

Contract Number: C03186
Contract Name: BENNINGTON BF 1000(20)

VERMONT
AGENCY OF TRANSPORTATION

PROPOSAL

STANDARD SPECIFICATIONS FOR CONSTRUCTION
DATED 2018 SHALL APPLY TO THIS CONTRACT

SPECIAL PROVISIONS

SCHEDULE OF ITEMS

ELECTRONIC BID BOND to be submitted in the amount of 5% of the Contractor's bid.

BIDDING PROCEDURE

Bid Proposals will not be read unless accompanied by an electronic bid bond, and they may be rejected as irregular if they are not in compliance with Agency specifications.

NOTE: All bid proposals shall be properly filled out and submitted electronically utilizing iCX Web System services.

VTrans Mission and Vision

Through excellent customer service, provide for the safe and efficient movement of people and goods.
A safe, reliable, and multimodal transportation system that grows the economy, is affordable to use and operate, and serves vulnerable populations.

Cover Page Proposal _____	1
Table of Contents _____	2
Project Special Provisions _____	3
Bennington BF 1000(20) - Wastewater System and Potable Water Supply Permit - Pending _____	200
Bennington BF 1000(20) - Public Water System Individual General Water Main Construction Per _____	201
ANR RME Consultation _____	202
Flood Hazard Area and River Corridor Permit _____	204
404 Corps of Engineers Permit _____	208
Impact Plans _____	253
Required Contract Provisions for Federal Aid Construction Contracts FHWA 1273 _____	257
Certification For Federal Aid Contracts _____	271
USDOL Davis Bacon Wage Rates - Bennington - 2024 _____	272
DBE Policy Required Contract Requirements CR110 _____	277
Attachment C - Standard State Provisions for Contracts and Grants _____	282
USDOT Standard Title VI Nondiscrim Assurances Appendix A and E _____	287
Standard Federal EEO Construction Contract Specifications _____	290
Contractor EEO Certification Form - CA109 _____	297
Vermont AOT Certificate of Compliance - CA271 _____	298
Vermont AOT Minimum Labor and Truck Rates - CA101 _____	302
Commodity Index Prices CA170 - Spec Book 2018 _____	303
Proposal Schedule of Pay Items _____	304

PROJECT SPECIAL PROVISIONS

PART I – PROJECT NOTICE TO BIDDERS

1. NOTICE TO BIDDERS – CONTRACT COMPLETION DATE. This Contract shall be completed on or before October 10, 2025.
2. NOTICE TO BIDDERS – PROHIBITION OF RUSSIAN GOODS. The Contractor is hereby notified that, pursuant to Vermont Executive Order No. 02-22, dated March 3rd, 2022, the purchase of Russian-sourced goods and goods produced by Russian entities (defined as institutions or companies that are headquartered in Russia or have their principal place of business in Russia) is prohibited. The awarded Contractor must fill out and sign the Executive Order 02-22 Vendor Certification as part of Contract awarding process.
3. NOTICE TO BIDDERS – SUBSECTION 631.02(a)(5). Subsection 631.02(a)(5) is hereby modified by adding the following as the second paragraph.

The heating and cooling systems shall be fitted with HEPA air filters meeting the requirements of the most current version of *DOE-STD-3020*. New HEPA filters shall be installed upon initial erection of the Field Office. All HEPA filters shall be replaced with new filters every 12 months, or when airflow through the filter becomes restricted, or as recommended by the manufacturer, whichever is more frequent.

4. NOTICE TO BIDDERS – SUBSECTION 631.02(a)(6). Subsection 631.02(a)(6) is hereby modified by being deleted in its entirety and replaced with the following.

- (6) Sanitary Facilities and Cleaning Supplies. Sanitary facilities consisting of a flush toilet, chemical toilet, or other approved type, shall be furnished by the Contractor, with proper sewage disposal as is necessary to comply with the requirements and regulations of the State and local Boards of Health and VOSHA. Sanitary facilities shall be cleaned and disinfected regularly, per the CDC guidance at: <https://www.cdc.gov/hygiene/cleaning/facility.html>. The frequency of cleaning shall be as outlined in the CDC guidance, or as directed by the Engineer. The degree of cleanliness shall be approved by the Engineer. Sanitary facilities shall be provided with either hot, running, potable water and soap, or an alcohol-based hand sanitizer containing at least 70% alcohol by volume, for use in washing hands.

A potable water system consisting of a sink with a faucet within the office, with a continuous supply of pressurized clean potable water, shall be supplied for the duration of the project. When clean potable water is not available, a commercial bottled drinking water system shall be installed in the Field Office complete with necessary disposable drinking cups (8 oz. size or larger), cup dispenser, and continuous water supply furnished for the duration of the project. The system shall supply both hot and cold water. The system and the bottled water shall be furnished by a commercial water service on a regular basis agreeable to the Engineer.

The Contractor shall supply the Field Office with hand sanitizer to be used for washing hands, and with a disinfectant for use in disinfecting surfaces. The hand sanitizer shall be alcohol based and shall contain at least 70% alcohol by volume. The disinfectant shall be one of the products identified on *EPA List N: Disinfectants for Use Against SARS-CoV-2 (COVID-19)*, and shall have a contact time of 5 minutes or less, as specified on *List N*. If the disinfectant supplied is of the liquid or spray-on type, the Contractor shall also supply the Field Office with disposable paper towels for use in applying the disinfectant.

5. NOTICE TO BIDDERS – SUBSECTION 635.03(a). Subsection 635.03(a) is hereby modified by being deleted in its entirety and replaced with the following:

The first payment of 50% of the lump sum price for Mobilization/Demobilization, or 10% of the adjusted Contract price, whichever is less, will be made within 30 days after execution of the Contract.

6. NOTICE TO BIDDERS – SUBSECTION 651.05. Subsection 651.05 is hereby modified by deleting subparts (a) and (b) in their entirety and replacing them with the following:

- (a) Topsoil. The Contractor shall have a soil analysis performed in accordance with Subsection 755.02 at a frequency of one analysis per 500 cubic yards for the first 1,000 cubic yards installed and one analysis per 1,000 cubic yards for all material installed thereafter, with a minimum of one analysis per project per source of composite material. The analysis shall be completed by a laboratory accredited by a nationally recognized accrediting body such as AASHTO. The analysis shall identify recommendations for soil additives to correct soil deficiencies and additives to accomplish the planting objectives specified. The Contractor shall incorporate all recommendations into the topsoil. The soil analysis and incorporation of all recommendations shall be completed prior to the material being delivered to the site. Topsoil shall be placed within one year of the soil analysis.

Topsoil shall be spread to a minimum depth of 4 inches, unless otherwise shown on the Plans. Topsoil shall be lightly compacted as heavy compaction will reduce the potential for seed-soil contact and germination success.

(b) Manufactured Topsoil. Manufactured topsoil shall be in accordance with Subsection 651.05(a). In addition, the Contractor shall submit the following information:

(1) Material Composition. Material description including all components with percentage by weight.

(c) Grubbing Material. Grubbing material shall be spread to the depth shown on the Plans.

7. NOTICE TO BIDDERS – SUBSECTION 755.02. Subsection 755.02 is hereby modified by being deleted in its entirety and replaced with the following:

755.02 TOPSOIL. Topsoil shall be a screened, workable soil free of refuse, roots, stones (larger than 1 inch), brush, noxious weeds, and other debris detrimental to plant growth.

(a) Natural Topsoil. Natural topsoil shall conform to the requirements of *ASTM D5268*.

(b) Manufactured Topsoil. Manufactured topsoil shall conform to the requirements of *ASTM D5268*, except as modified below:

(1) pH. The pH shall be 5.5 to 8.5.

(2) Organic Matter. Organic matter content (including, but not limited to, short paper fiber and biosolids) shall be in accordance with *ASTM D5268*. Short paper fiber and biosolids shall meet the following requirements:

a. Short Paper Fiber. Short paper fiber shall be in accordance with the Vermont Agency of Natural Resources *Comprehensive Short Paper Fiber Management Procedure*.

b. Biosolids. Biosolids shall be Exceptional Quality biosolids in accordance with the Vermont Agency of Natural Resources *Solid Waste Management Rules, Subchapter 13*.

(3) Per- and Polyfluoroalkyl Substances (PFAS). The composite manufactured topsoil shall have maximum PFAS screening values in accordance with Table 755.02A as determined in accordance with *EPA Method 1633*.

TABLE 755.02A – PFAS SOIL-TO-GROUNDWATER SCREENING VALUES

PFAS Analyte	Chemical Abstract Service (CAS) Number	Soil to Groundwater Screening Value (µg/kg)
Perfluoroheptanoic acid (PFHpA)	375-85-9	0.84
Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.38
Perfluorononanoic acid (PFNA)	375-95-1	0.44
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	3.40
Perfluorooctanic acid (PFOA)	335-67-1	1.60

8. NOTICE TO BIDDERS – PENDING PERMITS. The Contractor is hereby notified that approval of the Wastewater System and Potable Water Supply Permit and the Public Water System Individual/General Water Main Construction Permit are currently pending. The Agency will not award this project until these permits have been approved. It is expected that the project will be built as shown in the Contract. In the event that future conditions of these permits require work to be added to the Contract, the work will be reimbursed to the Contractor as Extra Work per Subsection 109.06.
9. NOTICE TO BIDDERS – INCENTIVE/DISINCENTIVE (I/D). The Agency's intent is to complete the Identified Work as rapidly as possible. To encourage the Contractor to complete the Identified Work within the period defined below, the Agency is willing to pay an incentive.
- (a) Dates. The allowable Bridge Closure Period is from 7:00 a.m. on Monday April 14th, 2025 until 6:59 a.m. on Friday June 6th, 2025., herein defined as the I/D Period.

While some activities are anticipated to impact traffic to Beech Street and Morgan Street, the contractor shall minimize closures. If the Contractor elects to close Beech Street or Morgan Street, a detailed detour plan and estimate of the closure duration shall be submitted to the Engineer a minimum of 14 days prior to the closure.

The Contractor shall submit a letter to the Engineer for review and approval specifying the Begin Construction Date for the I/D Period. This letter shall be received by the Engineer a minimum of 14 Calendar Days prior to the Begin Construction Date specified in the letter.

During the I/D Period, the Contractor will be allowed to work on the Project for 24 hours per day, 7 days per week, including holiday periods. Night work will be allowed during the I/D Period. See Special Provision No. 9 for additional information and requirements regarding night work.

The I/D Period as established above for this Contract is a fixed date and will not be changed for any reason whatsoever unless done so by the Chief Engineer, and then only under extreme conditions as determined by, and at the sole discretion of, the Chief Engineer.

- (b) Meetings. There shall be a pre-I/D Period meeting held on site with the Contractor's Superintendent, Contractor's Project Manager, the Engineer, the Project Manager, the Town of Bennington Town Manager, Town of Bennington Fire Department, Town of Bennington Department of Public Works, Bennington County Regional Commission, Town of Bennington Police Department, Vermont State Police, Southwestern Vermont Medical Center Emergency Department, and the Bennington Rescue Squad to discuss durations of work, types of night work, work sequencing, etc. The Contractor shall be responsible for setting this meeting up and making appropriate contacts. This meeting shall be held a minimum of 21 Calendar Days prior to the start of the I/D Period.

For this Project, there shall also be a public information meeting prior to the start of the I/D Period. The Contractor's Superintendent and Contractor's Project Manager shall be available to attend. The Contractor shall be prepared to discuss the construction schedule with the public. The Public Outreach Coordinator shall be responsible for setting this meeting up and making appropriate contacts. This meeting shall be held a minimum of 14 Calendar Days prior to the start of the I/D Period.

Weekly meetings between the Contractor, Engineer, and other pertinent parties as determined by the Engineer shall be held during the I/D Period to discuss the Project progress and future construction activities, and current CPM progress schedules and narratives.

- (c) Identified Work. All work identified below shall be completed before the end of the I/D Period:
- (1) The bridge and roadway shall be open to two-way traffic (two (2) - 11 foot lanes) with a pedestrian corridor (ADA compliant).
 - (2) All components of the Phase 3 traffic control plan on the Phasing Layout Sheet have been installed and implemented;

- (3) Both Type IIS base courses and one Type IVS intermediate course of pavement shall be placed and compacted at the following locations:
- (a) Between Station 11+50 to Station 14+00 for Vermont Route 9
 - (b) From Vermont Route 9 to Station 40+50 on Morgan Street
 - (c) From Vermont Route 9 to Station 30+50 on Beech Street.

Pavement transitions outside the limits above shall be course milled and shimmed;

- (4) The Concrete bridge deck overlay shall be cast and cured for a minimum of 7 days and to at least 85% of the concrete's 28-day design strength;
- (5) The prestressed concrete voided slabs shall be placed and post-tensioned;
- (6) The prestressed concrete box beams shall be placed, and;
- (7) The approach slab shall be cast and cured to 85% of the concrete's 28-day design strength.

No daily lane closures will be allowed prior to the start of the I/D Period, except to progress work for EPSC, Traffic Control, micropile installation, and municipal utility installation.

All prefabricated concrete elements required to complete the Identified Work shall be authorized for shipment prior to the start of the I/D Period.

- (d) Pay Schedule. The Contractor will receive a lump sum compensation of \$49,200.00 for completing the Identified Work before the end of the I/D Period.

In addition to the lump sum payment, the Contractor will also be compensated at a rate of \$600.00 per hour for each hour that the Identified Work is completed prior to the end of the I/D Period, up to a maximum total payment of \$150,000.00 (including the lump sum payment). Only whole hours will count toward this extra incentive payment.

For each hour after the end of the I/D Period that the Identified Work remains uncompleted, the Contractor will be assessed a disincentive at a rate of \$600.00 per hour. The full hourly disincentive amount will be assessed for each hour during which the Identified Work is not completed for any portion of the hour. There shall be no maximum on the disincentive amount.

This assessed disincentive is separate from, and will be imposed in addition to, liquidated

damages which may be imposed for failure to complete the Contract on time.

- (e) Underruns and Overruns. The proposal indicates an estimated quantity for each Pay Item. The fact that the actual amounts used in the construction of this Project may vary from the estimate will not be a basis or cause for changing any of the conditions for I/D.

The Agency recognizes that additional work beyond the work indicated in the Plans, is always possible in any construction contract. The Agency is willing to pay for necessary additional work in accordance with the terms and requirements of the Contract and the Standard Specifications for Construction, however, the Contractor shall absorb any resulting construction time within the original Project and CPM Schedules, and there will be no adjustments or changes to the I/D dates or I/D conditions.

- (f) Payment. Payment will be made under Item 900.615 Special Provision (Incentive/Disincentive)(N.A.B.I.).

10. NOTICE TO BIDDERS – NIGHT WORK. The Contractor is hereby notified that night work will only be allowed for completing required work during water system shutdowns as outlined in Note 15 on the Water and Sewer General Notes Sheet and during the I/D Period. The Engineer may abbreviate this time period as necessary. All work performed at night shall be completed in accordance with Subsection 105.14.

For the purposes of this Contract, "night" shall mean the period from sunset until sunrise of the following day for the location of the Project. The time of sunrise and sunset for any day of the year and any location can be determined using the following link: <https://www.esrl.noaa.gov/gmd/grad/solcalc/>.

11. NOTICE TO BIDDERS – NIGHT WORK NOISE RESTRICTIONS. The Contractor shall take measures to control the noise caused by its night work (as defined above) construction operations, including but not limited to noise generated by equipment used for drilling, concrete cutting, pneumatic tools, generating power for lights, compaction, vibration, demolition, excavation, and hauling. The cost for meeting the specified noise level criteria will not be paid for separately, but will be considered incidental to all other Contract items.

- (a) Overview of Noise Measurement. The decibel (dB) is the universal unit of sound measurement and is measured with ammeter that registers sound pressure and displays these readings on a sound level scale. Decibels are a logarithmic unit, which means that a noise measuring 110 decibels is actually 10 times as intense as a noise registering at 100 decibels. Because in certain areas and at certain times of the day, the existing ambient noise level can be significant, the goals for limiting construction noise are relative to the existing ambient conditions.

- (b) Recommended Mitigation Measures. Noise reduction mitigation measures as outlined in the FHWA Construction Noise Handbook (http://www.fhwa.dot.gov/environment/noise/construction_noise/handbook/handbook07.cfm) may be utilized by the Contractor and include the following:
- (1) Sequence work such that noisy activities occur concurrently, when possible.
 - (2) Shield or insulate stationary equipment such as air compressors and light towers.
 - (3) Properly maintain equipment with attention to lubrication, air intake, exhaust, and other aspects that impact noise.
 - (4) Employ systems to prevent slamming tailgates on dump trucks.
 - (5) Minimize idling of equipment.
- (c) Required Mitigation Measures. The Contractor shall utilize broadband sound (i.e. “white-noise, whooshing sound”) types of backup alarms, or adjustable backup alarms that can be adjusted down for the ambient noise level. Broadband sound is defined as sound where the acoustic energy is distributed over a very wide frequency range. The spectrum is largely smooth and continuous, except at the extremes.

12. NOTICE TO BIDDERS – ELECTRONIC DOCUMENT MANAGEMENT. The Contractor is hereby notified that the Contractor, their subcontractors, and suppliers shall create a Doc Express account and use the application for collection and management of electronic documents. Doc Express is a web based document management application which accepts electronic documents and provides security as appropriate for each submittal. All Contract required documents, such as Working Drawings as defined in Subsection 105.03 of the 2018 Standard Specifications for Construction, Progress Schedules, Mix Designs, Weld Procedures, Requests for Information and Erosion Control Plans shall be submitted at the following link: <https://docexpress.com>. The entire submittal and review process shall occur within Doc Express.

All costs associated with the use of Doc Express will be considered incidental to Item 635.11, Mobilization/Demobilization. The State will manage the Doc Express application including Contract setup upon Contract execution.

To create an account and for more information regarding the use of Doc Express see the information at the following link:

<https://outside.vermont.gov/agency/vtrans/external/docs/construction/Contracting/DocExpressOverviewforContractors.docx>

13. NOTICE TO BIDDERS – CONTACT WITH THE AGENCY. From the time of advertising until the actual bid opening for this Contract, all prospective Contractors, subcontractors, and suppliers shall direct all inquiries related to this project solely to the Agency's Office of Contract Administration AOT.ConstructionContractingInquiry@vermont.gov.

The deadline for submitting inquiries related to this project to the Office of Contract Administration is 4:30 p.m. Eastern Time on May 29th, 2024. No exceptions will be made to this requirement.

14. NOTICE TO BIDDERS – OTHER SPECIFICATIONS AND CONTRACT REQUIREMENTS.

Wastewater System and Potable Water Supply Permit - Pending
 Public Water System Individual/General Water Main Construction Permit - Pending
 ANR RME Consultation
 Flood Hazard Area and River Corridor Permit
 404 Corps of Engineers Permit
 Required Contract Provisions for Federal-Aid Construction
 Certification for Federal-Aid Contracts
 U.S. Department of Labor Davis-Bacon Wage Rates
 Disadvantaged Business Enterprise (DBE) Policy Contract Requirements
 Bulletin 3.5 Attachment C: Standard State Provisions for Contracts and Grants
 USDOT Standard Title VI/Non-Discrimination Assurances, Appendices A and E
 Standard Federal EEO Specifications
 Contractor's EEO Certification Form
 Vermont Certificate of Compliance
 Vermont Minimum Labor and Truck Rates
 Commodity Index Prices
 Schedule of Pay Items

15. NOTICE TO BIDDERS – DAVIS-BACON. U.S. Department of Labor Davis-Bacon wage rates are applicable to this Contract. Copies of the applicable rates are included in this proposal.

In the included wage rates, the requirements of Executive Order 13658 and 14026 do not apply to this Contract.

16. NOTICE TO BIDDERS – GENERAL SPECIAL PROVISIONS. The Contractor is hereby notified that the most recent General Special Provisions in effect on the date of advertisement shall apply to this Contract. The General Special Provisions may be found at the following address: <https://vtrans.vermont.gov/2018-specifications>

17. NOTICE TO BIDDERS – STANDARD DRAWINGS. The Vermont Agency of Transportation Standard Drawings listed on the Index of Sheets are not included in the plan set, but may be found at the following address:
https://outside.vermont.gov/agency/vtrans/external/CADD/WebFiles/Downloads/Standards/VA_OTconSTD_Owner.xml
18. NOTICE TO BIDDERS – INFORMATIONAL DOCUMENTS. The Contractor is hereby notified that the following informational documents for this Contract are available on iCXWeb and the VTrans Bid Opportunities website. These documents are being provided during the bid solicitation period for informational purposes only.
- (a) Traffic Management Plan (TMP) Checklist
 - (b) Geotechnical Report
 - (c) Record Plans
 - (d) Environmental Site Assessment
19. NOTICE TO BIDDERS – STAGING AND WASTE SITES. The Contractor is hereby notified that the Vermont Natural Resources Board has requested that VTrans contractors planning to use staging and waste sites governed by preexisting Act 250 permits notify District Coordinators prior to using these sites. Complying with preexisting Act 250 permits at these sites is the sole responsibility of the landowner and the Contractor, not the State.
20. NOTICE TO BIDDERS – ENVIRONMENTAL COMMITMENTS.
- (a) Threatened, Endangered, and Rare Species.
 - (1) This project shall be subject to Avoidance and Minimization Measures to protect the habitat and hibernacula of the northern long-eared bat. It is anticipated that the Contractor will be required to cut trees $\geq 3''$ in diameter and/or conduct bridge related activities within the identified project limits as part of the work. An acoustic monitoring survey of the Project area resulted in a probable absence determination for the species. Therefore, tree cutting and bridge related activities within the project limits may occur without any TOY restrictions.

The Contractor is hereby made aware of the potential for TOY restrictions related to proposed Waste, Borrow and Staging areas. Cutting trees ≥ 3 " in diameter outside of the contract project limits shall require further review under Section 105.25 Control of Waste, Borrow, and Staging Areas.

(b) Emerald Ash Borer.

- (1) As of 2018, emerald ash borer (EAB), *Agrilus planipennis*, has been confirmed within Vermont's borders. To provide an assurance of compliance with state and federal EAB laws the contractor shall adhere to the following:

Known EAB infestation areas are changing rapidly. Therefore the Contractor shall consult the online version of the EAB Infested Area Map (Located here: www.vtinvasives.org/land/emerald-ash-borer-vermont) on the same day cutting is to occur. If the project is located with an EAB infested area, ALL tree material, regardless of species, within the project area shall be handled in accordance with a document developed by the Vermont Department of Forests, Parks and Recreation and the Vermont Agency of Agriculture titled "Recommendations to SLOW THE SPREAD of Emerald Ash Borer When Moving Ash from the Infested Area", <https://vtinvasives.org/sites/default/files/images/SLS/SlowSpreadWoodVT%20FINAL.pdf>. Tree material shall not be moved out of state.

Alternatively, the Contractor may choose to hire a qualified professional (Arborist certified by the International Society of Arboriculture or Licensed Forester), at their own expense, to identify the presence of ash trees. Those identified ash trees would be subject to the above referenced recommendations, however other tree species would not.

The Contractor is also hereby made aware of the same potential restrictions as they relate to proposed Waste, Borrow and Staging areas under Section 105.25 Control of Waste, Borrow, and Staging Areas.

(c) Contaminated/ Urban Soils Background Area/PFAS

- (1) This project is located within an Urban Soils Background Area and PFAS area, as shown on the Vermont ANR Natural Resources Atlas. These areas have higher background levels of certain constituents and the Agency has therefore that material generated from these areas should be disposed of within an Urban Soil Background Area. These soils shall be reused on-site to the maximum extent possible, as shown on the plans; however, excess Urban Area soils shall be disposed of off-site by the Contractor within a designated Urban Soils Background Area. The process for submittal and review of proposed disposal locations shall be in accordance with Standard Specifications 105.25-105.28.

If the Contractor elects to use an alternate location outside of an Urban Soil Background Area, then soils must be disposed of in accordance with the Investigation and Remediation of Contaminated Properties Rule (IRule), FINAL ADOPTED RULE, July 8, 2019 at no additional expense to the project. The alternate location must be reviewed and approved by VTrans in accordance with Sections 105.25-105.28 of the Specifications, and the Contractor must secure all necessary permits and approvals from the Vermont Agency of Natural Resources for the alternate disposal site.

21. NOTICE TO BIDDERS – UTILITIES.

Existing aerial facilities owned by Green Mountain Power, Comcast, Consolidated Communications, Vermont Telephone Company, and FirstLight Fiber will be adjusted, as necessary, by employees or agents of the above companies in accordance with the *"Approximate Aerial Utility Relocation Route"* shown on the project plans.

Existing underground facilities owned by Consolidated Communications will be adjusted, as necessary, by employees or agents of the above company in accordance with the *"Approximate Underground Utility Relocation Route"* shown on the project plans.

Contacts for the above listed companies are as follows:

Green Mountain Power	Aaron Dickie	(802) 375-1526
Comcast Communications	John George	(518) 361-7227
Consolidated Communications	Bob Rondeau	(802) 881-4324
Vermont Telephone Company	Judy Paton	(802) 289-2104
FirstLight Fiber	Bill Gray	(802) 911-9506

Employees or agents of the above listed companies are to be allowed free and full access within the project limits with the tools, materials, and equipment necessary to install, operate, maintain, place, replace, relocate, and remove their facilities.

The Contractor is advised that exploratory excavation to locate existing underground facilities may be necessary to protect these facilities from damage. Where approved by the Engineer, these utilities shall be located and/or exposed by methods such as air/vacuum excavation and/or hand digging to determine their exact location. This exploratory work shall be classified as Trench Excavation of Earth, Exploratory and payment shall be through Pay Item 204.22, Trench Excavation of Earth, Exploratory, (N.A.B.I).

The contractor shall notify aerial utility pole owner if excavation will be within 10 feet of an existing pole. That pole owner may choose to be onsite for this activity. There will be no excavation allowed within 5 feet of existing poles and anchoring.

There will be no extra compensation paid to the Contractor for any inconvenience caused by working around and with the companies, or their facilities. Should the Contractor desire additional adjustments of the utility facilities for his/her convenience, proper arrangements shall be made in conformance with Subsection 105.07 of the Standard Specifications for Construction.

Vermont Statutes Annotated, Title 30, Chapter 86 (“Dig Safe”) requires notice to Dig Safe before starting excavation activities. The Contractor must telephone Dig Safe at 811 at least 48 hours (excluding Saturdays, Sundays and legal holidays) before, but not more than 30 days before, starting excavation activities at any location. In addition, before excavation and/or pavement grinding in or on the state highway right-of-way, the Contractor must contact the Agency’s Traffic Signal Superintendent, Dan Ertel, to obtain/verify the location of Agency’s underground utility facilities or to confirm the absence of such facilities. Dan can be reached at (802) 343-2188.

The Contractor is advised that many towns are not members of Dig Safe. It is the Contractor’s responsibility to check with towns prior to excavation and shall protect and restore utilities damaged within the project and as set forth in the Standard Specifications for Construction in Subsection 107.13 Protection and Restoration of Utilities and Services.

All Contractors, subcontractors or material suppliers involved in any project-related activity shall comply with all applicable codes and regulations related to working around live electrical lines; including, but not limited to maintaining the required minimum clear distance from an electrical utility facility. The Contractor’s Competent Safety Officer shall be well versed in OSHA and

VOSHA regulations, and shall be capable of implementing a plan to conform to these regulations during prosecution of work.

22. NOTICE TO BIDDERS – ROW SPECIAL AGREEMENTS. The Contractor, on behalf of the State of Vermont, shall be responsible to perform all tasks identified in the Right-of-Way Special Agreements listed below.

(a) Parcel 3

- (1) Owners: Ketih G. Forni and Jane A. Forni
- (2) Stationing: Foundation identified in close proximity of bridge replacement.
- (3) Type: Monitoring Foundation
- (4) Description: The State of Vermont and/or its contractor shall inspect and monitor Grantor's house's foundation (including video recording of Grantor's foundation and basement as deemed reasonable and necessary by the State of Vermont and/or its contractor) prior to, during and after completion of the project construction for a period not to exceed one (1) year after completion of project construction. If it is determined as a result of these tests that foundation is damaged or destroyed by the construction of the project, the State of Vermont and/or its contractor shall repair, replace, and/or pay for damages. The State of Vermont and/or its contractor agrees to make all testing results available to the Grantor within a reasonable time following the State of Vermont and/or its contractor's receipt of Grantor's written request.

(b) Parcel 4

- (1) Owner: Kenneth J. Pruden
- (2) Stationing: 12+50 LT to 12+96 LT
- (3) Type: Construction and Slope Rights
- (4) Description: Property Owner requests to retain any trees cut for this project that are on his parcel.

23. NOTICE TO BIDDERS – CONCURRENT CONSTRUCTION. The Contractor is made aware of the following VTrans construction project(s) which are expected to be in progress within the area of this project during its construction.

TABLE 1 – CONCURRENT CONSTRUCTION PROJECTS

Project	Contractor	Anticipated Contract Completion Date
Bennington NHG SGNL(64) Bennington STPG SGNL(63) Bennington STP 1000(23)	TBD	TBD

This list is not all-inclusive and it is possible there may be other VTrans, municipal, or private construction projects within the area of this project during its construction.

The Contractor shall coordinate construction schedules and traffic control with the work required for these projects.

There will be no extra compensation paid to the Contractor for any inconvenience caused by working around these or other projects.

24. NOTICE TO BIDDERS – SPECIAL CONSTRUCTION REQUIREMENTS.

- (a) The Contractor shall maintain a safe access to all ramps and U-turns at all times during the construction of this project.
- (b) During construction it will be necessary for the Contractor to maintain one-lane traffic for extended periods of time. In no case shall the paved width for this one-lane traffic, including shoulders, be reduced to less than 12 feet. This paved width shall remain free of obstructions and obstacles at all times.
- (c) The Contractor shall position Portable Changeable Message Signs at locations determined by the Engineer properly warning motorists of the roadway conditions ahead. As directed by the Engineer, these locations may change during construction as needs arise based on daily work activities. The message to be displayed shall be submitted to the Engineer in advance for approval. The displayed message should accurately reflect what motorists can expect to encounter through the project area. The cost of providing the Portable Changeable Message Signs shall be paid for under Contract item 641.15 or 641.17. The Contractor shall also install and maintain appropriate construction signing warning the traveling public of the expected roadway surface conditions.
- (d) Prior to final acceptance of the project, all drop inlets and bridge joints within the project limits shall be cleaned and all material within the drop inlets and bridge joints shall be removed. All paved areas adjacent to curbs shall be swept and cleaned of all extraneous material. Costs for this work will not be paid for directly, but will be considered incidental to all Contract items.

- (e) There are special events throughout the year that may require close communication and coordination between the Contractor and the municipality to reduce conflicts. The municipality will advise the Engineer and Contractor of the specifics of each event and the Engineer will direct the Contractor as to what actions, if any, will be necessary on the Contractor’s part to minimize impacts to the event. Special events that may conflict with Contractor operations are not limited to those which may be listed in this Notice to Bidders. There will be no extra compensation paid to the Contractor for any inconvenience caused by working around any listed or unlisted special events.

For more information about area special events, contact the following:

Bennington: Cassandra J. Barbeau
 Town Clerk
cbarbeau@benningtonvt.org
 802-442-1043

TABLE 1 – SCHEDULE OF KNOWN EVENTS

Event	Date
N/A	N/A

- 25. **NOTICE TO BIDDERS – AFAD.** The Contractor is hereby notified that Automated Flagger Assistance Devices (AFADs) are remotely operated devices that enable a certified flagger to be positioned out of the lane of traffic and are used to control motorists through work zones.

AFADs shall only be used in situations where there is no more than one lane of approaching traffic that needs to be controlled. Additionally, since AFADs are not traffic control signals, they shall not be used to replace traffic signals or other continuously operating traffic control devices.

These devices may be used as a safety enhancement to flaggers on an hour-for-hour basis. AFADs shall meet the following requirements:

- (a) All AFAD applications shall meet the requirements of the applicable sections of the current edition of the *Manual on Uniform Traffic Control Devices (MUTCD)*.
- (b) All AFAD applications shall be in accordance with *NCHRP Report 350* or the *MASH* for the applicable test level and device weight. Documentation of the crashworthiness of the device shall be submitted to the Engineer for approval prior to use on the project.

- (c) AFAD applications shall always be controlled by a flagger who has been trained in the operation of the AFAD and who meets the requirements of Section 630. The flagger shall not flag traffic and operate an AFAD at the same time.
- (d) Should an AFAD malfunction or otherwise not function as intended they shall be replaced by another AFAD or flagger(s) or work shall cease and the roadway shall be opened to unrestricted traffic flow immediately.
- (e) Each AFAD will be considered equivalent to one flagger and will be measured and paid for on an hourly basis under Item 630.15 Flaggers. One hour of AFAD use shall be paid for as one hour of flagging.
- (f) Flaggers will only be measured for payment when actually performing flagging duties. Flaggers controlling AFADs but not actually flagging will not be measured for payment, but will be considered incidental to the Contract lump sum price for Item 641.10 Traffic Control, or Item 641.11 Traffic Control, All-Inclusive, as applicable.
- (g) The use of AFADs may be suspended at the discretion of the Engineer.

26. NOTICE TO BIDDERS – BUILDING INSPECTION BENNINGTON BF 1000(20). For the protection of the Contractor and all property owners, before beginning any construction activities, the Contractor's insurer shall video inspect, inside and out, potentially affected properties within the project limits. The following building(s) shall be inspected, per Notice to Bidder #22:

- (a) Forni Property (Parcel 3)

The Contractor's insurer shall notify the Engineer when the video is complete, and the video shall be available upon request by the Agency. Any damage to the property identified because of the construction shall be addressed at the Contractor's expense.

Upon completion of the project construction, the Contractor's insurer shall again completely inspect, inside and out, and make a complete video CD record of the building as part of the inspection. A written copy of the complete inspection report shall be delivered to the Engineer by the Contractor. The video shall remain property of the Contractor's insurer for one year after the project completion date.

All members of the insurer's inspection team shall personally identify themselves to the Engineer prior to beginning each inspection. The Engineer shall be given a minimum of one (1) week notice prior to each inspection date. The Engineer will provide each property owner a minimum of two (2) days' notice prior to each inspection.

All costs involved in performing this work will be considered incidental to all Contract items.

27. NOTICE TO BIDDERS – PERFORMANCE GRADED ASPHALT BINDER. All permanent pavement on mainline including shoulders, side roads and ramps is required to use the PG binder grade specified in the Plans and Specifications. All other adjacent pavement used on the project, regardless of the method of placement, will be allowed to use either the binder grade as specified in the Plans and Specifications or PG 58-28 binder. There will be no additional compensation allowed for using either binder grade.
28. NOTICE TO BIDDERS – ELECTRONIC TICKETING VTRANS PORTAL. The Contractor is hereby notified that the Contractor, their subcontractors, and suppliers shall connect to the VTrans Portal and use the application for distribution and management of electronic tickets (e-Tickets). VTrans Portal is a State Cloud Based e-Ticket Database, including a web-based user interface and a jobsite mobile e-Ticket application. VTrans Portal will interface with the Contractor's supplier existing point of sales or e-Ticketing platform and will allow VTrans to manage bituminous material e-Tickets.

All costs associated with the use of VTrans Portal will be considered incidental to the appropriate pay items in Standard Specification Section 406 Bituminous Concrete pavement and Section 407 Bonded Wearing Course. The Agency will manage the VTrans Portal application including Contract setup upon Contract execution.

To create an account, connect to the VTrans Portal, and for more information regarding the use of VTrans Portal see the information at the following link:

<https://www.haulhub.com/vermont-agency-transport-22/>

29. NOTICE TO BIDDERS – Subsection 507.01. Subsection 507.01 is hereby modified by deleting subpart (b) and replacing it with the following:
- (b) Level II (Improved Corrosion Resistance). Level II reinforcing includes stainless-clad, dual-coated, hot-dipped galvanized, and continuously-galvanized reinforcing steel.
30. NOTICE TO BIDDERS – Subsection 713.01. Subsection 713.01 is hereby modified by adding the following subpart:
- (h) Hot-Dipped Galvanized Reinforcing Steel. Hot-dipped galvanized reinforcing steel shall be in accordance with *ASTM A767*, Class 1 Coating. Steel reinforcing bars to be coated shall be in accordance with *ASTM A615* or *ASTM A706*. Chromate treatment will not be required.

PART II – SECTION 900 SPECIAL PROVISION ITEMSBRIDGE RAILING, POWDER COATING

1. DESCRIPTION. This work shall consist of powder coating of the steel components in the Bridge Railing, Galvanized Steel Tubing/Concrete Combination.
2. MATERIALS.
 - (a) Powder Coating Systems. Protective coatings shall be applied to metals as a free flowing, dry powder using a dry finishing process to cure the coating onto the substrate.
 - (1) General Requirements. Systems shall be exterior grade powders consisting of two coats from a single manufacturer. Coats shall be compatible and per the manufacturer's recommendations. The first coat may be applied to bare metal or galvanized metal in accordance with the Contract. When applied to bare metal, the first coat shall be an epoxy zinc rich primer. When applied over galvanizing, the first coat of powder shall be recommended for use over galvanizing by the powder manufacturer. The topcoat shall be a urethane or polyester powder.
 - (2) Material Properties. Material properties shall be in accordance with Table 1 below.

TABLE 1 – POWDER COATING MATERIAL PROPERTIES

Property	Test Method	Test Requirement
Abrasion resistance	ASTM D4060 (CS-10 abrasive wheel, at 1,000 cycles)	100 mg weight loss (max.)
Adhesion	ASTM D3359, Method A or ASTM D3359, Method B	5A or 5B
Water resistance	ASTM B4585 or ASTM D2247 (100°F minimum, 2,000 hours)	No blister or film failure, no cracking or delamination
Salt spray resistance	ASTM B117, ASTM D1654 (1,000 hours)	Unscribed – No blisters or visual defects Scribed – 0 inches to 1/64 inch

- (1) Color. The color shall be in accordance with Section (b) of this Special Provision below.
 - (b) Structural Steel Coating Systems. Acceptable structural steel coating systems shall be one of the systems listed on both the Agency's [Approved Products List](#) and on the [NEPCOAT Qualified Products List B](#), and shall meet the following requirements:
 - (1) System. The structural steel coating system shall be a three-coat system with a prime, intermediate, and top coat. Components of different systems shall not be intermixed.
 - (2) Color. Individual coats shall have contrasting colors. The finish color of the top coat shall be black as specified in the Contract, and shall conform to SAE AMS-STD-595 for the respective chip number 27038.
 - (3) Damage. Damage to structural steel coating systems shall be repaired with a compatible structural steel coating system as specified herein.
3. METHOD OF PAYMENT. All costs associated with powder coating steel components for the Bridge Railing, Galvanized Steel Tubing/Concrete Combination in accordance with this Special Provision, Section 525 of the Standard Specifications, including all submittals, installations, and testing procedures and for furnishing all labor, tools, equipment, and incidentals necessary to complete the work will be incidental to Item 525.45 Bridge Railing, Galvanized Steel Tubing/Concrete Combination.

GROUT BAGS

1. DESCRIPTION. This work shall consist of performing underwater repairs of concrete substructure elements by installing grout bag scour and undermining countermeasures at the locations shown on the Plans and as directed by the Engineer.
2. GENERAL REQUIREMENTS. Grout bags utilized to form up areas under the substructure footing for injection of concrete shall be small, hand-placed fabric bags filled with grout.
3. MATERIALS. Materials shall conform to the following requirements:
 - (a) Grout. Grout shall be specially formulated for underwater placement with anti-washout admixtures and shall be in accordance with the grout bag system manufacturer's recommendations. Contractor shall submit mix design for approval.
 - (b) Fabric Bags. Fabric bags shall be made of high strength water permeable fabric of nylon or approved equal. Seams shall be double stitched. Fabric shall have the following properties:

TABLE 1 – FABRIC BAG REQUIREMENTS

Property	Test Method	Value
PHYSICAL		
Composition	--	Nylon
Weight	ASTM D 5261	270 g/m ² (8 oz/yd ²)
Thickness	ASTM D 5199	0.76 mm (30 mils)
MECHANICAL		
Grab Tensile Strength	ASTM D 4632	WARP 2270 N (510 lbs) FILL 2310 N (520 lbs)
Grab Tensile Elongation	ASTM D 4632	WARP 25 % FILL 25 %
Wide Width Strip Tensile Strength	ASTM D 4595	WARP 62 KN/m (350 lbs/in) FILL 62 KN/m (350 lbs/in)
Elongation at Break	ASTM D 4595	WARP 15 % FILL 15 %
Trapezoidal Tear Strength	ASTM D 4533	WARP 890 N (200 lbs) FILL 890 N (200 lbs)
HYDRAULIC		

Apparent Opening Size (AOS)	ASTM D 4751	250 mm (60) (U.S. Standard)
Flow Rate	ASTM D 4491	1222 liter/min/m ² (30 gal/min/ft ²)

Certification. A Type A Certification shall be furnished.

4. CONSTRUCTION REQUIREMENTS.

- (a) Preparation. The sediment isolation device shall be installed prior to commencing any work. The area specified for grout bag installation shall be cleared of all sticks, loose debris, and sharp objects. Dewatering of the installation area is not required. Placing grout bags or grout in underwater conditions will be allowed if the sediment isolation device is present.
- (b) Installation. Hand-placed fabric bags filled with grout shall be packed into the undermined location(s) identified on the Plans.

Pump filled fabric grout bags shall be placed over geotextile filter fabric and installed at the locations indicated in the Plans. Hand shovel work may be required to prepare the designated location for grout bag installation. Place one grout bag at a time and fill before moving on to the next grout bag location.

Grout bags should be snugly butted up against the void and each other to minimize any gaps.

Grout injection ports shall be installed facing upward. The grout pump shall be capable of delivering 10 gal/min.

The Contractor shall submit fabric grout bag material specifications and the required material certification to the Engineer for review and approval. The Contractor shall follow the manufacturer's recommendations for the specific fabric grout bag material approved. If material specifications and installation requirements differ between the manufacturer and the Contract Documents, they shall be brought to the attention of the Engineer for review and concurrence prior to installation.

Sediment isolation device shall be kept in place one full day after the work has been completed.

- 5. METHOD OF MEASUREMENT. The quantity of Special Provision (Grout Bags) to be measured for payment will be the number of cubic yards of grout set in place in the complete and accepted work.

