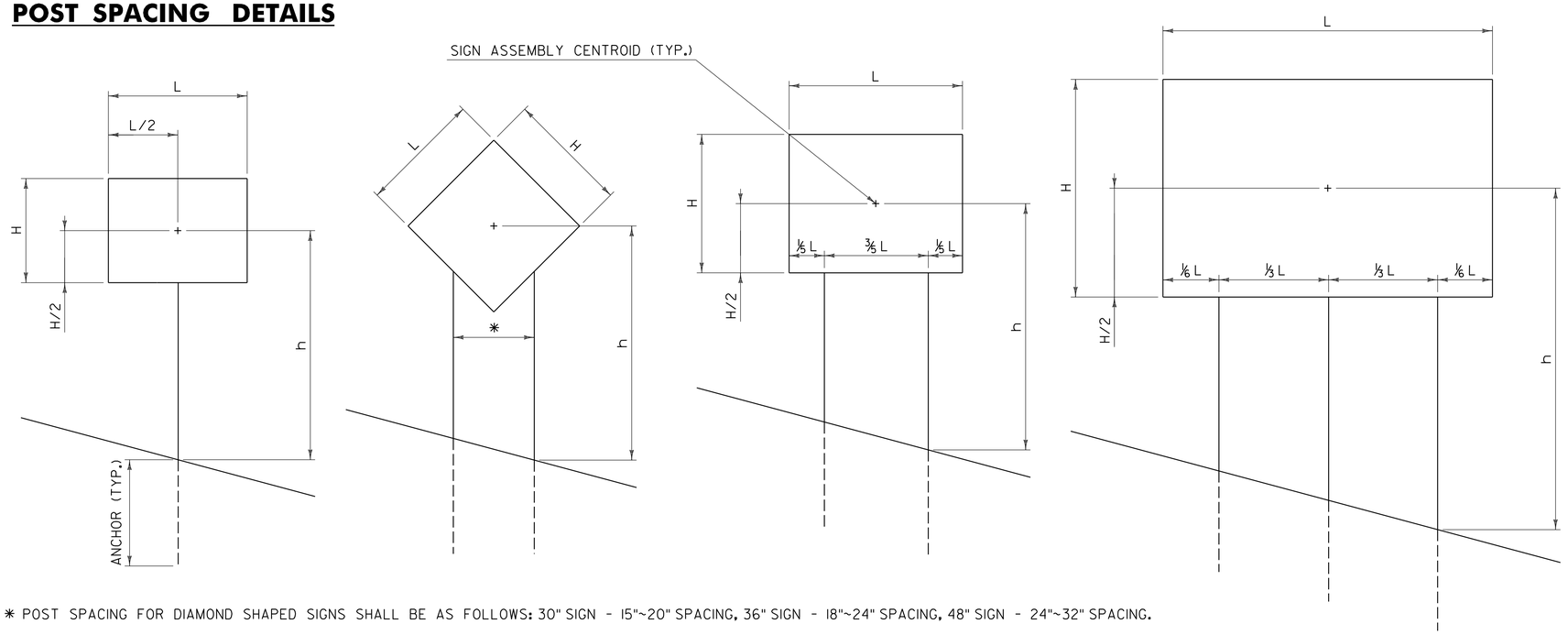
SLEEVE /ANCHOR INSTALLATION DETAIL



NOTES:

1. A SLEEVE SHALL BE INSTALLED FOR SIGN INSTALLATIONS IN CONCRETE OR PAVEMENT.
2. THE SLEEVE SHALL BE 18 INCHES MINIMUM IN LENGTH.
3. THREE INCH SLEEVES THAT DO NOT HAVE HOLES WILL REQUIRE THAT 7/16 INCH HOLES ARE DRILLED TO FACILITATE CONNECTIONS.
4. REFER TO CURRENT EDITION OF THE "VERMONT AGENCY OF TRANSPORTATION STANDARD SPECIFICATIONS FOR CONSTRUCTION" FOR MATERIAL REQUIREMENTS.

POST SPACING DETAILS



* POST SPACING FOR DIAMOND SHAPED SIGNS SHALL BE AS FOLLOWS: 30" SIGN - 15"~20" SPACING, 36" SIGN - 18"~24" SPACING, 48" SIGN - 24"~32" SPACING.