- 6. BASIS OF PAYMENT. The accepted quantity of Special Provision (Grout Bags) will be paid for at the Contract unit price per cubic yard. Payment will be full compensation for furnishing and placing the materials specified, and for furnishing all labor, tools, equipment, and incidentals necessary to complete the work.

Payment for excavating and preparing the grout bag foundation, and furnishing and placing geotextile and sediment isolation device will be paid for separately under the appropriate Contract items.

Payment will be made under:

<u>Pay Item</u>	<u>Pay Unit</u>
900.608 Special Provision (Grout Bags)	Cubic Yard

PERFORMANCE-BASED STRUCTURAL CONCRETE

1. DESCRIPTION. This work shall consist of designing, furnishing and placing high performance Portland cement concrete for structures and incidental construction.

The Portland cement concrete may consist of a homogeneous mixture of cement, fine aggregate, coarse aggregate, water, admixtures, and pozzolans, proportioned and mixed according to these specifications.

2. MATERIALS. Materials shall meet the requirements of the following subsections:

Portland Cement.....	701.02
Portland-Pozzolan Cement.....	701.05
Portland-Limestone Cement	701.06
Portland Blast-Furnace Slag Cement.....	701.07
Ternary Blended Cement	701.08
Fine Aggregate for Concrete.....	704.01
Coarse Aggregate for Concrete.....	704.02
Lightweight Coarse Aggregate for Structural Concrete	704.14
Lightweight Fine Aggregate for Structural Concrete	704.19
Preformed Joint Filler, Cork, and Asphalt-Treated Felt	707.08
Polyvinyl Chloride (PVC) Waterstop.....	707.10
Concrete Bonding Systems.....	707.16
Stay-in-Place Corrugated Metal Forms for Superstructure Slabs.....	715.05
Epoxy Bonding Systems.....	719.02
Concrete Curing Materials.....	725.01
Air-Entraining Admixtures	725.02(b)
Retarding Admixtures.....	725.02(c)
Water-Reducing Admixtures	725.02(e)
Water-Reducing and Retarding Admixtures.....	725.02(f)
Water-Reducing, High Range Admixtures.....	725.02(g)
Water-Reducing, High Range, and Retarding Admixtures	725.02(h)
Accelerating Admixtures	725.02(i)
Water-Reducing and Accelerating Admixtures.....	725.02(j)
Specific Performance Admixtures	725.02(k)
Mineral Admixtures.....	725.03
Silica Fume	725.03(b)
Slag Cement.....	725.03(c)
Polystyrene Insulation Board.....	735.01
Blanket Insulation Material.....	735.02
Pipe Insulation	740.08
Water.....	745.01

The coarse aggregate for superstructure shall be conditioned so that the total moisture percentage shall be the absorption percentage plus, at a minimum, 0.25% free moisture for the aggregate.

3. CLASSIFICATION AND PROPORTIONING. The following classes of concrete, shown in Table 1, are included in these specifications and shall be used as shown on the Plans.

TABLE 1 – PERFORMANCE-BASED CONCRETE CLASSES AND PROPERTIES

Concrete Class ¹	Min. 56-Day Compressive Strength (psi) ²	Max. W/CM Ratio ³	VSI ⁴	Slump/Spread Limit	Freeze/Thaw Durability ⁵		Air Content Limits ⁶	Max. Free Shrinkage	Max. 56-Day Surface Resistivity ⁷
					Min. Durability Factor	Max. Air Void Spacing Factor (in.)			
PCD	4,000	TBD	--	N/A ⁸	80	0.008	TBD	0.032%	Low
PCS	3,500	TBD	--	N/A ⁸	80	0.008	TBD	0.042%	Low
SCC	4,000	TBD	≤ 1	TBD ⁹	80	0.008	TBD	TBD ¹⁰	Low

¹ PCD = Performance Concrete, Deck

PCS = Performance Concrete, Substructure

SCC = Self Consolidating Concrete

- ² The concrete may be accepted if the design compressive strength from standard cured cylinders has been obtained at 28 calendar days. Any 56 calendar day acceptance cylinders shall be tested regardless of the results of earlier tests.
- ³ The maximum W/CM ratio shall be determined by the Contractor as established by mix qualification testing. During production, the W/CM ratio shall be less than or equal to the W/CM ratio from the approved qualification mix. See Subsection 3(b)(1).
- ⁴ Visual Stability Index (VSI) as determined in accordance with *ASTM C 1611*.
- ⁵ The freeze/thaw durability of the proposed mix design may be established by providing mix qualification testing demonstrating conformance with either of the two requirements. Testing shall meet the requirements of either *AASHTO T 161*, Procedure A, or *ASTM C 457*, as applicable. See Subsection 3(b)(2).
- ⁶ The minimum air content shall be determined by the Contractor as established by mix qualification testing. During production, the air content shall be greater than or equal to the air content from the approved qualification mix, see note 10. See Subsection 3(b)(2).
- ⁷ The Contractor shall determine the surface resistivity in accordance with Subsection 3(b)(4).
- ⁸ The mix shall not exhibit segregation. If the mix does exhibit segregation, the load shall be rejected. If the spread is equal to or exceeds 18 inches, the mix shall be classified as SCC.
- ⁹ The Contractor shall determine the spread target and limits in accordance with Subsection 3(b)(5). The spread shall be maintained within the determined spread limits for the placement. The mix shall not exhibit segregation. If the mix does exhibit segregation or exceeds the upper spread limit, the load shall be rejected, and subsequent loads shall be tested by the Contractor until the mix meets the allowable limits. The Engineer may perform a J-ring test at the time of placement if blocking is a concern.

- ¹⁰ The Contractor shall determine the free shrinkage in accordance with Subsection 3(b)(1). SCC will be allowed for use in superstructure elements if the free shrinkage meets the requirements for Class PCD. SCC will be allowed for use in substructure elements if the free shrinkage meets the requirements for Class PCS.

If a nominal maximum aggregate size is not specified, the Contractor shall determine the nominal maximum aggregate size using guidance from *ACI 211.1*. In no case shall the maximum aggregate size exceed 1/5 of the narrowest dimension between sides of the forms, 1/3 the depth of slabs, or 3/4 of the minimum clear spacing between individual reinforcing bars, bundles of bars, or pre-tensioning strands unless approved by the Engineer.

The Contractor may use industry methods to develop gradations not specified in Section 704 that are better optimized to satisfy the required concrete performance characteristics. If the Contractor is using a combined gradation, they shall provide the method or methods of how they will monitor gradation, the limits of the gradation ranges, and the frequency of monitoring.

Lightweight fine aggregate may be used to replace up to 30% of the volume of normal weight sand. The gradation of the lightweight fine aggregate shall conform to the requirements of *AASHTO M 195*. The lightweight fine aggregate shall be conditioned for enough time to fully saturate the material.

The stockpile shall be constructed so that the moisture content is uniform throughout the pile. The stockpile will be allowed to drain 12 to 15 hours immediately prior to use, unless an alternate procedure is approved by the Structural Concrete Engineer. The Contractor shall state the method, duration and procedure used to confirm that the material is at or above its saturated surface dry (SSD) value, by weight, throughout the pile.

The use of chlorides or admixtures containing chlorides is prohibited. All admixtures will be considered incidental to the work and included in the Contract unit price of the concrete.

The concrete materials may be proportioned using the absolute volumes method in accordance with the specified requirements. The volumetric proportioning method such as that outlined in *ACI 211.1* or other approved volumetric proportioning methods, shall be employed in the mix design.

Prior to placing concrete on the project (or prior to the trial pour or prior to the pre-placement meeting, whichever occurs first), the Contractor shall submit for approval the single mix design formulation that satisfies all mix design qualification requirements and testing for the class of concrete specified. The mix designs shall be submitted to the Structural Concrete Engineer at the Agency's Materials Section Central Laboratory. The Structural Concrete Engineer may require a minimum of 8 weeks for testing, review, and approval of new mix designs. No class of concrete shall be placed on a Project, including the trial pour, until the mix design is approved.

If the proposed Performance Concrete mix design fails to meet the qualification requirements, the Contractor shall submit a revised mix design formula in writing to address the mix qualification deficiencies of the original failed mix design.

Review of the revised mix design formula by the Structural Concrete Engineer will be completed within 14 calendar days. Upon approval of the revised mix design formula by the Structural Concrete Engineer, testing of the revised mix design may commence. Testing of the revised mix design formula shall be completed within 6 months of the revised mix design formula approval.

Until the testing of the revised mix design is completed and approved, the Structural Concrete Engineer will specify the use of an alternative, prescriptive mix design formula for the application in question, including appropriate acceptance requirements for the prescriptive alternative mix.

- (a) The mix design must contain the following information:
- (1) Class of concrete.
 - (2) Type of mix, conventional or self-consolidating concrete (SCC).
 - (3) Saturated surface dry or dry weights (specify which).
 - (4) Aggregate types, sources, specific gravities, and absorption values.
 - (5) 56 calendar day design compressive strength, psi.
 - (6) Cementitious content and the amount of each, pounds per cubic yard.
 - (7) Air content lower limit, percent.
 - (8) 56 calendar day surface resistivity value.
 - (9) Determined spread lower limit and upper limit for SCC.
 - (10) Maximum water/cementitious materials (W/CM) ratio.
 - (11) Volumetric quantities of each material in the mix design.
 - (12) Design unit weight of the mix.
 - (13) Chemical admixture types, brand names, and dosages.

- Concrete test mix or mixes shall be used to obtain the test results where applicable. All wet testing shall be done by personnel with current ACI Concrete Field Testing Technician Grade I certifications. All other tests shall be performed by a laboratory that is accredited by AASHTO re:source or the Concrete and Cement Reference Laboratory (CCRL) in the particular test method, or as allowed by the Engineer.
- (b) The following mix qualification tests shall be performed. The minimum air content value and the maximum water/cementitious materials ratio of the material used to pass the mix qualification tests shall become the minimum air content value and the maximum water/cementitious materials ratio allowed during production.
- (1) The Contractor shall provide test results that establish the shrinkage tendency of the concrete. The free shrinkage rate of the concrete shall be tested per the requirements of *AASHTO T 160*. The test specimen shall be a prism of 4 inch square cross section. Procedure 11.1.2 of *AASHTO T 160* shall be followed for storage and measurements, and all specified test age results shall be submitted. Specimen testing may be terminated after 28 calendar days of drying. Testing shall be performed by a laboratory accredited in the specific test method.
- (2) The Contractor shall provide test results that establish the freeze-thaw durability of the concrete. At the contractor's choice, either *AASHTO T 161* or *ASTM C 457* may be used to demonstrate freeze/thaw durability meeting the specification requirements.

Sampling shall be performed in accordance with *AASHTO R 60* on a qualification batch of concrete that is a minimum of 3 cubic yards. This freeze/thaw durability test batch shall also be tested for air content (*AASHTO T 152*), concrete temperature (*ASTM C 1064/C 1064 M*), and unit weight (*AASHTO T 121*). SCC concrete shall also be tested for spread (*ASTM C 1611/C 1611 M*, Procedure B).

For those electing to test for air void spacing factor in accordance with *ASTM C 457*, the Contractor shall make a minimum of two concrete cylinders per *AASHTO T 23* and report the average air-void spacing factor obtained from testing these two specimen. The cylinders shall be cured for a minimum of 5 calendar days prior to being tested according to the requirements of *ASTM C 457*.

The air content of the qualification batch that passes freeze-thaw durability testing shall become the minimum air content allowed in production. This shall also become the minimum air content allowed for all subsequent mix qualification testing.

- (3) The compressive strength of the concrete shall be measured based on the requirements of *AASHTO T 22* for 7, 14, 28, and 56 calendar day standard cured cylinders.
 - (4) The surface resistivity of the test mix shall be measured at 56 calendar days based on the requirements of *AASHTO T 358*. Results shall be categorized as Low, Very Low, or Negligible in accordance with *AASHTO T 358*, Table 1. The surface resistivity may be accepted prior to 56 calendar days if the results meet these requirements. 56 calendar day test results shall be completed and submitted regardless of the results of earlier tests.
 - (5) The Contractor shall determine the lower and upper spread limit for SCC concrete. The J-Ring Test and the Spread Test will be conducted at both the lower and upper spread limits. The J-Ring Test will be conducted per the requirements of *ASTM C 1621/C 1621 M*, and the Spread Test will be conducted per the requirements of *ASTM C 1611/C 1611 M*.

The J-Ring test results shall be compared to the Spread Test results at both the upper and lower limits. The difference between the two tests at both the upper and lower limit shall not be greater than 2 inches. At both the upper and lower limits, the Visual Stability Index (VSI) shall not be greater than 1.
- (c) The Alkali-Silica Reactivity (ASR) of each type of aggregate shall be measured separately based on the requirements of *AASHTO T 303*. If one or more of the aggregates exceeds 0.10% expansion, then the aggregate shall be tested again according to the requirements of *ASTM C 1567*.
- The Contractor may elect to go directly to *ASTM C 1567* testing if they suspect that the aggregate may exceed the 0.10% expansion if tested by *AASHTO T 303*. Testing shall be performed by a laboratory accredited in the specific test method.
- (d) After the mix design furnished by the Contractor has been reviewed and approved by the Structural Concrete Engineer, no changes to the mix design shall be allowed except as defined in Table 2. Following an approved change in accordance with Table 2, a contractor may still revert back to original approved mix design formulation. If a source change is requested due to a change in product or material name that does not include any significant change in product formulation or material characteristic, and this is substantiated by the product or material supplier in writing, re-testing is not required.

TABLE 2 – ALLOWABLE MIX DESIGN CHANGES FOR ALL MIX TYPES

Previously Approved Component or Property Being Changed	Mix Design Resubmittal Requirements ¹	No. of Changes Allowed
Cement source	If the alkali content (Na and K) of the new source is greater than that of the original source, and the original result from <u>Subsection 3(c)</u> was greater than 0.08% expansion, then updated ASR testing is required. Otherwise, no qualification testing is required.	Unlimited
Cement proportioning (+/- 5% by volume)	No qualification testing required	One
Aggregate proportioning (+/- 10% by volume)	No qualification testing required	One
Aggregate source	ASR testing and gradation check by original Contractor method	One
Slag source	If same grade is used, no qualification testing required	Unlimited
Silica fume source	No qualification testing required	Unlimited
Fly ash source	If either the calcium (CaO) or the alkali (Na and K) content of the new source is greater than that of the original source, and the original result from <u>Subsection 3(c)</u> was greater than 0.08% expansion, then updated ASR testing is required. Otherwise, no qualification testing is required.	Unlimited
Air-entraining admixture source – 725.02(b)	Resubmittal of freeze/thaw durability qualification testing	Unlimited
Shrinkage reducing admixture source – 725.02(k)	Resubmittal of shrinkage qualification testing	Unlimited
Corrosion inhibiting admixture source – 725.02(k)	Resubmittal of shrinkage qualification testing. If shrinkage qualification testing of the original mix design is greater than 70% of shrinkage limit, then updated shrinkage testing is required.	Unlimited
Latex admixture source – 725.02(d)	Resubmittal of surface resistivity testing	Unlimited
Accelerating admixture dosage increase – 725.02(i), 725.02(j)	Resubmittal of shrinkage qualification testing	Unlimited
Accelerating admixture source – 725.02(i), 725.02(j)	No qualification testing required	Unlimited
ASR mitigating admixture dosage decrease – 725.02(k)	Resubmittal of ASR qualification testing	Unlimited
ASR mitigating admixture source – 725.02(k)	Resubmittal of ASR qualification testing	Unlimited
All other admixture source and dosage changes – 725.02	No qualification testing required	Unlimited

- ¹ All changes will require administrative submittal to establish proposed changes. Where required, resubmittal testing shall be completed using the same material sources and proportions from the original approved mix design.

No new materials shall be incorporated without prior written approval of the Engineer. In no case shall concrete from more than one mix design be permitted to be used during the same pour without prior written approval of the Engineer.

The approved mix design will be allowed consecutive re-approval if no material proportioning or material sources have changed from the previous year's approved mix design and the mix design is submitted with updated aggregate properties and volumes adjusted accordingly. The aggregate properties shall be tested within 60 calendar days of the mix design submission. The properties to be tested include, but are not limited to, specific gravity and absorption.

The mix design shall be accompanied by the previously completed and accepted mix qualification test data and any applicable updated test information. The submittal shall also include all applicable quality control test results and all requests for variance from the material requirements of these specifications.

4. BATCHING. Measuring and batching of materials shall be done at an approved batch plant. Batch plants shall have an inspection completed prior to the first concrete placement on an Agency project if it has been longer than 12 calendar months from the last inspection. Request for inspection and required documentation must be received by the Materials Testing and Certification Section a minimum of 21 calendar days prior to the date of the requested inspection.

All deficiencies shall be corrected and verified a minimum of 5 calendar days prior to the first concrete placement for any Agency project. The batch plant shall meet the requirements of *AASHTO M 157*, except as modified in these specifications, and shall always be maintained in good repair. The batch plant shall be subject to periodic inspections by authorized representatives of the Agency. The batch plant shall have approved methods of storing, measuring, and dispensing approved admixtures.

All concrete batch plants offered for Agency approval shall be equipped for semi-automatic batching and proportioning of all cementitious material, aggregates, water, and for the automatic insertion of admixtures. The plants shall be equipped to automatically and accurately record and report batch weights.

Proper facilities shall be provided for the Engineer to inspect ingredients and processes used in the batching and delivery of the concrete. The Contractor shall, without charge, afford the Engineer all reasonable facilities for securing samples to determine whether the concrete is being furnished

in accordance with these specifications. In the batch room area, the producer shall provide the Inspector with a 24 inch × 18 inch horizontal working surface, at a sufficient working height, with a seat and an adequate view of the batching controls, display, and power supply.

The Contractor shall give the Engineer 24-hour's notice of intent to place concrete. Failure to give notice which causes postponement of placing operations shall not be reason for determining extension of Contract time per the requirements of Subsection 108.11.

(a) Batch Weight Tickets. Batch weight tickets shall include the following information;

- (1) Approved State of Vermont mix identification number
- (2) Weight of all aggregates
- (3) Weight of cementitious material
- (4) Quantity of admixtures by type
- (5) Quantity of water batched
- (6) Aggregate moistures
- (7) Total water to cementitious ratio

Materials on the batch weight ticket shall be identified by type. All batch weight ticket information shall be provided in English units. All materials added to the concrete batch shall be added to the batch weight ticket prior to delivery.

(b) Semiautomatic Batch Plants. When actuated by a starting mechanism, the semiautomatic batch controller shall start the weighing operation of the materials and stop the flow automatically when the designated weight has been reached. It shall be interlocked to ensure that the discharge mechanism cannot be opened until the weight is within the tolerance specified in Subsection 4(e).

Water and admixtures may be batched in a weigh batcher or by volume in a volumetric device. When actuated, volumetric controls shall start the measuring operation and stop the flow automatically when the designated volume has been reached.

(c) Testing Laboratory. The Contractor shall provide a weatherproof building or room at the plant site for the use of Agency personnel as a testing laboratory. The Contractor shall attain and maintain a qualified laboratory status in accordance with the current edition of the Agency's Qualified Laboratory Program. Failure to comply with this program may result in suspension of material production for Agency projects.

The testing laboratory shall have a minimum gross internal area of 150 square feet with a layout providing a minimum internal width of 7 feet, in which to house and use the equipment specified. Should the Contractor elect to provide additional equipment relevant to testing of Portland cement concrete and materials, the gross inside floor area of the laboratory shall be increased in proportion to the area required to house and operate the additional equipment. If the additional equipment is to be operated on a bench, the length of bench sections shall also be proportionally increased.

Adequate ventilation, lighting, heating, and any necessary electrical or gas connections shall be provided. Proper sanitary toilet facilities with a lavatory shall be available for use by Agency personnel at the plant site. Dedicated private telephone and internet services shall be provided to the laboratory. The internet connection shall have a minimum download capacity of 3 Mbps (megabits per second) without utilizing compression algorithms and the bandwidth speed shall be verified using an online speed test.

The laboratory shall be equipped with the following items and equipment:

- 1 Standard office desk, with lockable drawers or a separate lockable two-drawer file cabinet and chair
- 1 VTrans Qualified Laboratory Binder with producer equipment calibration data
- 1 Set of bench sections at least 2 feet wide providing a minimum of 28 square feet of working area with under-counter shelving
- 1 Standard laboratory stool
- 1 Fully automatic electronic calculator with eight digit capacity
- 1 Standard laboratory sink and faucet provided with an adequate supply of water meeting the requirements of Subsection 745.01. The sink shall drain to the outside of the laboratory
- 1 Bench brush
- 1 Floor brush
- 1 Motorized 8-inch sieve shaker with an adjustable timer. The shaker's operation shall be conducted by means of lateral and vertical motion of the sieve accompanied by jarring action with the following 8-inch diameter sieves: 3/8 inch (9.50 mm), No. 4

(4.75 mm), No. 8 (2.36 mm), No. 16 (1.18 mm), No. 30 (0.600 mm), No. 50 (0.300 mm), No. 100 (0.150 mm), plus pan and cover.

- 1 Mechanical aggregate shaker with an adjustable timer, a 1 cubic foot capacity, together with the following screens: 1-3/4 inch (43.0 mm), 1-1/2 inch (37.5 mm), 1 inch (25.0 mm), 3/4 inch (19.0 mm), 1/2 inch (12.5 mm), 3/8 inch (9.50 mm), 1/4 inch (6.30 mm), No. 4 (4.75 mm), No. 8 (2.36 mm), No. 16 (1.18 mm), and pan. The aggregate shaker may be placed in a separate enclosed area, or be shielded for dust and sound control. When the aggregate shaker is placed in a separate enclosed area, there shall be a minimum of 5 feet of clear space measured from the front frame of the aggregate shaker outward, as well as a bench section measuring approximately 36 inches high, 24 inches deep, and 50 inches long located adjacent to the aggregate shaker. The area shall be well lit and ventilated.
- 1 Square pointed shovel
- 5 Five gallon plastic buckets, with handles
- 1 Electronic balance with a minimum capacity of 50 pounds and accurate to 0.0002 pounds. If separate fine and coarse aggregate scales are to be used, the fine aggregate scale shall meet the requirements of *AASHTO M 231* Table 2, Class G2 with a minimum capacity of 1.75 pounds and readable to 0.0002 pounds. The coarse aggregate scale shall meet the requirements of *AASHTO M 231* Table 2, Class G5 with a minimum capacity of 50 pounds and readable to 0.002 pounds.
- 1 Set of standard masses (weights) to use for verifying the accuracy of the electronic balance
- 2 Double-burner hot plates with variable temperature controls
- 3 Metal pans with a nominal size of 9 inches × 9 inches × 2 inches
- 5 Metal pans with a nominal size of 9 inches × 13 inches × 2 inches
- 1 Sample splitter with a 2-1/2-inch chute
- 1 10-inch blunted trowel
- 1 4 foot × 4 foot minimum heavy canvas for quartering samples
- 1 Brass wire-bristle brush

- 1 Pair of heat-resistant gloves (500°F, short-contact)
- 2 1-1/2 inch soft bristle paint brushes

Acceptable substitutes for these items and equipment may be made with the approval of the Structural Concrete Engineer.

Batching operations shall not begin until the testing laboratory has been approved as being in compliance with these specifications and all equipment and equipment calibration requirements of the current VTrans Quality Assurance Program and Qualified Laboratory Program documents. Removal of any equipment, except with written request and written approval of the Structural Concrete Engineer, will revoke any prior approvals and/or qualifications and require the termination of batching operations.

The building or room designated as a testing laboratory shall be maintained in a clean condition by the producer and kept free of all articles not necessary for the testing of materials. Cleaning supplies shall be furnished by the Contractor.

- (d) Bins and Scales. The batch plant shall include bins, weighing hoppers, and scales with adequate separate compartments for fine aggregate and for each required separate size of coarse aggregate. If cement is used in bulk, a bin, hopper, and scale for cement shall be included. Each compartment shall be designed to discharge efficiently and freely into the weighing hopper or hoppers. Means of control shall be provided so that when required, the material may be added slowly in minute quantities and shut off with precision.

Hoppers shall be constructed to eliminate accumulations of tare materials and to discharge fully without jarring the scales. Partitions between compartments shall be configured to prevent spilling under any working condition. All batch plant structures shall be properly leveled and maintained in that condition within the tolerance required by the design of the weighing mechanism.

The scales for determining the mass (weight) of aggregate, water and cementitious material shall be comprised of a suitable system of levers or load cells. The levers or load cells will determine the mass (weight) consistently within 0.5% under operating conditions, with loads indicated either by means of a beam with balance indicator, a full-reading dial, or a digital read-out or display.

Adequate means for checking the accuracy of the scales shall be provided by the Contractor either using 50 pound weights or by other methods approved by the Structural Concrete Engineer. Weights shall be certified annually by the Division of Weights and Measures of

the Vermont Agency of Agriculture, Food, and Markets. All exposed fulcrums, clevises, and similar working parts of scales shall be kept clean.

When beam-type scales are used, provision shall be made for indicating to the operator that the required load in the weighing hopper is being approached. Poises shall be designed to be locked in any position to prevent unauthorized change of position. All measuring and weighing indicating devices shall be in full view of the operator while charging the hopper and the operator shall have convenient access to all controls.

The scales shall be serviced and their accuracy verified annually by a hopper-scale service person licensed by the Division of Weights and Measures. For Vermont plants, an Inspector representing the Division of Weights and Measures shall witness all testing conducted by the service person and will attach a seal to each hopper scale, provided it meets the current specifications, tolerances, and regulations adopted by the Division of Weights and Measures. Standard test weights used to determine the accuracy of hopper scales shall be certified yearly by the Division of Weights and Measures in accordance with their established standards.

The ready-mixed concrete producer shall hire a licensed hopper scale service person for annual checking and service of scales. In addition, Vermont producers shall schedule an inspection with the Division of Weights and Measures between February 15th and April 30th of each year. After April 30th, Vermont plants without current seals affixed to the hopper scales will not be permitted to supply concrete to Agency projects, unless otherwise directed by the Engineer or until the seals are affixed.

Out-of-state concrete producers shall observe all annual hopper scale weighing and seal requirements of their respective states.

- (e) Production Tolerances for Batching. For weighed ingredients, the accuracy of batching is determined by a comparison between the desired weight and the actual scale reading. For volumetric measurement of water and admixtures, accuracy is determined by checking the quantity either by weight on a scale or by volume in a calibrated container.

Admixture-dispensing systems shall, at a minimum, be annually calibrated by an admixture distributor representative. The admixture distributor representative shall check at least two volumes, with a check done at approximately 15% of the minimum and at 15% of the maximum manufacturer's recommended dosage range, or other targets as approved by the Structural Concrete Engineer.

Batching shall be conducted to accurately measure the desired quantities of materials within the tolerances specified in Table 3.

TABLE 3 – CONCRETE PRODUCTION TOLERANCES FOR BATCHING

Material	Tolerance (%)
Cement	± 1
Water	± 1
Aggregates	± 2
Chemical admixtures	± 3
Mineral admixtures	+ 10, - 1

(f) Storage and Proportioning of Materials.

- (1) Portland Cement. Either sacked or bulk cement may be used. No fraction of a sack of cement shall be used in a batch of concrete unless the cement is weighed.

All bulk cement shall be weighed on an approved weighing device. The bulk cement weighing hopper shall be properly sealed and vented to preclude dusting during operation. Facilities shall be provided for the sampling of cement at the batch plant, either from the storage silo or from the weighing hopper. The sampling device shall provide a sample that represents the true nature of the material being used. This device shall be a permanent installation located to allow for safe and easy access.

- (2) Water. Water may be measured either by volume or by weight. When measurement is by meter, the water meter shall be so located that the measurements will not be affected by variable pressures and temperatures in the water supply line.

Measuring tanks shall be equipped with an outside tap and valve to provide for checking the setting, unless other means are provided for readily and accurately determining the amount of water in the tanks.

All water metering methods shall be verified and calibrated on an annual basis or at any time there is a question of accuracy. All water added to the concrete at any point shall be through an approved metering method.

- (3) Aggregates. Aggregate stockpiles shall be formed on hard, well-drained areas that prevent contamination from underlying material and accumulation of excessive moisture.

Aggregates from different sources or of different gradations shall not be stockpiled together. Only rubber-tired equipment shall be permitted to operate on aggregate stockpiles.

Stockpiles shall be constructed as follows:

- a. If the stockpile is to be made using mechanical equipment (front end loader, clam bucket, rock ladder, radial stacker, or other approved equipment), the stockpile shall be made in such a manner that segregation is kept to a minimum.
- b. If the stockpile is to be made by dumping from trucks in multiple layers, each layer shall be approximately 4 feet in depth. Each layer shall be completely in place before commencing the next layer. Care shall be taken that successive layers do not “cone” down over the previous layer.
- c. No equipment shall be used to haul aggregate over the stockpiled material except to deposit the material for the layer being placed. It shall be the responsibility of the Contractor to ensure that the aggregate is kept free from deleterious material or degradation.

Stockpiles shall be maintained in such a manner that twice the anticipated aggregate requirement for any Agency project placements will be on hand and available for sampling and testing at least 48 hours before mixing operations for the placements are scheduled to begin. The Engineer may modify this requirement when special aggregates are required.

Aggregates shall be handled from stockpiles or other sources to the batch plant in such a manner as to secure a uniform grading of the material. Aggregates that have become segregated or mixed with earth or foreign material shall not be used. All aggregates, except lightweight coarse aggregate, produced or handled by hydraulic methods, and washed aggregates, shall be stockpiled or binned for draining at least 12 hours before being batched. In case the aggregates have a high or non-uniform moisture content, a storage or stockpile period longer than 12 hours may be required by the Engineer.

Stockpiles being watered per the specifications or allowed through producer QC procedures shall be watered for a sufficient time to ensure consistent moisture throughout the stockpile. Aggregate stockpiles being watered shall be loaded in the bin within 1 hour of being batched.

The Contractor shall conduct moisture content tests within 1.5 hours of the anticipated concrete batching time. If there is a visual difference in aggregate moisture appearance, aggregate moisture content will be tested again and new moisture test results shall be obtained and used as soon as possible. Material that has been stored in a storage bin for more than 10 hours shall be retested for moisture content. A minimum of one cubic yard of aggregate will be removed from the bottom of the storage bin. A minimum of one cubic yard of aggregate will then be removed and a moisture content sample taken.

Plants that employ moisture probes shall have them calibrated and verified a minimum of 24 hours prior to batching or as directed by the Structural Concrete Engineer. The procedure for checking the meter will be to run aggregate over the probe and then collecting a portion of the aggregate on which to perform a moisture content test. If the difference between the meter and the tested moisture content is greater than 0.5%, then the meter must be calibrated.

- d. Lightweight coarse aggregate stockpiles shall be presoaked for a minimum period of time to ensure that the aggregate is completely saturated surface dry or greater immediately prior to use as indicated by moisture testing. Soaking shall be accomplished by continuous sprinkling or other suitable means that will provide a uniform moisture content throughout the stockpile. The stockpile shall be allowed to drain for 12 to 15 hours immediately prior to use.
- (4) Admixtures. The Contractor shall follow an approved procedure for adding the necessary amounts of admixtures to each batch. Admixtures shall be dispensed in such a manner that will ensure uniform distribution of the material throughout the batch within the required mixing period. Except as specified herein, all admixtures shall be added to the batch at the plant, unless otherwise authorized by the Structural Concrete Engineer.

Chemical admixture containers, metering equipment, and scales shall be calibrated annually by a qualified admixture distributor representative. Admixture calibration and verification shall be done at 15% of the high, at approximately the middle, and at 15% of the low recommended ranges for the admixture being dispensed by the system. The calibration and verification shall be done in the presence of an Agency representative when requested by the Agency.

All dispensers shall include visual inspection aids such as graduated transparent cylinders. A separate dispenser shall be provided for each liquid admixture. If the dispensing system does not provide visual inspection aids, then periodic verification tests shall be done at a frequency satisfactory to the Structural Concrete Engineer. Calibration and verification records shall be kept at the production facility for a minimum of one year. The producer shall do the calibration and verification of the metering systems when requested.

Storage and dispensing systems for liquid admixtures shall be equipped to allow thorough circulation and/or agitation of all liquid in the system. This shall be required prior to the first batching of concrete for Agency projects in any calendar year and periodically thereafter at intervals not to exceed 60 calendar days for the duration of the period the plant is supplying concrete for Agency projects.

If the plant has received a delivery of at least 25% of the volume of the storage container, this will be considered as a method of circulation or agitation. If the circulation method is used, the admixture shall be circulated until a complete exchange of admixture is achieved. If an agitation method is used, the method shall be subject to approval by the Structural Concrete Engineer. If an admixture does not need agitation, then the admixture manufacturer shall submit in writing stating this annually.

Storage and dispensing systems for liquid admixtures shall be maintained within the manufacturer's stated temperature and environmental conditions.

It shall be the responsibility of the Contractor to use the quantity of Agency-approved admixtures needed to obtain concrete meeting the requirements of the Contract. All admixtures will be approved by the Structural Concrete Engineer prior to incorporation into the mix.

- a. Air-Entraining Admixture. Air-entraining admixture shall be used as required to obtain the specified air content.

b. Water-Reducing, Retarding, and Water-Reducing and Retarding Admixtures, Accelerators and Specialty Admixtures. Dosages shall be in the recommended range as stated by the Manufacturer, unless otherwise approved by the Manufacturer.

(5) Fly Ash or Slag. Fly Ash or Slag shall be stored at the batch plant in separate storage or holding bins or other approved holding containers and shall be protected from rain and moisture.

5. MIXING AND DELIVERY.

(a) General. Concrete may be mixed at the site of construction, at a central point, or wholly or in part in transit mixers. The production of concrete shall meet the requirements of *AASHTO M 157* with the following additional requirements:

(1) All concrete shall reach its final position in the forms no more than 1.5 hours after the cement has been added to the water. When an approved admixture to slow or temporarily halt the hydration process of the cement is used, this time limit will be extended to 2 hours, provided the mix has adequate workability. Prior to discharge, the Contractor shall perform concrete temperature testing on every load of concrete which will be deposited after the 1.5 hour time limit, as defined above, to verify the concrete temperature is within the limits defined by Subsection 7.

A time limit greater than 2 hours may be approved if the request is made a minimum of 3 working days prior to the placement and all quality control test results are within specification immediately prior to placement. The request to extend the time limit beyond 2 hours shall include the requested time limit and required admixture dosages. Acceptance testing will be performed by the Engineer, concrete will not be accepted on the basis of quality control tests performed by the Contractor.

Concrete shall not have water added once discharging has begun. Admixtures may be adjusted as required by the producer before discharge has begun. Admixtures to slow or temporarily halt the hydration process of the cement shall only be added at the production facility.

If, in the opinion of the Engineer, any concrete appears to have visually changed from previously placed concrete, the Contractor shall perform quality control tests to confirm the concrete conforms to the specifications.

- (2) Addition of water or admixtures at the project site must be communicated to field inspection personnel. If additional mixing water, admixtures, or other additions are required, a minimum of 30 revolutions of the mixer drum at mixing speed shall be required before discharge of any concrete. If water is added in excess of the specified maximum W/CM ratio, the concrete shall not be used.
- (3) The Engineer may require the Contractor to perform uniformity tests on a transit mixer or agitator, in accordance with *AASHTO M 157* and reported except as modified. Two samples shall be taken. The first sample shall be taken after 15% of the load volume has been discharged, and the second prior to 85% of the load volume being discharged.

Slump and air content tests shall be performed on each sample. The maximum difference in air content between the two samples shall be 1%. For concretes with a specified slump of 4 inches or less, the maximum difference between the two samples shall be 1 inch. For concretes with a specified slump greater than 4 inches, the maximum difference shall be 1-1/2 inches. If both conditions are not met, then the Contractor will be required to either modify the mixing procedure and/or batching sequence, or that transit mixer or agitator will not be allowed to deliver concrete to the project. The Contractor will be required to perform uniformity tests to confirm the changes have satisfactory results.

- (4) Each load of concrete delivered at the job site shall be accompanied by a batch weight ticket meeting the requirements of Subsection 4.
- (5) The Contractor shall provide direct communication service from the site of the work to the batch plant that shall always be available to the Engineer during concrete operations. The cost of this service will be considered incidental to the work.
- (6) When use of a Water-Reducing, High Range Admixture or Water-Reducing, High Range, and Retarding Admixture is specified for deck concrete, the Contractor shall submit, for the Engineer's approval, information about the admixture manufacturer, the admixture addition rate, and when the admixture is to be added to the mixture (i.e., at the plant, on project, or a combination thereof).

To obtain the required concrete characteristics, a representative from the concrete producer is required on the project to determine the final admixture dosage and water addition for each load of concrete. The dosage shall be applied by means of a dispenser, or by other means of accurately measuring volume as approved by the Engineer. The Contractor shall provide QC concrete testing personnel, with current

ACI Concrete Field Testing Technician Grade I Certification, to confirm the concrete is within specifications for the required work.

- (7) All concrete shall be discharged into the forms before 300 revolutions of the drum or blades, not including initial mixing revolutions. The total allowed number of revolutions may be increased as directed by the Engineer.

Mortar shall be mixed in an approved mixer at the site of placement or in transit mixers when approved by the Engineer. The Engineer will withdraw approval for use of transit mixers, if necessary, to ensure a quality product or if the rate of delivery cannot be coordinated with finishing requirements.

- (b) Stationary Mixers. When a stationary mixer is used for the complete mixing of the concrete, the mixing time for mixers that have a capacity of 10 cubic yards or less shall be not less than 90 seconds. For mixers that have a capacity of more than 10 cubic yards, the mixing time shall be determined by the concrete producer.

The time is valid provided that mixer efficiency tests prove the concrete is satisfactory for uniformity and strength. The plant shall be equipped with a timing device that will not permit the batch to be discharged before the predetermined mixing time has elapsed. Vehicles used in hauling shall comply with the requirements of Subsection 5(c).

- (c) Transit Mixers. Transit mixers and agitators shall be subject to periodic inspections by an authorized representative of the Agency. Such equipment shall bear a currently dated inspection sticker supplied by the Agency indicating that the transit mixer or agitator conforms to the Agency's requirements.

For the purpose of this specification, the term agitator shall be interpreted to mean a vehicle with a drum that is not used to do the initial mixing of the concrete but is used to transport the concrete and mix the concrete prior to discharge.

Transit mixers shall be equipped with a water-measuring tank with a visible sight gauge for use when the water for the batch is supplied from the transit mixer tank. The gauge shall be clean and legibly graduated. Measuring tanks shall be provided with outside drain valves or other means to check their calibration. These should be easily opened for checking at any time.

Electrically-actuated revolution counters shall be required on all transit mixers except on mixers charged at central mix plants and utilized as agitator trucks only.

All mechanical details of the mixer or agitator such as water measuring and discharge apparatus, condition of the blades, speed of rotation of the drum, general mechanical

condition of the unit and clearance of the drum shall be checked before a further attempt to use the unit will be permitted.

Mixers and agitators shall be kept free from accumulation of hardened concrete or mortar. The mixing blades shall be rebuilt or replaced when any part or section is worn $\frac{3}{4}$ inch or more below the original height of the manufacturer's design. A copy of the manufacturer's design, showing the dimensions and arrangements of blades shall be available to the Engineer at the plant at all times.

The mixing of concrete containing silica fume is very important and shall be mixed in accordance with the appropriate situation:

- (1) When silica fume is added to the batch by bags or in bulk from a silo, each batch of concrete shall be mixed for not less than 125 revolutions of the drum or blades at the rate of rotation designated by the manufacturer of the equipment as the mixing speed. The mixing and agitating speeds shall be found on the metal plate on the mixer.
- (2) When silica fume is blended with cement or a combination of cement and mineral admixture at the cement plant prior to being delivered to the concrete plant, each batch of concrete shall be mixed for not less than 70 nor more than 100 revolutions of the drum or blades at the rate of rotation designated by the manufacturer of the equipment as the mixing speed. The mixing and agitating speeds shall be found on the metal plate on the mixer. If inconsistent test results are obtained, or the batch of concrete appears not to be completely mixed, the mixing revolutions shall be extended as necessary.

When a transit mixer or agitator is used for transporting concrete, mixing during transport shall be continuous and at two to six rotations per minute or as designated by the manufacturer of the equipment as agitating speed. Failure to do so is cause for rejection of the concrete.

Transit mixers and agitators assigned to a project shall not be used for other purposes until the desired work is completed at the site, and shall arrive at the project within the cycle that anticipated placement conditions dictate. The interval between loads shall be controlled in order that concrete in place shall not become partially hardened prior to placing succeeding batches. The plant capacity and transportation facilities shall be sufficient to ensure continuous delivery at the rate required.

Before discharging transit mix from a transit mixer that has been operating at agitating speed, the drum or blades shall be rotated approximately one minute at mixing speed. The same procedure shall apply to agitators.

Upon discharge of the concrete from the drum, a sufficient amount of water shall be charged into the drum to properly cleanse the drum. This water shall not be used as a part of the next succeeding batch but shall be discharged from the drum prior to the charging of the drum with the concrete ingredients. The drum shall be completely emptied before receiving materials for the succeeding batch. Re-tempering of concrete or mortar that has partially hardened, by remixing with or without additional materials, shall not be permitted.

6. QUALITY CONTROL. The Contractor shall provide assistance, equipment, materials, and curing for field sampling and testing as required by the Engineer. All costs shall be included in the Contract Unit Prices under Section 631. The Engineer shall perform all acceptance sampling and testing in accordance with the Agency's Quality Assurance Program. The Contractor shall perform all on-site Quality Control (QC) sampling and testing. The person performing the QC sampling and testing shall have, as a minimum, current ACI Concrete Field Testing Technician Grade I Certification.

(a) Trial Pour. When concrete will be used for a deck or overlay, or when deemed necessary by the Engineer, the Contractor shall construct a slab to be used for the trial pour. The purpose of the trial pour is to ensure that the mix can be placed and finished in accordance with these specifications. The slab shall be a minimum of 10 feet × 10 feet × 9 inches thick.

If the concrete is intended to be placed by pump, the trial pour concrete shall be placed by pump. The pump will be setup in the configuration that best represents the most difficult pumping condition. The wet concrete properties will be checked at the point of placement. The Contractor will demonstrate that they can provide an acceptable finish to the concrete for the element to be completed. The Contractor will need to bull float a minimum of 50% of the surface area of the slab and hand finish the curb areas in the same manner as anticipated during the production pour.

The Contractor may elect to construct the slab so that the same screed equipment and same finishing method can be used as anticipated for the production pour. In this case the Contractor will not be required to bull float a minimum percentage of surface area unless that will be included in their process for finishing the concrete deck surface during the deck pour. The test slab will become the property of the Contractor and removed from the project after completion of the trial pour.

Concrete production activities shall be closely monitored to ensure that no deviations are made from the approved mix design. If test results indicate a failure to obtain the characteristics as specified in Table 1, the Engineer may reject the material. The Contractor will be responsible for proposing solutions which could include changes to the mix design and will require testing be done with no extra payment. The modified mix design shall not be used until successful test results are obtained during a trial pour that is representative of the anticipated pour conditions.

- (a) Sampling. Sampling for tests shall be taken in accordance with the requirements of *AASHTO R 60* or other procedures approved by the Agency. Sampling will be done at point of placement or as close to it as practical.
- (1) Changes. Any time that there is a change in admixture dosage outside of the allowable tolerances, whether modified at the batch plant or at the site, additional QC sampling and testing shall be performed on the modified load prior to incorporating the concrete into the work.
- (2) Beginning of Load Sampling. Beginning of Load Sampling is sampling for QC testing purposes that is taken before 15% of the load has been discharged. Beginning of Load Sampling shall be performed as required by the Engineer, or as needed to ensure that the Concrete meets the Contract requirements at the point of placement. The QC personnel shall monitor the placement operation and adjust the mix accordingly to ensure that the material being incorporated into the work meets Contract requirements.
- (c) Slump Tests. Slump tests shall be made in accordance with *AASHTO T 119 M/T 119*.
- (d) Spread Tests. Spread tests for SCC shall be made in accordance with the requirements of *ASTM C 1611/C 1611 M*, Procedure B. The concrete inside the cone shall not be tamped.
- (e) Visual Stability Index (VSI) Tests. VSI tests for SCC shall be made in accordance with the requirements of *ASTM C 1611/C 1611 M*, Appendix X.1 and shall be performed on each completed spread test.
- (f) Air Content Tests. Air content tests shall be made in accordance with the pressure method specified in *AASHTO T 152*.

For Class SCC, the specimens shall be fabricated in accordance with *ASTM C 1758/C 1758 M*.

(g) Compressive Strength Tests.

- (1) General. The number of compressive strength tests performed for acceptance should be in accordance with the guidance given in the current edition of the *VTrans Materials Sampling Manual*. The Engineer may order additional tests as deemed necessary.

Compressive test cylinders shall be made in accordance with the requirements of *AASHTO T 23*, and tested for compressive strength in accordance with the requirements of *AASHTO T 22*.

For Class SCC, the specimens shall be fabricated per *ASTM C 1758/C 1758 M*.

(2) Categories of Testing.

- a. Acceptance Testing. Acceptance testing utilizes specimens to determine the compliance with requirements for the project. All test cylinders used for quality acceptance testing shall be stored in an approved curing box until they are shipped to the Agency's Materials Section Central Laboratory.
- b. Job Control Testing. Job control testing utilizes specimens to determine whether adequate curing procedures are being followed and for early form removal or early loading of structure.
1. All job control specimens shall be stored on the structure and shall receive the same curing and protection from the elements as the concrete that they represent up until 24 hours before anticipated testing of specimens.
 2. The maturity method may be used as an alternative for estimating the concrete strength. The procedures of *ASTM C 1074* shall be followed except as noted below:
 - i. For Section 8.1 there shall be a minimum of 17 cylinders cast. Two of the 17 shall have temperature sensors embedded in them to be used for monitoring.
 - ii. For Section 8.4 there shall be 3 cylinders tested for each test age.

- iii. For Section 8.4 for rapid set concrete mixes the test ages shall be 12 hours, 1 day, 2 days, 7 days, and 28 days.

The contractor may adjust or add test ages if approved by the Engineer.

All temperature measuring devices shall be verified/calibrated on a 12 month basis or sooner if there are questions about the accuracy. The device shall have an accuracy of +/- 2° F.

At least two temperature sensors shall be embedded each day in each pour. One sensor shall be placed where maturity is expected to develop the slowest at, or near, an exposed outer edge, and a second sensor shall be placed in the concrete poured from the last load of the day. Sensors shall be placed at least 2 inches to 4 inches from any existing concrete or an exposed outer edge. The temperature sensing end of the monitor shall not be placed in direct contact with reinforcing materials or other elements that will protrude through the surface of the concrete. The contractor shall submit the proposed locations to the Engineer for review and approval.

- c. Specimen Curing Requirements. Specimen curing requirements shall be as stated in the specifications or as directed by the Engineer. If not specifically stated, the curing shall be as specified in Table 4.

TABLE 4 – CONCRETE SPECIMEN CURING REQUIREMENTS

Testing Category	Number of Specimens	Curing Location
Acceptance	See MSM	Curing box
Job control – applicable curing period	2	On structure

- (h) Concrete Temperature. Concrete temperature tests shall be made in accordance with the requirements of *ASTM C 1064/C 1064 M*.

7. WEATHER AND TEMPERATURE LIMITATIONS – PROTECTION OF CONCRETE. The temperature of the concrete just prior to placement in the forms shall not be less than 50°F nor more than 85°F. Aggregates and water shall be heated or cooled as necessary to produce concrete within these temperature limits.

Placement and curing procedures shall be approved by the Engineer prior to actual placement.

(a) Hot Weather Concrete. Placement of concrete during hot weather may be limited by the Engineer based on an assessment of temperature, humidity, wind velocity, and sun radiation conditions. No concrete shall be placed when the ambient air temperature is, or is expected to be, above 90°F.

(b) Cold Weather Concrete.

(1) General. Cold weather concrete will be any concrete placed or cured when the ambient air temperature is expected to be below freezing at any point or below 40°F for a continuous 8-hour period. No concrete shall be placed when the ambient air temperature is lower than 10°F except by written permission of the Engineer. A cold weather concrete plan shall be submitted to the Engineer for their review and acceptance before any cold weather concrete is placed.

When placing cold weather concrete, the Contractor shall have adequate equipment for heating and protecting the materials and freshly-placed concrete meeting the approval of the Engineer. This equipment shall be on the job and ready to deploy prior to the commencement of concrete placing operations.

No concrete shall be placed in any superstructure or thin section under cold weather conditions.

(2) Heating of Materials. The heating equipment deployed for cold weather concrete placement shall be capable of heating the materials uniformly. Aggregates shall not be heated to a temperature exceeding 150°F. If water is heated to a temperature exceeding 140°F, the water shall be mixed with the aggregate before the cementitious material is added.

The materials shall be heated in such a manner, for such a period of time, and in such quantity, as to produce concrete having a uniform temperature within the specified temperature range at the time of placement. Materials containing frost or frozen lumps shall not be used.

Stockpiled aggregates may be heated using dry heat or steam. Aggregates shall not be heated directly by gas or oil flame or on sheet metal over fire. When aggregates are heated in bins, steam-coil or water-coil heating, or other methods that will not be detrimental to the aggregates, may be used.

(3) Antifreeze Compounds. Salts, chemicals, or other foreign materials shall not be used in the mix to lower the freezing point of the concrete.

- (4) Preparation of Forms. Before placing concrete; any ice, snow, or frost shall be completely removed from the forms.

Concrete shall not be placed on any surface or in any forms that are frozen, have surface temperatures below 32°F, or that contain frozen materials. The frozen surface or forms shall be completely thawed the day before the placement of the concrete and shall be kept continuously thawed until the concrete is poured. The temperature difference between forms or substrate and the plastic concrete shall not exceed 40°F.

- (5) Housing. The Contractor shall furnish sufficient canvas with a supporting framework or other suitable type of housing to fully enclose and protect the structure when placing and curing cold weather concrete. The sidewalls and roofing of the protective housing shall be completely built before the placing of any concrete.

The protective housing shall be constructed independently of the forms and bracing and with adequate space to allow for form removal and the initial finishing of the concrete as required during the heating period. Joists shall be located to suitably support the housing roof with no sagging. The protective enclosure shall be heated to the proper temperature before placing any concrete.

When the temperature readings taken on or in the concrete indicate the temperature of the concrete may fall below 50°F, the Contractor shall, without exposing the concrete, immediately build the necessary enclosures around the area involved and supply heat to ensure curing conditions as specified in Subsection 15. The enclosure shall be removed when directed by the Engineer.

- (6) Heating the Enclosure. The enclosure shall be heated in such a manner that the temperature of the concrete and the enclosed air shall be kept above 50°F, and not more than 20°F above the concrete temperature, for the designated curing period. During this time, the concrete shall be kept continuously wet to provide proper curing. After the curing period, the temperature shall be gradually lowered to that of the surrounding atmosphere, taking at least 48 hours for the transition but at no time exceeding a 1°F change per hour.

When dry heat is used, a means of maintaining atmospheric moisture shall be supplied. The Contractor shall also maintain adequate fire protection and shall provide personnel to keep the heating units in continuous operation. When concrete placement operations are in locations where water levels may fluctuate, the

supports for heating equipment shall be built so that the heating equipment can be raised and steam lines shall be placed above the probable high water level.

The enclosure shall be well-ventilated to avoid accumulation of carbon dioxide and carbon monoxide.

When using a hydronic heating system with heat-transfer fluid that circulates through a series of hoses, the heat-transfer hoses shall be laid on top of the vapor barrier, usually plastic sheeting, then covered with approved insulating materials or by other approved methods for retaining heat.

- (7) Temperature Records. The Contractor shall provide an automatic temperature recorder to continuously record concrete curing temperatures and ambient air temperatures for the entire curing period. Recording thermometers shall be capable of measuring and recording temperatures within the range of 0°F to 200°F with maximum graduations of 5°F.

Temperature sensors shall be carefully placed within the curing enclosure or in the concrete to ensure that temperatures are measured at typical locations. The recorder's accuracy shall be certified once every 12 months, with the certificate displayed with each recorder. The Engineer may make random checks of each recorder.

On each recorder chart, the Engineer shall indicate the location of the representative concrete, the placement date, and start and finish times of the temperature record. At the completion of the curing period, the recorder charts shall be submitted to the Engineer.

A thermometer shall be provided that is capable of displaying the current ambient temperature with a maximum gradation of 1°F. The Inspector will use the thermometer to take periodic temperature measurements of the enclosure at varying locations.

The Contractor shall provide a hand-held infrared thermometer capable of taking no-contact measurements that is accurate within plus or minus 2% of the reading. The thermometer's accuracy shall be certified once every 12 months, with the certificate provided with each thermometer.

When the Contractor places concrete at more than one location within the specified curing period or if the Engineer determines that monitoring of a single pour is

necessary in multiple locations, additional monitoring and recording equipment shall be furnished to provide temperature records at each location.

8. FORMS. The Contractor shall be responsible for, and shall make good, any injury arising from inadequate forms. The Engineer shall be provided the opportunity to inspect all forms prior to concrete placement.

Unless the plans specifically allow for the use of stay-in-place forms, such forms shall not be used in the construction of any superstructure or bridge deck. Stay-in-place forms will only be allowed as approved by the Engineer.

- (a) Falsework. In general, falsework that cannot be founded upon a solid footing shall be supported by falsework piling. The Engineer may require the Contractor to employ screw jacks or hardwood wedges to correct any deflections or settlement, however slight, occurring in the falsework.
- (b) Construction. Forms shall be mortar-tight and sufficiently rigid to prevent distortion due to the pressure of the concrete and other loads incidental to the construction operations, including vibration. Forms shall be constructed and maintained to prevent the opening of joints due to shrinkage of the lumber. Sealers and caulking as approved by the Engineer shall be used where forms abut structural steel members, such as top flanges of beams and girders, etc.

To ensure their easy removal, forms shall be filleted and chamfered at all sharp corners, unless otherwise shown on the Plans or directed by the Engineer, and shall be given a bevel or draft in the case of all projections, such as girders and copings.

Falsework and forms for slabs, beams, and girders shall be constructed to provide the camber shown on the Plans or ordered by the Engineer.

Falsework and forms for Class SCC construction shall be designed with consideration given to concrete placement rates, mix temperature, additives, and placement procedures that effect hydrostatic pressure of the concrete. Forms shall be water-tight and sufficiently rigid to prevent distortion due to the pressure of the concrete and other loads incident to the construction operations, including vibration, which should not be needed.

- (c) Form Lumber. All face form lumber for exposed surfaces shall be concrete form exterior grade plywood, not less than five ply and with a minimum thickness of 3/4 inch. In computing stud spacing, plywood shall be considered 1 inch lumber, provided that the grain of three of the plies runs perpendicular to the studs.

Form lumber for unexposed surfaces may be dressed tongue-and-groove, dressed shiplap, or square-edge surfaced four sides of uniform width and thickness, with a minimum thickness, after finishing, of 3/4 inch.

All form lumber shall be sound and free from loose or rotten knots, knotholes, checks, splits, or waness showing on the surface that will be in contact with the concrete. Used face form lumber, having defects or patches which may produce work inferior to that resulting from new material, shall not be used.

Other form materials may be used with the permission of the Engineer.

- (d) Form Ties. Metal ties or anchorages within the forms shall be constructed to permit their removal to a depth of at least 1 inch from the face without injury to the concrete. Wire ties shall be used only in locations where they will not extend through surfaces exposed in the finished work and then only when authorized.

The cavities on vertical and overhead surfaces shall be filled with a product that meets the requirements of Subsection 780.02. The manufacturer's directions shall be followed for surface preparation, mix, and application. Cavities on horizontal surfaces shall be filled in with a mortar mix using the same proportion of cementitious material and sand. The surfaces shall be saturated with water for a minimum of an hour, dried to SSD just prior to being filled, and cured by a method in Subsection 15 approved by the Engineer for a duration of 3 calendar days

- (e) Surface Treatment. All forms shall be treated with commercial form oil prior to placing reinforcement, and wood forms shall be saturated with water immediately before placing the concrete. Any material that will adhere to or discolor the concrete shall not be used.
- (f) Metal Forms. The specifications for wood forms regarding design, mortar-tightness, filleted and chamfered corners, beveled projections, bracing, alignment, removal, reuse, and oiling also apply to metal forms. The metal used for forms shall be of such thickness that the forms will remain true to shape throughout the concrete placement operations.

All bolt and rivet heads shall be countersunk. Clamps, pins, or other connecting devices shall be designed to hold the forms rigidly together and to allow removal without injury to

the concrete. Metal forms that do not present a smooth surface or do not line up properly shall not be used. Care shall be exercised to keep metal forms free from rust, grease, or other foreign matter.

(g) Removal of Forms.

- (1) Deck Superstructure. The forms, or their supports, for any portion of a structure shall not be removed before the end of the 10-day cure period for the deck. Forms under beams or floor slabs may be removed upon approval of the Engineer after the concrete attains 85% of the minimum compressive strength as specified in Table 1, but not prior to the end of the 10-day cure period.
- (2) Substructure. The forms, or their supports, for any portion of a substructure shall not be removed without the approval of the Engineer. Forms under arches, pier caps, or other special design conditions may be removed upon approval of the Engineer after the concrete attains 85% of the minimum compressive strength as specified in Table 1.

The removal of forms and supports may begin when the concrete is found to have the required strength. In no case shall the number of curing days be less than specified in Table 5.

Methods of form removal likely to cause overstressing of the concrete shall not be used. Forms and their supports shall not be removed without approval. Supports shall be removed in such a manner as to permit the concrete to uniformly and gradually take up the stresses due to its own dead load.

(h) Stay-in-Place Corrugated Metal Forms (SIPCMF) for Superstructure Deck Slabs.

- (1) General. Use of SIPCMF for superstructure deck slab construction shall be subject to the following requirements:
 - a. Fascia overhangs shall be formed with removable forms that leave the resulting concrete with a flat-surfaced finish.
 - b. Bays that are constructed in stages such that a longitudinal joint is required shall be made with removable forms.
- (2) Design Requirements. The following requirements shall govern the design of SIPCMF:

- a. The design span shall be the clear span of the form plus 2 inches, measured parallel to the form flute (also referred to as the form valley).
 - b. The design load shall be the sum of the weight of forms, bar reinforcement, plastic concrete, and 55 pounds per square foot for construction loads.
 - c. The unit working stress shall not exceed 75% of the specified minimum yield strength of the material.
 - d. The dead load deflection shall not exceed 1/180 times the form span length or 1/2 inch, whichever is less.
 - e. Physical design properties shall be computed with the requirements of the latest edition of the *American Iron and Steel Institute Specifications for the Design of Cold-Formed Steel Structural Members*.
- (3) Construction Requirements. The following construction requirements shall apply to the use of SIPCMF:
- a. Construction Drawings. The Contractor shall submit construction drawings for SIPCMF in accordance with the requirements of Subsection 105.03. These drawings shall contain the following information as a minimum:
 1. The name of the SIPCMF supplier.
 2. A layout showing the compression and tension region of each beam/girder.
 3. The method of SIPCMF attachment for the compression and tension regions.
 4. The geometric properties of each type of panel being used.
 5. The number, location, and type of panels being used within each girder bay.
 6. Panel laps, considering the direction of concrete pours.
 7. The specifications for the material used to fill the flutes.
 8. Any other material data, erection information, or miscellaneous notes that may be required.

- b. Handling and Installation. Care and protection shall be given the metal form sheets, supports, and accessory items during handling, shipping, and storage. During loading, hoisting, and unloading operations, extra precaution and care shall be taken to prevent damage to ends, corners, and edges of form sheets, supports, and accessory items.

If the form units and accessories are to be stored prior to installation, they shall not be placed in contact with the ground and shall be adequately covered or protected to keep them dry.

Form supports shall be placed in direct contact with the flange of beam/girder/stringer or floor beam. All attachments shall be made by permissible welds, bolts, clips, or other approved means. The welding of form supports to steel not considered weldable or to portions of flanges subject to tensile stresses shall not be permitted. Welds and welding shall be in accordance with the requirements of Subsection 506.10, with the exception that a 1/8-inch fillet weld will be permitted.

Form sheets shall not be permitted to rest directly on the flanges. They shall be securely fastened to form supports by self-tapping screws and shall have a minimum bearing length of 1 inch at each end. Transverse construction joints shall be located at the bottom of a valley. A 1/4 inch diameter weep hole shall be drilled at the lower end of each flute or valley.

Screed and pouring runway supports shall not be located directly on the form sheets, form supports, or reinforcing steel. No loose sheets or miscellaneous hardware shall be left on the structural slab at the end of the working day.

The corrugated metal sheets shall be fabricated for the placement sequence used, with the joints between sections of sheets overlapped or securely fastened to eliminate differential deflections. Any exposed form metal where galvanizing has been damaged shall be cleaned and repaired to the satisfaction of the Engineer.

(4) Inspection Procedures. The following three-step inspection procedure will be used to check the soundness of the concrete deck against the SIPCMF.

- a. Step 1. Not less than two days after completion of a concrete structural slab pour, but prior to the next slab pour, one panel of the SIPCMF shall be removed from the most recently completed pour of each span, at a location selected by the Engineer, to provide visual evidence that the concrete mix or the construction procedures are obtaining the desired results.

If the concrete mix or the construction procedures are varied significantly within a pour, such as a change in the extent of vibration or change in the workability of the mix, another section of forming shall be removed to verify that the new procedures are yielding desirable results.

- b. Step 2. After the concrete has attained 85% of the specified design strength, the Engineer will spot-check the underside areas of the steel forms by sounding with a suitable weight hammer. If honeycomb or voided areas are detected, the SIPCMF at that location shall be removed for a visual inspection.
- c. Step 3. A minimum of 2% of the total SIPCMF area shall be removed for visual inspection of the concrete surface. The amount of sounding and form removal may be moderated, at the Engineer's discretion, after a substantial amount of the slab has been constructed and inspected, if the Contractor's methods of construction and results of the inspections as outlined above indicate that sound concrete is being obtained throughout the slab.

If, after removing a section of form, the concrete is found to be defective, additional panels shall be removed as directed by the Engineer. All defective concrete shall be repaired to match the adjacent concrete in section and color to the satisfaction of the Engineer.

The Contractor shall provide all facilities required for the safe, suitable, and convenient means of access to the forms for the Engineer's inspection procedures.

The form sections shall be removed by a metal saw or air-carbon-arc gouging with minimum damage to the concrete. Cuts shall only be sufficiently deep to sever the form. Any other method of removal shall be submitted to the Structures Engineer for approval. Cuts parallel to the corrugations in the forms shall be located on the sloping surface midway

between a crest and valley. Cuts parallel to the supporting beams/girders shall be made through the supporting angles taking care not to damage the structural steel beams/girders.

The Contractor will not be required to replace the forms which have been removed.

9. PLACING CONCRETE.

- (a) Workforce. The Contractor shall always have sufficient skilled personnel during the concreting operations to properly place, consolidate, and finish the concrete. If, in the opinion of the Engineer, the Contractor does not have sufficient skilled personnel to handle the concrete properly, the Engineer may postpone the start of the concreting operations until the Contractor has remedied this situation.
- (b) Pre-Placement Meeting. For deck pours, or as required by the Engineer, a pre-placement meeting shall be scheduled by the Contractor to take place at least 7 calendar days before concrete placement, and prior to the Trial Pour, if required. Attendees at the pre-placement meeting shall include, but not be limited to, the Contractor's Project Superintendent, the Engineer, the Agency's Structural Concrete Engineer, and the concrete producer.

The Contractor shall provide a placement plan that addresses, but is not limited to, the following topics:

- (1) Time of concrete placement and amount
- (2) Batch plant testing
- (3) Delivery of concrete
- (4) Method of concrete placement on the deck
- (5) Consolidation and finishing of concrete
- (6) QC testing of the plastic concrete
- (7) Protection of the concrete from evaporation
- (8) Curing of the concrete
- (9) How to avoid long delays for balance loads
- (10) Screed, work bridge, and rail set-up

- (11) Dry run schedule
 - (12) Contingency plans for long delays, break downs, weather events and other potential problems
 - (13) Crew size and responsibilities
 - (14) Available equipment
 - (15) Project layout including locations for all pumps, cranes, testing, cleanouts, staging, etc.
- (c) Placement Limitations. All concrete shall be placed in daylight, unless otherwise authorized in writing by the Engineer. Authorization to place concrete at any other time shall not be given unless an adequate lighting system is provided prior to beginning the concrete placement operations.

Concrete shall not be placed under adverse environmental conditions that the Engineer determines will interfere with acceptable placement and/or finishing operations.

Concrete shall not be placed until the depth and character of the foundation, the apparent adequacy of the forms and falsework, and the placing of the reinforcing steel have been approved by the Engineer. The interior of the forms shall be clean of all debris before concrete is placed.

The Contractor shall submit to the Engineer a schedule of batching, delivery, and placement prior to the beginning of the concreting operations. The Contractor shall comply with the requirements of Subsection 5.

Equipment and tools necessary for handling materials and performing all parts of the work shall meet the approval of the Engineer as to design, capacity, and mechanical condition and must be on the site before the work is started. Any equipment, in the judgment of the Engineer, that proves inadequate to obtain results prescribed shall be improved or new equipment substituted or added.

The Engineer may suspend the pour or reject the pour if the Contractor deviates from the accepted pour plan which will also include unacceptable delivery rates. The Contractor will not be allowed compensation due to the pour being suspended or rejected due to the Contractor deviating from the accepted pour plan or uncontrolled delivery rates.

For simple spans, concrete should be deposited by beginning at the lower end of the span and working toward the upper end. For continuous spans, where required by design considerations, the concrete placing sequence shall be as shown on the Plans.

Concrete shall not be deposited in the forms more than 4 feet from its final position.

The dropping of unconfined concrete more than 5 feet will not be permitted.

Concrete shall not be deposited in running water.

The rate of placing the concrete shall be so regulated that no excessive stresses are placed on the forms. Concrete in all decks shall be placed in one continuous operation, unless otherwise specified.

Concrete shall be placed in continuous horizontal layers, the thickness of which shall not exceed 18 inches, unless otherwise directed by the Engineer. Each succeeding layer shall be placed before the underlying layer has taken initial set and shall be consolidated in a manner that will eliminate any line of separation between the layers. When it is necessary, due to any emergency, to place less than a complete horizontal layer at one operation, such layer shall terminate in a vertical bulkhead.

After the concrete has taken its initial set, care shall be exercised to avoid jarring the forms or straining the ends of projecting reinforcing bars.

- (d) Placement of Overlays. For a period of at least 24 hours before the placement of overlay material, the prepared surface shall be flooded with water. After removal of all free water, the overlay material shall be deposited on the damp surface and manipulated to coat the horizontal and vertical surfaces to be covered. The rate of progress shall be controlled to prevent the drying of previously deposited materials.
- (e) Use of Chutes. Chutes, troughs, and pipes used in placing concrete shall be arranged to avoid segregation of the materials and the displacement of the reinforcement and shall be approved by the Engineer. Aluminum chutes, troughs, or pipes will not be permitted.

All chutes, troughs, and pipes shall be kept clean and free of hardened concrete by thoroughly flushing with water after each run. Open troughs or chutes shall be either of metal or metal-lined and shall extend as nearly as possible to the point of deposit. When the discharge must be intermittent, a hopper or other device for regulating the discharge shall be provided.

Dropping of unconfined concrete more than 5 feet or depositing a large quantity at any point and running or working it along the forms will not be permitted.

- (f) Use of Vibrators. Unless otherwise specified, the concrete shall be consolidated with mechanical vibrators, of an approved type and design, operating within the concrete. When required, vibrating may be supplemented by hand-spading with suitable tools to ensure proper and adequate consolidation.

Vibrators shall be manipulated to work the concrete thoroughly around the reinforcement and imbedded fixtures and into corners and angles of the forms to produce surfaces free of imperfections. Vibrators shall not be used to cause concrete to flow or run into position in lieu of placing. The vibration at any point shall be of sufficient duration to accomplish consolidation but shall not be prolonged to the point where segregation occurs.

Vibrators shall have non-metallic or rubber-coated heads. Vibrating machines shall at no time be left running unattended in the concrete.

When it is necessary due to an emergency to discontinue the placing of a monolithic section, the use of vibrators shall cease. Vibrators shall not again be used until a sufficient depth of fresh concrete is placed to prevent any possibility of the effect of vibration on the concrete already in place and in no case shall this depth be less than 2 feet.

The number of vibrators used shall be ample to consolidate the incoming concrete immediately after it is deposited in the form. The Contractor shall have at least one spare vibrator in serviceable condition at the site of the structure in which more than 25 cubic yards of concrete are to be placed.

The vibrators shall be capable of transmitting vibration to the concrete at frequencies of not less than 4,500 impulses per minute under load. The vibration shall be of sufficient intensity and duration to cause plasticity, settlement, and complete consolidation of the concrete without causing segregation. The vibrator shall visibly affect a mass of concrete of 2-inch slump over a radius of at least 18 inches.

- (g) Blasting Operations. All blasting operations within 200 feet of any concrete work shall be completed prior to the placement of the concrete. Regardless of the above limitation on blasting operations, the Contractor shall be responsible for any damage resulting from blasting operations.

10. DEPOSITING CONCRETE UNDER WATER.

- (a) General. Concrete shall not be deposited under water except as specified by the Contract or upon approval of the Engineer and shall be subject to the following specifications.

- (b) Placement. When placing concrete underwater, the Contractor shall use a tremie or an alternate method of conveyance, approved by the Engineer, which minimizes the mixing of fresh concrete and water. A tremie shall have a hopper at the top that empties into a watertight tube at least 10 inches in diameter.

The discharge end of the tube on the tremie shall include a device to seal out water while the tube is first filled with concrete. An inflatable ball will not be permitted. The device shall keep its shape and float without danger of deflation.

The placement shall be continuous to the elevations shown on the Plans and the resulting concrete shall be monolithic and homogeneous.

Concrete shall not be deposited in water that has a temperature of 35°F or below. When the water temperature is between 35°F and 40°F, the mixing water, the aggregates, or both shall be heated as specified in Subsection 7(b).

A tremie shall be constructed of heavy-gauge steel pipe and consist of watertight joints between the tremie sections with a diameter of not less than 10 inches. The tremie hopper shall have a capacity of at least 1/2 cubic yard. When a batch is dumped into the hopper, the flow of the concrete shall be induced by slightly raising the discharge tube, always keeping it in the concrete.

Tubes shall be kept continuously submerged in concrete during discharge. The depth that the tube is submerged in concrete and the height of the concrete in the tube shall be sufficient to prevent water from entering the tube. The Contractor shall continuously monitor the difference in elevation between the top of the concrete and the end of the discharge tube.

Horizontal movement of discharge tubes through the concrete will not be allowed.

For minor quantities, at the sole discretion of the Engineer, a direct pumping method may be approved. If a direct pumping method is to be implemented, the pipe discharging the concrete shall consist of heavy-gauge steel sections. The Contractor shall demonstrate the ability to pump the concrete without the pump line surging or otherwise moving in the water as concrete is being pumped.

Cylinders cured as field cure shall be cured at the same temperature as the water covering the concrete.

11. PUMPING. Where concrete is conveyed and placed by mechanically-applied pressure, the equipment shall be suitable in kind and adequate in capacity for the work. The pump shall be capable of pumping concrete within the specified slump limits. The use of aluminum pipe as a conveyance for the concrete will not be permitted.

The operation of the pump shall be such that a continuous stream of concrete without air pockets is produced. When pumping is completed, the concrete remaining in the pipeline, if it is to be used, shall be ejected in such a manner that there will be no contamination of the concrete or separation of the ingredients. The equipment shall be arranged so that no resulting vibrations may damage freshly placed concrete.

12. CONSTRUCTION JOINTS.

- (a) Construction Joint Locations. Joints shall be formed at the location shown on the Plans. Any variation or new location of joints shall require written permission of the Engineer. Feather edges at construction joints will not be permitted. Joints shall be formed with inset formwork so that each layer of concrete will have a thickness of not less than 6 inches.
- (b) Joining Fresh Concrete to Previously Set Concrete. When joining fresh concrete to concrete that has hardened, the surface of the set concrete shall be roughened in such a manner that will not leave loosened particles or damaged concrete at the surface and shall be thoroughly cleaned of all laitance, loose, and foreign material. Immediately prior to the placing of the new concrete, the surface shall be saturated with water.

When shown on the Plans or ordered by the Engineer, the surface shall be thoroughly coated with a very thin coating of mortar, neat cement grout, or epoxy bonding system and all forms drawn tight against the face of the concrete. This coating shall not be allowed to dry out before being covered with fresh concrete.

- (c) Filled Construction Joints. Filled construction joints shall contain a pre-formed cork joint filler or other pre-formed joint filler that may be shown in the Contract. Joint filler shall be cut to fit exactly and shall completely fill the space that is shown on the Plans. Where a pour grade or caulking grade filler is indicated to be used in the joints, that portion of the joint to be filled shall be formed with a separate material (other than the pre-formed joint filler) that can easily be removed prior to placement of the above indicated filler.
- (d) Water Stops. Approved water stops shall be placed at locations shown on the Plans. They shall form continuous watertight joints.

- (e) Bond Breakers. Bond breakers shall be asphalt-treated felt or pipe insulation, as shown on the Plans.

13. EXPANSION JOINTS. All expansion joints shall be constructed according to details shown on the Plans.

- (a) Filled Compression and Expansion Joints. Filled compression and expansion joints shall be made with a pre-formed self-expanding cork joint filler or other pre-formed joint filler that may be shown in the Contract. Joint filler shall be cut to fit exactly and shall completely fill the space that is shown on the Plans. Where a pour grade or caulking grade filler is indicated to be used in the joint, that portion of the joint to be filled shall be formed with a separate material (other than the expansion joint filler) that can easily be removed prior to placement of the above indicated filler.
- (b) Special Types of Expansion Joints. Special types of expansion joints may be used when shown on the Plans or ordered by the Engineer.

14. CONCRETE FINISHING.

- (a) Finishing Bridge Decks and Overlays.

- (1) General. The Contractor shall follow the procedures and details for placing the deck in accordance with the pre-placement meeting. The procedure shall provide for adequate labor, equipment, and material supply to complete placement of concrete on the entire deck, or specified portion thereof.

If, during the placement, unforeseen circumstances delay the progression of the pour to a point where the concrete begins to lose plasticity, the Contractor shall be prepared to place a bulkhead, as directed by the Engineer.

If at any time the screed machine does not advance in a 15-minute period due to delayed concrete delivery, mechanical breakdown or other problem, the Contractor shall immediately cover concrete that is under the screed machine past the leading edge of the concrete with wet burlap. Just before concrete placement is to begin, the burlap shall be removed, the screed machine will be moved back, fresh concrete will be added to the area that was directly under the screed to the leading edge, and the area will be vibrated again. The screed machine may then be advanced forward to continue the placement.

Approval of their methods and equipment does not relieve the Contractor of full responsibility for obtaining the required surface finish.

Prior to texturing, the finished concrete surface shall be examined by the Contractor. Surface irregularities greater than 1/8 inch in 10 feet in either the longitudinal or the transverse direction shall be corrected in a manner acceptable to the Engineer. When a bituminous concrete surface is to be placed on a bridge deck, the deviation shall not be greater than 1/4 inch. When a sheet membrane is being applied, sharp ridges shall not be allowed. Thin mortar or laitance, which may have accumulated ahead of the finishing machine screed, shall be removed from the work site. These materials shall not be used to fill depressions.

If the bridge deck concrete does not meet the above smoothness requirements, the Contractor shall remove high spots up to 1/2-inch high by means of grinding. Any other corrections shall be made only with the written approval of the Engineer. The use of bush hammers will not be allowed. No concrete shall be removed that will result in a concrete slab thickness less than that shown on the Plans.

Any deck that cannot be corrected by a method satisfactory to the Engineer shall be removed and replaced at the Contractor's expense.

Sidewalks shall receive their final finish with a fine bristled broom.

- (2) Turf Drag. When specified on the plans, the surface shall be given a suitable texture with an artificial turf drag made of molded polyethylene or other material or method that will provide an acceptable finish. The selection of turf drag or other method should be capable of producing a surface texture with a horizontal peak-to-peak distance ranging from 0.02 inch to less than or equal to 0.25 inch and having a peak-to-peak amplitude of 0.005 inch to 0.8 inch. A turf drag material or other acceptable method that will minimize tearing and rolling of coarse aggregate from the surface shall be used.

The Contractor shall apply the finish texture in a transverse direction using hand methods. Other directions may be allowed with the approval of the Engineer. All texturing shall be performed from a work bridge immediately following the finishing operations and prior to curing operations. A second work bridge will be required for curing purposes unless a method using a single work bridge has been approved by the Engineer.

One pass of the turf drag over the finished area is desired. The drag shall leave a seamless strip between passes. The finish texture resulting from the drag shall stop within 15 inches of the curb face, rail anchor bolts, or edge of deck. Any buildup of concrete at the beginning or end of the pass shall be hand troweled to provide an even transition.

The drag should produce a transverse, skid-resistant micro-texture acceptable to the Engineer, but should not tear the surface. If the drag is not producing an acceptable micro-texture, the Contractor shall adjust the means and methods until an acceptable micro-texture is achieved.

The Contractor shall check the drag material before the deck pour and from time-to-time during finishing for tears, worn surface, or hardened concrete. The Contractor shall clean or replace the drag as often as necessary to maintain a well-defined micro-texture.

The turf drag or other acceptable methods should not be applied when the surface is so wet or plastic that the ridges formed flow back into the valleys when the drag has passed, nor should dragging be delayed until the concrete is so hard that sharp ridges cannot be formed by the drag. Fogging or similar methods shall be deployed to ensure that the surface does not dry prematurely.

If the 10-minute maximum, as specified in Subsection 15(c), for applying the wet cure cannot be met, then fogging of the area shall be performed in a manner that keeps the relative humidity above the evaporation rate of the concrete surface, but not so excessive that water begins to collect on the surface prior to texturing or other surface manipulating procedures.

- (3) Finishing Machine Rail Supports. Finishing machine rail supports shall be of substantial construction and accurately set so that the finished deck surface will conform to the profile and transverse sections shown in the Plans. Finishing machine rail supports shall be placed and adjusted to properly provide for the deflection of forms, falsework, and structural supporting members which will occur during the placement of the concrete.

The finishing machine rail supports shall be spaced at a maximum of 2 feet on center and of sufficient design as to secure the rail to prevent it from falling off the support. The screed rails shall be configured to allow the screed machine and work bridges to be fully functional over the entire deck area.

Sufficient screed rails shall be provided so that all rails necessary for any one continuous pour may be preset and graded before the start of concreting operations. The removal of screed rails and exposed chairs shall be accomplished without walking in the fresh concrete and while the concrete is still plastic.

The Contractor shall furnish a work bridge or bridges of an approved type, capable of spanning the entire width of the deck without deflection to the concrete slab surface.

- (4) Finishing. After the concrete has been placed, it shall be struck off by a finishing machine and the operation shall be repeated as necessary to produce a uniformly consolidated, dense, smooth surface. The final passage of the finishing machine shall result in a uniform surface at the required grade and slope over its entire area.

Finishing machines shall be kept in true adjustment. Machines shall not be used until the proper adjustments have been made and the adjustments have been checked and approved by the Engineer.

Sufficient time shall be provided prior to beginning concreting operations for the finishing machine to be operated over the full length of the bridge deck segment to be placed. This test run shall be made with the screed adjusted to its finishing position. While operating the finishing machine in this test, the screed rails shall be checked for deflection and proper adjustment, the cover on slab reinforcement shall be measured, and the controlling dimensions of slab reinforcement and forms shall be checked.

After the concrete is placed, it shall be struck off by one of the following methods:

- a. A self-propelled concrete finishing machine may be deployed, supported on suitable rails, and equipped with adjustable strike-off and finishing roller screeds capable of producing the required finish surface for the full width of the bridge from face-to-face of curbs.
- b. An approved mechanical vibrating screed may be deployed, capable of exerting a force of at least 12 pounds per linear foot, and generating at least 6,500 vibrations per minute when checked by a vibration reed-type tester. The vibrating screed shall provide a uniform finish throughout its entire length and shall be properly adjusted so as not to drive the aggregate more than 1/4 inch below the surface.

In areas that are inaccessible to finishing machines, an approved manual vibratory-equipped power screed with an approved grade-control method may be used with approval from the Engineer. Smoothness shall be checked as specified in Subsection 14(a)(1) to ensure a smooth ride and seamless transition to the finishing machine's finished area.

If manual vibratory-equipped power screeds are used, then initial vibration of the concrete for consolidation in those areas shall be of the minimal duration possible to avoid over-vibration and loss of air entraining of the surface concrete in these areas.

Hand finishing shall be allowed only in areas inaccessible to finishing machines or manually driven vibratory-equipped power screeds. Hand screeds or bull floats shall be magnesium and at least 10 inches in width. Care shall be taken not to overwork the concrete surface during any finishing operation. Smoothness shall be checked as specified in Subsection 14(a)(1) to ensure a smooth ride and seamless transition to the finishing machine's finished area.

15. CURING CONCRETE.

- (a) General. Water for use in curing concrete shall conform to the requirements of Subsection 745.01. The effective cure time shall be only the time that the concrete has been maintained in a wet condition with the concrete surface temperature above 50°F. If the concrete is not maintained in a wet condition and/or the concrete surface temperature drops below 50°F, it shall not be counted as effective cure time. The cure period will be extended 4 hours for every 1 hour the concrete is below 50°F, beginning when the concrete temperature is raised to or exceeds the minimum curing temperature.

Regardless of the curing medium specified, the entire surface of the newly placed concrete shall be kept damp. This shall be achieved by applying water with a nozzle that atomizes the flow so that a mist and not a spray is formed. The moisture shall not be applied under pressure directly upon the concrete and shall not be allowed to accumulate in a quantity sufficient to cause a flow or washing of the surface.

The atomized flow shall be applied continuously until the surfaces can be covered by the specified curing mediums. For bridge barriers, curbs, and sidewalks the curing method shall be applied within 15 minutes of the completion of the finishing process.

Concrete components shall be cured for the times specified in Table 5.

TABLE 5 – CURING TIMES FOR CONCRETE COMPONENTS

Type of Construction	Curing Methods (Subsection)	Effective Cure Time (Days)
Substructure	17(b)(1), (2), (3), (5), (7), (8)	7
Superstructure	17(b)(2), (8)	10 ¹
Retaining walls	17(b)(1), (2), (5), (6), (8)	7
Headwalls	17(b)(1), (2), (5), (6), (8)	7
Sidewalks, curbs, and gutters	17(b)(2), (8)	7

¹ There shall be no activity on the superstructure during the cure period.

(b) Curing Methods. All exposed surfaces of newly placed concrete shall be cured by one of the following specified methods:

- (1) Water Curing. Curing with water shall be by continuously sprinkling or flooding of all exposed surfaces for the entire required curing period.
- (2) Burlap Curing. The entire exposed surface of the concrete shall be covered with two layers of approved burlap that has been pre-soaked with water. The burlap shall then be covered with a lapped layer of white polyethylene sheeting. Once the concrete superstructure has hardened sufficiently, a stream of water, applied with a soaker hose or similar device, shall be run continuously under the polyethylene sheeting until the cure period is complete.
- (3) Sand Cover. The entire exposed surface of the concrete shall be covered with at least 3 inches of approved sand that shall be kept wet for the entire curing period.
- (4) White Polyethylene Sheeting. The entire exposed surface of the concrete shall be covered with a blanket of white polyethylene sheeting, maintained and fastened to provide a nearly airtight condition in contact with the surface where possible. If, in the opinion of the Engineer, this cover is not adequately provided or maintained to ensure the proper conditions for the concrete cure, then the white polyethylene sheeting cure shall be terminated and another method substituted.
- (5) White Burlap-Polyethylene Sheeting. The entire exposed surface of the concrete shall be covered with a blanket of white burlap-polyethylene sheeting. The burlap shall be thoroughly dampened prior to placing and shall be placed next to the concrete. All joints shall be lapped a minimum of 18 inches. The burlap shall be kept damp throughout the curing period.