GENERAL NOTES:

1. ALL SQUARE TUBE STEEL POSTS AND ANCHORS SHALL BE FORMED INTO A SIZE AND SHAPE IN SUCH A MANNER THAT NEITHER FLASH NOR WELD SHALL INTERFERE WITH THE TELESCOPING PROPERTIES, NOR DAMAGE THE GALVANIZING.
2. ANCHORS MAY BE DRIVEN OR SET INTO A DUG HOLE AND BACKFILLED. IF DRIVEN, A DRIVING CAP SHALL BE USED. THE DUG HOLE INSTALLATION METHOD SHALL BE UTILIZED IN AREAS WITH POOR SOIL CONDITIONS OR AS DIRECTED BY THE ENGINEER. BACKFILL SHALL BE COMPACTED AS DIRECTED BY THE ENGINEER.
3. THE TOPS OF SIGN POSTS SHALL BE AT OR NEAR THE TOP OF SIGN. THE POST SHALL NOT EXTEND ABOVE THE TOP OF SIGN.
4. SIGN POSTS SHALL BE INSTALLED A MINIMUM OF ONE FOOT BELOW GROUND, INSIDE THE ANCHOR. THE LENGTH OF ANCHOR EXPOSED ABOVE GROUND SHALL NOT EXCEED FOUR INCHES.
5. ALL DIMENSIONS SHOWN IN INCHES.