- (6) Membrane-Forming Curing Compounds. White-pigmented or fugitive-dye membrane-forming curing compounds may be used for curing concrete in minor drainage structures. All other uses of curing compounds shall be approved in writing by the Engineer. Only membrane-forming curing compounds approved by the Agency's Materials Section may be used.

When membrane curing is used, the exposed concrete shall be thoroughly sealed immediately after the free water has left the surface. The concrete inside the forms shall be sealed immediately after the forms are removed and necessary finishing has been done.

The solution shall be applied in one or two separate applications. If the solution is applied in two increments, the second application shall follow the first application within 30 minutes. Satisfactory equipment shall be provided, together with means to properly control and ensure the direct application of the curing solution to the concrete surface to result in a uniform coverage of the surface area at the rate of 1 gallon of solution for each 150 square feet.

If rain falls on the newly-coated concrete before the film has dried sufficiently to resist damage, or if the film is damaged in any other manner, a new coat of the solution shall be applied to the affected portions equal in curing value to that specified above.

Should the surface be subject to continuous injury or the use of curing compound results in a streaked or blotchy appearance, the method shall be stopped and water curing applied.

- (7) White Polyethylene Sheeting with Sand Cover. This method may be used only when approved by the Engineer and shall conform to the requirements of Subsection 15(b)(4). The airtight condition shall be obtained by the addition of a uniform sand cover with a minimum depth of 2 inches.
- (8) Pre-Dampened Cotton Mats. The entire exposed surface of the concrete shall be covered with a blanket of cotton mats that has been pre-dampened with water. The mats shall be maintained in a damp condition until the curing period is complete.

If, in the opinion of the Engineer, the Contractor's curing procedure is not producing an adequate cure, the Engineer may direct a change in the cure method at no additional cost to the Agency.

- (c) Bridge Decks. For bridge decks, the curing method shall promptly follow the screed machine, within a maximum lag time of 10 minutes and without interruption. If this lag time cannot be met, then fogging of the area shall be performed in a manner that keeps the relative humidity above the evaporation rate of the concrete surface, but not so excessive that water begins to collect on the surface prior to texturing or other surface manipulating procedures.

16. LOADING OF CONCRETE. After the concrete has been placed and the finishing operations concluded, it shall not be walked on or disturbed in any manner, including removal of forms, for a minimum period of 18 hours. If retarder is used as an admixture, this minimum period may be extended as directed by the Engineer.

- (a) Substructure. No backfill material shall be placed against a newly completed structure unless the concrete cure is maintained in accordance with Table 5, and until the field cured test cylinders have attained 85% of the compressive strength specified in Table 1. However, the Contractor may erect forms for subsequent concrete placement on footings after 18 hours have elapsed from the time that the footing placement was completed, provided the concrete has sufficient strength to allow it to be worked on without damage, and proper cure is maintained.

Static loads, such as forms, reinforcing steel, or other materials necessary for construction, may be placed on any concrete after it has been in place 72 hours, or a compressive strength of 1,800 pounds per square inch has been obtained, provided proper curing is maintained. Superimposed loads from subsequent concrete pours will not be allowed on any substructure unit or section in place until the field cured test cylinders have attained 85% of the compressive strength specified in Table 1, and provided curing of the supporting section is maintained in accordance with Table 5.

- (b) Superstructure. Static loads, such as forms, granite curbing, cast-in-place concrete curb, and other materials necessary for deck construction, shall not be placed on deck concrete until the effective cure time specified in Table 5 is complete and the field-cured test cylinders for this concrete have attained 85% of the compressive strength specified in Table 1.

The Contractor shall keep bridge floors free of all motor vehicles, transit mixers, and heavy construction equipment until the curing period is satisfactorily completed, the field-cured test cylinders for the bridge floor concrete have attained the compressive strength specified in Table 1, and the field-cured test cylinders for the curb concrete or bridge rail concrete, as applicable, have attained 85% of the compressive strength specified in Table 1.

(c) Vertical Joints. Concrete shall not be placed against a vertical construction joint until the previously placed concrete has been in place a minimum of 72 hours.

17. METHOD OF MEASUREMENT. The quantity of Special Provision (Performance-Based Concrete, Class PCD), Special Provision (Performance-Based Concrete, Class PCS), and Special Provision (Performance-Based Concrete, Class SCC) to be measured for payment will be the number of cubic yards of the class of concrete specified in the complete and accepted work, as determined by the prismatic method using dimensions shown on the Plans or as directed by the Engineer.

The quantity of concrete shall also include the volume of superstructure precast concrete stay-in-place forms, but exclude the volume of steel or other stay-in-place forms and form filling materials. No deductions will be made for the volume of concrete displaced by steel reinforcement, structural steel, expansion joint material, scuppers, weep holes, conduits, tops of piles, scoring, chamfers or corners, inset panels of 1-1/2 inches or less in depth, or any pipe less than 8 inches in diameter.

18. BASIS OF PAYMENT. The accepted quantity of Special Provision (Performance-Based Concrete, Class PCD), Special Provision (Performance-Based Concrete, Class PCS), and Special Provision (Performance-Based Concrete, Class SCC) will be paid for at the Contract unit price per cubic yard. Payment will be full compensation for performing the work specified, including designing the mix, performance of trial pours, and satisfactory finishing and curing. Payment will also be full compensation for furnishing all forms, materials, including joint filler and bond breaker, labor, tools, admixtures, and equipment, including automatic temperature recording units, trial batches, and incidentals necessary to complete the work.

The cost of heating materials and protecting the concrete against cold weather, and any additional cost for cement, will not be paid for separately but will be considered incidental to the Contract unit prices for the applicable concrete pay items.

The cost of furnishing testing facilities and supplies at the batch plant and the setting of inserts, bench marks, and bridge plaques furnished by the Agency will not be paid for separately but will be considered incidental to the Contract unit prices for the applicable concrete item.

Costs for all materials, labor, and incidentals for steel or other stay-in-place forms and form filling materials will not be paid for separately but will be considered incidental to the Contract unit prices for the applicable concrete item.

Payment will be made under:

<u>Pay Item</u>	<u>Pay Unit</u>
900.608 Special Provision (Performance-Based Concrete, Class PCD)(FPQ)	Cubic Yard
900.608 Special Provision (Performance-Based Concrete, Class PCS)(FPQ)	Cubic Yard

INCENTIVE/DISINCENTIVE (I/D)

- 1. INCENTIVE/DISINCENTIVE (I/D). To provide a common proposal for all bidders and expedite the incentive payment process, the Agency has entered an amount of \$150,000 in the proposal to become part of the Contractor’s total bid. The dollar amount entered by the Agency is the maximum amount payable under the incentive clause, but the actual payment/deduction will be computed and paid/deducted per this Special Provision and the stipulations of Notice to Bidders No 9.

The payment of monies for performance under the Incentive/Disincentive (I/D) specifications contained in these Special Provisions shall be as follows:

- (a) The quantity of incentive to be paid will be the accepted quantity of incentive computed per the provisions of Notice to Bidders No 9. For the incentive payment as described in part (d) of Notice to Bidders No. 9, the Contractor will be paid in the next biweekly estimate in which the Contractor has satisfactorily met the requirements of I/D.
- (b) The quantity of disincentive to be deducted will be the quantity of disincentive computed per the provisions of Notice to Bidders No 9. For the assessed disincentive as described in part (d) of Notice to Bidders No. 9, the Engineer will deduct the amount due the Agency from the monies due the Contractor on the next biweekly estimate.

Payment will be made under:

<u>Pay Item</u>	<u>Pay Unit</u>
900.615 Special Provision (Incentive/Disincentive)(N.A.B.I.)	Dollar

JUNCTION BOX, HEAVY DUTY

1. DESCRIPTION. This work shall consist of furnishing and installing heavy duty junction boxes at the location(s) shown in the Plans and as directed by the Engineer.
2. MATERIALS. Materials shall meet the requirements specified in the Plans.

A Type A Certification shall be furnished.
3. CONSTRUCTION REQUIREMENTS. Junction boxes shall be constructed in accordance with the requirements of Section 678, in the locations shown in the plans or as directed by the Engineer.
4. METHOD OF MEASUREMENT. The quantity of Special Provision (Junction Box, Heavy Duty) to be measured for payment will be the number of Junction Boxes installed in the complete and accepted work.
5. BASIS OF PAYMENT. The accepted quantity of Special Provision (Junction Box, Heavy Duty) will be paid for at the Contract unit price for each. Payment will be full compensation for furnishing, transporting, handling, and installing the materials specified, and for furnishing all labor, tools, equipment and incidentals necessary to complete the work.

<u>Pay Item</u>	<u>Pay Unit</u>
900.620 Special Provision (Junction Box, Heavy Duty)	Each

MICROPILES

1. DESCRIPTION. This work shall consist of furnishing and installing micropiles at the locations and to the required capacities indicated in the Contract Documents.
2. GENERAL REQUIREMENTS. The Contractor is responsible for furnishing, installing, and testing micropiles and pile top attachments for this project. The Contractor shall select the micropile type, size, pile top attachment, installation means and methods, estimate the ground-grout bond value, and determine the required bond length and final micropile diameter. The Contractor shall design and install micropiles that will develop the load capacities indicated in the Contract Documents. The micropile load capacities shall be verified by verification load testing as required and shall meet the test acceptance criteria specified herein.
3. MATERIALS. Materials shall meet the following requirements:
 - (a) Permanent Casing. Permanent casing shall be new, flush joint-type steel pipe of appropriate thickness to withstand the stresses associated with advancing it into the ground, in addition to the stresses due to hydrostatic and earth pressures. The permanent steel casing/pipe shall conform to the minimum requirements of ASTM A252 for Grade 3 pipe, or API 5CTN80. The casing/pipe shall have a minimum yield stress of 80 ksi.
 - (1) Certification. Certification for permanent casing pipe shall meet the following requirements.
 - a. For permanent casing conforming to ASTM A 252, a Type D Certification shall be furnished.
 - b. For permanent casing meeting API standards, the following Quality Control (QC) system and all QC activities shall be the responsibility of the Manufacturer/Supplier. The Engineer has the right to monitor any QC sampling and testing and to test any material or retained samples for specification conformance.

1. Quality Control. A “Plant Lot” of pipe in a raw material state shall be a maximum of 1000 linear feet. A random coupon sample shall be taken from every 250 feet of casing from each plant lot. These coupons shall be tested for tensile strength, yield strength, elongation, and wall thickness. The minimum elongation shall be 15%. For casing that will be welded, the testing shall also include sulfur content and carbon equivalency (CE) as defined in American Welding Society (AWS) D1.1, Section XI5.1. The sulfur content shall not exceed 0.05% and the CE shall not exceed 0.45. Results of the testing shall be submitted to the Engineer for approval.

Coupons shall be marked with an identification number which will be retraceable to the test certifications and which includes the VTrans contract number. All casing in a plant lot shall be marked along the tubular body of the casing with the same identification number prior to testing. The identification number shall appear on every piece of casing at no more than 10 foot intervals.

If the Engineer determines the test results to be satisfactory, the approved plant lot may then be manufactured into the final product. Four random coupon samples taken from the “drops” during the manufacturing process shall be identified with the plant lot number and shipped to the job site with the finished casing.

The Contractor shall incorporate the following Quality Assurance (QA) system at the direction of the Engineer:

2. Quality Assurance. The “drops” shipped with the finished casing shall be tested by the Contractor, at an AMRL Accredited Laboratory, to identify the material properties outlined in Quality Control of this Section. The Engineer will review the test results prior to installation of the casing. If test results do not satisfy the criteria, coupons shall be taken from the lot at the job site. The requirement for testing of the “drops” may be waived at the discretion of the Engineer.

For each test result of the coupons taken from the lot at the job site found by the Engineer to be unsatisfactory, the rejected pieces shall be removed from the lot. An additional two test coupons shall be taken from the lot at the job site. If test results from either of these additional two test coupons are unsatisfactory, the entire plant lot is rejected. If satisfactory results are obtained, proceed as specified above.

VTrans may direct the Contractor to test any additional casing from the lot at the job site.

- (2) Additional Requirements. Permanent casing that is installed in coupled (spliced) sections shall meet the following requirements:
- a. The casing shall be flush joint and the pipe joint shall be completely shouldered with no stripped threads.
 - b. Welds shall meet the requirements of Subsection 506.10. The welding plan and procedures shall be approved by the VTrans Fabrication Supervisor.
- (b) Bar Reinforcement. Bar reinforcement shall be Grade 75, continuously threaded bar, meeting the requirements of AASHTO M 31M/M 31 (ASTM A 615/A 615M) or continuously threaded Uncoated High-Strength Steel Bars conforming to AASHTO M 275M/M 275 (ASTM A 722/A 722M), as used in the design submittal.
- Bar couplers, if required, shall develop the ultimate tensile strength of the bars without any evidence of failure.
- (c) Cement. Cement shall meet the requirements of Subsection 701.02.
- (d) Grout. Grout shall be a neat cement or sand/cement mixture with a minimum compressive strength of 4,500 psi at 28 days. Water for mixing grout shall be potable. The use of Grout Sand and Fly Ash in the mix is optional.

During production, micropile grout shall be tested by the Contractor for compressive strength at an approved laboratory in accordance with AASHTO T 106 (ASTM C 109) at a frequency of no less than one set of three 2 inch grout cubes from each grout plant each day of operation or per every 10 piles, whichever occurs more frequently. The compressive strength shall be the average of the 3 cubes tested.

Grout consistency as measured by grout density shall be determined by the Contractor per AASHTO T 133 (ASTM C 188) or API RP-13B-1 at a frequency of at least one test per pile, conducted just prior to start of pile grouting. The Baroid Mud Balance used in accordance with API RP-13B-1 is an approved device for determining the grout density of neat cement grout. The measured grout shall have a specific gravity of between 1.9 and 2.0, or as used in the mix design submittal.

Grout samples shall be taken directly from the grout plant. The grout cube compressive strength and grout density test results shall be provided to the Engineer within 24 hours of testing.

- (e) Centralizers and Spacers. Centralizers and spacers shall be fabricated from Schedule 40 PVC pipe, tube, steel, or material non-detrimental to the reinforcing steel. Wood shall not be used.
- (f) Structural Steel. Structural steel shall meet the requirements of Subsection 714.02 or 714.03 as used in the design submittal.

4. SUBMITTALS. The Contractor shall submit the following:

- (a) Qualifications. The micropile Contractor shall be fully experienced in all aspects of micropile and construction, and shall furnish all necessary plant, materials, skilled labor, and supervision to carry out the work under the Contract. The experience information outlined below shall be submitted to the Engineer for approval. This information shall be approved prior to any other work occurring under this specification. The Contractor shall allow 10 working days for the review of this material.
 - (1) Five projects in the past five years of similar scope and size to that indicated in the Contract Documents. A brief description of the scope of work and a reference shall be included for each project. As a minimum, the reference shall include an individual's name and current contact information. The micropile contractor shall not sublet the whole or any part of the work under the Contract without the written approval of the Engineer.
 - (2) The proposed On-Site Supervisor for this work having supervised the successful installation of micropiles on at least five projects in the past five years.
 - (3) The proposed key personnel (Superintendent, Driller, and Project Engineer/Manager) who will be materially involved, with each having at least three years of relevant experience.

- (b) Design and Installation Procedure. Submit the design and installation procedure information outlined below to the Engineer for approval. The Contractor shall allow 20 working days for the review of this material. Work shall not begin prior to receiving approval by the Engineer. Approval of the installation method by the Engineer does not constitute a guarantee of acceptable pile installations. Acceptable installations are the responsibility of the Contractor.

The micropiles shall be designed by a Professional Engineer (Structural or Civil) licensed in the State of Vermont, using FHWA's Micropile Design and Construction Reference Manual and the latest version of the AASHTO LRFD Bridge Design Specifications. The micropiles shall satisfy both structural and geotechnical requirements. The Contractor's Professional Engineer shall design the diameter, length, reinforcement, pile connections, grout strengths, and grouting pressures; select the equipment, procedures, and methods so that each pile meets the pile acceptance criteria, can support the ultimate tension and compression loads with combined bending moments and unbraced lengths, and meet other requirements indicated in the Contract Documents. The Contractor's Professional Engineer shall be responsible for the design, supervision, and reporting of the Verification Test Loading.

The design and details shall be signed, stamped, and dated by the Contractor's Professional Engineer.

The submitted design and installation procedure shall include the following information:

- (1) Pile computations and details for each design capacity, including but not limited to grout-to-ground bond, piezometric levels, material unit weights and strength; nominal pile diameter, length, reinforcement, and pile connections; and post grout tube and grouting pressures.
- (2) Proposed steel drill casing/pipe used as reinforcement. Pile computations shall account for the reduced area of the threaded joint in the structural design of the pile, particularly for the capacity in tension and bending. Identify any joint location restrictions that must be followed in construction. Pile computations shall account for 1/16 inch deduction in casing/pipe wall thickness as sacrificial material.
- (3) Equipment for pile installation.
- (4) Procedures for pile installation, including but not limited to installation sequence and the approximate time required for each sequence step.
- (5) Procedures for advancing through boulders and other obstructions.

- (6) Procedures for containment of drilling fluid and spoil, and disposal of spoil.
- (7) Where applicable, drawings that show specific work can be performed under limited headroom conditions and as close to obstructions as site conditions warrant, to install the piles at the locations and pile batters indicated in the Contract Documents. Provide information on the length of the casing sections to be used, as dictated by the length of the drill mast and by the available overhead clearance, and the resulting location of joints. Welding procedures for all shop and/or field welds shall be submitted.
- (8) Procedures and equipment for placing grout.
 - a. Prepare the mix design for the grout and obtain documentation from an AMRL accredited laboratory showing the following:
 1. The mix design conforms to the submitted mix and meets the strength requirements specified by the Contractor's Professional Engineer.
 2. The compressive strength of the mix, tested at 3, 7, 14, and 28 days.
 3. The specific gravity of the mix.
 - b. Identify a method for monitoring quality control of the mix. At a minimum, the Contractor shall use a Baroid Mud Balance per American Petroleum Institute (API) Recommended Practice (RP) 13B-1: Standard Procedure for Testing Water-Based Drilling Fluids, to check the specific gravity of the mixed grout prior to placement of the grout into each micropile.
 - c. Provide pressure gauges capable of measuring the actual grout pressures used and such that actual pressure readings are within the middle third of the gauge.
- (9) Post-grouting equipment and procedures, including the method, sequence of operations, and equipment required.
- (10) Layout drawings showing the proposed sequence of pile installation. Coordinate this sequence with the proposed phasing and scheduling. Layout drawings should include micropile number, design load for each pile, type and size of bar reinforcement, minimum total bond length, total micropile length, and the pile top attachment details.

(11) Description of test setup and jack, pressure gauge, and load cell calibration curves. Equipment calibration test reports shall be provided for each test jack, pressure gauge and master pressure gauge, and electronic load cell to be used. The test equipment shall have been calibrated within 90 calendar days of the date submitted by an independent testing firm.

(c) Record Information. Submit revisions to the design and installation procedure information outlined in part (b) of SUBMITTALS of this Section to the Engineer as required within 60 days from completion of micropile installation.

5. CONSTRUCTION REQUIREMENTS.

(a) Drilling and Excavation. Progress all micropiles using steel drill casing. The hole shall be advanced using a duplex drilling method without drilling or flushing ahead of the drill casing by more than 1 foot. Drilling and excavation shall be performed in such a manner as to prevent collapse of the hole. Use of bentonite slurry is not permitted. Use of polymer slurry to remove cuttings from the cased hole shall be approved by the Engineer.

An obstruction is defined as something encountered while advancing a micropile that is not expected based on boring log findings or known obstructions identified on the Plans. Boulders, cobbles, bedrock, and very dense till material are not considered obstructions. When obstructions are encountered during excavation for a pile, the hole shall be advanced by means of coring, a tricone roller bit, or other tooling approved by the Engineer. Use of drop-type impact hammers and blasting are not permitted. Use of down-the-hole hammers shall be approved by the Engineer.

The Contractor shall notify the Engineer in writing when a potential obstruction is encountered. Upon notification, the Engineer shall determine if an obstruction has been encountered that will cause an increase in the time required to accomplish the work. The Contractor will be notified of the Engineer's determination as to whether or not an adjustment of the Contract is warranted. If an adjustment is warranted, the Contract will be modified in writing accordingly. Any adjustment made will exclude loss of anticipated profits.

All tools and materials required to remove the obstruction shall be available at the site at all times during micropile installation and in sufficient quantities to avoid delays in the execution of this work.

Procedures and operations shall be controlled so as to prevent undermining, damage, or settlement to adjacent structures, tunnels, utilities, or adjacent ground. All drilling operations shall be discontinued at the first sign of undermining, damage, or settlement and a written plan shall be provided to the Engineer for review with procedures to avoid reoccurrence. Work shall be resumed only after the Engineer has approved the plan in writing. All damage and settlement shall be repaired at no additional cost to VTrans.

The rate of fluid flow used to progress the holes shall be monitored. Drilling fluid shall be controlled and spoils shall be disposed of in accordance with the approved procedures.

Holes shall not be progressed, pressure-grouted, or post-grouted, within a radius of 5 feet of a micropile until the grout for that micropile has set for 24 hours.

The drill hole shall be open along its full length to at least the design minimum diameter prior to grout placement.

- (b) Reinforcement and Post Grout Tube Placement. Centralizers sized to position the reinforcement within 3/8 inch of plan location from the center of the pile shall be provided. The centralizers shall be sized to allow grout tremie pipe insertion to the bottom of the drill hole and to allow grout to freely flow up the drill hole and casing. The centralizers shall be securely attached to the reinforcement to withstand installation stresses. Centralizers shall be provided at centers not to exceed 10 foot spacing. Micropile reinforcement shall not be dropped into the hole. When a post grout tube is used, it shall be attached to the steel reinforcement prior to lowering it into the hole.
- (c) Grout Placement and Casing Removal. The Contractor shall perform grout testing in accordance with part (d) of MATERIALS of this Section.

Grout shall be placed by means of a tremie pipe from the bottom of the pile upward. The initial volume of grout required to fill the hole shall be recorded along with the grouting pressure and volume of grout being pumped into the pile during pressure grouting. Upon completion, the grout level shall be maintained at or above the pile cut-off elevation until the grout has set.

The grout pressure and volume measuring gauges at the pile installation site shall be accessible and legible to the inspector during the grouting operations.

- (d) Construction Tolerances. Piles shall be installed so that the center of each micropile does not vary from the location indicated in the Plans by more than 6 inches. Micropiles shall not vary from the vertical or established batter by more than 1/4 inch per foot, as measured

above ground. The top elevation of the completed micropile shall have a tolerance of plus or minus one inch.

- (e) Testing. Compression load testing shall be conducted in accordance with ASTM D 1143, except as modified herein. Tension load testing shall be conducted in accordance with ASTM D 3689, except as modified herein.

Verification load test pile(s) shall be installed at a location approved by the Engineer. The test pile shall not be a production pile. The Contractor shall perform the verification test on a micropile of the same diameter and cased length as the production piles. The uncased length shall be determined so that the test loads applied to the micropile result in an accurate determination of the nominal grout to soil bond strength in the bond zone. Test loads shall not exceed 80 percent of the structural capacity of the micropile structural elements; including steel yield in tension, steel yield or buckling in compression, or grout crushing in compression.

Testing equipment shall include dial gauges, a dial gauge independent reference frame, jack and pressure gauge, electronic load cell (with readout device), and a reaction frame. The load cell is required only for the creep test portion of the verification test. The Contractor shall provide a description of test setup and jack, pressure gauge, and load cell calibration curves in accordance with subpart (b)(11) of SUBMITTALS of this Section.

Design the testing reaction frame to be sufficiently rigid and of adequate dimensions such that excessive deformation of the testing equipment does not occur. Align the jack, bearing plates, and stressing anchorage such that unloading and repositioning of the equipment will not be required during the test.

Apply and measure the test load with a hydraulic jack and pressure gauge. The pressure gauge shall be graduated in 100 psi increments or less. The jack and pressure gauge shall have a pressure range not exceeding twice the anticipated maximum test pressure. Jack ram travel shall be sufficient to allow the test to be done without resetting the equipment. Monitor the creep test load hold during verification test with both the pressure gauge and the electronic load cell. Use the load cell to accurately maintain a constant load hold during the creep test load hold increment of the verification test.

Measure the pile top movement with a pair of dial gauges capable of measuring to 0.001 inch. The dial gauges shall have a travel sufficient to allow the test to be done without having to reset the gauges. Visually align the frame to be parallel with the axis of the micropile and support the gauges independently from the jack, pile, or reaction frame.

Test verification pile(s) to a maximum test load of 2.5 times the maximum compressive or tensile resistance specified, hereafter termed "Design Test Load" shown on the Plans. The verification pile load tests shall be performed by incrementally loading the micropile in accordance with the following cyclic load schedule for both compression and tension loading:

TABLE 1 – VERIFICATION LOAD TESTING SCHEDULE

AL = Alignment Load DTL = Design Test Load		
	Load	Hold Time
1	AL (0.05 DTL)	1 minute
2	0.25 DTL	1 minute
3	0.50 DTL	1 minute
4	AL	1 minute
5	0.25 DTL	1 minute
6	0.50 DTL	1 minute
7	0.75 DTL	1 minute
8	AL	1 minute
9	0.25 DTL	1 minute
10	0.50 DTL	1 minute
11	0.75 DTL	1 minute
12	1.00 DTL	1 minute
13	AL	1 minute
14	0.25 DTL	1 minute
15	0.50 DTL	1 minute
16	0.75 DTL	1 minute
17	1.00 DTL	1 minute
18	1.33 DTL	60 minutes
19	1.75 DTL	1 minute
20	2.00 DTL	1 minute
21	2.25 DTL	1 minute
22	2.50 DTL	10 minutes
23	2.00 DTL	1 minute
24	1.00 DTL	1 minute
25	0.50 DTL	1 minute
26	AL	1 minute

The test load shall be applied in increments of 25 percent of the DTL. Each load increment shall be held for a minimum of 1 minute. Pile top movement shall be measured at each load increment. The load-hold period shall start as soon as each test load increment is applied. The verification test pile shall be monitored for creep at the 1.33 DTL. Pile movement during creep test shall be measured and recorded at 1, 2, 3, 4, 5, 6, 10, 20, 30, 50, and 60 minutes. The AL shall not exceed 5 percent of the DTL. Dial gauges shall be reset to zero after the initial AL is applied.

The acceptance criteria for micropile verification load test are:

- (1) The tolerable movement during the load test at the top of the micropile shall be 0.5 inch, unless otherwise directed by the Engineer.
- (2) At the end of the 1.33 DTL creep test load increment, test piles shall have a creep rate not exceeding 0.05 inch/log cycle time (1 to 10 minutes) or 0.1 inch/log cycle time (6 to 60 minutes or the last log cycle if held longer). The creep rate shall be linear or decreasing throughout the creep load hold period.
- (3) Failure does not occur at any load increment up to and including the 2.5 DTL maximum test load. Failure is defined as load where the slope of the load versus head settlement curve first exceeds 1/32 inch/kip.

Upon completion of the test, the Contractor's Professional Engineer shall provide, to the Engineer, a written summary of the verification test results and a comparison of the results with the individual acceptance criteria above. The load test data will provide the opportunity to confirm the micropile design assumptions and installation methods as used in the design submittal. The Contractor shall allow 5 working days for the review of this material. The Engineer will either confirm the capacities and bond lengths specified in the design submittals or reject the pile(s) based upon the verification test results.

Adjustment of the micropile lengths may be made by the Contractor's Professional Engineer on the basis of the load test results. If the verification test micropile fails to meet the acceptance criteria, the Contractor's Professional Engineer shall modify the design, the construction procedure, or both. These modifications may include modifying the installation methods, increasing the bond length, or changing the micropile type. At the completion of verification testing, test piles shall be removed down to the elevation specified by the Engineer.

- (f) Pile Acceptance Criteria. Pile(s) shall be accepted if all of the following criteria are met:
 - (1) Pile meets Construction Tolerance criteria.

- (2) Pile meets the MATERIALS requirements of this Section and was installed in accordance with the approved submittal.
- (3) Pile is not damaged.
- (g) Unacceptable Piles. Unacceptable piles are piles which do not meet the acceptance criteria identified in part (f) above.

A written plan shall be submitted to the Engineer for remedial action, indicating how to correct the problem and prevent its reoccurrence. Unacceptable piles shall be repaired, augmented, or replaced in accordance with the approved remedial plan at no additional cost to VTrans.

6. METHOD OF MEASUREMENT. The quantity of Special Provision (Micropile Verification Load Test) will be the number of load tests performed in the complete and accepted work.

The quantity of Special Provision (Unexpected Obstruction Drilling) to be measured for payment will be the number of hours taken to advance the micropile through the obstruction.

The quantities of Special Provision (Micropile, Cased) and Special Provision (Micropile, Uncased) of the size specified to be measured for payment will be the number of linear feet installed in the complete and accepted work.

The quantity of Special Provision (Furnishing Equipment for Installing Micropiles) to be measured for payment will be on a lump sum basis in the complete and accepted work.

7. BASIS OF PAYMENT. The accepted quantity of Special Provision (Micropile Verification Load Test) will be paid for at the Contract unit price per each. Payment will be full compensation for furnishing and mobilizing the required equipment to perform a verification load test, including erecting and dismantling the test setup, and for furnishing all labor, tools, equipment, and incidentals necessary to complete the work.

The accepted quantity of Special Provision (Unexpected Obstruction Drilling) will be paid for at the Contract unit price per hour. Payment will be full compensation for performing the work of overcoming encountered obstructions and for furnishing all materials, labor, tools, equipment and incidentals necessary to complete the task.

Any required increase in strength of the verification test pile elements above the strength required for the production piles shall be provided for in the Contractor's bid price.

The accepted quantities of Special Provision (Micropile, Cased) and Special Provision (Micropile, Uncased) of the size specified will be paid for at the Contract unit price per linear foot. Payment will be full compensation for providing all required submittals; for furnishing, transporting, storing, handling, and placing the materials specified, including but not limited to permanent casing, bar reinforcement, grout, centralizers, spacers, and pile top attachment; and for furnishing all labor, tools, equipment, and incidentals necessary to complete the work.

The Contractor shall be responsible for estimating the grout take. There will be no extra compensation allowed for grout overruns.

The accepted quantity of Special Provision (Furnishing Equipment for Installing Micropiles) will be paid for at the Contract lump sum price. Payment will be full compensation for furnishing and mobilizing to the project site all equipment required for installing the micropiles, operating and maintaining the equipment while in service on the project, and demobilizing the equipment from the project site.

When the equipment for installing the micropiles has been set up and installation of production piles has started, a payment of 50 percent of the Contract lump sum price will be allowed. The remaining 50 percent of the Contract lump sum price will be paid when the micropile installations are complete and the equipment has been removed from the site to the satisfaction of the Engineer.

Payment will be made under:

<u>Pay Item</u>	<u>Pay Unit</u>
900.620 Special Provision (Micropile Verification Load Test)	Each
900.630 Special Provision (Unexpected Obstruction Drilling)	Hour
900.640 Special Provision (Micropile, Cased)	Linear Foot
900.640 Special Provision (Micropile, Uncased)	Linear Foot
900.645 Special Provision (Furnishing Equipment for Installing Micropiles)	Lump Sum

SANITARY SEWER SYSTEMS

1. DESCRIPTION. This work shall consist of the construction of new gravity sanitary sewer mains, pipe lining of sewer mains by the Heat Cured-in-Place-Pipe (CIPP) or Ultraviolet Cured-in-Place-Pipe (CIPP) methods, re-establishing sewer service laterals as required and appurtenances including the temporary maintenance of existing sewage flows and transfer of the existing systems to the new systems.

Upon successful transfer to new system, ancillary work includes removal of existing sanitary sewer manholes, existing sanitary sewer piping including all temporary piping and appurtenances, removal of bypass pumping operations, and concreting of temporary sewer saddles as depicted on the Drawings.

The work under this Section shall be performed in accordance with these provisions, the Contract Plans, and Sections 105 and 628 of the Standard Specifications.

2. REFERENCE STANDARDS

- (a) ASTM D3034 - Type PSM Poly (Vinyl Chloride) (PVC) Sewer Pipe and Fittings.
- (b) ASTM D3212 - Joints for Drain and Sewer Plastic Pipes Using Flexible Elastomeric Seals.
- (c) UNI-B-6 - Low Pressure Air Testing of Installed Sewer Pipe.

3. SUBMITTALS. Submit Fabrication drawings in accordance with Section 105 for all sewer system components including SDR 35 PVC sewer piping, PVC fittings including tees, elbows, crosses, reducers and end caps, flexible rubber transition couplings, sewer saddles, gaskets, rigid urethane insulation including ring and cover when noted on the Plans, and all ancillary appurtenances.

Submit manufacturers' certified data for each pipe type to be used on the project, including dimensions, specifications of pipe material, gasket material, pipe class/pressure rating.

Submit manufacturers' certified data for each type of fitting to be used on the project, including dimensions, specifications of fitting material, gasket material, class/pressure rating, and appurtenances.

Submit all information and data noted below in subsections Heat Cured-in-Place-Pipe (CIPP) or Ultraviolet Cured-in-Place-Pipe (CIPP) for the selected CIPP method proposed by the Contractor.

Submit a detailed plan for Maintenance of Existing Sewage Flows for review and approval by the Town of Bennington, the Engineer, VTrans, and the Vermont Department of Environmental Conservation, Drinking Water and Groundwater Protection Division (DWGWPD), Wastewater Systems and Potable Water Supply Program’s Regional Engineer. A suggested sewer maintenance plan is provided in the Contract plans and Specifications for the Contractor’s reference. The Contractor’s plan for Maintenance of Existing Sewage Flows shall detail his/her proposed construction schedule and procedure for maintaining sewage flows during lining of the existing sewer main between SMH #696 and SMH #713, and removal and replacement of SMH #696 including new sewer piping tie-in’s to existing sewer piping, and for transferring service from the existing system to the new system including construction and testing of all new sanitary sewer piping and manholes. See below for additional submittal details.

Submit an exploratory excavation plan at the preconstruction conference for review and approval. The exploratory excavation shall confirm existing pipe size, material, exact location, invert, and the status of the existing pipes, whether active or abandoned.

- 4. QUALITY ASSURANCE. The Contractor shall be thoroughly trained and experienced in the skills and equipment required for installation and testing of sewer piping and appurtenances.

The Contractor shall protect sewer piping materials before, during and after installation. In the event of damage, the Contractor shall immediately make all repairs and replacements necessary to the approval of the Engineer and Owner at no additional cost to the Owner.

Upon direction of the Engineer, the Contractor shall remove, replace and/or rework all sewer piping and appurtenances that do not meet the requirements of this Section. The Contractor shall perform all remedial measures at no additional cost to VTrans.

- 5. MATERIALS. Materials shall meet the requirements of the following Subsections:

Crushed Stone for Bedding and Blanket.....704.02A

Crushed Gravel for Subbase704.05

Granular Backfill for Structures.....704.08

Concrete for reaction blocking and sealing temporary sewer saddles shall conform to the requirements of Section 541 for Concrete, Class B unless otherwise specified.

Crushed stone used for all PVC sewer pipe bedding and blanket shall meet the gradation requirements of Table 704.02A - Gradation Requirements for 19.0 MM (3/4”) Stone.

All PVC Sewer Pipe, including inside drop piping noted in other sections, shall be SDR 35 unless otherwise noted on the Plans.

(a) SDR 35 PVC Sewer Pipe

- (1) General: Main line and building lateral sewers shall be SDR35 PVC sewer pipe unless noted otherwise and shall be in compliance with ASTM D3034 or ASTM F1760.
- (2) Joints: Sealing gaskets must meet the requirements of ASTM D3034 or ASTM F1760 In addition, the pipe joints must be able to withstand a minimum hydrostatic pressure of 50 psi (345 kPa) without leakage.
- (3) Pipe Stiffness: The minimum ring stiffness shall be 46 psi (320 kPa) for SDR35 pipe. This stiffness will be determined using the test methods prescribed by ASTM D3034 and ASTM F1760.
- (4) Fittings: Injection-moulded gasketed PVC fittings shall meet the requirements of ASTM D3034 and ASTM F1336. Fabricated fittings must conform to ASTM F1336.

(b) Temporary Sewer Saddles

- (1) Castings shall be ductile iron per ASTM 536, Grade 65-45-12. Protected with an exterior coating of paint.
- (2) Adjustable strap shall be Type 304 stainless steel and a minimum of 3 1/2" wide.
- (3) Bolts shall be 1/2" Type 304 stainless steel and lubricant coated.
- (4) Nuts and washers shall be Type 304 stainless steel.
- (5) The rubber gasket shall be Styrene Butadiene Rubber (SBR) per ASTM D 2000 MBA 710, compounded for water and sewer service.

(c) Flexible Rubber Couplings

- (1) Flexible rubber couplings shall be made of elastomeric PVC.
- (2) Maximum test pressure of 4.3 psi.

- (3) The coupling shall provide a positive seal against infiltration and exfiltration, be leakproof and resistant to chemicals, ultraviolet rays, fungus growth, and normal sewer gases.
 - (4) Flexible Rubber couplings shall conform to ASTM D5926, CI 173 and CSA B602.
 - (5) Stainless steel clamps shall be corrosion-resistant and rustproof.
6. GENERAL. Care shall be exercised by the Contractor to avoid disrupting the operation of existing sanitary sewer facilities without prior written approval of the Engineer.

When existing underground utilities, not scheduled for removal or abandonment, are encountered in the excavation, they shall be adequately supported and protected from damage. Any damage to utilities shall be repaired promptly in accordance with Subsection 107.13 at no additional cost to VTrans.

The Contractor shall be responsible for the unloading, storing, hauling, and distribution of all materials. All materials that are damaged, destroyed, or lost during and after unloading shall be replaced at the Contractor's expense. All pipe, pipe fittings, and accessories shall be handled so as to avoid shock. Pipes having factory applied joint material shall be stacked and blocked to prevent damage to the joint material. Material not needed for immediate use shall be stored in a safe manner at places provided by the Contractor and approved by the Engineer.

The Contractor's attention is called to the fact that sewer pipe and fittings are comparatively brittle. Care shall be taken in handling and laying to avoid damaging the pipe and fittings.

The location of all pipes shall be approved by the Engineer.

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

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

If shown on the Plans or directed by the Engineer, poor foundation material encountered below the normal grade of the pipe bed shall be removed and replaced with granular backfill for structures as directed by the Engineer.

Where ledge rock, rocky or gravelly soil, hardpan, or other unyielding foundation materials are encountered in the trench excavation at the normal grade of the pipe bed, the trench shall be excavated to a width equal to the outside diameter of the pipe plus 36 inches, and to a depth of 12

inches below the pipe grade. This area shall be backfilled with Granular Backfill for Structures as directed by the Engineer.

Payment for additional excavation and backfill, including Granular Backfill for Structures noted above, shall be considered incidental to Item 900.640, Special Provision (SDR 35 PVC Sewer Pipe, All-Inclusive), respective of the size specified.

The length of trench to be opened at one time shall be kept within reasonable limits unless otherwise permitted or directed by the Engineer.

No tunneling will be permitted except by written approval of the Engineer. Permission to tunnel will be granted only in short sections where, in the opinion of the Engineer, the pipe can be safely and properly installed and the backfill properly compacted.

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

Accumulated water, ice, and snow shall be promptly removed and disposed of by pumping or other approved means. Disposal shall be carried out in a manner which will not create a hazard to public health; cause injury to public or private property, work completed or in progress, or public streets; or cause any interference in the use of streets and roads by the public. Pipes under construction shall not be used for drainage of excavations.

Where pipes are to be placed in an embankment, excavation for the pipe shall be made after the embankment has been completed to the specified height above the designed grade for those pipes shown on the Plans.

Sheeting and bracing required for trenches shall be removed to the elevation of the pipe but no sheeting will be allowed to be pulled, removed, or disturbed below the pipe.

8. BEDDING FOR PIPE. All PVC sewer pipe shall be bedded on ¾" crushed stone as depicted on the Drawings. Bedding and blanket shall meet the gradation requirements of Table 704.02A - Gradation Requirements for 19.0 MM (¾") Stone.

Unless otherwise specified, the bed shall be shaped to fit the pipe for a depth of not less than 10 percent of its total height and shall have recesses to receive the bell.

Concrete cradle bedding shall be installed on approved subgrades when shown on the Plans or directed by the Engineer.

9. LAYING PIPE. All PVC sewer pipe, including SDR 35 sewer pipe, shall be installed in accordance with AWWA C600, Latest Edition.

No pipe shall be placed until the trench and the prepared foundation have been approved by the Engineer.

The laying shall begin at the outlet end and the lower segment of the pipe shall be in contact with the shaped bedding throughout its full length. Bell or grooved ends of rigid pipes and the circumferential laps of flexible pipe shall be placed facing upstream. The longitudinal laps or seams of flexible pipe shall be at the sides.

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

The pipe shall be laid to conform to the lines and grades shown on the Plans or as directed by the Engineer. Each pipe shall be so laid as to form a close joint with the next adjoining pipe and to bring the inverts continuously to the required grade.

Each length of pipe shall be shoved home against the pipe previously laid and held securely in position. Joints shall not be "pulled" or "cramped" without approval of the Engineer.

Before any joint is made, the pipe shall be checked to ensure that a closed joint with the next adjoining pipe has been maintained and that the inverts are matched and conform to the required grade. The pipe shall not be driven down to grade by striking it.

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

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

Concrete reaction blocking shall be provided as detailed at all pressure pipe bends, tees, crosses, reducers, valves, caps, and plugs. Pipe joint at these fittings shall be mechanical joint with retainer glands. The use of retainer glands does not reduce the requirements for thrust restraint.

10. JOINING PIPE. Sewer pipe shall be joined in accordance with the detailed instructions of the manufacturer.

Sewer pipe with premolded gaskets shall be driven completely home and the gasket checked for proper positioning. Poured joints utilizing oakum and joint sealer shall not be allowed.

Where recommended by the manufacturer, the Contractor shall furnish coupling pullers for joining the pipe. Gasket feeler gages shall be available for use by the pipe layer and the Engineer for checking the position of the rubber gaskets in the completed joint, if so directed by the Engineer.

Any fittings showing a crack, and any fitting or pipe that has received a severe blow which may have caused a fracture, even though no fracture can be seen, shall be marked as rejected and removed at once from the work.

Sewer pipe shall be cut by means of a handsaw, "metal-inserted" abrasive wheels, or by pipe cutters with blades, not rollers, doing the cutting. All cut ends shall be examined for possible cracks caused by cutting.

11. TESTING OF SYSTEM. The Contractor shall provide all necessary equipment and instrumentation required for proper completion of the flushing and testing. Quality of water, testing procedures, and method of disposal of water shall be approved by the Engineer. Prior to testing, the system shall be flushed with water to remove construction debris.

All tests shall be made in the presence of the Engineer. Preliminary tests made by the Contractor without being observed by the Engineer will not be accepted. The Engineer will be notified at least eight hours before any work is to be inspected or tested.

All defects in the system shall be corrected and retested until acceptable to the Engineer. Repairs shall be made to achieve the standard of quality specified for the entire system.

Sections of the system may be tested separately, but any defect that may develop in a section previously tested and accepted shall be promptly corrected and retested.

Test data shall be recorded on a form acceptable to the Engineer. A copy of all test data shall be submitted to the Engineer at the completion of testing.

All piping, including existing CIPP lined piping and all temporary sewer piping (both gravity and pressurized force mains) utilized for the Maintenance of Existing Sewage Flows, shall be tested in accordance with the following test methods, in addition to any test required by State and local codes or building authorities:

(a) Gravity Sewer Testing.

- (1) General. The Contractor shall have the option of using the air test or water test for testing sewers.

The maximum sewer length to be tested at one time shall be that length between any two successive manholes.

Pipe trenches shall be backfilled prior to performing the test.

All service laterals, stubs, and fittings shall be plugged or capped and adequately braced to withstand thrust forces.

The depth of groundwater above the pipe section to be tested shall be determined.

Portions of sewer lines in conflict with water mains shall be tested as ordered by the Engineer.

- (2) Air Testing. Low pressure air testing shall be conducted in accordance with the following procedures:
- a. Each end of the test section shall be plugged, capped, and braced. Necessary safety precautions shall be taken to prevent blowouts and possible injury.
 - b. An air hose shall be connected to a tapped plug used for an air inlet. The hose shall be connected to the air control equipment, which shall include valves and pressure gauges. These shall allow air to enter the sewer test line, monitor air pressure in the sewer, shut off air, and provide pressure reduction and 0 to 10 psi relief. The monitoring pressure gauge shall have a range 0 to 14.5 psi with divisions of 0.10 psi, and an accuracy of 0.05 psi.
 - c. The air compressor and air supply shall be connected to the test line and the test section filled slowly until a constant pressure of 3.5 psi is maintained.
 - d. A pressure above 3 psi shall be maintained for at least five minutes to allow the temperature to stabilize. A check for leaks shall be made and if any are found, the pressure shall be released and the fitting replaced or repaired.
 - e. After the stabilization period, the pressure shall be adjusted to 3.5 psi and the air supply disconnected.
 - f. Measure and record the time interval for the test line pressure to drop from 3 to 2.5 psi.
 - g. If the groundwater table is above the pipe, increase above test pressures 0.6 psi for each 1 foot the groundwater is above the invert of the pipe.
 - h. The minimum time required for a pressure drop of 1.0 psi using the air test shall be 75 seconds per inch of diameter of the main sewer being tested as shown in the table below.

Minimum Time Required to Drop 1.0 psi	
Pipe Size	<i>Minutes:Seconds</i>
6"	7:30
8"	10:00

- i. Any line tested that does not hold the minimum specified pressure for the time specified will be considered to have failed the pressure test and shall be repaired and retested. The Contractor may have the option of conducting a water test in accordance with these specifications if the air test has failed.

(3) Exfiltration Test. An exfiltration test measures the amount of water leaking out of the sewer while maintaining a low pressure on the entire sewer being tested.

The exfiltration test procedure shall be as follows:

- a. A tapped plumbers plug should be inserted in the downstream manhole inlet sewer. The water supply connection is made at this point, but never directly from a public water supply system or hydrant.
- b. A stand pipe shall be tightly connected at the upstream end of the sewer. The height of the stand pipe shall be as directed but in all cases shall be 24 inches higher than any point in the sewer or 24 inches higher than the highest known groundwater table, whichever is higher, and shall be not higher than 25 feet above the lowest point in the section being tested.
- c. Water shall be added at the downstream connection in order to avoid air pockets. The line shall be filled to the elevation designated in the stand pipe. A manhole may be used as a stand pipe. The Engineer may require the manholes to be tested independently in accordance with procedures specified in this Subsection.
- d. The line shall be allowed to stand with water for at least four hours in order that air may escape, and absorption may take place.
- e. The lines shall be filled to the reference mark, and the drop or loss that occurs during a 15- minute period shall be measured. The minimum head shall be maintained throughout the test, adding any volume of water required and including that volume in the leakage measurements. The test shall be repeated as directed.

- f. The reading shall be recorded, and the leakage shall be converted to liters per millimeter of pipe diameter per kilometer of sewer per 24-hour day (gallons per inch of pipe diameter per mile of sewer per 24-hour day).
 - g. Allowable leakage shall be 100 gallons/inch/mile/ day.
- (4) Infiltration Test. If the groundwater table is at least 24 inches above the entire sewer section to be tested, the Engineer may allow the Contractor to perform an infiltration test.

The infiltration test procedure shall be as follows:

- a. The upstream end of the section shall be plugged or taped.
 - b. The measuring device shall be installed in the downstream end. If a V-notch weir is used, it must be installed so as to maintain a watertight seal between the weir and the interior surface of the pipe. The weir shall meet the approval of the Engineer.
 - c. Sufficient time shall be allowed for infiltrating water to develop a steady, uniform flow.
 - d. The reading shall be recorded, and the leakage shall be converted to gallons per inch of pipe diameter per mile of sewer per 24-hour day.
 - e. Allowable leakage shall be 100 gallons/inch/mile/day.
- (5) Calibrated Television Inspection Reports. Upon completion of successful lining of the existing 8" corrugated metal pipe (CMP) sewer main located under the Walloomsac River streambed, the Contractor shall provide VTrans and the Town of Bennington with a copy of the calibrated television inspection reports and associated video recordings. See Item 900.645 Special Provision (Cured-In-Place-Pipe Lining – Sewer Main, All Inclusive) (8") for further details.
- (b) Temporary Force Main. Upon completion of construction of the temporary force main, the temporary force main shall be pressure and leakage tested to ensure there are no leaks.
- (1) Pressure Test
- a. All newly laid temporary force main pipe or any valved section thereof shall be subjected to a hydrostatic pressure of at least 1.5 times the highest working pressure or 200 psi minimum in accordance with the following

procedure:

1. Test pressures shall:
 - i. not be less than 50 pounds per square inch at the highest point along the test section;
 - ii. not exceed pipe or thrust restraint design pressures;
 - iii. be of at least 2-hour duration;
 - iv. not vary by more than 5 pounds per square inch; and
 - v. not exceed twice the rated pressure of the valves when the pressure boundary of the test section includes closed gate valves.
 2. Each valved section of pipe shall be filled with water slowly and the specified test pressure, based on the elevation of the lowest point of the line or section under test and corrected to test gauge, shall be applied by means of a pump connected to the pipe.
 3. Before applying the specified test pressure, air shall be expelled completely from the pipe and valves.
 4. All exposed pipe, fittings, valves, and joints shall be examined carefully during the test. Any damaged or defective pipe, fittings, or valves that are discovered following the pressure test shall be repaired or replaced with sound material and the test shall be repeated.
- (2) Leakage Test. Leakage test shall be conducted concurrent with the pressure test. Leakage shall be determined by the quantity of water that must be supplied into the newly laid pipe, or any valved section thereof, to maintain pressure within 5 pounds per square inch of the specified test pressure after the air in the pipeline has been expelled and the pipe has been filled. No pipe installation will be accepted if the leakage is greater than that determined by the following formula:

$$L = [(N)(D)(\sqrt{P})] / 7400$$

where:

L is the allowable leakage, in gallons per hour;

N is the number of joints in the length of pipeline tested;

D is the nominal diameter of the pipe, in inches; and

P is the average test pressure during the leakage test, in pounds per square inch gauge.

- (c) Manhole Leakage Test. Sanitary sewer manholes shall be tested in accordance with the procedures presented in Special Provision, Sanitary Sewer Manholes.

12. BACKFILLING.

- (a) General. Immediately prior to backfilling, all debris, forms, and similar materials shall be removed from the excavation. Backfilling shall not be done in freezing weather, with frozen materials, or when materials already placed are frozen.
- (b) Pipe Bedding Area. Prior to laying pipe, bedding material shall be placed to the limits of the excavation and to a depth beneath the pipe as specified. This material shall be Crushed Stone meeting the gradation requirements of Table 704.02A – Gradation Requirements for 19.0 MM (3/4”) Stone. As the pipe is laid, bedding material shall be extended to the spring line of the pipe and leveled along the width of the trench.

The pipe installation is to be inspected and approved by the Engineer before being covered.

- (c) Pipe Envelope Area. The pipe envelope, or blanket, for PVC pipe consists of Crushed Stone meeting the gradation requirements of Table 704.02A – Gradation Requirements for 19.0 MM (3/4”) Stone, placed from the spring line of the pipe to a depth of 12 inches over the top of the pipe. The material shall be carefully placed and spread over the width of the trench and compacted using an approved tamper.

The Contractor shall take all necessary precautions during placement and compaction of the bedding and pipe envelope materials to prevent either damage to or displacement of the pipe.

- (d) Above Envelope Area. Material used for backfilling trenches above the envelope area (and below the Subbase under roadways and sidewalks) shall consist of common fill material free of wood, foreign materials or stones exceeding 6” in diameter as depicted on the plans. The material shall be carefully placed and spread over the width of the trench and compacted using an approved tamper.

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

Backfill material shall be evenly spread and compacted in lifts not more than 12 inches thick or as approved by the Engineer. Previously placed or new materials shall be moistened by sprinkling, if required, to ensure proper bond and compaction.

Whatever method of compacting backfill is used, care shall be taken that stones and lumps shall not become nested and that all voids between stones shall be completely filled with fine material.

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

Backfill material shall be compacted to the following percentages of maximum dry density and the in-place moisture content shall be not more than 2 percent above the optimum moisture content, as determined by AASHTO T 180, Method C:

Around all structures, under roadway paving, roadway paving, shoulders and embankments	95 percent
All other areas	90 percent

13. PRELIMINARY FIELD INSPECTION OF HOUSE SEWER SERVICE CONNECTIONS.
 Sizes, materials, and locations of all existing sewer services as depicted on the drawings are based solely on the best available information. This information has not been verified by field inspections. The Contractor shall be required to perform the following prior to installation of new sanitary sewer piping:
- (a) Contractor shall perform exploratory excavation as indicated in the Exploratory Excavation Plan and per the direction of the Engineer on each existing lateral sewer service as necessary prior to construction of the new sanitary sewer piping.
 - (b) The exploratory excavation shall confirm existing pipe size, inverts, material, exact location, and the status of the existing service pipe, whether active or abandoned. Payment for exploratory excavation to determine locations and depths of existing water and sewer building services shall be made under Item 204.22 Trench Excavation of Earth, Exploratory (N.A.B.I.).
 - (c) If exploratory excavation reveals that new service connections will be located in conflict with other proposed infrastructure, including to but not limited to, drainage pipes, catch

basins, utility ducts, transformers, and pedestals, the Contractor shall notify the Engineer before construction of the service connection. No additional compensation will be made to the Contractor to mitigate conflicts due to the Contractor's failure to forecast these conflicts.

14. MANHOLES. Manholes shall conform to the requirements of Special Provision, Sanitary Sewer Manholes.
15. REMOVAL OF EXISTING SANITARY SEWER MANHOLES. Existing sanitary sewer manholes depicted on the plans for removal shall be excavated, demolished, removed, and disposed of in their entirety. Excavations shall be backfilled. Backfill material for backfilling shall meet the requirements of Subsection 704.08, Granular Backfill for Structures. The Contractor shall backfill and compact materials including sand borrow meeting Subsection 704.03A, and subbase of dense graded crushed stone meeting Subsection 704.06A to the depths depicted on the roadway typical cross section, unless otherwise directed by the Engineer. Compaction requirements shall be the same as those noted above for backfilling sewer pipe.
16. HEAT CURED-IN-PLACE-PIPE LINING – GRAVITY SEWER AND STORM MAINS.
 - (a) General
 - (1) Description
 - a. It is the intent of this specification to provide for the reconstruction of pipelines and conduits by the installation of a resin impregnated flexible tube that is either inverted or pulled into the original pipeline/conduit and expanded to fit tightly against said pipeline by the use of water or air pressure/ The resin system shall then be cured by elevating the temperature of the fluid (water/air) used for the inflation to a sufficient enough level for the initiators in the resin to effect a reaction. The finished pipe shall be such that when the thermosetting resin cures, the total wall thickness shall be a homogeneous and monolithic felt and resin composite matrix, chemically resistant to withstand internal exposure to domestic sewage or stormwater.
 - (2) Qualifications
 - a. Since sewer or stormwater products are intended to have a 50+ year design life, and in order to minimize the Owner's risk, only proven products with substantial successful installations and experience will be approved. In order for the CIPP Contractor to be deemed commercially acceptable and approved for this project, they must meet the following criteria:

1. CIPP Product

- i. The CIPP product must have been installed in a minimum of 500,000 linear feet or 2,500 manhole to manhole line sections of successful wastewater or stormwater collection systems in North America and must be documented to the satisfaction of the Owner.
- ii. The CIPP product shall comply with the latest versions of ASTM F1216 or ASTM F1743, including appendices.
- iii. For the CIPP to be considered commercially proven, it shall have been successfully in service in an application similar to this project for a minimum of 10 years and documented to the satisfaction of the Owner.
- iv. The lining tube manufacturer shall operate under a quality management system that is third party certified to ISO 9001 or other internationally recognized organization standards. Proof of certification shall be submitted with the Contractor's bid and required for approval.
- v. If requested, third-party test results supporting the structural properties and long-term performance of the CIPP product shall be submitted for approval, and such data shall be satisfactory to the Owner. No CIPP product will be approved without independent third-party testing.

2. Installation Contractor

- i. The Installation Contractor shall be certified by the CIPP product manufacturer to have at least 5 years active experience in the installation of the proposed CIPP product.
- ii. The Installation Contractor shall satisfy all insurance, financial and bonding requirements of the Owner, and shall have installed within the United States a minimum of 500,000 lineal feet of the same CIPP product being represented by the bidder.
- iii. The Installation Contractor superintendent(s) designated for the project shall have installed a minimum of 100,000 lineal

feet and shall have 5 years of installation experience of the same CIPP product being represented by the bidder. This shall be documented to the Owner's satisfaction in the form of a resume of work experience detailing scope of work (linear footage and pipe diameters), location of work, and reference contact information for each project listed.

- iv. The Installation Contractor shall operate under a quality management system that is third party certified to ISO 9001 or equivalent standards. Proof of certification or quality management system shall be submitted with the Installation Contractor's bid and required for approval.

(3) Structural Requirements

- a. Each CIPP shall be designed to withstand internal and/or external loads as dictated by the site and pipe conditions. Unless specified differently by the Owner/Engineer in the contract documents, the design thickness of the CIPP shall be derived at using standard engineering methodology as found in ASTM F1216, Appendix X1. The long-term flexural modulus shall not exceed 50 percent of the short-term value for the CIPP resin system and shall be substantiated through third-party testing. The thickness calculations, signed and sealed by a registered professional engineer licensed in the State of Vermont, shall be submitted to the Owner prior to CIPP installation.
- b. The layers of the finished CIPP shall be uniformly bonded. It shall not be possible to separate any two layers with a probe or point of a knife blade so that the layers separate cleanly or such that the knife blade moves freely between the layers. If separation of the layers occurs during testing of the field samples, new samples will be cut from the work. Any reoccurrence may be cause for rejection of the work.
- c. The enhancement Factor 'K' to be used in the CIPP design shall be assigned a value of 7.
- d. Long-term testing in general accordance with ASTM D2990 must have been performed for flexural creep of the CIPP pipe material to be installed. Such testing results are to be used to determine the long-term, time dependent flexural modulus to be utilized in the product design. This is a performance test of the materials (CIPP Tube and Resin) and general

workmanship of the installation and curing as defined within the relevant ASTM standard. A percentage of the instantaneous flexural modulus value (as measured by ASTM D790 testing) will be used in design calculations for external buckling. The percentage, or the long-term creep retention value utilized, will be verified by this testing. The materials utilized for the contracted project shall be of a quality equal to or better than the materials used in the long-term test with respect to the initial flexural modulus used in the CIPP design.

- e. The CIPP shall meet the following minimum strength requirements:

TABLE 1 - MINIMUM PHYSICAL PROPERTIES				
	ASTM Method	Polyester System	Filled Polyester System	Vinyl Ester System
Flexural Strength	D790	4,500 psi	4,500 psi	5,000 psi
Flexural Modulus (initial)	D790	250,000 psi	400,000 psi	300,000 psi
Flexural Modulus (50-year)	D790	125,000 psi	200,000 psi	150,000 psi

- f. The required CIPP wall thickness shall be based as a minimum on the physical properties in Table 1 - Minimum Physical Properties above, and in accordance with the design equations in the Appendix X1 of ASTM F1216, and the following design parameters:

<u>TABLE 2 – MINIMUM DESIGN PARAMETERS</u>	
Design Safety Factor (typically used value)	= 2.0
Retention Factor for Long-Term Flexural Modulus to be used in Design (As determined by long-term tests described in Section (a) (3) d. and approved by the Owner)	= 50% max
Ovality* (calculated from (X1.1 of ASTM F1216))	= % ⁽¹⁾
Enhancement Factor, K	= 7.0
Groundwater Depth (above invert of pipe)	= 0 feet ⁽¹⁾
Soil Depth (above crown of pipe)	= 10 feet
Soil Modulus (only required for fully deteriorated design conditions)	= psi ⁽¹⁾
Soil Density (only required for fully deteriorated design conditions)	= lb/cu ft ⁽¹⁾
Live Load (only required for fully deteriorated design conditions)	= AASHTO H20
Design Condition (partially or fully deteriorated)*	= fully

* Based on review of video logs, design conditions of pipeline can be fully or partially deteriorated (See ASTM F1216, Appendix X1). The Owner will be solely responsible for determining pipe conditions and parameters utilized in design.

⁽¹⁾ In the absence of other information and to ensure uniformity in bidding, the following assumptions shall be used: Ovality = 2%; Groundwater Depth at one half soil depth to invert; Soil Modulus = 1000psi; Soil Density = 120 lb/cu ft.

(4) Materials

a. CIPP Tube

1. The CIPP tube shall consist of one or more layers of a flexible needled felt or an equivalent nonwoven or woven material, or a combination of nonwoven and woven materials, capable of carrying resin, withstanding installation pressures and curing temperatures. The CIPP tube should be compatible with the resin system to be used on this project. The material should be able to stretch to fit irregular

pipe sections and negotiate bends.

2. The CIPP tube should be fabricated under controlled conditions to a size that, when installed, will tightly fit the internal circumference and the length of the original conduit. Allowances should be made for the longitudinal and circumferential stretching that occurs during placement of the tube. Maximum stretching allowances shall be as defined in ASTM F1216 or ASTM F1743. The Installation Contractor shall verify the lengths in the field before cutting the liner to length. Continuous individual liners can be made over one or more manhole to manhole sections.
 3. The CIPP tube shall be uniform in thickness and when subjected to the installation pressures shall meet or exceed the designed wall thickness.
 4. Any plastic film applied to the tube on what will become the interior wall of the finished CIPP shall be compatible with the resin system used, translucent enough that the resin is clearly visible, and shall be firmly bonded to the felt material.
 5. At time of manufacture, each lot of CIPP tube shall be inspected and certified to be free of defects. The tube shall be marked for distance at regular intervals along its entire length, not to exceed five feet. Such markings shall also include the CIPP tube Manufacturer's name or identifying symbol.
 6. The CIPP tube may be made of single or multiple layer construction where any layer must not be less than 1.5 mm thick. A suitable mechanical strengthener membrane or strip may be placed in between layers where required to control longitudinal stretching.
- b. Resin Components
1. The resin system shall be a corrosion resistant polyester or vinyl ester, along with a compatible catalyst system.
 2. The resin used shall not contain non-strength enhancing fillers.
 3. When combined with the CIPP tube, the resin system shall provide a CIPP that meets the structural requirements of ASTM F1216 or ASTM F1743, the minimum physical properties specified in

Table 1 - Minimum Physical Properties, and those properties which are to be utilized in the design of the lining system for this project.

4. When combined with the CIPP tube, the resin system shall provide a CIPP that complies with the chemical resistance requirements specified in ASTM F1216 or ASTM F1743.

(b) Execution

(1) General

- a. The Installation Contractor shall deliver the resin impregnated CIPP tube to the site and provide all equipment required to insert and cure the CIPP within the host pipe. The Installation Contractor shall designate a location where the tube will be vacuum impregnated with the resin prior to installation. If requested by the Owner, the Installation Contractor shall notify the Engineer at least 48 hours prior to wet out to allow the Owner's representative to observe the materials and wet out procedure. All procedures to prepare the CIPP for installation shall be in strict accordance with the Manufacturer's recommendations.
- b. The CIPP shall be vacuum impregnated with resin not more than 120 hours before the time of installation and stored out of direct sunlight at a temperature of less than 70° F.

(2) Notification And Preparation

- a. For sewer lining, the Installation Contractor shall notify all residents affected by this construction at least 24 hours prior to any service disruption affecting their service connection. The Installation Contractor shall make every effort to maintain service usage throughout the duration of the project.
- b. The Installation Contractor shall perform cleaning, video, and inspection prior to installation of the CIPP. The Installation Contractor, when required, shall remove all debris from within the pipe that will interfere with the installation of the CIPP. The Owner shall provide a dumpsite for such debris removed during the cleaning operations.
- c. It shall be the responsibility of the Installation Contractor to notify the Owner of line obstructions, offset joints or collapsed pipe that will prevent the insertion of the tube or significantly reduce the capacity of the sewer. The Owner, with input from the Installation Contractor shall determine the

method of pipe repair required and shall address these concerns on a case-by-case basis.

- d. Protruding laterals or services shall be trimmed flush with the inside of the main sewer wall prior to installation of the CIPP. Trimming shall not cause damage to the lateral or service beyond the inside face of the main sewer.
- e. The Installation Contractor is responsible for providing traffic control in accordance with Part 6 (Temporary Traffic Control) of the latest edition of the Manual on Uniform Traffic Control Devices (MUTCD). A traffic control plan shall be submitted to the Owner for approval prior to arriving on site to do the necessary work.
- f. The Installation Contractor is responsible for providing confined space entry training and equipment for their employees in accordance with Standard 1910.146 (permit-required confined space) of the Occupational Safety & Health Administration (OSHA) regulations. An entry permit shall be filled out prior to entering any confined space.

(3) Bypass Pumping

- a. The Installation Contractor, when required, shall provide for the flow of sewage or stormwater around the section or sections of pipe designated for repair. When possible, the bypass shall be made by plugging the line at an existing upstream manhole and pumping the flow into a downstream manhole or adjacent system. The pump and bypass lines shall be of adequate capacity and size to handle the flow. The Installation Contractor shall furnish all necessary pumping equipment, conduit, etc. to adequately, safely, and environmentally divert sewage flow around the work.
- b. The Installation Contractor shall submit a general bypass or Maintenance of Sewage Flow Plan.

(4) Television Inspection

- a. The Installation Contractor shall provide video equipment capable of properly documenting the conditions as found within the pipe. Lighting for the video camera shall illuminate the entire periphery of the sewer. The camera shall be radial view type capable of viewing 360° within the pipe and shall provide an unobstructed view of the full pipe.

- b. The video shall begin with a clear identification of the pipeline location, upstream and downstream manhole designation, and pipe diameter. The video shall provide an accurate length measurement of the entire segment and of the distance to each lateral connection. The Installation Contractor shall pan all lateral connections on both the pre and post-videos.
- c. Reverse video set-ups shall be utilized when line obstructions prevent full segment televising from the initial set-up direction.
- d. Both a pre-lining and post-lining video shall be submitted to the Owner for approval. The discs shall be clearly and properly labeled.

(5) Installation

- a. The CIPP shall be installed in accordance with the practices given in ASTM F1216 (for direct inversion installations) or ASTM F1743 (for pulled-in-place installations). The quantity of resin used for the tube's impregnation shall be sufficient to fill the volume of air voids in the CIPP tube with additional allowances being made for polymerization shrinkage and the loss of any resin through cracks and irregularities in the original pipe wall. A vacuum impregnation process shall be used in conjunction with a roller system to achieve a uniform distribution of the resin throughout the CIPP tube.
- b. The resin-impregnated CIPP tube shall be installed into the host pipe by methods specified in ASTM F1216 or ASTM F1743 and proven through previous successful installations. The insertion method shall not cause abrasion or scuffing of the CIPP tube. Hydrostatic or air pressure shall be used to inflate the CIPP tube and mold it against the walls of the host pipe. There will be no use of sewage in place of clean water for insertion of the tube, or for the curing of the liner.
- c. Temperature gauges shall be placed between the CIPP tube and the host pipe's invert position to monitor the temperatures during the cure cycle.

(6) Curing

- a. After the CIPP tube installation is completed, the Installation Contractor shall supply a suitable heat source and recirculation equipment (if required). The equipment shall be capable of delivering hot water or steam throughout

the section to uniformly raise the temperature above the temperature required to affect a cure of the resin.

- b. The heat source shall be fitted with suitable monitors to gauge the temperature of the incoming and outgoing heat supply (for water cure) and outgoing heat supply (for steam cure). Water or air temperature in the pipe during the cure period shall be as recommended by the resin Manufacturer.
- c. Initial cure shall be deemed to be completed when inspection of the exposed portions of the CIPP appears to be hard and sound and the remote temperature sensor(s) indicates that the temperature is of a magnitude to realize an exotherm. The cure period shall be of a duration recommended by the resin Manufacturer, as modified for the installation process, during which time the recirculation of the heat and/or cycling of the heat exchanger to maintain the temperature is continued.

(7) Cool Down

- a. Cool down may be accomplished by the introduction of cool water or air to replace water or pressurized air being relieved. Care shall be taken in the release of the hydrostatic head so that a vacuum will not be developed.
- b. For CIPP work on storm pipes or combined sewer pipes, the Contractor shall collect styrene laden water for treatment so that it doesn't discharge to waters of the state. Collected water can be discharged to a nearby sewer after approval by an authorized city employee.

(8) Finish

- a. The finished CIPP shall be continuous over the entire length of an insertion run and be as free as commercially practical from visual defects such as foreign inclusions, dry spots, pinholes, and delamination. The CIPP shall be homogeneous, and free of any leakage from the surrounding ground to the inside of the CIPP.
- a. Where the CIPP is installed through a manhole uninterrupted, the invert shall be maintained smooth within the manhole, with approximately the bottom half of the CIPP continuous through the length of the manhole. The invert of the manhole shall be shaped and grouted as necessary to support the liner. The cost of this work shall be included in the CIPP unit price.

- c. During the warranty period, any defects which will affect the integrity or strength of the CIPP, collect solids or sediment, or reduce hydraulic flow capabilities of the product shall be repaired at the Installation Contractor's expense in a manner mutually agreed upon by the Owner and the Installation Contractor.
- (9) Reinstall Laterals and Services
- a. Accurate location of the lateral and service connections shall be made by inspection of the pre-installation videotape or sewer walk.
 - b. After the CIPP has been installed, all existing active lateral sewers and services shall be reinstated unless otherwise indicated by the Owner or on the plans. The reinstatement of laterals and services shall be done without excavation unless otherwise specified by the Engineer. Reinstatement of laterals and services shall be accomplished from the interior of the CIPP by means of a video camera directed cutting device or by direct man entry when feasible.
 - c. All cut lateral and service connections shall be free of burrs, frayed edges, or any restriction preventing free flow of wastewater. Laterals shall be reinstated to a minimum of 90% of their original diameter and no more than 100% of their minimum diameter. The CIPP shall be tightly sealed at the cut openings with no gaps.
- (10) Quality Assurance Procedures
- a. For every two thousand five hundred (2,500) lineal feet of CIPP installed, two (2) flat plate samples shall be processed and tested. For pipe diameters less than 18 inches, restrained end samples may also be utilized. The CIPP physical properties shall be tested in accordance with ASTM F1216, Section 8, using either allowed sampling method. The flexural properties must meet or exceed the values listed in Table 1 - Minimum Physical Properties above. of this specification and the values submitted to the Owner by the Installation Contractor for this project's CIPP wall design, whichever is greater.
 - b. Testing shall be completed by an accredited, independent laboratory. Testing results shall be provided to the Owner within seven (7) days of receipt.

- c. Wall thickness of samples shall be determined in a manner consistent with paragraph 8.1.2 of ASTM D5813. The minimum wall thickness at any point shall not be less than 87.5% of the specified design thickness calculated in Table 2 – Minimum Design Parameters above.
- d. Flexural testing of the collected samples shall be conducted in accordance with ASTM D790, latest version, with only the structural portion of the CIPP being tested.
- e. CIPP installation shall be inspected by post-lining video inspection. Variations from true line and grade may be inherent because of the conditions of the original piping. No infiltration of groundwater should be observed. All service entrances should be unobstructed and accounted for.

17. ULTRAVIOLET CURED-IN-PLACE-PIPE FOR SEWER MAINS

(a) General

(1) Scope of Work

- a. The Work specified in this Section includes furnishing all labor, supervision, equipment, appliances and materials and performing all operations including cleaning; removal and disposal of debris; bypass pumping; pre- and post- construction television inspection (NASSCO PACP standards); performing sample testing; lining existing sanitary sewer lines; installing end seals; reconnecting active building connections and installing UV cured top hats at laterals damaged during the reconnection process; removing protruding taps by remote methods; stopping active leaks that might interfere with the integrity of the liner to be installed; providing water; complete and accepted, in accordance with the contract documents
- b. The completed liner and top hat liner will form a continuous, tight fitting, corrosion resistant and verifiable non-leaking cured in place pipe.
- c. Information relative to structures, numbers, pipe sizes, pipe material and pipe lengths have been shown on the Contract Drawings
- d. Service lateral connections may be a combination of tees, wyes, or break-in taps with varying sizes and angles ranging from 30 to 90 degrees.

- e. Removal and replacement of fences, repair to yards, lawns, sidewalks, driveways, and other public or private property, due to action or processes related to the work being performed shall be included in the cost of the Work.
- f. All manholes shall be considered Permit Required Confined Spaces, in accordance with OSHA standard 29 CFR 1910.146.
- g. The Contractor is required to perform television inspection (CCTV) prior to construction to verify the following.
 - 1. Conditional Assessment to NASSCO PACP standards, identifying areas that will require open excavation to allow for lining.
 - 2. Center Line of each lateral inlet and rotational direction (e.g. 135.23 ft @ 9 o'clock)
- h. The Contractor is required to perform television inspection whilst the liner is fully inflated and pressed against the host pipe during the curing process
 - 1. The Contractor shall be able to stop the curing process to remove any defect found in the uncured liner. Defects found in fully cured liner shall be cut out and replaced at no cost to the Owner.
 - i. The Contractor is further required to perform a CCTV Inspection one (1) year after substantial completion. If the Contractor were to perform the CCTV Inspection at, shortly after or significantly after the one (1) year mark, the Contractor will still be held liable for any defects that are discovered. Retainage will be held in accordance with the Agreement until the CCTV has been completed, submitted.

(2) Submittals

- a. Shop drawings or Fabrication Drawings, a list of materials and technical data shall be submitted to the Owner for approval prior to any work being performed under this Section of the Specifications.
- b. The Contractor shall submit to the Owner, in writing, the information below prior to or at the time indicated. Failure to do so will prevent progression of the work to the next step.

- c. The Contractor is required to submit the following:
1. Shop drawings which detail short-term and long-term properties (providing all supporting test data) of all component materials and construction including the CIPP liner, end seals, UV cured top hats, etc.
 2. Recommendations for material storage, CIPP liner handling, insertion, curing, trimming and finishing.
 3. Structural Calculations for each CIPP and top hat liner size, recommended thickness.
 4. Methods and equipment used to reinstate connection sewers, lateral pipes or manholes.
 5. CCTV Inspection reports and all measurements to internal connections that require re-establishment (locations for reconnection of active services).
 6. Manufacturers recommended installation procedure.
 7. Documentation confirming material meets ASTM F2019.
 8. Independent test results of CIPP samples taken.
 9. Warranty information.
 10. MSDS for all hazardous chemicals used or anticipated to be onsite.
 11. Manufacturers resin data test results
 12. Experience record of contractor performing the work
 13. Bypass pumping or Maintenance of Sewage Flow Plan and Emergency Action Plan.
 14. Curing log showing temperature, pressure, and time.
 15. CIPP Repair methods.
 16. Physical samples.

- d. If pre-installation and post-installation inspections are combined onto one hard copy, submit copy after completion of each section lined per the schedule above described. Request may be made to include more than one segment to a hard copy in order to maximize use.
- e. Sample removed for testing will be individually labeled and logged to record the following
 - 1. Owner's project number and name
 - 2. Sample number
 - 3. Segment number of line as noted on plans
 - 4. Thickness of liner and resin
 - 5. Date and time of sample
 - 6. Name of Contractor or Subcontractor performing the work
 - 7. Date, location and name of testing company
 - 8. Results of test certified by tester
- f. Samples shall be taken once (1) every run or at the Owner's request and numbered as follows:
 - 1. Sample #/A : Resin Sample
 - 2. Sample #/B : upstream thickness test
 - 3. Sample #/C : downstream thickness test
 - 4. Additional samples will be lettered consecutively after C.
 - 5. Updated copies of the log shall be submitted to the Owner after each Crew-day is completed
- g. Reports shall be submitted on 8-1/2 X 11 paper, larger drawings shall be folded to this format. Submittals shall be stamped by the Contractor to indicate, Contractor, Date of Submittal, Owner's project title and number, applicable Section of Specification to be referenced, and shall be signed by preparer.

- h. CCTV videos shall be submitted in a clear snap-top plastic protective box, labeled on DVD and protective box to indicate:
 - 1. Owner's Project Name
 - 2. Owner's Project Number
 - 3. Date of video inspection
 - 4. Segment number of line
 - 5. Contractor's name
 - 6. Inspection being done (pre-inspection, curing inspection, post inspection)
- i. Within fourteen (14) days of any planned bypass, the Contractor shall submit a bypass plan for any proposed bypass or dewatering activity.

(3) References

- a. The following standards based on the latest edition form a part of this Specification as referenced.
 - 1. AASHTO Standard Specification for Highway Bridges
 - 2. ASTM D543 – Practices for Evaluating the Resistance of Plastics to Chemical Reagents
 - 3. ASTM D790 - Standard Test Methods for Flexural Properties of Unreinforced and Reinforced Plastics and Electrical Insulating Materials
 - 4. D3567 Practice for Determining Dimensions of "Fiberglass" (Glass Fiber Reinforced Thermosetting Resin) Pipe and Fittings
 - 5. ASTM F1216 Practice for Rehabilitation of Existing Pipelines and Conduits by the Inversion and Curing of a Resin-Impregnated Tube
 - 6. ASTM D2990 - Standard Test Methods for Tensile, Compressive, and Flexural Creep and Creep-Rupture of Plastics
 - 7. NASSCO Standards

8. WRc Sewerage Rehabilitation Manual, Type II Design, 4th Edition, 2001

(4) Quality Assurance

a. Contractor Experience and Liner System Approval

1. The Contractor shall have successfully managed and completed UV cured-in place pipe (CIPP) rehabilitation projects on line sizes defined in the Contract Documents in the United States and its territories within the last five (5) years previous to bid date.
2. The Superintendent in Charge of the installation shall have a minimum of five (5) years' experience prior to bid date overseeing the installation of UV CIPP sewer liners in the United States and its territories. Jointly the Contractor and Superintendent in Charge shall have successfully installed 50,000 linear feet (9.46 miles) of sewer liner in the United State and its territories prior to the bid date. Should the Superintendent in Charge be replaced during the Contract for any reason, the new Superintendent in Charge shall have experience equal to or greater than the original, the new Superintendent in Charge shall be subject to Owner approval in advance.
3. Liner design calculation shall be stamped by a Registered Professional Engineer licensed by the State of Vermont. Design calculations shall be submitted in accordance with subsection (a) (2), Submittals, above.
4. Lateral repair products must have a minimum of 100 UV cured top hat liner installations in wastewater collection system in the US.

b. Product Quality Assurance

1. All sampling and testing shall be done by an independent testing agency submitted on by the Contractor and approved by the Owner. The testing lab shall be listed in the ASTM International Directory of Testing Laboratories, or have documented compliance with Section 01451, "Independent Testing Services".

2. CIPP and Top Hat liners shall be provided by a single manufacturer. The supplier shall be responsible for the provision of all test requirements specified herein as applicable. In addition, all liners or top hats to be installed under this Contract may be inspected at the plant for compliance with this Section by an independent testing laboratory provided by the Owner, at the Contractor's expense. The Contractor shall require the manufacturer's cooperation in these inspections.
 3. The contractor shall prepare samples of the installed CIPP liner and UV cured top hat liners for subsequent testing of its physical properties.
 - i. Contractor shall cut two (2) samples of uncured liner from each run, one from the upstream side and another from the downstream side, of the liner being installed. Insert one section of light train in the restraint system above ground and cure the liner under similar conditions as those of the liner installed in the ground. The sample shall be identified as described in subsections (a) (2) e. and (a) (2) f. above. The Contractor shall split the sample with the Owner. The Owner's sample shall also be labeled as describe in previous sections above.
 - ii. UV cured top hat liner samples shall be prepared so as to simulate installation methods and trauma of the product.
- c. Sample Testing
1. The cured sample shall be tested by an independent testing laboratory. All samples shall have chain of custody documentation to the testing lab. No payment shall be made until the results of the test have been received and confirmed to meet the required standard. Failure to meet the specified physical properties shall be considered defectivework and shall be replaced at no cost to the Owner.
 2. The contractor shall be responsible for all costs associated with the testing of the liner physical properties and composition.
 3. The cured sample shall be subject to the following independent tests:

(5) Public Notification

- a. All property owners shall receive notification that their sewer service will be interrupted during the CCTV inspection and liner installation. The property owners shall also be notified that the interruption has ended. The Contractor shall distribute all written notices to each affected property owner at the following times:
 1. Seven (7) days prior to lining activities
 2. Between Twenty-Four (24) and Forty-Eight (48) hours prior to lining activities
 3. Within Twenty-Four (24) hours after completion of lining activities
 4. Within One (1) hour from when the lateral pipe has been re-established and open to the Main Line Sewer
- b. The Owner will provide copies of all public notifications for distribution by the Contractor.
- c. Each notice shall include the date, start time and estimated time when service will be completely restored. The Contractor shall provide a telephone number for property owners to call for information regarding the work.
- d. The Contractor shall contact any homeowner or business that cannot be activated within the time stated in the written notice.
- e. The maximum amount of time any home or business shall be without sanitary sewer service is eight (8) hours. Any home or business that is without sanitary service for longer than eight (8) hours will be bypassed to the sanitary sewer at no additional cost to the Owner.
- f. Contractor's schedule is subject to approval based on critical stakeholders and at no additional cost to the Owner.
- g. The Contractor and appropriate subcontractors shall attend community outreach meetings scheduled by the Owner as necessary.

B. Products

(1) General

- a. The CIPP lining shall be a resin-impregnated fiberglass flexible tube which is inserted into the sewer to be rehabilitated and cured-in-place by an acceptable UV curing method. The tube may have a suitable polyurethane membrane coating for protection of the interior surface and to provide a uniform, smooth flow surface and may be removed after installation and curing is completed. The resin shall be a liquid UV curable resin and shall be suitable for the design conditions as well as the curing process.
- b. All material and installation procedures provided by the Contractor for use in the CIPP installation shall be equal to or exceed the requirements of ASTM F2019.
- c. Wrinkles in the finished liner which reduce the hydraulic capacity of the pipe are unacceptable and shall be removed or repaired by the contractor at no cost to the Owner.
- d. Contractor shall be responsible for control of all material and process variables to provide a finished CIPP possession the minimum properties specified in ASTM F2019.

(2) Television Inspection

- a. The mobile unit and video equipment shall be of such quality as to perform the Television Inspection adequately.
- b. The final DVD shall be in a format playable by Windows Media Player.

(3) Chemical Resistance

- a. Domestic Sewage: The chemical resistance test should be completed in accordance with ASTM Test Method D543. Exposure should be for a minimum of one month at 86 degrees Fahrenheit. No more than twenty (20%) percent loss of initial flexure strength and flexure modulus shall result when subject to the following solutions:

Chemical Solution	Concentration percent
Tap Water (pH 6-9) H ₂ O	100%
Nitric Acid	5%
Phosphoric Acid	10%
Sulfuric Acid	10%
Gasoline	100%
Vegetable Oil	100%
Detergent	0.1%
Soap	0.1%

b. All test results shall be certified by an approved testing laboratory.

(4) Component Properties

a. Flexible Tube

1. The tube shall consist of one or more layers of fiberglass laminate that meets the requirements of ASTM F2019
2. Tubing material shall be free from tears, holes, cuts, foreign materials and other surface defects.
3. The wall color of the interior pipe surface of CIPPL after installation shall be a light reflective color so that a clear detailed examination with closed circuit television inspection equipment may be made.

b. Resin

1. The liquid UV curable resin shall saturate the tube and produce a properly cured liner which is resistant to abrasion due to solids, grit, and sand.
2. Polyester, vinyl ester, or epoxy resin and catalyst system shall comply with the following requirements and that when properly cured meets the requirements of ASTM F1216. Resins created from recycled materials are not allowed.

c. Top Hat

1. The product shall be a fiberglass laminate impregnated with an UV-light reactive Polyester resin which when cured is chemically resistant to domestic sewage over the expected lifetime of the rehabilitated pipe.
2. The product shall be compatible with the lining system utilized for the mainand/or lateral sewer lines.
3. The flexible fiberglass top hat tube insert shall be fabricated to a size that when installed will key into the internal surface irregularities of the lateral joint and neatly fit tight to the internal circumference of the lateral. The top hat tube shall be a laminate made of non-woven fiberglass materials that allow for circumferential stretching and angular alignment with the lateral pipe connection geometry during insertion.
4. The insert laminate shall seal to the inside wall of the sewer main 3 inches around the lateral opening.
5. Top hats shall extend no less than twelve (12) inches and no greater than twenty (20) inches into the lateral.

d. Hydrophilic End Seals

1. The end seals shall be composed of hydrophilic rubber and molded as a one- piece cylinder with a minimum width of three (3) inches. When installed, the end seal shall form a 360 degree seal between the host pipe and the newly installed liner.
2. Hydrophilic end seals shall be Insignia End Seals, or approved equal.
3. The materials utilized for the hydrophilic end seal shall be as recommended by the manufacturer and shall be provided in kits that are designed to accommodate varying pipe diameters, manhole depths, junction configurations, and pipe liner products. The hydrophilic end seal kits shall becompatible with ultraviolet curing methods. The components of the hydrophilic end seal kits shall include a tubular sleeve, and a mechanical fastener.
4. The use of caulking, rope or a band type end seal will not be allowed.