OTHER STDS. REQUIRED: **NONE**

REVISIONS AND CORRECTIONS

JAN. 2, 2013 - ORIGINAL APPROVAL DATE

APPROVED

HIGHWAY SAFETY & DESIGN ENGINEER

DIRECTOR OF PROGRAM DEVELOPMENT

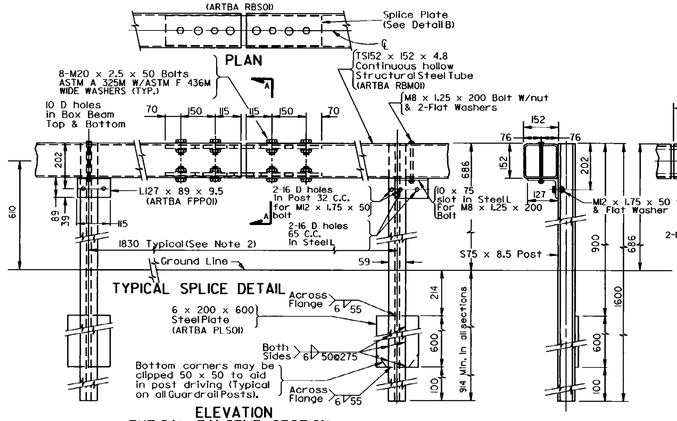
Mark D. Richter

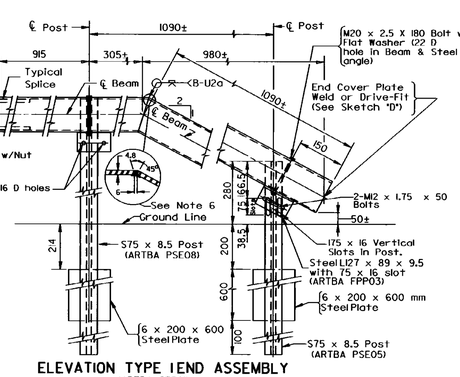
FEDERAL HIGHWAY ADMINISTRATION

SQUARE TUBE SIGN POST AND ANCHOR

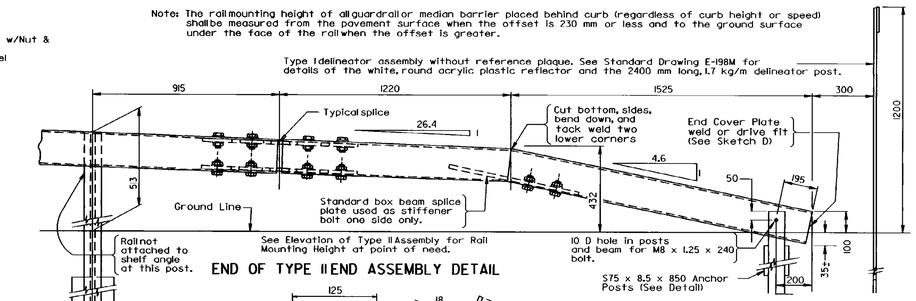
VERMONT AGENCY OF TRANSPORTATION

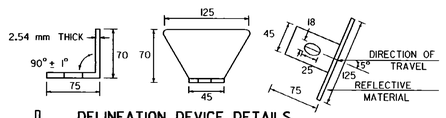
STANDARD T-45

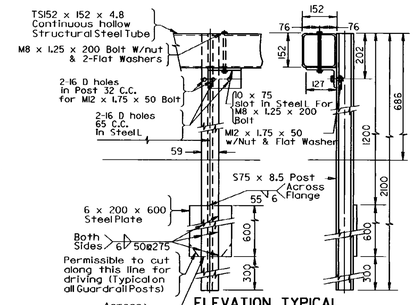


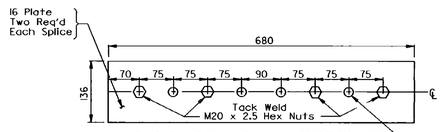


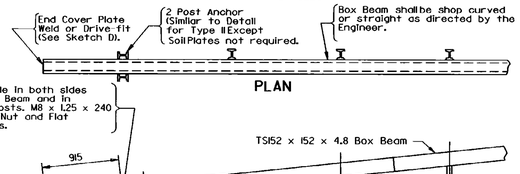
Note: The rail mounting height of all guardrail or median barrier placed behind curb (regardless of curb height or speed) shall be measured from the pavement surface when the offset is 230 mm or less and to the ground surface under the face of the rail when the offset is greater.

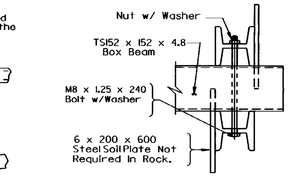


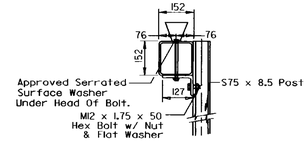




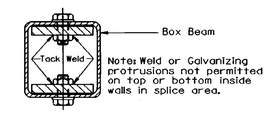


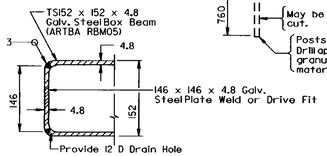




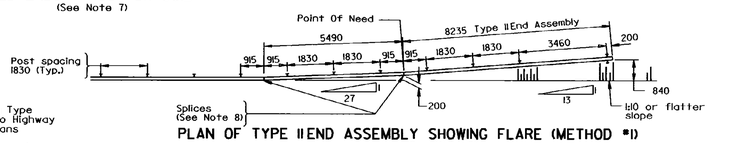


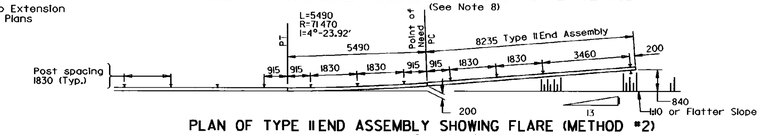
Note:
The reflectorized aluminum delineation device is to be erected at every other box-beam splice (i.m.). Delineator shall meet the specification requirements for ASTM B 209M, ALLOY 5052-H32. The reflective material shall meet the requirements of subsection 750.08 in the VAOT Standard Specifications for Construction and shall be of encapsulated lens silver or amber. Amber is to be installed on the left or median side of Interstate highways and ramps. The delineator shall be attached to the rail as shown in the details. Delineators shall not be placed on the approach or terminal end assemblies.

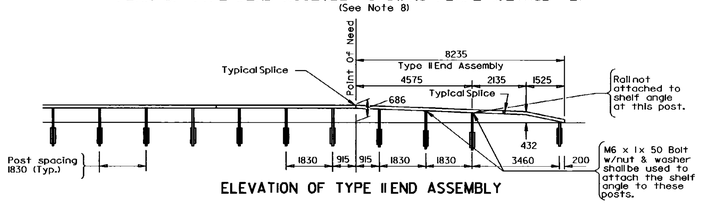




TRAFFIC SIDE ELEVATION
TYPICAL TREATMENT FOR
BURIED ENDS - ROCK OR SOIL
(See Note 7)