(5) Finished And Cured CIPP Liner And Top Hat Properties

- a. The physical properties of the cured CIPP shall have a minimum initial test values as given in Table 1 of ASTM F2019, supplemented below, for polyester, vinyl ester and epoxy resins.

Test Property	Test Value	Test Method
Flexural Strength	20,000 psi	ASTM D790
Flexural Modulus	1,000,000 psi	ASTM D790
Tensile Strength	20,000 psi	ASTM D3039

- b. The physical properties of the cured Top Hat Liner shall have a minimum initial test values as given in Table 1 of ASTM D790, supplemented below, for polyester, vinyl ester and epoxy resins.

Test Property	Test Value	Test Method
Flexural Modulus	800,000 psi	ASTM D790

(6) Design Criteria

- a. The liner and top hat liner shall be designed in accordance with the standards set forth in ASTM F2019, Appendix XI and these specifications.
- b. All material properties used in design calculations shall be long-term values. Contractor shall familiarize himself with site conditions when preparing liner and top hat design.
- c. Contractor shall calculate the required minimum thickness for each pipe and lateral based on the pipeline condition, actual level of deterioration may vary within any given section of sewer.
- d. Contractor shall supply all assumed values and calculations for the design including but not limited to:
 1. Modulus of Soil reaction
 2. Unit weight of soil
 3. Minimum ovality for straight runs

4. Traffic loads
 5. Groundwater
 6. Allowance for flood elevation
 7. Safety Factors
- e. External Buckling Design: Where the CIPP is designed as a standalone pipe, a fully deteriorated condition, the Contractor shall furnish to the Owner, third party testing and verification of design analysis techniques for each manufacturer or CIPP product.
- f. The bond between CIPP and top hat Layers shall be strong and uniform. All layers after cure must form one homogenous structure pipe wall.
- g. The following design parameters shall be used and not devalued

Parameter	CIPP System
Pipe Condition	Fully deteriorated
Design Life	50 years
Soil Type	Saturated
Design Thickness	The needed output product thickness, at a minimum, to meet the design thickness
Groundwater Depth	Ground surface level
Ovality of Pipe	2% of circumference minimum
Soil loads	130 pcf
Traffic Loads	AASHTO H-20 live load with two truckspassing and applicable construction loads as required by the Contractor's means and methods
k Enhancement Factor	7
Modulus of Soil	Max 1000 psi
Poisson's ratio	0.3
Long Term Flexural Strength	50% of initial ASTM D-790
Long Term Young's Modulus (e)	50% of initial ASTM D-790
Max Deflection (vertical axis)	7.5%
Min F.S	2.0

- h. Liner thickness for the Work specified, will be calculated by the Contractor for each specific line segment shown in the Contract Drawings. The Contractor shall verify the depth of cover for all line segments shown as part of the CIPP and top hat design. Contractor's design shall be based on the depth of cover for each pipe segment.
- i. Pre-liner Requirements: The outer foil shall be suitable to control resin loss and liner thickness in heavily infiltrated areas and areas subject to void space. Any damage or defects resulting from a loss of resin or a reduction

in CIPP wall thickness shall be repaired at the Owners discretion at no cost to the Owner.

(c) Execution

(1) General

- a. Work performed under this Specification shall be done in accordance with Municipal, State and Federal Standards. Traffic control and safety is the responsibility of the Contractor.
- b. All equipment, materials, labor and processes required to complete the work must be ready on-site before installation begins.

(2) Time of Operation

- a. It is suggested that the Contractor schedule his/her operations to coincide with low flow levels in the existing pipe (if any). It will be necessary for the Contractor to determine the optimal time period for scheduling the work. It is the responsibility of the Contractor to inspect the site and determine site conditions.

(3) Dewatering

- a. It is the Contractors responsibility to dewater the sewer and maintain existing sewerage flows at all times. A plan for dewatering must be submitted to the Engineer and the Owner for review and approval prior to commencement of any work.
- b. The Contractor shall be responsible to maintain the existing flows at all times in an acceptable manner as not to create a nuisance of or in any way endanger the adjoining properties, utilities, or environment.
- c. By-passing sanitary sewer flows to a storm sewer or other watercourse is not allowed at any time.
- d. The Owner assumes no liability to the Contractor for any delay, cancellation, loss of expense to which he/she may become subject, directly or indirectly, due to normal or heavy flows in the existing sewer.

(4) TV Inspection And Cleaning

- a. The pipe to be lined must be clean and televised per industry standards.

- b. The pipe to be lined shall be cleaned such that no debris or obstructions remain and the pipe is free of all debris and obstruction that negatively affect the flow of wastewater through these pipes. Sanitary pipes not free of debris or obstructions may be removed from the work by the Engineer. The Engineer reserves the right to require additional cleaning of pipes to be lined to remove debris or obstruction at time of liner installation. Additional cleaning will be at no cost to the Owner.
- c. An experienced person trained in locating breaks, obstacles and service connections by visual inspection shall perform the inspection of sewer mains. The interior of the sewer shall be carefully inspected to determine the locations of conditions which may prevent proper installation of CIPP. Contractor shall furnish television report and DVD to the Owner as required.
- d. The Contractor shall measure the actual inside diameter at different location of the sewer to determine the appropriate size of CIPP liner to use.
- e. Prior to lateral rehabilitation activities, the area around the lateral sealing surface in both the main and lateral shall be inspected. Waste product build-up, hard scale, roots, lateral cutting debris or resin slugs must be removed using high pressure water jetting or in-line cutters. Clean each service lateral to be lined and dispose of any resulting material in accordance with Local, State, and Federal Regulations. The term "cleaned" shall mean the removal of all sand, dirt, roots, grease, and all other solids or semi-solid materials from the entire interior of the sewer lines.

(5) Line Obstructions

- a. It shall be the responsibility of the Contractor to clean the line of all line obstructions such as solids, dropped joints, protruding taps or collapsed pipe that will prevent the installation of the liner. As a general guide, a 10% reduction in the pipe area should be considered for repair or removal. It is the intent of this Contract that all such reductions have been removed under previous Contracts. If inspection reveals an obstruction that cannot be removed by conventional sewer cleaning equipment or internal cutting, such as cutting out roots, then the Contractor shall inform the Owner that a Point repair is needed to uncover and remove or repair the obstruction.

(6) Hydrophilic End Seals

- a. Access to the manhole interior using conventional methods shall be necessary to measure the pipe interior at the manhole prior to installation of the hydrophilic endseal. The pipe interior shall be measured from 6:00 to 12:00 and from 3:00 to 9:00, with the mean determining the normal pipe diameter.
- b. After the mainline and ends of pipe have been accessed; cleaned and inspected the hydrophilic end seal product shall be placed inside the end of pipe to be rehabilitated. The mechanical fastener is placed into a conformation such that the outer profile of the mechanical fastener is smaller than the diameter of the pipe to be rehabilitated, and the mechanical fastener is placed within the tubular sleeve. Dual-sided adhesive tape may be applied to the outer surface of the mechanical fastener to adhere the outer surface of the mechanical fastener to the inner surface of the tubular sleeve. The tubular sleeve is then placed inside the end of the pipe, and the mechanical fastener is placed into a conformation where the tubular sleeve is held to the pipe wall.
- b. Insert continuous hydrophilic water stops at each manhole opening, centered within the intersection of the host pipe and the manhole wall. If defects in the host pipe near the manhole are such that the end seal will not form a watertight seal between the liner and host pipe, apply hydraulic cement to the defects in the host pipe to provide a smooth surface to receive the end seal.

(7) CIPP Installation

- a. Prior to installation, the bypass pumps, including backups, shall be tested and running. The cost for these access points is incidental to the project. Locations for the manhole/access points shall be submitted per Subsection 2., Submittals.
- b. Resin Impregnation: The wet-out or resin impregnation shall only occur at the manufactures plant and in accordance with ASTM F2019.
- c. Tube installation forces or pressure shall be limited so as not to stretch the tube longitudinally by more than 2% of the original length.

- d. No CIPP installation will be undertaken in weather conditions that could jeopardize the installation of the CIPP, or be detrimental to the long term performance of the CIPP.
- e. The liner shall be installed using the pull-in method as described in ASTM F2019 sections 6.2.1 and 6.2.2.

6.2.1 Sliding Foil and Winch Cable: Upon verification of the removal of all debris and protrusions a sliding foil and a winch cable may be pulled through the line. The Sliding foil shall cover approximately the lower third or up to half of the circumference of the pipe, as recommended by the manufacturer. At the upstream end, it is locked in place by being inserted underneath the plug used to block the flow in the manhole.

6.2.1 Pulling Head or Pulling Manifold and Invert Roller: The liner is connected to the winch cable by forming a pulling head or using a pulling manifold. A pulling head can be made by turning the end of the liner over into a loop. If a pulling manifold is used it shall be attached to the end of the liner with sufficient strength to transfer the pulling force. It contains a mounting point for the air/stream hose. During the mounting of the pulling manifold care shall be taken to provide an airtight fit of the calibration hose to the manifold. If a pulling head has been used, it shall be dismantled after pulling in the liner. Then a manifold is mounted airtight into the calibration hose. In invert guide roller is placed in the winch manhole. The invert roller shall allow the pulling head or manifold to enter the manhole before the pulling is terminated. A swivel connection to the pulling cable may be added to avoid twisting the liner.

- f. The existing pipe must be dewatered for any CIPP installation that does not use an inversion method to expand the tube against the pipe wall. The Contractor shall eliminate any incoming water and remove standing water, at no additional cost to the Owner.
- g. The inlet air hose shall be connected to the installation equipment and shall be equipped with an air compressor of sufficient capacity to expand the impregnated fabric tube. While the tube expands under pressure a multi lamp ultraviolet curing assembly shall be drawn through the pipe without causing curing to commence.

- h. The ultraviolet curing lights shall be tuned or optimized to the photo initiator system of the resin or the initiator system of the resin shall be optimized to the output of the ultraviolet curing lights.
 - 1. Travel through the pipe shall be at a pre-determined speed which allows for cross-linking polymerization of the CIPP resin. Air pressure shall be adjusted to sufficient pressure to hold the impregnated fabric tube tight to the pipe wall. The desired pressure shall be maintained by adjustment of the outlet valves.
 - 2. A full protocol for time, rate of travel of the UV assembly, pressures and amounts of lamps in operation shall be maintained as documentation for the correct curing of the fabric tube. The protocol shall be recorded automatically from the beginning of inflation of the liner until the end of curing. It shall also show the basic information in a header, and clearly identify the renovated section.
- i. Finish: The finished CIPP shall be continuous over the entire length of the run and be as free as commercially practicable from any visual defects such as foreign material, dry spots, pinholes, and delamination. It shall also meet the leakage requirements or pressures test specified herein for main line and lateral connections.
- j. If broken due to misaligned pipe at the manhole wall, the Contractor fails to make a tight seal; the Contractor shall apply a seal at that point. The seal shall be of a resin mixture compatible with the CIPP and at no additional cost to the Owner.
- k. For post-construction television inspection, the Contractor is responsible for adhering to NASSCO's Pipeline Assessment and Certification Program (PACP) guidelines. Verification of NASSCO PACP certification is required.
- l. Video inspections and tap reopening shall be performed using a swivel head camera capable of looking directly up a tap. Cutting and trimming equipment shall be able to satisfactorily perform the operations. Satisfactory operation of cameras and other equipment must be demonstrated and approved before lining operations begin.
- m. After the tube has been cured in place, the Contractor shall reconnect all the existing service connections. The Owner reserves the right to use means

such as dye testing to confirm activity, as necessary at the cost of the Owner. Opening the lateral connections shall be done without excavation, and in the case of non-man entry pipes, from the interior of the pipeline by means of a television camera and a cutting device that re-establishes them to not less than 90% capacity.

- n. The cuts shall be trimmed to a neat, clean, circular opening concentric with the service line pipe, free of jagged edges, “sawteeth”, resin plugs or resin shelves. All cuts shall be brushed with a like resin or wire brush to form a smooth opening so as not to catch floatables in the sewage.
- o. The CIPP shall make a tight seal at the manhole opening with no annular gaps using hydrophilic end seals as specified herein. Materials and procedures used shall be submitted for approval as part of the CIPP system. Where the liner continues through the manhole, the upper portion of the liner will be removed and the bottom half to remain resulting in a smooth, continuous flowline through the manhole. Inverts may be rebuilt using epoxy grout or the CIPP liner material should be sealed to the invert and bench with quick-set epoxy mortar or high viscosity epoxy. These procedures shall be completed before proceeding to the next manhole section.
- p. The Contractor shall make sure through video inspection or whatever other means necessary that each active lateral connection is opened, free to discharge and is not plugged or backed up as a result of the lining operation

(8) Top Hat Installation

- a. The top hat shall be loaded on the applicator apparatus, attached to a robotic manipulator device and positioned in the mainline pipe at the service connection that is to be rehabilitated. The robotic device together with a television camera will be used to align the top hat with the service connection opening. Air pressure, supplied to the applicator through an air hose, shall be used to insert the resin impregnated connection repair product into the lateral pipe. The inserted top hat will then be inspected using a TV camera to confirm the top hat is correctly positioned and/or centered in the lateral opening prior to curing. The insertion pressure will be adjusted to fully deploy the top hat into the lateral connection and hold the top hat tight to the main and lateral pipe walls.

- b. The pressure apparatus shall include a bladder of sufficient length in both the main and lateral lines such that the inflated bladder extends beyond the ends of both the lateral tube and main line brim segments of the top hat pressing the end edges flat against the internal pipe wall thus forming a smooth transition from top hat to pipe diameters without a step, ridge or gap between the top hat and the inner diameters of the lateral and mainline pipes.
- c. After insertion is completed, recommended pressure must be maintained on the impregnated top hat for the duration of the UV light curing process
- d. The packer is then deflated, removed from connection and returned to the manhole to repeat the cycle.
- e. The finished top hat shall be free of dry spots, lifts and delamination. The installed top hat should not inhibit the post installation video inspection, using a closed-circuit television camera, of the mainline and service lateral pipes or future pipe cleaning operations.
- f. After the work is completed, the Contractor will provide the customer with an electronic picture and recorded data identifying the location and showing the completed work and restored condition of all the rehabilitated laterals.

(9) Inspection

- a. For each continuous length designated by the Owner in the Contract Documents or each production run of liner utilized (in the case where resins are applied as part of the manufacturing process), one liner sample shall be prepared from a section of the cured pipe at an intermediate manhole or at the termination point. (Note: In areas with limited space and larger diameter pipes, other sampling techniques may be required).
- b. The liner samples shall be tested in accordance with the applicable ASTM procedures for the resin being used.
- c. If the liner fails to meet the test criteria, it will be repaired as necessary by the Contractor, and retested, at no additional expense to the Owner. The pipe line will not be considered acceptable until it successfully passes the requirements of this test.
- d. The Contractor shall be responsible for all costs, and delays incurred due to efforts to locate and repair any leaks in any sewer pipeline which fails the

test, regardless of whether the failure is due to workmanship, material failure or the result of improperly installed equipment.

- e. All testing will be conducted by the Contractor or his/her approved Subcontractor in the presence of the Owner's representative. The Contractor or his/her Subcontractor shall keep a written record that will show the results of the tests conducted. The records shall include sufficient data on length of line, weir levels, time, and related features noted during the testing of each segment of the line. A copy of records shall be given the Owner's Representative and Engineer.
- f. Payment for work will not be considered until post videos are received, reviewed and accepted by the Owner. The Owner reserves the right to re-review tapes after payment for final acceptance. The post video shall include full mainline surveillance as well as the viewing of all laterals for adequate cutting of openings.

(10) Clean-Up Operations

- a. All materials removed from the pipe line and from the pipe lining process shall be satisfactorily disposed of off-site by the Contractor.
- b. Prior to final acceptance, the Contractor shall demonstrate, in the presence of the Owner, the capability of the liner to perform as specified. Any deficiencies found in the liner shall be corrected at no additional cost to the Owner.

(11) Field Testing and Acceptance

- a. Following installation of each cured-in-place-pipe (CIPP), conduct a television inspection of the completed work. An additional television inspection shall be performed one (1) year after substantial completion. If the Contractor were to perform the CCTV at the one (1) year mark or shortly after, they are still liable to repair any defects that are discovered. Retainage will be held in accordance with the Agreement until the CCTV has been completed, submitted, and accepted by the Engineer.
- b. Field acceptance of the liner shall be based on the Engineer's evaluation of the installation including inspection videos and a review of certified test data for the installed pipe samples.
- c. Groundwater infiltration of the liner shall be zero.

- d. All service connections shall be open and clear.
- e. There shall be no evidence of splits, cracks, breaks, lifts, kinks, delaminations, or crazing in the liner.
- f. If any defective liner is discovered after it has been installed, it shall be removed and replaced with either a sound liner or a new pipe at no additional cost to the Owner. Repair methods shall be submitted to the Engineer for approval. Any liner failure that requires excavation work to repair shall be initiated within two (2) hours of failure observation.

18. TRANSFER OF EXISTING SYSTEM TO NEW SYSTEM. The Contractor shall maintain existing sewage flows during construction of the new sanitary sewer systems, including both gravity piping and force main piping, and during transfer of the new systems to the existing systems. The Contractor shall submit and receive approval of a detailed plan for Maintenance of Existing Sewage Flows prior to beginning work on the systems.

(a) Maintenance of Existing Sewage Flows.

The Contractor's Maintenance of Existing Sewage Flow Plan shall detail his/her proposed construction schedule and procedure for maintaining sewage flows during lining of the existing sewer main between SMH #696 and SMH #713, and removal and replacement of SMH #696 including new sewer piping tie-in's to existing sewer piping, and for transferring service from the existing system to the new system including construction and testing of all proposed sanitary sewer piping and manholes, including interconnections for maintenance of sewer service to users at all times during construction. The Plan shall include all items noted under this section.

- (b) Sewage System: Maintain flow in accordance with VTrans, Town of Bennington, and permit requirements. The objectives of the Maintenance of Sewage Flow Plan described herein are to ensure that wastewater collected in the existing sanitary sewers is conveyed to the wastewater treatment plant for treatment prior to discharge and to prevent the discharge of untreated waste to the environment.
- (c) Bring to the Contractor's attention important requirements for coordination of the Work.
- (d) Contractor shall coordinate, schedule and perform all Work in a manner to prevent discharge of raw sewage to the environment and to ensure all wastewater is directed to the wastewater treatment plant. In no case shall the CONTRACTOR perform Work in any manner that allows sewage to be dumped to public or private property, in Municipal Streets, into excavations, or into waterways. The CONTRACTOR shall either immediately

- cease any activities that cause a discharge or put measures in place to collect and convey the waste to the Bennington Wastewater Treatment Facility per direction of VTrans, the Town of Bennington's Director of Public Works, or the Engineer.
- (e) Temporary Utilities: All temporary power, light, gas, drainage, water, process piping, pumps, valves, piping, fittings and appurtenances shall be furnished and installed by the Contractor including insulation and/or pipe heat tracing as necessary to achieve the objectives of the sequence of Work.
 - (f) Maintenance of Flow: Provide for maintaining sewage flow to the wastewater treatment facility. The Contractor's work may require disruption of the conveyance system when the new sewage system is transferred to the existing system. During this time the Contractor's is required to follow a plan that prevents the discharge of raw sewage.
 - (g) The Contractor shall maintain existing sewage flows during lining of the existing sanitary sewer piping, construction of the new sanitary sewer piping and manholes, and during connection of the new system piping to the existing system. The Contractor shall submit and receive approval of a detailed construction schedule and procedure including a Maintenance of Existing Sewage Flow Plan for transferring service from the existing system piping to the new system prior to beginning work on the sanitary sewer system.
 - (h) Contractor shall establish construction phasing such that the existing sanitary sewer main including all manholes and lateral pipes remain in service during lining of the existing sanitary sewer piping and construction of the new sanitary sewer main and manholes. Upon successful testing of new sanitary sewer main and manholes, the existing sanitary sewer main may be transferred over to the new system piping and the temporary system piping decommissioned.
 - (i) Maintain detoured traffic at all times while maintaining existing sewage flows. See Traffic Control Plans for details.
 - (j) At locations where temporary bypass piping may cross an existing sidewalk, the Contractor shall maintain handicap accessible pedestrian traffic at all times while maintaining existing sewage flows.
 - (k) Plugging or blocking of sewage flows shall incorporate a primary and secondary plugging device.
 - (l) Submittals. Maintenance Flow Plan: The plan shall be submitted after contract award and at least 14 days prior to starting construction of the new sewer system, the Contractor shall submit a flow maintenance plan to the Engineer indicating the sequence of all procedures

and work that he/she will take to ensure flow will be directed to the wastewater treatment facility. Upon review, the plan shall be revised, if required, to the satisfaction of the VTrans, the Town of Bennington, the Engineer, and the Vermont Department of Environmental Conservation, Drinking Water and Groundwater Protection Division (DWGWPD), Wastewater Systems and Potable Water Supply Program's Regional Engineer. Submit four (4) copies of the plan for each required submittal.

The Maintenance Flow Plan submittal shall include the following items:

- (1) A detailed plan and description of proposed pumping system. Indicate number, size, material, location and method of installation of suction and discharge piping, size of pipeline or conveyance system to be bypassed, staging area for pumps, site access point, and expected flow.
- (2) Size and location of manhole or access points for suction and discharge hose or piping.
- (3) Sections showing suction and discharge pipe depth, embedment, select fill and special backfill, if buried.
- (4) Temporary pipe supports and anchoring required.
- (5) Thrust and restraint block sizes and locations.
- (6) Sewer plugging method and type of plugs.
- (7) Bypass pump sizes, capacity, number of each size to be on site and power requirements including power source, and piping equipment including valving and fittings.
- (8) Backup pump, power requirements including power source, and piping equipment including valving and fittings.
- (9) Calculations of static lift, friction losses, and flow velocity. Pump curves showing pump operating range.
- (10) Design plans and computation for access to bypass pumping locations indicated on drawings.
- (11) Calculations for selection of bypass pumping pipe size.
- (12) Method of noise control for each pump and/or generator.

- (13) Method of protecting discharge manholes or structures from erosion and damage.
 - (14) Schedule for installation and maintenance of bypass pumping lines.
 - (15) Procedures to monitor upstream mains for backup impacts.
 - (16) Adjustable ultra-sonic liquid level monitoring equipment including cellular based output capabilities for web-based internet monitoring and calling out of a high liquid level alarm event.
 - (17) Procedures for setup and breakdown of pumping operations.
 - (18) Procedures for maintaining vehicular and pedestrian traffic during bypass operations.
 - (19) Emergency plan detailing procedures to be followed in event of pump failures, sewer overflows, service backups, and sewage spillage. Maintain copy of the emergency plan on site for duration of bypass operations.
- (m) Sewage System Maintenance of Flow.
- (1) General: The method of flow maintenance shall be determined by the CONTRACTOR subject to the approval of the VTrans, the Town of Bennington, and the ENGINEER prior to the commencement of construction. The locations of the temporary facilities and/or work shall be such that they will not interfere with vehicular and/or pedestrian traffic in the area.
 - (2) Use of Pipelines: Existing pipelines may be available for use by the CONTRACTOR for bypass operations. Care shall always be taken to prevent the surcharging of sewers, process piping or treatment system.
 - (3) Untreated Sewage Bypassing: The CONTRACTOR shall discharge temporary bypasses to sanitary sewers or treatment works only. The CONTRACTOR shall not bypass untreated sewage to storm drains, excavations, onto streets or thoroughfares, surface waters (directly or by runoff), etc., except in an emergency to avoid personal injury or loss of life.
 - (4) CONTRACTOR/OWNER Cooperation: In order to maintain the flow of sewage at the required level, the CONTRACTOR, VTrans, and the Town of Bennington will work closely together. The Town of Bennington can offer insight into historical flow trends, capacity of adjacent sewers and estimate of volumes; however, the CONTRACTOR shall be required to supervise the operation of the flow

maintenance plan that needs to be operated to ensure that sewage collected in the service area is treated at the Bennington Wastewater Treatment Facility.

- (5) Where depicted on the Plans, new sanitary sewer piping shall be connected to existing sanitary sewer pipe with an approved transition coupling.
 - (6) Prior to making connections into the existing sanitary sewer system piping, the Contractor shall notify VTrans, and the Town of Bennington, and the Engineer three days in advance in writing of the date when the Contractor will be ready to complete the work.
 - (7) After the connections are made, the Contractor shall divert the sewage flow to the new sewer piping.
 - (8) Upon successful transfer to new system, the Contractor shall remove all temporary sanitary sewer piping, pumps, and cap all temporary fittings installed for the purposes of maintaining existing sewage flows.
- (n) Temporary Bypass Pumping System.
- (1) Contractor's Responsibility: Schedule and perform work in manner that does not cause or contribute to incidence of overflows, releases or spills of sewage from sanitary sewer system or bypass operation.
 - (2) Equipment:
 - a. Pumps:
 1. Fully automatic self-priming units that do not require the use of foot-valves or vacuum pumps in priming system.
 2. Electric or diesel powered.
 3. Constructed to allow dry running for long periods of time to accommodate cyclical nature of effluent flows.
 4. Contractor shall provide.
 - i. Necessary stop/start controls for each pump.
 - ii. One operational standby pump maintained on site with discharge piping connected to the temporary force main via a normally closed valved wye connection and suction piping

installed in the manhole's wet well.

- iii. Isolation plug valve(s) and check valve(s) as needed.
- iv. Quiet flow pumps due to nearby residential neighborhood.

b. Bypass Pumping Design Requirements:

1. Existing sewage flows upstream of SMH #713 are estimated to be as follows:
 - i. Average Daily Flow = 288,000 GPD = 200 GPM
 - ii. Peak Hourly Flow = 2,000 gallons/hour = 760 GPM
 - iii. Peaking Factor = 3.8 for flows > 100,000 GPD and < 500,000 GPD per VT. EPR's.
 - iv. Total Dynamic Head (TDH) to be determined by CONTRACTOR.
2. Bypass pumping system shall continuously operate 24 hours per day until such time as the transfer to the new sewer piping is complete.
3. Sufficient capacity to pump peak hourly flow of 760 GPM up to a maximum demand of 1,000 GPM at design TDH.
4. Pump shall have the capacity to operate at a minimum of 0 GPM.
5. Provide pipeline plugs and pumps of adequate size to handle peak flow, and temporary discharge piping to ensure total flow of existing sewer main can be safely diverted around the new sewer main section to be constructed.

c. Monitoring of Existing Flows:

1. Furnish and install adjustable ultra-sonic liquid level monitoring equipment inside the bypass manhole wet well including cellular based output capabilities for web-based internet monitoring and calling out of a high liquid level alarm event with-in the bypass manhole.

(o) Suggested Maintenance of Existing Sewage Flow Plan.

- (1) The proposed Temporary Maintenance of Existing Sewage Flow Plan configuration does not, and is not intended to, cover all requirements for the temporary maintenance of sewage flows and is provided to assist the CONTRACTOR in developing his/hers comprehensive Maintenance of Existing Flow Plan. The proposed Temporary Maintenance of Existing Sewage Flow Plan is presented on the Temporary Water and Sewer Details 1 sheet as contained in the Plans.
 - a. When new sewers are connected to existing manholes and existing pipe penetrations cannot be used, pipe openings shall be core drilled to accommodate the new pipe. Approved watertight boots or gaskets shall be furnished and installed per manufacturer's instructions, and then the opening around the gasket shall be grouted to a watertight seal. Existing manhole grouted inverts, flow lines, aprons, etc. shall be chipped out and re-grouted to accommodate the new piping. Grout holes or damage in manhole wall opening with non-shrink grout until flush with outside face of wall. The exterior of the manholes shall be coated with a bitumastic or other watertight sealant meeting the approval of the sewer owner.
 - b. Upon successful transfer to new system, the Contractor shall remove existing sewer system piping that is no longer active.
- (2) Following is a *Suggested Sequence of Construction for Maintenance of Existing Sewage Flows* that the Contractor may propose to utilize, or they may opt to revise and propose their own proposed sequence of construction:
 - a. Submit Contractor's *Maintenance of Existing Sewage Flow* plan for review and approval as noted above including project schedule timeframe and identifying primary and back-up power source(s) for sewage bypass pumps.
 - b. Establish traffic detour signage, re-route traffic, and close Main Street and Bridge No. 6 between Morgan and Beech Streets.
 - c. Install two - 6" sewer saddles on the existing 8" sewer main downstream of SMH #696. Reference detail on Sheet 69 of 77, *Suggested Sewer Bypass Piping at SMH #696*.
 - d. Install temporary 4" HDPE butt-fused sewage force main extending from 6" sewer saddle easterly to existing SMH #713. Lay force main piping on existing roadway if work is performed

prior to demolition of the bridge or once the new bridge has been constructed. Attach force main piping to utility support beam (approx. 70± LF across the Wallomsac River) if the work is to be performed after the existing bridge has been demolished.

- e. Install temporary pump station components including trailer or skid mounted, electric or diesel powered pumps (one operational and one on operational stand-by).
- f. Install wet well liquid level controls and pump suction piping for both pumps in SMH #713 wet well. Ensure that all force main piping restraints are installed prior to testing.
- g. Perform pressure and leakage testing on temporary force main.
- h. Connect the discharge end of the temporary 4" HDPE temporary force main to the 6" sewer saddle.
- i. Connect the primary pump discharge piping to the temporary 4" HDPE temporary force main. With appropriate 4" plug and check valving, the operational standby pump discharge piping may be tied into the temporary 4" force main via a wye fitting to allow for quick switchover in the event of an emergency.
- j. Install a flow barrier within SMH #713 to stop effluent flow. In order to allow for greater room within SMH #713 for pump suction piping, and alternatively to installation of an interior flow barrier, install 8" plug in the effluent pipe of SMH #713 and cut existing 8" CMP sewer main effluent pipe at 6± feet downstream of the SMH penetration. Either method is acceptable as required to provide access to the 8" sewer main for re-lining.
- k. Test functionality of the temporary bypass pumping system including high liquid level alarm call-out in the presence of the Engineer and correct issues as required.
- l. Re-line existing 8" CMP sewer main under river. Pressure test re-lined sewer main piping.
- m. At any time, perform exploratory excavation to identify all influent piping locations and invert elevations that discharge into SMH #696.

- n. Concurrently, or at another time, install temporary 6" PVC gravity sewer piping and necessary fittings from 6" sewer saddle to three tie-in points upstream of SMH #696.
- o. Pressure test temporary 6" PVC gravity sewer piping between the 6" sewer saddle and the three tie-in points.
- p. Connect temporary 6" PVC gravity piping to the 6" sewer saddle. One at a time and without delay, cut existing 6" sewer pipe and connect temporary 6" PVC gravity piping to each of the three tie-in sewer pipes.
- q. Once Morgan Street gravity piping has been diverted from SMH #696 AND at any time when the bypass pumping is operational, cut 8" CI gravity sewer main at effluent side of SMH #696 and install temporary cap in location per detail depicted on Sheet 69 of 77.
- r. Cut influent side of 8" sewer main at SMH #696 and install new sanitary sewer manhole #696. Vacuum or water test manhole.
- s. Install and pressure test three, new 6" PVC piping segments extending from SMH #696 upstream to each of the three tie-in sewer pipes.
- t. Connect each of the three new 6" PVC piping segments extending upstream from SMH #696 to existing gravity piping with 6" flexible rubber couplings.
- u. Install two new 8" PVC sewer spool pieces at the influent and effluent sides of the new SMH #696, and connect to existing sewer main piping with flexible rubber couplings.
- v. If previously installed, remove interior flow barrier in SMH #713. Otherwise, if effluent pipe was cut at SMH #713, re-connect existing 8" re-lined sewer main to SMH #713. Re-connect with new 8" PVC sewer spool piece with flexible rubber coupling at pipe connection and stainless steel expandable rubber boot/seal at the manhole penetration.
- w. Backfill the new SMH #696.

- x. Flush temporary 6" gravity piping with water provided from a water truck, cut piping at 6" saddle, remove temporary piping, and cap branch pipe of 6" saddle. Abandon capped saddle in-place.
- y. Flush temporary 4" force main piping with water provided in barrel with pump suction piping, cut force main piping at 6" saddle, and cap branch pipe of 6" saddle. Abandon capped saddle in-place.
- z. Remove all temporary force main piping, pumps, controls, interior flow barrier and/or plug in SMH #713, and utility support beam if used.
- aa. Upon completion, sewage flows are once again returned to pre-construction conditions.

19. WATER MAIN - SEWER SEPARATION. Where water mains and sewer lines are in the same area as a result of work under the Contract, parallel installations or crossings of such installations shall conform to the requirements as specified in the Vermont Environmental Protection Rules (EPR), Chapter 1, Wastewater System and Potable Water Supply Rules, Effective November 6, 2023 (or Latest Edition), and as specified below.

In addition, all reconstruction or relocation of existing water or sewer facilities shall be as approved by the utility owner. Such approval shall be obtained for scheduling, materials, and configuration of the reconstruction or relocation.

Separation of Sanitary Sewer Service Lines and Sanitary Sewer Collection Lines from Water Mains, Water Service Lines and Water Service Pipes (Reference EPR Section § 1-1007):

- (a) Horizontal Isolation Distances from Water Mains, Water Service Lines, and Water Service Pipes
 - (1) All portions of a sanitary sewer collection line and sanitary sewer service line shall be at least 10 feet horizontally from all portions of a proposed, existing, or permitted water mains, except where site conditions prevent obtaining the 10-foot separation and one of the following requirements is met:
 - a. The sanitary sewer collection line or sanitary sewer service line shall be water main pipe or equivalent and, to ensure water tightness:
 - 1. shall be pressure tested at 50 pounds per square inch; or

2. all joints not meeting the 10 feet horizontal separation shall be further improved to prevent leakage using mechanically jointed non-flexible pipe couplings, concrete encasement, or other equivalent methods as approved by the Secretary.
 - b. The bottom of the water main shall be at least 18 inches above the top of the sanitary sewer collection line or sanitary sewer service line and the water main is in a separate trench or on an undisturbed soil shelf in the sewer trench.
- (2) All portions of a sanitary sewer collection line and sanitary sewer service line shall be at least 10 feet horizontally from all portions of a proposed, existing, or permitted water service line or water service pipe, except when one of the following requirements is met:
- a. The water service line or water service pipe shall be sleeved with pipe materials approved by the Vermont Plumbing Rules, and:
 1. if the sleeves terminate below ground, the ends of the sleeve are sealed to be watertight; or
 2. if the sleeves terminate above finished slab or in a basement, the ends of the sleeve are sealed to be watertight or left open.
 - b. The water service line or water service pipe shall be in a separate trench or an undisturbed soil shelf in the sewer trench and one of the following requirements is met:
 1. the bottom of the water service line or water service pipe shall be at least 18 inches above the top of the sanitary sewer collection line or sanitary sewer service line; or
 2. the sanitary sewer collection line or sanitary sewer service line shall be water main pipe or equivalent and, to ensure water tightness:
 - i. shall be pressure tested at 50 pounds per square inch; or
 - ii. all joints not meeting the 10 feet horizontal separation are to be further improved to prevent leakage using mechanically jointed non-flexible pipe couplings, concrete encasement, or other equivalent methods as approved by the Secretary.

- (b) Vertical Separation and Crossings for Water Mains, Water Service Lines, and Water Service Pipes
- (1) Sanitary sewer collection lines and sanitary sewer service lines crossing above proposed, existing, or permitted water mains shall be laid so the bottom of the collection line or service line is 18 inches above the top of the water main with the joints of the collection line or service line equal distance from the crossing, except where site conditions prevent obtaining the 18-inch separation and one of the following requirements is met:
- a. The sanitary sewer collection line or sanitary sewer service line shall be sleeved to a point 10 horizontal feet from the center line of the crossing.
 - b. The sanitary sewer collection lines and sanitary sewer service lines shall:
 1. be water main pipe or equivalent and, to ensure water tightness:
 - i. shall be pressure tested at 50 pounds per square inch; or
 - ii. all joints not meeting the 10 feet horizontal separation are to be further improved to prevent leakage using mechanically jointed non-flexible pipe couplings, concrete encasement, or other equivalent methods as approved by the Secretary; and
 2. the sanitary sewer collection line shall be provided structural support, such as sleeving of the sanitary sewer, that will extend beyond the trench excavation for the water service line or water service pipe.

20. METHOD OF MEASUREMENT. The quantity of Special Provision (Removal of Existing Sanitary Sewer Manhole, All-Inclusive) to be measured for payment will be the number of units removed in the complete and accepted work.

The quantity of Special Provision (SDR 35 PVC Sewer Pipe, All-Inclusive) of the type and size specified to be measured for payment will be the number of linear feet of sewer line installed in the complete and accepted work, as measured along the flow line of the pipe.

The quantity of Special Provision (Cured-in-Place-Pipe Lining – Sewer Main, All-Inclusive) of the type and size specified to be measured for payment will be the number of linear feet of sewer line installed in the complete and accepted work, as measured along the flow line of the pipe.

The quantity of Special Provision (Transfer to New System, Sewer) to be measured for payment will be on a lump sum basis for the transfer to new system performed in the complete and accepted work.

21. BASIS OF PAYMENT. The accepted quantity of Special Provision (Removal of Existing Sanitary Sewer Manhole, All-Inclusive), will be paid for at the Contract unit price per each. Payment shall be full compensation for removal of existing sanitary sewer manholes including furnishing, transporting, handling, installing, and testing the materials specified including, but not limited to, all excavation, dewatering as required, demolition, removal and disposal of the structure in its entirety, all backfill including Granular Backfill for Structures, sand borrow, and Subbase of Dense Graded Crushed Stone, compaction, and for making all necessary piping disconnections; and for furnishing all labor, equipment, tools, and incidentals necessary to complete the work.

The accepted quantity of Special Provision (SDR 35 PVC Sewer Pipe, All-Inclusive), of the type and size specified, will be paid for at the Contract unit price per linear foot. Payment shall be full compensation for furnishing, transporting, handling, installing, and testing the materials specified including, but not limited to, sawcutting existing pavement and existing concrete roadway, excavation, dewatering as required, crushed stone pipe bedding and blanket, backfill, SDR 35 PVC pipe, fittings including elbows, tees, wyes, crosses, eccentric SDR 35 PVC reducers when reducing size, SDR 35 PVC gasketed couplings, flexible rubber transition couplings, and end caps; and for making all necessary connections; for calibrated television inspection for deflection testing; and for furnishing all labor, equipment, tools, and incidentals necessary to complete the work.

All excavation, excluding solid rock and boulders greater than 1.0 cubic yards, bedding and blanket materials, backfill operations, and disposal of excavated material not suitable for backfill for all Sewer Pipe of the type and size specified under this Section, will not be paid for separately, but will be considered incidental to the respective Contract item.

The accepted quantity of Special Provision (Cured-in-Place-Pipe Lining – Sewer Main, All-Inclusive), of the type and size specified, will be paid for at the Contract unit price per linear foot.

Payment shall be full compensation for all work and expenses incidental thereto for the complete furnishing and installation of the liner including but not limited to: submittals, design calculations, mobilization and demobilization, pipe cleaning, pre-installation and post-installation CCTV inspection, removing line obstructions, liner materials, top hats, hydrophilic end seals, cutting protruding taps, maintenance of existing sewage flows including bypass pumping and coordination, cutting roots, curing, reinstatement of taps, testing, logging, excavation, backfill, and for all other work incidental thereto and are included in the price stated in these Items.

In the event that the cleaning and pre-installation CCTV inspection cannot be completed due to the condition of the pipe, including but not limited to: obstructions that the camera is incapable of passing from either end of the pipe, sags in the pipe that cause the camera to not pass the entire length of the pipe, and/or other conditions not including protruding taps, payment will be made as a percentage of the work that was able to be performed as coordinated with the Owner and Engineer.

Payment shall also be full compensation for furnishing, transporting, handling, installing, and testing the materials specified including, but not limited to, mobilization and demobilization, pipe cleaning, protruding lateral cutouts, lateral reinstatement, traffic control, maintenance of building access, sawcutting existing pavement, excavation, dewatering as required, bedding and blanket, backfill, development of a Maintenance of Existing Sewage Flow plan to be submitted to the Engineer for review, maintenance of existing sewage flows including all operational and redundant operational stand-by bypass pumping as required, liquid level alarm controls and call-outs, installation of temporary sewer service piping and the subsequent removal of the temporary sewer service piping when no longer required, for performing all exploratory excavation as may be required; for diversion of sewage flow from connection points, associated pumping/dewatering of connection areas, making the physical connection into existing systems including, but not limited to, demolition and reconstruction of existing structures as required; transfer of existing sewage flows to the new systems, removal of existing sanitary sewer, combined sewer, and pipes where noted and as ordered by the Engineer; for performing television inspection and video recording of the existing sanitary sewer mains and combined waste sewer mains prior to construction, and again after completion of the Work; for providing as-built records to VTrans and the Town of Bennington, Department of Public Works for all utility installations including all lined sanitary sewer work; and for making all necessary connections; for preparatory site miscellaneous work, erosion prevention & sediment control implementation, miscellaneous equipment, cleanup of the entire site after construction; for tree pruning, removal, replacement and tree root fertilization as may be required; for grading, loaming, seeding for site restoration; plugging and abandoning old pipelines and associated work; also maintenance of adjacent utility services, insurance, traffic control during any and all construction activities, temporary facilities, general supervision; and for furnishing all labor, equipment, tools, and incidentals necessary to complete the work.