GENERAL NOTES

1. POST SPACING SHALL BE 1830 mm EXCEPT AS OTHERWISE NOTED ON PLANS. PAYMENT FOR BOX BEAM GUARDRAIL AND ANCHORAGE TERMINAL WILL BE MADE IN ACCORDANCE WITH SECTION 621 OF THE VAOT STANDARD SPECIFICATIONS FOR CONSTRUCTION.
2. SEE BRIDGE PLANS FOR GUARDRAIL TO BRIDGE RAIL TRANSITION DETAILS, REDUCED POST SPACING CRITERIA AND PAY ITEMS FOR TRANSITIONS AND CONNECTIONS TO BRIDGE RAIL.
3. FOR MATERIAL REQUIREMENTS AND CONSTRUCTION DETAILS, SEE SECTION 728 OF THE VAOT STANDARD SPECIFICATIONS FOR CONSTRUCTION.
4. THE LINE OF BOX BEAM GUARDRAIL, WHEN COMPLETED, SHALL PRESENT A SMOOTH AND PLEASING GRADE LINE IN BOTH HORIZONTAL AND VERTICAL PLANES.
5. RAIL ALIGNMENT SHALL BE STRAIGHT AT SPLICES. NO LATERAL BENDS PERMITTED WITHIN THE SPLICE. THIS DOES NOT PRECLUDE THE SHOP FABRICATION OF BENT SPLICES. CURVED BOX BEAM GUARDRAIL WITH A RADIUS OF 220 m OR LESS SHALL BE SHOP WORKED TO THE REQUIRED CURVATURE.
6. STEEL BACKUP BAR THAT IS USED TO CONTROL WELD PENETRATION AT JOINT MAY REMAIN IN PLACE.
7. THE 21 960-mm TERMINAL ENDS SHOULD BE TERMINATED WITH A TYPE I END ASSEMBLY EXCEPT WHERE TERMINATED IN A BACK SLOPE. THE TYPICAL TREATMENT FOR BURIED ENDS SHOULD BE USED TO TERMINATE IN A BACK SLOPE AND MAY BE INCLUDED AS PART OF THE 21 960-mm APPROACH AND TERMINAL ENDS. THE TYPE APPROACH END OFFSET SHOULD BE AT LEAST EQUAL TO THE CLEAR ZONE (AS MEASURED FROM THE EDGE OF TRAVELED WAY). IN NO CASE, HOWEVER, WILL THE END OFFSET BE LESS THAN THAT SHOWN ON THE PLANS.
8. THE TYPE II END ASSEMBLY SHALL BE USED AT DRIVEWAYS, SIDEWALKS AND OTHER RESTRICTED AREAS WHERE THE 21 960-mm APPROACH OR TERMINAL END CANNOT BE ACCOMMODATED. LOCATIONS OF THE TYPE II END ASSEMBLY SHALL BE GIVEN ON THE PLANS OR AS DIRECTED BY THE ENGINEER. THE TYPE II END ASSEMBLY SHALL BE FLARED BACK AS SHOWN IN THE DETAILS. THE CONTRACTOR HAS THE OPTION OF USING EITHER METHOD #1 OR METHOD #2 TO ACHIEVE THE FLARE. WHEN METHOD #2 IS SELECTED, THERE WILL BE NO ADDITIONAL PAYMENT FOR THE RAIL CURVATURE. WHEN RESTRICTIVE CONDITIONS DO NOT PERMIT THE STANDARD SET BACK OF 840 mm, THE FLARE RATE SHALL BE FLATTENED TO ACCOMMODATE THE REDUCED SET BACK. TO REDUCE THE FLARE USING METHOD #1 FIRST FLATTEN THE FLARE RATE OF THE 8235-mm END ASSEMBLY, ONCE THE 8235-mm END ASSEMBLY AND THE ADJACENT 5490-mm BOX BEAM ELEMENT IS IN A STRAIGHT LINE FURTHER REDUCTION OF THE SET BACK IS ACHIEVED BY FLATTENING THE FLARE OF THE ENTIRE 5490-mm SECTION. TO REDUCE THE FLARE RATE AND SET BACK USING METHOD #2 REDUCE THE CURVE RATE IN THE CURVED 5490-mm RAIL ELEMENT. FLARE AND SET BACK FOR METHOD #1 IS ACCOMPLISHED BY UTILIZING PLAY IN THE SPLICE PLATES. IF SPLICE PLATES WILL NOT ACCOMMODATE THE DESIRED FLARE AND OFFSET, THE CORNERS AND/OR WIDTH OF THE PLATE SHALL BE REDUCED BY GRINDING AND THE GALVANIZING FIELD REPAIRED PER THE VAOT STANDARD SPECIFICATIONS FOR CONSTRUCTION.
9. FOR DESCRIPTION AND SPECIFICATION OF PART IDENTIFIED 'ARTBA...' SEE LATEST REPORT PREPARED AND APPROVED BY THE AASHTO-AGC-ARTBA JOINT COOPERATIVE COMMITTEE "A GUIDE TO STANDARDIZED HIGHWAY BARRIER HARDWARE".
10. ALL POSTS IN A GIVEN RUN TO BE OF THE SAME TYPE.

NOTE: ALL DIMENSIONS ARE IN MILLIMETERS (mm) EXCEPT WHERE NOTED.

REVISIONS AND CORRECTIONS

JUNE 13, 1997 - ORIGINAL APPROVAL DATE

APPROVED

DIRECTOR OF ENGINEERING

DESIGN ENGINEER

BOX BEAM GUARD RAIL

VERMONT AGENCY OF TRANSPORTATION

VAOT Metric STANDARD G-1bM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