The accepted quantity of Special Provision (Transfer to New System, Sewer) will be paid for at the Contract lump sum bid price. Payment will be full compensation for furnishing all materials, tools, labor, and equipment suitable for effecting the transfer of systems as specified. Items for payment under this lump sum amount include, but are not limited to, development of a Maintenance of Existing Sewage Flow plan to be submitted to the Engineer for review, maintenance of existing sewage flows including all bypass pumping including pumps, force mains, design, maintenance, and appurtenances as required, installation of temporary gravity sewer main piping and connections at existing sewer mains, installation of temporary sewer service piping at new/existing piping conflicts and the subsequent removal of the temporary sewer service piping when no longer required; for preparing an exploratory excavation plan and performing all exploratory excavation as indicated in the exploratory excavation plan and per direction of the Engineer, for performing all exploratory excavation at SMH #696 on each existing sewer main entering the manhole to determine the main's size, material, location, and invert; for diversion of sewage flow from connection points, associated pumping/dewatering of connection areas, making the physical connection into existing systems including, but not limited to, excavation and backfill, all fittings, piping, and appurtenances, coring existing structures, demolition and reconstruction of existing structures as required; transfer of existing sewage flows to the new systems, removal of existing sanitary sewer pipes where noted on the Plans or as ordered by the Engineer; for providing "red-line" as-built records to VTrans and the Town of Bennington for new utility installations including all new sanitary sewer work; and furnishing all tools, labor, equipment, and incidentals necessary to complete the work.

For all new sewer piping noted above; when additional excavation and backfill is required to replace poor foundation material below the normal grade of the pipe, payment for additional excavation and backfill, including Granular Backfill for Structures noted above shall be considered incidental to Item 900.640, Special Provision (SDR 35 PVC Sewer Pipe, All-Inclusive), respective of the PVC sewer pipe size specified.

Payment for removal of existing concrete roadway or solid rock/boulders greater than 1 cubic yard encountered within the trench limits will be made under Item 203.16, Solid Rock Excavation.

VTrans will provide the services of a Professional Engineer to oversee construction of the sewer lines, to ensure that State requirements are met and to sign and stamp all paperwork required by the Drinking Water and Groundwater Protection Division of the Department of Environmental Conservation, Agency of Natural Resources. The Professional Engineer shall advise the Engineer, and the Engineer will provide direction to the Contractor.

Payment will be made under:

<u>Pay Item</u>	<u>Pay Unit</u>
900.620 Special Provision (Removal of Existing Sanitary Sewer Manhole, All-Inclusive)	Each
900.640 Special Provision (SDR 35 PVC Sewer Pipe, All-Inclusive) (6")	Linear Foot
900.640 Special Provision (SDR 35 PVC Sewer Pipe, All-Inclusive) (8")	Linear Foot
900.640 Special Provision (Cured-in-Place-Pipe Lining - Sewer Main, All-Inclusive) (8")	Linear Foot
900.645 Special Provision (Transfer to New System, Sewer)	Lump Sum

SANITARY SEWER MANHOLES

- 1. DESCRIPTION. This work shall consist of the construction of new sanitary sewer manholes, including all ancillary appurtenances including cast iron frames and covers, inside drop pipe and fittings, and exploratory excavation.
- 2. MATERIALS. Materials shall meet the requirements of the following Subsections and as noted below:

Sand Borrow	703.03
Crushed Stone for Bedding.....	704.02
Crushed Gravel for Subbase	704.05
Precast Drop Inlets, Catch Basins, and Manholes	705.04
Mortar, Type II.....	707.02
Bar Reinforcement.....	713.01
Welded Steel Wire Fabric.....	713.05
Cast Iron Frame and Cover.....	715.01

Unless otherwise specified, cast-in-place concrete shall conform to the requirements of Section 541 for Concrete, Class B.

The term “cast iron,” as used in these Specifications, or in various Contract items, when used in conjunction with covers and frames, shall be understood to mean “cast iron or gray iron.” The Contractor shall use gray iron covers and frames meeting the requirements of Subsection 715.01(b) instead of cast iron covers and frames. Steps or ladder rungs in sanitary sewer manholes shall be plastic, complying with all applicable OSHA dimensional and structural requirements. Unless otherwise shown on the Plans, the rungs shall be cast into the fresh concrete, except that for precast units, the rungs may be grouted into preformed voids with a non-shrink grout approved by the Engineer after the concrete has cured.

Crushed stone used for bedding material beneath structures shall meet the gradation requirements of Table 704.02A – Gradation Requirements for 19.0 MM (3/4”) Stone.

Cast iron frames and covers for all new sanitary sewer manholes shall be furnished as detailed on the plans and as noted below.

Cast iron frames and covers for all new sanitary sewer manholes shall be adjusted to finished grade with precast concrete class ‘B’ risers. Adjustment utilizing brick shall not be allowed. Sanitary sewer manhole cast iron frames and covers shall be gray iron (CL35B), heavy duty H-20 load rated, and meeting ASTM A48. The word "SEWER" shall be cast into a diamond design on the top surface of the cover.

Sanitary sewer piping and fittings required for inside drops shall be SDR 35 PVC and shall conform to the requirements of Item 900.640 Special Provision (SDR 35 PVC Sewer Pipe, All-Inclusive) as contained in the Section below entitled SANITARY SEWER SYSTEMS.

3. SUBMITTALS. Submit Fabrication drawings in accordance with Section 105 for all structures. Shop Drawings for all structures shall include structural design calculations, buoyancy calculations, and shall be stamped by a professional structural engineer, registered in the State of Vermont.

Submit an exploratory excavation plan at the preconstruction conference for review and approval. The exploratory excavation shall confirm existing pipe size, material, exact location, invert, and the status of the existing pipes, whether active or abandoned.

4. EXPLORATORY EXCAVATION REQUIREMENTS. The Contractor shall perform exploratory excavation to verify location, orientation, sizes, inverts, status of the existing sewer pipes, whether active or abandoned, and associated buried fittings of all existing sewer mains entering sanitary sewer manhole SMH #696 prior to construction of the new manhole. The Contractor shall use extreme caution to prevent damage to existing utilities. Payment for exploratory excavation for confirming existing sanitary sewer main data shall be considered incidental to Item 900.645 Special Provision (Transfer to New System, Sewer). Payment for all other required exploratory excavation, as depicted on the Plans or as directed by the Engineer, shall be made under Item 204.22 Trench Excavation of Earth, Exploratory (N.A.B.I.).

The Contractor shall perform exploratory excavation prior to ordering new precast concrete structures.

5. GENERAL CONSTRUCTION REQUIREMENTS. The excavation shall be to the depth shown on the Plans or ordered by the Engineer, and carefully shaped and graded.

If shown on the Plans, or if poor foundation material is encountered below the normal grade of the structure, material shall be removed and replaced with Granular Backfill for Structures as directed by the Engineer.

Payment for additional excavation and backfill including Granular Backfill for Structures noted above, shall be considered incidental to Item 900.620, Special Provision (Sanitary Sewer Manhole with Inside Drop, All-Inclusive) (6' I.D.).

Cast iron frames and covers for all new sanitary sewer manholes shall be adjusted to finished grade with precast concrete class 'B' risers. Adjustment utilizing brick shall not be allowed.

Channels, inverts, and floor areas for sewer manholes shall be constructed of Class A concrete conforming to Section 541. Inverts shall have the exact shape of the sewer to which they are connected and any change in size or direction shall be gradual and even. All construction of sewer manholes must be carried out to ensure watertight work. Any leaks in manholes shall be repaired to the satisfaction of the Engineer, or the entire structure shall be removed and rebuilt. Leakage testing shall be performed in accordance with CONSTRUCTION OF SANITARY SEWER MANHOLES, Part (a), Sanitary Sewer Manhole of this Section.

Sanitary sewer manholes shall be placed on a level, uniformly compacted base of Crushed Stone bedding to the extent shown on the Plans or as ordered by the Engineer.

Unless otherwise specified in the contract, all precast sections shall be rated for H-20 loading in accordance with the current AASHTO Standard Specifications for Highway Bridges.

6. CONSTRUCTION OF SANITARY SEWER MANHOLES.

- (a) Sanitary Sewer Manhole. Sanitary sewer manholes shall be precast sewer manholes of the type and diameter shown on the Plans and shall meet the requirements of Subsection 705.04 except that all barrel joints shall contain an o-ring seal. Steps shall meet OSHA requirements for new construction. The exterior of the entire manhole shall be coated with a bitumastic or other watertight sealant meeting the approval of the Town of Bennington and VTrans. All joints between pipes and the manhole shall be made using an approved watertight boot.

The cast iron frame shall be placed in a full mortar bed on the concrete grade ring and the cast iron cover shall be placed on top of the frame. Precast concrete grade rings shall be used in lieu of brick for grade adjustment as noted above. Cast iron covers with frames for sanitary sewer manholes shall have the word "SEWER" cast into the top surface.

Interior sanitary sewer piping and fittings required for inside drops shall be constructed as detailed on the plans.

Leakage tests shall be made by the Contractor and observed by the Engineer on each sanitary sewer manhole. The leakage test shall be a vacuum test or water test performed as described below.

The Contractor shall provide all necessary equipment and instrumentation required for proper completion of the testing. All tests shall be made in the presence of the Engineer. Preliminary tests made by the Contractor without being observed by the Engineer will not be accepted. The Engineer will be notified at least eight hours before any work is to be inspected or tested.

All defects shall be corrected and retested until acceptable to the Engineer. Repairs shall be made to the standard of quality specified for the entire system. Any defects that may develop in a manhole previously tested and accepted shall be promptly corrected and retested.

Test data shall be recorded on a form acceptable to the Engineer. A copy of all test data shall be submitted to the Engineer at the completion of testing.

- (b) Vacuum Test. The vacuum test shall be performed on manholes, completely constructed, with inlet and outlet pipes in place. Test shall be conducted before any backfilling begins. Any material around the base section shall be removed to expose the entire side of the manhole. Plug pinholes and horizontal seams with a non-shrinking concrete grout.

Brace the inlet and outlet pipes/plugs to prevent movement during the test. Use air inflated plugs in good condition.

The vacuum test shall be performed using equipment acceptable to the Engineer. The equipment shall be in good operating condition. All gauges shall not have any broken glass or other visible abnormalities. The test shall be performed by trained personnel familiar with the equipment and the test.

The test shall have a minimum duration of two minutes. The vacuum shall be pumped down to 10 inches of mercury on an acceptable gauge, and held. At the time the removal of air is stopped, the test time shall begin.

Any manhole that has a vacuum drop to nine inches of mercury or less, within the following time intervals, shall have failed the test.

0 - 10 ft. deep: less than 2 minutes.

10 - 15 ft. deep: less than 2-1/2 minutes.

15 - 20 ft. deep: less than 3 minutes.

over 20 ft. deep: less than T.

Calculations for manholes deeper than 20 feet:

$$T = 0.085 [DK/Q]$$

T = Time of pressure drop in seconds.

K = 0.000419 DL; but not less than 1.0.

$Q = 0.0015 \text{ ft}^3/\text{min}/\text{ft}^2$ of area.

D = Nominal manhole diameter in inches.

L = Depth of manhole in feet.

- (c) Water Test. All pipes and other openings into the manhole shall be suitably plugged and the plugs braced to prevent blowout.

The manhole shall then be filled with water to the top of the cone section. With the approval of the Engineer, a period of time may be permitted to allow for absorption. At the end of this period, the manhole shall be refilled to the top of the cone, if necessary, and the measuring time of at least four hours begun. At the end of the test period, the manhole shall be refilled to the top of the cone, measuring the volume of water added. This amount shall be converted to liters per vertical meter of depth per 24-hour day (gallons per vertical foot of depth per 24-hour day). The leakage for each manhole shall not exceed 1.0 gallon/foot/day. If leakage exceeds the allowable rate, repairs shall be made as approved by the Engineer and the manhole retested.

7. CURING AND PROTECTION. After the masonry work is completed, it shall be kept moist and protected from the elements in a satisfactory manner for a period of at least 48 hours. Concrete shall be cured in accordance with Subsection 541.17.
8. BACKFILLING. Backfilling shall not begin until the end of the curing period. Backfill material shall be approved by the Engineer and placed in layers not exceeding 6 inches in depth. Each layer shall be thoroughly tamped using mechanical tampers. Special care shall be taken to ensure adequate compaction around the inlet and outlet pipes.
9. METHOD OF MEASUREMENT. The quantities of Special Provision (Sanitary Sewer Manhole with Inside Drop, All-Inclusive) (6' I.D.) to be measured for payment will be the number of units used in the complete and accepted work.
10. BASIS OF PAYMENT. The accepted quantities of Special Provision (Sanitary Sewer Manhole with Inside Drop, All-Inclusive) (4' I.D.) will be paid at the Contract unit price per unit. Payment will be full compensation for furnishing, transporting, handling, testing, and placing the materials specified, including excavation, dewatering as required, crushed stone bedding, backfilling, compaction, concrete, concrete risers, top sections, reinforcing steel, steps, pipe, flexible rubber boots, SDR 35 PVC piping and fittings including tees, elbows, crosses, reducers, end caps, flexible rubber transition couplings, and support strapping for a complete inside drop manhole system, mortar, precast concrete grade rings, bitumastic or other watertight sealant, cast iron frame and

cover, coatings, pipe stubs, curb board, and bituminous fillets, and for furnishing all labor, tools, equipment, and all incidentals necessary to complete the work.

All excavation, excluding solid rock excavation greater than 1 cubic yard, associated with the construction and installation of Special Provision (Sanitary Sewer Manhole With Inside Drop, All-Inclusive) (6' I.D.), will not be paid for separately, but will be considered incidental to this Contract item.

Payment will be made under:

<u>Pay Item</u>	<u>Pay Unit</u>
900.620 Special Provision (Sanitary Sewer Manhole With Inside Drop, All-Inclusive) (6' I.D.)	Each

WATER SYSTEMS

1. DESCRIPTION. This work shall consist of the construction and relocation of the existing 10" ductile iron (DI) water main with a new permanent 10" DI water main supported under the new bridge within the limits indicated on the Plans.

The relocation work shall include, but is not limited to, installation of four (4) new permanent gates valves for purposes of system isolation during construction and subsequent interconnections to existing water main piping, two new additional gate valves for system pressure zone isolation and system flushing, new 6" and 8" DI water main piping, new post hydrant for flushing, construction of new 10" DI relocated water main piping connected to a new 10" DI water main supported under the new bridge. Ancillary work includes installation of two (2) water service connections to existing properties including new corporation stops and water shut offs or curb boxes, exploratory excavation, maintaining and transferring the existing system piping to the new water system piping, and removal of all existing water system piping that is no longer active.

The work under this Section shall be performed in accordance with these provisions, the Contract Plans, and Section 629 of the Standard Specifications.

2. REFERENCE STANDARDS. Information and requirements contained in these provisions are based on the most recent version of the following standards:
 - (a) AWWA/ANSI Standard C104/A21.4 for Cement-Mortar Lining for Ductile Iron Pipe and Fittings.
 - (b) AWWA/ANSI Standard C110/A21.10 for Ductile Iron Fittings.
 - (c) AWWA/ANSI Standard C111/A21.11 for Rubber Gasket Joints for Ductile Iron Pipe and Fittings.
 - (d) AWWA/ANSI Standard C150/A21.50 for the Thickness Design of Ductile Iron Pipe.
 - (e) AWWA/ANSI Standard C151/A21.51 for Ductile Iron Pipe, Centrifugally Cast.
 - (f) AWWA/ANSI Standard C153/A21.53 for Ductile Iron Compact Fittings.
 - (g) AWWA/ANSI Standard C600 for Installation of Ductile Iron Water Mains and their Appurtenances.
 - (h) AWWA Standard C651 for Disinfecting Water Mains.
 - (i) NSF standards for all materials used in the production of potable water pipe.

(j) AWWA C509 – Resilient Wedge Gate Valves – 3 Inch through 12 Inch – for Water and Other Liquids.

3. SUBMITTALS. Submit Fabrication drawings in accordance with Section 105 for all water system components including DI and copper piping, fittings, valves, post flushing hydrant, corporation stops, curb stops with extension box, pre-insulated restrained joint DI piping, urethane insulation, aluminum pipe jacketing, steel sleeves, stainless steel casing spacers, steel expansion joints, bridge pipe supports/hanger assemblies including roller supports, pipe covering protection saddles, threaded rods, beveled plate washers, nuts, and all ancillary appurtenances.

Submit manufacturers' certified data for each pipe type to be used on the project, including dimensions, specifications of pipe material, gasket material, pipe class/pressure rating, coatings, and linings.

Submit manufacturers' certified data for each type of fitting to be used on the project, including dimensions, specifications of fitting material, gasket material, class/pressure rating, coatings, linings, joint restraints, and appurtenances.

Submit an exploratory excavation plan at the preconstruction conference for review and approval. The exploratory excavation shall confirm existing pipe sizes, materials, exact locations of interconnections, and top of pipe elevations.

Submit manufacturers' certified data for the bridge mounted water main pipe and fittings including pre-insulated restrained joint DI piping, urethane insulation, aluminum pipe outer jacketing, steel sleeves, stainless steel casing spacers, steel expansion joints, bridge pipe supports/hanger assemblies including roller supports, pipe covering protection saddles, threaded rods, beveled plate washers, nuts, and all ancillary appurtenances.

Submit to VTrans, the Town of Bennington, and the Engineer, a detailed construction schedule and procedure for transferring service from the existing system to the new system including construction, flushing, testing, and disinfection of all proposed temporary water mains, services, and interconnections for maintenance of water service to users at all times during construction and shall receive approval(s) of the submittal prior to beginning work on the system.

4. QUALITY ASSURANCE. The Contractor shall be thoroughly trained and experienced in the skills and equipment required for installation and testing of water piping and appurtenances.

The Contractor shall protect water piping materials before, during and after installation. In the event of damage, the Contractor shall immediately make all repairs and replacements necessary to the approval of the Engineer and Owner at no additional cost to the Owner.

Upon direction of the Engineer, the Contractor shall remove, replace and/or rework all water piping and appurtenances that do not meet the requirements of this Section. The Contractor shall perform all remedial measures at no additional cost to VTrans.

5. MATERIALS. Materials shall meet the requirements of the following Subsections:

Sand Borrow Bedding and Blanket.....	703.03
Crushed Stone	704.02
Crushed Gravel Bedding and Blanket.....	704.05
Granular Backfill for Structures.....	704.08
Copper Water Tube, Seamless.....	740.04
Ductile Iron Pipe, Cement Lined	740.07
Pipe Insulation	740.08
Extension Service Box, Cast Iron.....	740.09
Curb Stop, Brass	740.10
Gate Valves.....	740.11
Corporation Stops	740.14
Chlorine Solution.....	742.01

Concrete shall be Class B, unless otherwise specified, and shall conform to the requirements of Section 541.

Sand borrow or sand fill used for copper water tube bedding and blanket shall meet the gradation requirements of Table 703.03A.

Crushed gravel used for ductile iron pipe bedding and blanket shall meet the gradation requirements of Table 704.05A - Fine.

The Engineer will approve corporation stops and curb stops for use on the project after consultation with the Town of Bennington, Department of Public Works, but prior to the stops being ordered by the Contractor.

Corporation stops shall be furnished and installed with heavy duty double strap, epoxy coated, service saddles.

(a) Ductile Iron Pipe

- (1) Refer to Plans for locations and sizes of various pipe types required.
- (2) Ductile Iron (DI) Water Pipe shall meet the referenced standards.
- (3) All ductile iron pipe shall be Class 52.

- (4) Pipe shall be cement mortar lined and seal coated. Cement lined minimum 1/8-inch thick.
 - (5) Pipe shall be coated on the outside with bituminous coating.
 - (6) Joint: Push-on unless otherwise noted on the Plans.
 - (7) Gaskets: All gaskets shall be nitrile rubber (NBR) (Acrylonitrile Butadiene). Gaskets made of Styrene Butadiene Rubber (SBR) shall not be acceptable.
 - (8) Mechanical joint pipe, where indicated on the Plans, shall be installed with mechanical joint restraints.
 - (9) Pipe shall be furnished in 18 to 20 foot laying lengths.
 - (10) Pipe shall be installed with three bronze conductivity wedges per joint.
 - (11) Pipe shall be manufactured by American Cast Iron Pipe Company, Atlantic States Pipe Company, U.S. Pipe and Foundry Co., or McWane Pipe Company.
 - (12) Each pipe length shall be clearly marked with the manufacturer's name or trademark, nominal pipe size, material designation, pressure class, dimensional ratio (DR), quality control code, and AWWA/ASTM designations.
- (b) Ductile Iron Fittings
- (1) Size: As shown on the Drawings.
 - (2) Minimum pressure rating: 350 psi for ductile iron fittings.
 - (3) Lining: Cement lining minimum 1/8-inch thick, ANSI A21.4/AWWA C104.
 - (4) Coating: Seal coating inside and outside, ANSI A21.4/AWWA C104.
 - (5) Joint: Mechanical joint with retainer gland, unless otherwise shown on the Plans, ANSI A21.51/AWWA C151.
 - (6) Ductile Iron Fittings Class 350; Ductile iron fittings shall be so-called compact or short-bodied fittings. Ductile Iron compact fittings AWWA C153, A21.53. Minimum wall thickness for fittings shall be equal to Class 54 ductile iron pipe for sizes 3" to 12", and Class 56 for sizes 14" to 24".

- (7) Gaskets: All gaskets shall be nitrile rubber (NBR) (Acrylonitrile Butadiene). Gaskets made of Styrene Butadiene Rubber (SBR) shall not be acceptable.
 - (8) Retainer Glands: Shall be pressure rated for 350 psi.
 - (9) All couplings shall be restrained mechanical joint solid sleeves with ductile iron long body and ductile iron glands. Sleeves, glands, and gaskets shall be of appropriate style and size for the pipes being connected.
- (c) Resilient Seated Gate Valves:
- (1) Meet or exceed requirements of AWWA C509.
 - (2) Sizes as shown on the Plans.
 - (3) Mechanical joint with retainer glands, unless otherwise shown on the Plans.
 - (4) Nonrising stem, low operating torque, wedge design, seal flow in either direction, non-chatter type valve. All interior valves shall be provided with handwheel.
 - (5) 200 psi working pressure.
 - (6) Nut operated, open right (clockwise or as required by the Town of Bennington, Department of Public Works).
 - (7) Double "O" ring seal.
 - (8) Materials of construction:
 - a. Body and Bonnet: Cast-iron or ductile-iron, smooth full diameter waterway, epoxy coated inside and out.
 - b. Stem: Bronze.
 - c. Disc Assembly Wedge: Styrene butadiene rubber (SBR) bonded to cast-iron wedge.
- (d) Valve Boxes:
- (1) All buried gate valves, including tapping valves, shall be provided with valve boxes.
 - (2) Boxes shall be cast iron, heavy pattern, sliding adjustable type with cast iron cover.

- (3) The upper section shall have a flange to prevent settling.
 - (4) Boxes shall have barrels not less than 5 inch inside diameter and lengths adapted to valve design. The barrels shall lap at least 6 inches when in the most extended position.
 - (5) The word "WATER" shall be cast into the cover.
 - (6) Valve box alignment devices shall be provided for all buried valves. The device shall be of HDPE and colored white. It shall be furnished in two pieces that will lock together under the operating nut without requiring the removal of the operating nut. The device shall not affect the operation of the valve. No one-piece device will be accepted.
- (e) Post Flushing Hydrant
- (1) Post hydrant for flushing shall be self-draining , non-freezing, compression type with a 2-3/16" main valve opening and a 1½" pentagon operating nut. All principle working parts shall be brass.
 - (2) Inlet connection shall be 4" mechanical joint (MJ). The full-port outlet nozzle shall be 2-1/2" National Standard Thread (NST). Outlet nozzle shall be furnished with cap and chain.
 - (3) All water flow shall pass thru a 3-1/2" diameter, 14mm thick fusion bonded epoxy (FBE) coated steel pipe or barrel, and cast iron top stock hydrant waterway. Barrel shall be FBE coated both internally and externally. Post hydrant shall be NSF/ANSI 372 certified.
 - (4) All working parts shall be serviceable from above ground with no excavation or replacement needed. Exposed parts of hydrant and barrel shall be painted red.
 - (5) Minimum post hydrant height including required barrel length above and below finish grade shall be as detailed on the Drawings.
- (f) Curb Stops, Corporation Stops, and Fittings
- (1) O-rings: All O-rings shall be nitrile rubber (NBR) (Acrylonitrile Butadiene). O-rings made of Styrene Butadiene Rubber (SBR) shall not be acceptable.
 - (2) Conforms to the Safe Drinking Water Act (SDWA), NSF/ANSI 61, and NSF/ANSI 372.

- (g) Extension Service Boxes or Curb Boxes
 - (1) Extension service boxes or curb boxes shall be Erie Style.
- (h) Water Main on Bridge
 - (1) Rigid restrained joint pipe and fittings shall be U.S. Pipe Mech-Lok™, U.S. Pipe TR Flex™, McWane Super-Lock®, McWane TR Flex®, or approved equal.
 - (2) Rigid restrained joint pipe shall be Class 52, cement lined with seal coating inside and outside.
 - (3) Rigid restrained pipe joints shall be furnished and installed for the required number of joints back from each fitting, as required by the Plans and details, regardless of the pipe material type.
 - (4) Flanged Pipe
 - a. Pipe; AWWA C115; A21.51; size as shown on Plans.
 - b. All flanged joints shall be 125 lb. standard with neoprene rubber gaskets, minimum 1/8-inch thick.
 - (5) Urethane Insulation
 - a. The water pipes shall be pre-insulated with a factory installed, void free, polyurethane foam insulation.
 - b. Pipe insulation shall be 3-inch thick polyurethane foam insulation. Insulated pipe shall be installed with an aluminum lock seam outer jacket. Outer jacket shall be as supplied and installed by the insulation manufacturer.
 - c. Form fitting insulation and jacket kits shall be used to field insulate jacket bends and other fittings, according to manufacturer's recommendations.
 - d. Insulated pipe joints shall be completed with the use of prefabricated urethane half shells and a pre- rolled sheet stock of the same material and gauge as the outer jacket.
 - e. Urethane insulation and outer jacket shall be manufactured and applied by Urecon, the equivalent manufactured by Insul-Tek, or approved equal.

- (6) Steel Sleeves; Steel sleeves or casings pipe shall conform to the requirements of these provisions, the Plans, and Section 625 of the Standard Specifications. Smooth walled steel sleeves shall be as follows:
- a. Sleeve for new water main piping.
 - b. Smooth walled steel sleeve diameter shall be 20" (Outside Diameter).
 - c. Smooth walled steel sleeve shall be new plain steel pipe with a minimum wall thickness of 0.375 inches. The sleeve shall conform to ASTM A 139 and shall have minimum yield strength of 35,000 PSI.
 - d. Carrier pipe shall be 10" diameter, Class 52 ductile iron.

- (7) Casing Spacers: Following installation of the sleeve, casing spacers shall be installed on the carrier pipe prior to the carrier pipe being inserted into the sleeve. Casing spacers shall be spaced a maximum of 2 feet apart along the length of the carrier pipe with one casing spacer within 2 feet of each side of a pipe joint and the rest evenly spaced.

Casing Spacers shall have the following material properties:

- a. Shell: 14 gauge, T-304 stainless steel.
- b. Risers: 10 gauge, T-304 stainless steel
- c. Fasteners: T-304 stainless steel
- d. Liner: 0.090 thick PVC
- e. Runners: Ultra high molecular weight polyethylene.

Casing spacers shall be Cascade Casing Spacers by Cascade Waterworks Manufacturing Co., PSI Ranger II casing spacers by Pipeline Seal and Insulator, Inc., or approved equal.

- (8) Expansion Joints: Thermal expansion joints shall be Ford Meter Box Company, Single Steel Expansion Joint (FEJ1 Style), EBAA Iron Works (Ex-Tend 200, Series 210-F1), or approved equal.
- (9) Pipe Supports (Hanger Assemblies)

- a. Rigid restrained joint pipe and fittings for the new permanent water main shall be supported from the new bridge superstructure with pipe supports, otherwise referred to as hanger assemblies.
- b. Pipe supports, or hanger assemblies, shall be installed in locations as depicted on the plans.
- c. All structural steel for pipe supports shall conform to AASHTO M270M/M270, Grade 50. All structural steel for pipe supports shall be hot-dip galvanized in accordance with AASHTO M III and M 232.
- d. Pre-insulated rigid restrained joint pipe and outer aluminum jacket shall be supported with one (1) adjustable pipe roller support installed on the bottom of the pipe's outer jacket, pipe covering protection saddles, galvanized threaded rods, nuts, U-Bolts, washers, and beveled washers per the details depicted on the plans.
- e. Pipe roller supports shall be hot-dip galvanized as manufactured by B-Line (B3114 Series), Anvil International (Figure 171), or approved equal.
- f. Pipe covering protection saddles shall be stainless steel as manufactured by B-Line (B3164 Series), Anvil International (Figure 164), or approved equal.

(10) Curtain Wall Utility Sleeve

- a. Steel Utility Sleeve through bridge curtain wall shall be galvanized with a continuous welded water stop.
- b. Sleeve for new water main piping. Carrier pipe shall be 10" diameter, Class 52 ductile iron.
- b. Smooth walled steel sleeve diameter shall be as required (minimum 16" inside diameter).
- c. Smooth walled steel sleeve shall be new plain steel pipe with a minimum wall thickness of 0.375 inches. The sleeve shall conform to ASTM A 139 and shall have minimum yield strength of 35,000 PSI.
- d. Carrier pipe shall be 10" diameter, Class 52 ductile iron.

6. GENERAL. Care shall be exercised by the Contractor to avoid disrupting the operation of existing water facilities without prior written approval of the Engineer.

When existing underground utilities, which are not scheduled for removal or abandonment, are encountered in the excavation, they shall be adequately supported and protected from damage. Any damage to utilities shall be repaired promptly in accordance with Subsection 107.13 at no additional cost to VTrans.

Any work associated with existing water lines or appurtenances shown on the Plans to be temporarily relocated to maintain service, removed, or abandoned in place shall be performed as an incidental item of construction unless specifically noted otherwise.

The Contractor shall be responsible for the unloading, storing, hauling, and distribution of all materials. All such material that is damaged, destroyed, or lost during and after unloading shall be replaced at the Contractor's expense. All pipe, pipe fittings, and accessories shall be handled so as to avoid shock. Pipe having factory-applied joint material shall be stacked and blocked to prevent damage to the joint material. Material not needed for immediate use shall be stored in a safe manner at locations selected by the Contractor and approved by the Engineer.

The Engineer will approve the location of all pipes.

7. EXCAVATION. Where the pipe is to be laid below the existing ground line, a trench shall be excavated to the required depth and to a width sufficient to allow for joining of the pipe. The bedding and backfill material under and around the pipe shall be compacted according to the applicable material specification. Where feasible, trench walls shall be vertical.

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

If shown on the Plans, or if poor foundation material is encountered below the normal grade of the pipe bed, material shall be removed and replaced with Granular Backfill for Structures as directed by the Engineer.

Ledge rock, rocky or gravelly soil, hardpan, or other unyielding foundation material encountered at the normal grade of the pipe bed shall be removed and replaced with Granular Backfill for Structures. The width of the pipe bed shall be equal to the inside diameter of the pipe plus 36 inches. The minimum depth shall be 12 inches below the pipe grade, unless otherwise shown on the Plans or directed by the Engineer.

Payment for additional excavation and backfill including Granular Backfill for Structures noted above, shall be considered incidental to Item 900.640, Special Provision (Ductile Iron Pipe, Cement Lined, All Inclusive) and Item 900.640, Special Provision (Seamless Copper Water Tube, All Inclusive), respectively.

No tunneling will be permitted except by written approval of the Engineer. Permission to tunnel will be granted only in short sections where, in the opinion of the Engineer, the pipe can be safely and properly installed and the backfill properly compacted.

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

Accumulated water, ice, and snow shall be promptly removed and disposed of by pumping or other approved means. Disposal shall be carried out in a manner which will not create a hazard to public health; cause injury to public or private property, work completed or in progress, or public streets; or cause any interference in the use of streets and roads by the public. Pipes under construction shall not be used for drainage of excavations.

Where pipes are to be placed in embankment fill, the excavation shall be made after the embankment has been completed to a height of 1 m (3 feet) plus one pipe diameter above the designed grade of the pipe.

Sheeting and bracing required for trenches shall be removed to the elevation of the pipe, but no sheeting will be allowed to be pulled, removed, or disturbed below the pipe.

8. BEDDING FOR PIPE. Ductile iron pipe shall be laid on suitable soil and backfilled and compacted with select material per the details depicted on the plans. Select material shall be crushed gravel meeting 704.05A - Fine.

Copper piping shall be bedded and covered with sand meeting 703.03A per details depicted on the plans.

Concrete cradle bedding shall be installed on approved subgrades when shown on the Plans or directed by the Engineer.

9. LAYING PIPE. Installation of all water lines shall be in accordance with ANSI/AWWA C 600, "Ten States Standards," and as specified.

Pipe laying shall begin at the outlet end. The lower segment of the pipe shall be in contact with the shaped bedding throughout its full length. Bell or grooved ends of rigid pipes and the circumferential laps of flexible pipe shall be placed facing upstream. The longitudinal laps or seams of flexible pipe shall be at the sides.

All pipe and fittings shall be carefully examined for defects, and no pipe or fittings that are known to be defective shall be laid. If any defective piece is discovered after laying, it shall be removed

and replaced at the Contractor's expense. All pipes and fittings shall be cleaned before they are laid and shall be kept clean until accepted in the completed work.

The pipe shall be laid to conform to the lines and grades indicated on the Plans or as directed by the Engineer. Each pipe shall be so laid as to form a closed joint with the next adjoining pipe and to bring the inverts continuously to the required grade. Pipe deflections shall not exceed manufacturer's recommendations.

Each length of pipe shall be driven home against the pipe previously laid and held securely in position. Joints shall not be "pulled" or "cramped."

Before any joint is made, the pipe shall be checked to ensure that a closed joint with the next adjoining pipe has been maintained and that the inverts are matched and conform to the required grade. The pipe shall not be driven down to grade by striking it.

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

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

The use of concrete reaction blocking shall be limited to caps, tees, valves, hydrants, and bends of 22.5 degrees and greater. Blocking shall be placed only on the sides of each fitting in the direction of thrust and not underneath for use as a foundation or support. All other bends less than 22.5 degrees shall be restrained by use of retainer glands at each bend and at all joints within three pipe lengths on each side of the bend with ductile iron pipe joint restraint harnesses.

Separation of water mains and sewers shall conform to the requirements of Special Provision (Sanitary Sewer Systems).

10. JOINING PIPE. Water pipe shall be joined in accordance with the detailed instructions of the manufacturer.

Where recommended by the manufacturer, the Contractor shall furnish coupling pullers for joining the pipe. Gasket feeler gauges shall be available for use by the pipe layer and the Engineer for checking the position of the rubber gaskets in the completed joint, if so directed by the Engineer.

The electrical conductivity of the pipeline and attached services shall be maintained at all joints, couplings, valves, and fittings through the use of three brass wedges at each joint, or with conduction straps. No couplings shall be made at any point on the pipeline or attached services without incorporating provisions to maintain electrical conductivity.

Any fittings showing a crack, and any fitting or pipe which has received a severe blow that may have caused a fracture, even though no such fracture can be seen, shall be marked as rejected and removed at once from the work.

Water pipe shall be cut by means of a handsaw, "metal-inserted" abrasive wheels, or by pipe cutters with blades, not rollers, doing the cutting. All cut ends shall be examined for possible cracks caused by cutting.

11. WATER MAIN ON BRIDGE.

Construction Requirements: This work shall include the installation, testing, and disinfection of a new 10" water main on the new bridge within the limits indicated on the Plans.

The Contractor shall install the new pre-insulated water main and pipe supports/hanger assemblies beneath the bridge decking and sidewalk, located in the south bay as depicted on the Drawings, and installed accurately in a straight line and grade between two steel utility sleeves cast into the curtain walls of Abutment #1 and Abutment #2 at the locations and grades depicted on the plans, profiles, and details.

The steel and hardware used to attach the water main to the new bridge shall be galvanized or metalized in accordance with Subsection 506.15 of the Standard Specifications. Any galvanized or metalized surface damaged by welding or other causes during the installation of the water main shall be cleaned and painted in accordance with Subsection 513.06, part (f).

The Contractor shall adjust the rigid restrained joint DI water main pipe so that a pipe joint does not occur within 2 feet of any pipe support/hanger assembly. In order to prevent rain and other forms of moisture from penetrating the jacket, the Contractor shall seal all joints in the insulation and jacket with suitable mastics or other sealants which will maintain a waterproof seal.

DI water main pipe and fittings which are installed beyond the ends of the two - 20" steel sleeves shall be pre-insulated until the new pipe reaches a buried depth of 6' - 0" as depicted on the Profile. Payment for this additional pre-insulation of the two piping segments shall be considered incidental to Item 900.645 Special Provision (Water Main on Bridge)(10").

All work shall conform to these provisions, the Contract Plans, Profiles, and Details, and Section 629 of the Standard Specifications.

12. SETTING OF VALVES AND FITTINGS. Valves, fittings, plugs, and caps shall be set and joined to pipe in the manner specified above for laying and joining pipe.

Gate valves, including tapping valves, shall have nut operation, open right (clockwise), unless otherwise specified by the Town of Bennington.

A valve box shall be provided for every valve.

A valve box shall be provided for every valve that has no gearing or operating mechanism or in which the gearing or operating mechanism is fully protected with a gear case. The valve box shall not transmit shock or stress to the valve and shall be centered and plumb over the wrench nut of the valve, with the box cover flush with the surface of the finished pavement or other such level as directed by the Engineer.

All gate valves shall be installed with concrete valve anchorage restraint as detailed on the Drawings.

Mains shall be drained through drainage branches or blowoffs to dry wells from which the water can be pumped. Drainage branches, blowoffs, hydrants, air vents, and appurtenances shall be provided with valves and shall be located and installed as shown on the Plans.

Drainage branches or blowoffs shall not be connected to any sewer, submerged in any stream, or be installed in any other manner that will permit back siphonage into the distribution system.

All dead ends of new mains shall be closed with plugs or caps; such dead ends shall be equipped with suitable blowoff facilities.

Corporation stops shall, in all instances, be tapped into the main on the side and at the 10 o'clock or 2 o'clock position. Four inches of rigid insulation shall be installed per the details above the copper water service piping at the gooseneck from the corporation stop in instances where there is less than the minimum of 6 feet of cover over the connecting service line. The main shall be tapped by skilled workers and the stop installed in accordance with the manufacturer's recommendations at the locations shown on the Plans or as directed the Engineer. The stops may be installed at a later date, at which time the main may be tapped under pressure. All defective taps shall be repaired or replaced at the Contractor's expense.

Prior to installation, the Contractor shall thoroughly clean all exposed portions of any valves, removing all labels and all traces of foreign substance using only a cleaning solution approved by the manufacturer of the valve and being careful to avoid all damage to surfaces and coatings.

13. SETTING OF POST FLUSHING HYDRANTS. Post flushing hydrants, herein referred to as post hydrants, shall be located as shown on the Plans or as directed so by the Engineer as to provide complete accessibility and minimize the possibility of damage from vehicles or injury to pedestrians.

When placed behind the curb, the post hydrant barrel shall be set so that no portion of the hose nozzle cap is less than 6 inches or more than 12 inches from the gutter face of the curb.

When set in the lawn space between the curb and the sidewalk, or between the sidewalk and the property line, no portion of the post hydrant or nozzle cap shall be within 6 inches of the sidewalk.

All post hydrants shall stand plumb and shall have their discharge piping oriented per the direction of the Engineer. Post hydrants shall be set to the established grade, with discharge piping set at least 24 inches above the ground, as shown on the Drawings or as directed by the Engineer.

Each post hydrant shall be connected to the main with a 4-inch branch controlled by an independent gate valve, unless otherwise specified.

All post hydrants shall be set with a drainage pit (3 feet × 3 feet by 1.5 feet deep). The drainage pit shall be excavated below each post hydrant and backfilled with ¾" crushed stone, and compacted under and around the elbow of the post hydrant to a level of 6 inches above the waste opening. No drainage pit shall be connected to a sewer.

Concrete thrust restraint shall be provided as detailed on the Drawings.

14. ANCHORAGE. The bowl of each hydrant or blow-off shall be well braced against unexcavated earth at the end of the trench with concrete backing, or the hydrant shall be tied to the pipe with suitable metal tie rods or clamps as shown on the Plans or directed by the Engineer.

All plugs, caps, tees, and bends, unless otherwise specified, shall be provided with a reaction backing, or movement shall be prevented by attaching suitable metal rods or clamps as shown or specified.

Concrete reaction backing shall be placed between solid ground and the fitting to be anchored; the area of bearing on the pipe and on the ground in each instance shall be that shown on the Plans or directed by the Engineer. The backing shall, unless otherwise shown or directed, be placed in such a manner as to contain the resultant thrust forces in such a way that the pipe and fitting joints will be accessible for repair.

Concrete for reaction backing shall be plant batched, poured in place, concrete. Thrust blocks shall not be backfilled within one (1) hour of being poured to allow sufficient time for setting of the concrete. Onsite mixed concrete is not acceptable.

A metal harness of tie rods or clamps of adequate strength to prevent movement may be used instead of concrete backing, as directed by the Engineer. Steel rods or clamps shall be galvanized or otherwise rustproofed, or shall be painted as shown or directed by the Engineer.

15. PRESSURE AND LEAKAGE TESTS. Except as otherwise directed, all pipelines shall be tested. Pipelines laid in excavation or bedded in concrete shall be tested prior to field painting. Pipe to be insulated shall be tested prior to installing insulation.

The Contractor shall furnish all gauges, testing plugs, caps, and all other necessary equipment and labor to perform leakage and pressure tests in sections of an approved length. Each valved section or a maximum length of 1000 feet of pipe shall be tested. The Contractor shall provide and bear the costs of any additional taps to the waterline necessary to perform the pressure and leakage test between valves.

All water required for testing shall be potable. All testing shall be conducted in the presence of the Engineer.

Potable water required for flushing and testing shall be furnished by the Owner at no cost to the Contractor.

The Contractor shall make the necessary provisions to tap the pipe at the high point to release all air and shall plug the pipe after completing the test. Hydrants or blowoffs located at high points may be used for air release instead of taps if approved by the Engineer.

For the pressure test, the Contractor shall develop and maintain for two hours, 150 percent of the working pressure measured in kilopascals (pounds per square inch). Failure to hold the designated pressure for the two-hour period will constitute a failure of the section tested.

The leakage test shall be performed for a duration of two hours, only after the pressure test has been satisfactorily completed. During the leakage test, the Contractor shall measure the quantity of water required to maintain the maximum operating pressure of the main. Leakage shall not exceed allowable values for leakage as presented in ANSI/AWWA C 600 latest revision. All testing shall be conducted in accordance with ANSI/AWWA C600 latest revision.

Allowable leakage shall be calculated based on the following formula:

$$L = (SD \sqrt{P}) / (148,000) \text{ where:}$$

L = the allowable leakage in gallons per hour.

S = the length of pipe being tested in feet.

D = the nominal diameter of the pipe in inches.

P = the average test pressure in psi (gauge).

Should any section of pipe fail either the pressure or leakage test, the Contractor shall do everything necessary to locate and repair or replace the defective pipe, fittings, or joints at no expense to VTrans.

If for any reason the Engineer should alter the foregoing procedure, the Contractor shall remain responsible for the tightness of the line within the above requirements.

16. DISINFECTING. Before being placed in service, the pipeline, valves, hydrants, etc., shall be chlorinated in accordance with ANSI/AWWA C651, latest revision. The entire procedure of chlorinating the pipes shall be approved by the Engineer two weeks prior to the time the work is to be done. The methods to be employed shall be fully satisfactory to the Engineer before they are applied. The location of chlorination and sampling points is to be determined by the Engineer in the field.

The Contractor may employ the new permanent post flushing hydrant where depicted on the Plans for temporary flushing. The orifice size required for all temporary flushing connections shall be in accordance with AWWA C651, Disinfecting Water Mains (Latest Edition). The Contractor shall also install three (3) new temporary 1" chlorination injection points (CIP) and one (1) permanent manual air release at all water main interconnection points.

The general procedure for chlorination shall be to first flush out the lines until all dirty or discolored water has disappeared, then to apply the chlorine in approved dosages through a tap at one end of the line while water is being drawn at the other extremity of the line until the entire line contains chlorine solution. The chlorine solution shall remain in the pipeline for a period of 24 hours.

Within 24 hours following the chlorination period, all treated water shall be flushed from the lines or portions thereof at their extremities and replaced with water from the distribution system.

Special disinfecting procedures shall be used as directed by the Engineer where the above outlined method is not practical, and when making connections to existing mains. The Contractor shall provide all necessary apparatus, materials, and labor for disinfecting the mains and shall make the required taps for this purpose. Disinfection of the mains shall be under the immediate direction of the Engineer during all phases of the work.

Prior to being placed in operation for domestic use, all new portions of the system shall be flushed, pressure tested, disinfected, and flushed again. Following this procedure, at least two water samples shall be collected from representative sample points and sent to the Vermont Department of Health Laboratory's Division of Environmental Health, or other testing laboratory approved by the Vermont Department of Health, for bacteriological testing. Passing sample results are required before the system may be placed on-line for drinking. Sample bottles shall be obtained from the same laboratory.

17. PRELIMINARY FIELD INSPECTION OF HOUSE SERVICE CONNECTIONS. Sizes, materials, and locations of all existing water services as depicted on the drawings are based solely on the best available information. This information has not been verified by field inspections. The Contractor shall be required to perform exploratory excavation as indicated in the Exploratory Excavation Plan and per the direction of the Engineer on each existing lateral water service. The exploratory excavation shall confirm existing pipe size, material, exact location, and the status of the existing pipe, whether active or abandoned. Payment for water service exploratory excavation shall be made under Item 204.22 Trench Excavation of Earth, Exploratory (N.A.B.I.).

If exploratory excavation reveals that new service connections will be located in conflict with other proposed infrastructure, including to but not limited to, drainage pipes, catch basins, utility ducts, transformers, and pedestals, the Contractor shall notify the Engineer before construction of the service connection. No additional compensation will be made to the Contractor to mitigate conflicts due to the Contractor's failure to forecast these conflicts.

18. HOUSE CONNECTIONS. New lateral water service lines shall be installed to all existing buildings as depicted on the Plans. New water service lines as depicted on the Plans shall be installed prior to isolation of the existing 10" water main for bridge demolition. Service lines disrupted within the construction limits shall be replaced as ordered by the Engineer. The actual location of each ordered house connection shall be determined in the field by the Engineer as noted above.

All service lines shall be seamless copper water tube from the corporation stop to the curb stop. The copper tubing shall be attached to the corporation stop and curb stop in a manner satisfactory to the Engineer. Sufficient slack shall be left adjacent to the corporation stop and curb stop to prevent damage to the copper tubing by movement of the pipeline. Care shall be exercised in the placing and laying of copper tubing to be sure that the pipe does not have kinks or lie directly on a sharp stone or ledge which would cause damage to the pipe. The Contractor shall place 6 inches of selected material as approved by the Engineer, adjacent to, above and below the tubing.

In making cuts in copper service pipe, a hacksaw, preferably used with a miter box, shall be used to cut the tubing. A cutter or tool designed for tube cutting may also be used. The tubing shall be reamed, and after placing the coupling nut on the pipe, the pipe shall be flanged, using a flanging tool designed particularly for this purpose.

All services shall be tested for leakage, and in all instances, the corporation stop shall be left in the open position upon completion of the installation.

19. BACKFILLING.

- (a) General. Immediately prior to backfilling, all debris, forms, and similar materials shall be removed from the excavation. Backfilling shall not be done in freezing weather, with frozen materials, or when materials already placed are frozen.
- (b) Pipe Bedding Area. Prior to laying pipe, bedding material shall be placed to the limits of the excavation and to a depth beneath the pipe as specified. This material shall be per the details depicted on the plans. The Engineer may direct the use of material meeting the requirements for Granular Backfill for Structures when required and as noted above. As the pipe is laid, bedding material shall be extended to the spring line of the pipe and leveled along the width of the trench. The pipe installation is to be inspected and approved by the Engineer before being covered.
- (c) Pipe Envelope Area. The pipe envelope consists of selected suitable material placed from the spring line of the pipe to a depth of 12 inches over the top of the pipe. The material shall be carefully placed and spread over the width of the trench and compacted using an approved tamper.

\The Contractor shall take necessary precautions during placement and compaction of the bedding and pipe envelope materials to prevent either damage to or displacement of the pipe.

- (d) Above Envelope Area. Unless otherwise shown on the Plans, material used for backfilling trenches above the envelope area (and below the Subbase of Dense Graded Crushed Stone under roadways) shall be suitable material that was removed during excavation, or obtained from borrow, and when compacted shall make a dense stable fill. The material shall not contain vegetation, porous matter, or stones larger than 6 inches in the widest dimension. If additional material is required, it shall be furnished from approved sources.

Backfill material shall be evenly spread and compacted in lifts not more than 12 inches thick or as approved by the Engineer. Previously placed or new materials shall be moistened by sprinkling, if required, to ensure proper bond and compaction.

Whatever method of compacting backfill is used, care shall be taken that stones and lumps shall not become nested and that all voids between stones shall be completely filled with fine material.

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

Around all structures, under roadway paving, shoulders, and embankments	95 percent
All other areas	90 percent

Backfill material shall be compacted to the following percentages of maximum dry density and the in-place moisture content shall be not more than 2 percent above the optimum moisture content as determined in accordance with AASHTO T 180, Method C:

20. CONSTRUCTION/INSTALLATION REQUIREMENTS. All temporary water system shutdowns required for completion of water main interconnections at Valves V1, V3, and V4, including cutting existing water main piping and installing new piping, couplings, gate valves, pipe restraints and end caps, shall be completed at night between 11:00 pm and 3:00 am unless provided prior written approval by the Town of Bennington, or the Engineer.
21. WATER SYSTEM TRANSFER. The Contractor shall maintain existing water service during construction of the new water distribution mains and during the connection of the new system to the existing system. The Contractor shall submit to VTrans, the Town of Bennington, and the Engineer, and where required, to the Vermont Department of Health, a detailed construction schedule and procedure for transferring service from the existing system to the new system including construction, flushing, testing, and disinfection of all proposed temporary water mains, services, and interconnections for maintenance of water service to users at all times during construction, and shall receive approval(s) of the submittal prior to beginning work on the system.

The proposed temporary water maintenance plan configuration does not, and is not intended to, cover all requirements for maintaining temporary water main service and is provided to assist the contractor in developing his or her comprehensive maintenance of water flows plan. See the Contract Plans for a suggested construction sequence for maintenance of existing water flows.

All temporary water mains, services, and interconnections for maintenance of water service shall be constructed, flushed, tested, and disinfected in accordance with all sections of this Special Provision.

Prior to making the transfer, the Contractor shall notify the owner and the Engineer three days in advance in writing that the system is ready to be transferred.

In the event of a planned temporary water service shutdown, the contractor shall notify all customers to be temporarily out of water a minimum of 48 hours prior to the shutdown activity. At no time shall a customer be without water for more than 4 hours.

All temporary water system shutdowns required for completion of water main interconnections, including cutting and capping existing water main piping, must be performed during the nighttime hours between 11:00 pm and 3:00 am unless provided prior written approval by the Town of Bennington, or the Engineer, with the following exception:

Water main interconnection at Main Street and Beech Street for installation of valve V2 shall be completed during daytime working hours between 9:00 am and 1:00 pm.

As noted above, the Contractor shall perform exploratory excavation as indicated in the exploratory excavation plan and per direction of the Engineer on each existing lateral water service. The exploratory excavation shall confirm existing pipe size, material, and exact location.

After the new water mains are constructed, flushed, pressure tested, and disinfected, the Contractor shall divert the water to the new water mains, and remove inactive existing system piping as shown on the Plans or directed by the Engineer.

22. METHOD OF MEASUREMENT. The quantity of Special Provision (Extension Service Box and Curb Stop, All-Inclusive), of the size specified, to be measured for payment will be the number of units installed in the complete and accepted work.

The quantity of Special Provision (Corporation Stop, All-Inclusive), of the size specified, to be measured for payment will be the number of units installed in the complete and accepted work.

The quantity of Special Provision (Gate Valve with Valve Box, All-Inclusive), of the size specified, to be measured for payment will be the number of units of each size and type specified installed in the complete and accepted work.

The quantity of Special Provision (Permanent Manual Air Release, All-Inclusive) to be measured for payment will be the number of units installed in the complete and accepted work.

The quantity of Special Provision (Post Flushing Hydrant, All-Inclusive) to be measured for payment will be the number of units installed in the complete and accepted work.

The quantity of Special Provision (Seamless Copper Water Tube, All-Inclusive), of the size specified, to be measured for payment will be the number of linear feet installed in the complete and accepted work, as measured along the flow line of the pipe.

The quantity of Special Provision (Ductile Iron Pipe, Cement Lined, All-Inclusive), of the size specified, to be measured for payment will be the number of linear feet installed in the complete and accepted work, as measured along the flow line of the pipe.

The quantity of Special Provision (Water Main on Bridge) (10") to be measured for payment will be on a unit basis for each permanent water main installation constructed on a bridge in the complete and accepted work.

The quantity of Special Provision (Transfer to New System, Water) to be measured for payment will be on a lump sum basis for each transfer in the complete and accepted work.

23. BASIS OF PAYMENT. The accepted quantity of Special Provision (Extension Service Box and Curb Stop, All-Inclusive), of the size specified, will be paid for at the Contract unit price per each. Payment will be full compensation for the furnishing, transporting, handling, installing, and connecting the curb stop, and for furnishing all labor, tools, equipment, excavation, dewatering as required, backfill, and all incidentals necessary to complete the work.

The accepted quantity of Special Provision (Corporation Stop, All-Inclusive), of the size specified, will be paid for at the Contract unit price per each. Payment will be full compensation for the furnishing, transporting, handling, installing, and connecting the corporation stop including drilling and tapping of the water main, and for furnishing all labor, tools, equipment, excavation, dewatering as required, backfill, and all incidentals necessary to complete the work.

The accepted quantity of Special Provision (Gate Valve with Valve Box, All-Inclusive), of the size specified, will be paid for at the Contract unit price per each. Payment will be full compensation for the furnishing of all labor, tools, equipment, excavation, dewatering as required, backfill, valve, valve box, mechanical joint retainer glands, concrete valve anchor restraint, valve box alignment devices, and all incidentals necessary to complete the work.

The accepted quantity of Special Provision (Permanent Manual Air Release, All-Inclusive) will be paid for at the Contract unit price per each. Payment will be full compensation for furnishing, transporting, handling, installing, and connecting the corporation stop including drilling and tapping of the water main, connecting the curb stop with rod, copper water tubing, valve box and cover, fittings, couplings, end caps, piping extensions where required, testing, and disinfecting the materials specified, and for furnishing all labor, tools, equipment, excavation, dewatering as required, backfill, and all incidentals necessary to complete the work.

The accepted quantity of Special Provision (Post Flushing Hydrant, All-Inclusive) will be paid for at the Contract unit price per each. Payment will be full compensation for the furnishing of all labor, tools, equipment, including all excavation, dewatering as required, backfill, compaction, post flushing hydrant including barrel, fittings, couplings, hydrant extensions where required, drainage aggregate, concrete thrust restraint, metal tie rods and clamps, hydrant rotation for correct alignment as required, for painting of post hydrant and barrel, and for all incidentals necessary to complete the work.

Payment for cement lined ductile iron spools or nipples, and gate valve associated with installation of the post flushing hydrant shall be made under the respective Contract item.

The accepted quantity of Special Provision (Seamless Copper Water Tube, All-Inclusive), of the size specified, will be paid for at the Contract unit price per linear foot. Payment will be full compensation for furnishing, transporting, handling, installing, testing, and disinfecting the materials specified, including fittings and clamps; for making all necessary connections; for furnishing and installing all required fittings including elbows, tees, reducers, and couplings as required; and for furnishing all tools, labor, equipment; for sawcutting pavement and existing concrete roadway, excavation, dewatering as required, sand bedding and cover, pipe insulation, all backfill including sand borrow and subbase of dense graded crushed stone to the depths depicted on the roadway typical cross section, compaction, and all incidentals necessary to complete the work.

All excavation, excluding solid rock and boulders greater than 1.0 cubic yards, bedding and blanket materials, backfill operations, and disposal of excavated material not suitable for backfill for all Copper Water Tube of the type and size specified under this Section, will not be paid for separately, but will be considered incidental to the respective Contract item.

For all new water piping noted above; when additional excavation and backfill is required to replace poor foundation material below the normal grade of the pipe, payment for additional excavation and backfill, including excavation support, bedding and cover, backfill operations, disposal of excavated material not suitable for backfill and Granular Backfill for Structures as noted above will not be paid for separately, but will be considered incidental to Item 900.640, Special Provision (Seamless Copper Water Tube, All-Inclusive), respective of the copper water pipe size specified.

The accepted quantity of Special Provision (Ductile Iron Pipe, Cement Lined, All-Inclusive), of the size specified, will be paid for at the Contract unit price per linear foot. Payment will be full compensation for furnishing, transporting, handling, installing, testing, and disinfecting the materials specified, including temporary chlorination injection points, temporary blow-offs for flushing, for all fittings and clamps; for making all necessary connections; for furnishing and installing all required fittings including elbows, tees, reducers, end caps, and couplings as required including mechanical joint retainer glands; for furnishing and placing concrete or other materials for reaction backing or furnishing and installing tie rods, clamps, and restrained joints including ductile iron pipe joint restraint harnesses; and for furnishing all tools, labor, equipment; for sawcutting pavement and existing concrete roadway, excavation, dewatering as required, crushed gravel bedding, pipe insulation, all backfill including subbase of dense graded crushed stone, compaction, and all incidentals necessary to complete the work.

All excavation, excluding solid rock and boulders greater than 1.0 cubic yards, bedding and blanket materials, backfill operations, and disposal of excavated material not suitable for backfill for all Ductile Iron Pipe of the type and size specified under this Section, will not be paid for separately, but will be considered incidental to the respective Contract item.

For all new water piping noted above; when additional excavation and backfill is required to replace poor foundation material below the normal grade of the pipe, payment for additional excavation and backfill, including excavation support, bedding and cover, backfill operations, disposal of excavated material not suitable for backfill and Granular Backfill for Structures as noted above will not be paid for separately, but will be considered incidental to Item 900.640, Special Provision (Ductile Iron Pipe, Cement-Lined, All-Inclusive), respective of the ductile iron pipe size specified.

The accepted quantity of Special Provision (Water Main on Bridge)(10”) will be paid for at the Contract lump sum price. Payment will be full compensation for providing, supporting, and installing the new water main on the bridge and to the limits depicted on the Contract Plans, including rigid restrained joint pipe, flanged pipe, expansion joints, fittings, urethane insulation with aluminum outer jacket, steel sleeves, casing spacers, casing end seals, galvanized steel utility sleeves with continuous welded water stop, pipe hanger assemblies; for providing, installing, and sealing pipe insulation and jacket as necessary; additional pre-insulation beyond each end of the Limits of Payment as depicted on the Profile; for conducting pressure and leakage tests; for disinfecting the system; for excavation and backfill, and for furnishing all labor, tools, equipment, and incidentals necessary to complete the work.

Payment will be made as follows:

A payment of 90% of the Contract lump sum price will be made when the new permanent water main has been installed on the new bridge, all necessary adjustments have been made, all tests have been successfully completed, and the line has been placed in service to the satisfaction of the Engineer.

The remaining 10% of the Contract lump sum price will be paid once the new water main has provided continuous trouble-free service for a period of 30 calendar days as determined by the Engineer.

The accepted quantity of Special Provision (Transfer to New System, Water) will be paid for at the Contract unit price per lump sum. Payment will be full compensation for preparation of a plan for Maintenance of Water Flows; for performing all work associated with interconnections with existing water system piping including cutting existing piping, installation of concrete pipe restraints and temporary chlorination points (MAR/CIP's), and end caps as noted on the Plans; for installation and removal of temporary blowoff and/or flushing piping and appurtenances, for performing all work items as directed by the Engineer to remove existing water main piping, valves, and hydrants, including but not limited to, cutting and capping existing mains, laterals, and hydrants, closing existing valves and curb stops; for maintaining existing water system flows including temporary relocation of water mains and water service piping where required; for flushing, testing, and disinfection of all new temporary and permanent water main piping, services, and interconnections; for maintenance of water service to users at all times during construction; for removing existing valve boxes and curb boxes, and removal of any existing main which conflicts with the construction necessary to complete the transfer to the new system, including disinfection; for providing specialized labor, materials, dewatering, and all concrete for thrust restraints; for preparing an exploratory excavation plan and performing all exploratory excavation as indicated in the exploratory excavation plan and per direction of the Engineer on each existing lateral water service to determine the service's size, material, and location; for providing "red-line" as-built records to VTrans and the Town of Bennington for new utility installations including all new water work; all tools, and equipment for effecting the transfer of systems as specified, and for furnishing all tools, labor, equipment, and incidentals necessary to complete the work.

Payment for removal of existing concrete roadway or solid rock/boulders greater than 1 cubic yard encountered within the trench limits will be made under Item 203.16, Solid Rock Excavation.

VTrans will provide the services of a Professional Engineer to oversee construction of the waterlines, to ensure that State requirements are met and to sign and stamp all paperwork required by the Drinking Water and Groundwater Protection Division of the Department of Environmental Conservation, Agency of Natural Resources. The Professional Engineer shall advise the Engineer, and the Engineer will provide direction to the Contractor.

Payment will be made under:

<u>Pay Item</u>	<u>Pay Unit</u>
900.620 Special Provision (Extension Service Box and Curb Stop, All-Inclusive)($\frac{3}{4}$ "	Each
900.620 Special Provision (Extension Service Box and Curb Stop, All-Inclusive)(1"	Each
900.620 Special Provision (Corporation Stop, All-Inclusive)(1"	Each
900.620 Special Provision (Gate Valve with Valve Box, All-Inclusive)(4"	Each
900.620 Special Provision (Gate Valve with Valve Box, All-Inclusive)(6"	Each
900.620 Special Provision (Gate Valve with Valve Box, All-Inclusive)(8"	Each
900.620 Special Provision (Gate Valve with Valve Box, All-Inclusive)(10"	Each
900.620 Special Provision (Permanent Manual Air Release All-Inclusive)	Each
900.620 Special Provision (Post Flushing Hydrant, All-Inclusive)	Each
900.640 Special Provision (Seamless Copper Water Tube, All-Inclusive)($\frac{3}{4}$ "	Linear Foot
900.640 Special Provision (Seamless Copper Water Tube, All-Inclusive)(1"	Linear Foot
900.640 Special Provision (Ductile Iron Pipe, Cement-Lined, All-Inclusive)(4"	Linear Foot
900.640 Special Provision (Ductile Iron Pipe, Cement-Lined, All-Inclusive)(6"	Linear Foot
900.640 Special Provision (Ductile Iron Pipe, Cement-Lined, All-Inclusive)(8"	Linear Foot
900.640 Special Provision (Ductile Iron Pipe, Cement-Lined, All-Inclusive)(10"	Linear Foot
900.645 Special Provision (Water Main on Bridge)(10"	Lump Sum
900.645 Special Provision (Transfer to New System, Water)	Lump Sum

IN-WATER SEDIMENT ISOLATION DEVICE

1. DESCRIPTION. This work shall consist of designing, furnishing, installing, maintaining, and removing in-water sediment isolation devices at the locations shown in the Plans and as directed by the Engineer.
2. MATERIALS. In-Water Sediment Isolation Devices shall be any measure which effectively separates sediments or pollutants from waters of the state as defined in the Vermont Water Quality Standards.
3. SUBMITTALS. The proposed In-Water Sediment Isolation Device shall be submitted for acceptance as part of the EPSC Plan and in accordance with any permit conditions. The proposal shall include the design, and a plan for the construction, installation and maintenance of the In-Water Sediment Isolation Device.
4. GENERAL. When used to contain sediments or pollutants from a work area that is adjacent to or under water, the device shall be installed to completely enclose the portion of the work area that will be under water. The Device shall deflect and withstand any existing current or wave action and be effective at any anticipated water level. The Device shall be anchored continuously along the bottom, to prevent the escape of all sediments or pollutants into the main stream or body of water.

The Contractor shall repair or replace damaged or otherwise ineffective devices as ordered by the Engineer. The Contractor shall remove material accumulated behind the device as directed by the Engineer.

The Contractor shall remove the device and all supporting and anchoring material prior to acceptance of the project, unless otherwise directed by the Engineer.

5. METHOD OF MEASUREMENT. The quantity of Special Provision (In-Water Sediment Isolation Device) to be measured for payment at the location specified to be measured for payment will be on a lump sum basis in the complete and accepted work.

6. BASIS OF PAYMENT. The accepted quantity of Special Provision (In-Water Sediment Isolation Device) will be paid for at the Contract lump sum price. Payment will be full compensation for designing, furnishing, installing, handling, maintaining and removing the in-water sediment isolation device and accumulated sediments, and for furnishing all labor, tools, equipment, and all incidentals necessary to complete the work.

Payment will be made under:

<u>Pay Item</u>	<u>Pay Unit</u>
900.645 Special Provision (In-Water Sediment Isolation Device)	Lump Sum

CONCRETE BRIDGE DECK SURFACE PREPARATION

1. DESCRIPTION. This work shall consist of blanket diamond grinding the concrete bridge deck.

The work under this Section shall be performed in accordance with these provisions, the Plans, and Section 509 of the Standard Specifications, as appropriate.

2. CONSTRUCTION REQUIREMENTS. The construction shall be performed in accordance with these specifications, the Contract Plans, and recommendations of the equipment provider.

- (a) Concrete Bridge Deck Grinding Equipment. Provide grinding equipment that is power driven, self-propelled, and specifically designed to smooth and texture Portland cement concrete with diamond blades or diamond impregnated cylinder rings. The equipment shall be at a minimum 35,000 pounds including the grinding head, and of a size that will grind a strip at least 3 feet wide. The effective wheelbase of the machine shall be no less than 12 feet. The equipment shall have a positive means of vacuuming the grinding residue from the deck pavement surface, leaving the surface in a clean, near-dry condition.

The equipment shall have a set of pivoting tandem bogey wheels at the front of the machine and rear wheels or tandem bogies that travel and track in the fresh cut surface. The equipment shall be maintained to ensure it is in the proper working order, with attention paid to the “roundness” of the match and depth control wheels. Any wheels found to be out of round shall be immediately replaced.

The equipment shall be capable of grinding the surface in the longitudinal direction without causing spalls or other damage at cracks, joints, and other locations. Grinding equipment that causes raveling, aggregate fractures, or disturbance to the joints shall not be permitted. The equipment shall be capable of correcting the bridge deck profile and provide the proper cross slope.

The equipment shall be capable of grinding the longitudinal joint material whether it be Rapid Set Concrete or Ultra High Performance Concrete (UHPC). If UHPC is specified for use within the Contract Documents the grinding of the UHPC surface shall be performed when a strength of 10 ksi has been achieved and per the manufacturers recommendations. If significant fiber pullout is observed during grinding operations, grinding shall be suspended and not resumed until approved by the Engineer.

Provide equipment capable of feathering longitudinal ridges along the limits of grinding that remain after grinding is complete. Equipment shall be capable of grinding up to the face of curb or barrier in order to provide a uniform transition from the deck surface at the face of curb or barrier to the finished deck surface after grinding.

- (b) Concrete Bridge Deck Grinding. Grinding operations shall not begin until the effective cure time for the bridge deck concrete is complete and the wearing course of bituminous concrete pavement has been placed on the bridge approaches.

Grinding operations shall be performed in a longitudinal direction and provide a uniform finished texture. The beginning and end grinding lines shall be normal to the bridge centerline or along the deck skew. Grinding shall terminate 10 feet beyond the ends of the concrete bridge deck in the bituminous concrete pavement except for locations with steel bridge joints or as otherwise directed by the Engineer. Grinding shall also be terminated within the limits identified in Subsection 509.03.

- (1) Geometric Requirements. Each pass shall grind a strip at least 3 feet wide and not exceed the following vertical criteria:
- a. Unless otherwise noted on the Plans, the maximum depth of material removed by diamond grinding shall be 1/2 inch.
 - b. The maximum vertical difference between longitudinal passes shall be 1/8 inch.
 - c. Depressions exceeding the allowable grinding depth shall be addressed in the Blanket Grinding Work Plan. All depressions shall meet the specified grinding smoothness and texture requirements post remediation.
- (2) Smoothness. Provide uniform transverse and longitudinal slope of the concrete deck with no depressions or misalignment of slope greater than 1/8 inch in 10-ft when tested with a 10-ft straightedge. The surface will be checked at random by the Engineer during the grinding operation to assure that no depressions exist that will pond water. The straightedge shall be placed in contact with the surface in successive positions parallel to and perpendicular to the centerline of the structure. If existing concrete surface is parabolic, the straight edge test shall not be used across the parabolic surface.
- (3) Texture. The surface texture shall be a parallel, corduroy-type consisting of grooves between 1/16 and 1/8 inches wide. The peaks of the ridges need to be approximately 1/16 inch higher than the bottom of the grooves.
- (4) Cleaning. Remove grooving and grinding residue with a vacuum attached to the grooving or grinding machine. The vacuum shall leave the deck surface in a clean, near dry condition. Dispose of grooving and grinding residue at an appropriate disposal facility.

- (5) Grinding operations. Grinding shall continue until one of the following criteria are approved by the Engineer:
- a. Grind the concrete bridge deck until the surface meets the smoothness and texture required or,
 - b. Maximum depth of grinding, texture, and depression remediation measures are met
- (6) Feathering Ridges along Limits of Grinding. Longitudinal ridges along the limits of grinding that remain after grinding is complete shall be feathered out to provide a uniform transition from the deck surface at the face of curb or barrier to the finished deck surface after grinding.

3. SUBMITTALS.

- (a) Blanket Grinding Work Plan. For exposed concrete bridge decks, the Contractor shall submit a written Blanket Grinding Work Plan to the Engineer. The Blanket Grinding Work Plan shall be approved prior to commencing the bridge closure period. Blanket diamond grinding of the exposed concrete bridge deck shall be completed in accordance with the approved Blanket Grinding Work Plan.

At a minimum, the plan shall include detailed procedures and information for the following:

- (1) Determining initial grinding depth,
- (2) Monitoring depth of grinding,
- (3) Determine location of wheel paths,
- (4) Depth of grinding for subsequent passes.
- (5) Repair procedures if the deck is damaged during grinding operations.
- (6) Remedial action if depressions exceed geometric limits of grinding.
 - a. Means of determining remaining clear cover over reinforcing steel for further grinding.
 - b. Subsequent grinding patterns if sufficient clear cover remains over the reinforcing steel.

- c. Where the depression does not provide clear cover for subsequent grinding, procedures may include removing and replacing concrete to an extent below the top mat of reinforcing steel or other methods approved by the Engineer.

(7) Manufacturer’s specifications for concrete bridge deck grinding equipment.

- 4. METHOD OF MEASUREMENT. The quantity of Special Provision (Concrete Bridge Deck Surface Preparation) to be measured for payment will be the number of square feet of concrete bridge deck surface prepared in the complete and accepted work. Measurement will be based on the horizontal distance between the face of curb or barrier as shown on the Plans and the longitudinal length of the bridge deck. The longitudinal length measured for payment will be extended by 10 feet beyond each end of the bridge deck except for locations with steel bridge joints or as otherwise directed by the Engineer.
- 5. BASIS OF PAYMENT. The accepted quantity of Special Provision (Concrete Bridge Deck Surface Preparation) will be paid for at the Contract unit price per square foot. Payment will be full compensation for furnishing, transporting, handling, all materials required; submittals; quality control testing and for furnishing all materials, labor, tools, equipment, and incidentals necessary to complete the work.

Payment will be made under:

<u>Pay Item</u>	<u>Pay Unit</u>
900.670 Special Provision (Concrete Bridge Deck Surface Preparation)	Square Foot

BITUMINOUS CONCRETE PAVEMENT, SMALL QUANTITY

1. DESCRIPTION. This work shall consist of constructing one or more courses of bituminous mixture on a prepared foundation in accordance with these specifications and the specific requirements of the type of surface being placed, and in reasonably close conformity with the lines, grades, thicknesses, and typical cross sections shown on the Plans or established by the Engineer.

The work under this Section shall be performed in accordance with these provisions, the Plans, and the appropriate provisions of Section 406 of the Standard Specifications, except as modified below.

2. REQUIREMENTS FOR SUPERPAVE BITUMINOUS MIXTURES.
 - (a) Acceptance Testing. For evaluating mixtures and pavement produced under this special provision, the following acceptance practices replace the acceptance testing listed in Subsection 406.03C and Subsection 406.14(a) with the procedures listed below and the criteria specified in Table 1.
 - (1) Sampling. The material will be sampled at the frequency specified by the Engineer, but in no case shall the frequency be less than that specified in Table 1. Each sample or lot will be considered representative of a particular quantity of material outlined in Table 1, or as determined by the Engineer.
 - (2) Acceptance Quality Characteristics. For items listed as Acceptance Quality Characteristics (AQC), if the material meets or exceeds the Acceptable Quality Level (AQL), it will be deemed compliant, and paid full price. If any AQC fails to meet the Rejectable Quality Level (RQL), the material will be deemed unacceptable, and shall be rejected unless otherwise directed by the engineer. Test results that fall between the AQL and RQL will be deemed acceptable and subject to negative pay adjustment.
 - (3) Pay Factors. When they are included in the Contract, the following pay factors will apply to all accepted material, except as noted below:
 - a. Mixture Properties Pay Factor (PF_{MP}). This pay factor will be calculated based on air voids. Box samples will be subject to full Pay Factor determination.

- b. Mat Density Pay Factor (PF_{MD}). This pay factor does not apply to material used for leveling courses, side roads, independent shoulders paved separately, or handwork. The Engineer may elect to waive the pay factor for other material at their discretion. Cores will not be taken within 6 inches of a longitudinal joint or within 50 feet of a transverse joint, except on bridges. Bridge decks or approaches will not be cored within 10 feet of a bridge joint or transverse joint, and bridges less than or equal to 20 feet in length will not be cored.
- (4) Rounding and Reporting of Values. Results from all calculations shall be rounded and reported as specified below:
- a. Report all pay factors to 0.0001 and all pay adjustments to 0.01. For intermediate calculations used to obtain pay factors and pay adjustments, Quality Indices shall be rounded to 0.01, and all other values should retain the maximum available precision.
 - b. For rounding, the use of AASHTO Rounding Rule D shall not be permitted. Instead, when rounding, if the first digit to the right of the number to be rounded is greater than or equal to 5, then the number shall be rounded away from zero to the next number with larger magnitude. If the digit to the right of the number to be rounded is less than 5, then the number shall remain the same.

For example, for rounding to the nearest one decimal (0.1):

5.35 rounds to 5.4 -5.35 rounds to -5.4

5.34 rounds to 5.3 -5.34 rounds to -5.3

TABLE 1 – Acceptance Quality Characteristics

Quality Characteristic	Min. Sampling Frequency	Evaluation Method	Type of Criteria	Lower Specification Limit (LSL)	Upper Specification Limit (USL)	AQL	RQL
Air Voids	1 per 500 tons	Single Test Deviation	Acceptance	JMF-1.0%	JMF+1.0%	D = 0	D = -1
Mat Density – All Courses	Minimum 4 per paving course, 1 per 500 tons	PWL	Acceptance	91%	-	PWL = 80	PWL = 50

(5) Evaluation Method.

- a. Single Test Deviation. The value obtained from the tested sample will be compared to the JMF, USL and LSL using the following formulas.

$$D = 1 - \frac{|TR - JMF|}{0.5(USL - LSL)}$$

where:

D = Deviation of the sample from the specification limits. If the calculated value of $D > 0.0$, then D will be set equal to 0.

TR = Sample test result

JMF = Job mix formula

USL = Upper specification limit

LSL = Lower specification limit

- b. Percent Within Limits. Determination performed in accordance with Subsection 406.03C(d).

(6) Pay Factor Determination.

- a. Mixture Properties Pay Factor. Once the Deviation for Air Voids has been determined, the Mixture Properties Pay Factor for acceptable material will be calculated using the formula below.

$$PF_{MP} = 0.1D_{AV}$$

where:

PF_{MP} = Mixture Properties Pay Factor

D_{AV} = Deviation for Air Voids

- b. Mat Density Pay Factor. Once the PWL for Mat density has been determined, the Mat Density Pay Factor for acceptable material will be calculated using the formula below.

For $80\% \leq PWL_{MD} \leq 100\%$

$$PF_{MD} = 0.00150 PWL_{MD} - 0.1200$$

For $80\% \leq PWL_{MD} < 50\%$

$$PF_{MD} = 0.0050 PWL_{MD} - 0.4000$$

where:

PWL_{MD} = Total percent within specification limits for mat density

PF_{MD} = Mat Density Pay Factor

3. METHOD OF MEASUREMENT. The quantity of Special Provision (Bituminous Concrete Pavement, Small Quantity) to be measured for payment will be the number of tons for a lot of mixture (each type) complete in place in the accepted work (Q) as determined from the weigh tickets.

The quantities of all applicable Pay Adjustments calculated for the project will be determined as specified below.

When applicable, the measured quantity of Special Provision (Bituminous Concrete Pavement, Small Quantity) placed (Q) will be multiplied by the Mixture Properties Pay Factor, (PF_{MP}), and the Contract Bid Price (B), to determine a Mixture Pay Adjustment, (PA_M) as follows:

$$PA_M = PF_{MP} \times Q \times B$$

When applicable, the measured quantity of Special Provision (Bituminous Concrete Pavement, Small Quantity) placed (Q) will be multiplied by the Mat Density Factor, (PF_{MD}), and the Contract Bid Price (B), to determine a Mat Density Pay Adjustment, (PA_{MD}) as follows:

$$PA_D = PF_{MD} \times Q \times B$$

4. BASIS OF PAYMENT. The measured quantity of Special Provision (Bituminous Concrete Pavement, Small Quantity) will be paid for at the Contract unit price per ton. Payment shall be full compensation for furnishing, mixing, hauling, and placing the material specified and for furnishing all labor, tools, equipment, and incidentals necessary to complete the work.

Payment for Pay Adjustments shall be debited against the Contract prices (lump units) bid for the Pay Adjustment items.

The cost of repairing core areas will not be paid for separately but will be considered incidental to Special Provision (Bituminous Concrete Pavement, Small Quantity).

The costs of furnishing testing facilities and supplies at the plant will be considered included in the Contract unit price of Special Provision (Bituminous Concrete Pavement, Small Quantity).

The costs associated with obtaining samples for acceptance testing will be incidental to the cost of Special Provision (Bituminous Concrete Pavement, Small Quantity).

When not specified as items in the Contract, the costs of correcting deficiencies in the existing pavement, cleaning and filling joints and cracks, sweeping and cleaning existing paved surfaces, the emulsified asphalt applied to tack these surfaces, and tacking of manholes, curbing, gutters, and other contact surfaces will not be paid for directly, but will be incidental to Special Provision (Bituminous Concrete Pavement, Small Quantity).

Special Provision (Bituminous Concrete Pavement, Small Quantity) mixture approved by the Engineer for use in correcting deficiencies in the aggregate subbase or base course constructed as part of the Contract will not be paid for as Special Provision (Bituminous Concrete Pavement, Small Quantity), but will be incidental to the Contract item for the specified type of base course.

Special Provision (Bituminous Concrete Pavement, Small Quantity) mixture used to correct deficiencies in an existing pavement or to adjust the grade of a bituminous concrete surface completed under the Contract will be paid for at the Contract unit price for Special Provision (Bituminous Concrete Pavement, Small Quantity).

Payment will be made under:

<u>Pay Item</u>	<u>Pay Unit</u>
900.650 Special Provision (Mat Density Pay Adjustment, Small Quantity) (N.A.B.I.)	Lump Unit
900.650 Special Provision (Mixture Pay Adjustment) (N.A.B.I.)	Lump Unit
900.680 Special Provision (Bituminous Concrete Pavement, Small Quantity)	Ton

Bennington BF 1000(20)

April 23, 2024

PLACEHOLDER for Wastewater System and Potable Water Supply Permit- Pending

Bennington BF 1000(20)

April 23, 2024

PLACEHOLDER for Public Water System Individual/General Water Main Construction Permit - Pending

Vermont Department of Environmental Conservation

Watershed Management Division
88 Merchants Row, Suite 430 Asa Bloomer Building
Rutland, VT 05701-5903
www.watershedmanagement.vt.gov

Agency of Natural Resources

[cell] 802-490-6163
[fax] 802-786-5915
[email] joshua.carvajal@state.vt.us

STATUTORY AUTHORITY:

*This approval is issued under Title
19 V.S.A. Chapter 1 § 10(12)*

Vermont Agency of Transportation
Program Development Division
National Life Building
Montpelier, Vermont 05633-5001
Phone: 802-828-3978

RE: Bennington BF1000(20)**ANR Permit Database Number: 2882**

This letter constitutes approval of the above referenced project located on VT Route 9 (TH-2) for BR 6 over the Walloomsac River. The project involves replacement of the existing bridge structure and other related work. This Title 19 authorization for stream activities is based on review of the Preliminary Plan Set dated 06/22/2021.

The project is subject to the following Standard Conditions:

- 1) The project shall be constructed as defined in the documents linked in the Title 19 Share Point site.
 - a. Any amendment to the plans which in any way affects surface waters and/or riparian corridors shall be reviewed by this office and approval received by VTrans prior to construction.
 - b. Any construction modifications that deviate from the approved plans which in any way affects surface waters and/or riparian corridors shall be reviewed by this office and approval received by VTrans prior to the construction activity.
- 2) That the contractor's schedule of accomplishment of water quality related work to be submitted prior to the start of construction, and as required under general specification #105.23(a) shall include site-specific methods of operation. Temporary construction fills, check dams, silt barriers and other erosion control works shall be described and shown on pertinent plans.
- 3) That the Vermont Agency of Transportation general specification #105.23 addressing erosion and sediment control be carefully adhered to in order to minimize turbidity and other adverse impacts to water quality.
- 4) That the Vermont Agency of Transportation general specification #105.24 addressing pollution control be carefully followed in order to limit, if not prevent altogether, the discharge of fuel, grease, oil, raw concrete, paint, chemicals, and debris to waters of the State.
- 5) An on-site pre-construction conference between the contractor, VTrans Resident Engineer and ANR River Management Engineer (RME) shall be held prior to commencement of any regulated construction activities. Please contact Josh Carvajal at (802) 490-6163 or joshua.carvajal@vermont.gov to schedule the conference.
- 6) Approved in-stream working dates on this project are limited from July 1st to October 1st (unless otherwise specified in this approval). Contractor proposals for any other construction activities in or adjacent to flowing water during the restricted period must be isolated from stream flow and must receive prior approval from the River Management Engineer.

The project is subject to the following Special Conditions:

- 7) A project specific flow control plan shall be submitted by the contactor to the VTrans Resident Engineer and ANR RME for review and approval prior to commencement of any in-stream wet work.
- 8) Construction oversight shall ensure channel profile and bed forms are shaped according to plans and that abrupt transitions across the channel width are reshaped prior to completion of construction activities.
- 9) All temporary windrowed berms for temporary diversion of water or for site access during construction shall be removed and/or smoothed to the final shape indicated on the approved project documents.
- 10) Authorization is for Preliminary Plans; final plan set will be submitted electronically to the ANR RME.
- 11) Design of new bridge does not satisfy the bankfull width requirements and is a deviation from the DEC Stream Alteration General Permit (SAGP). Authorization is based on Section D of the SAGP, due to the bridge being 'In an urban setting confined by unmovable public infrastructure or habitable structures'.

All the provisions of this approval shall be made a part of the final construction contracts and documents.

Portions of this state-owned or operated transportation project are located in a municipality that participates in the National Flood Insurance Program (NFIP) and the project involves development activity (i.e. placement of fill, structural improvements, grading, excavating, etc...) within the Special Flood Hazard Area (SFHA) as delineated on the Flood Insurance Rate Map (FIRM) and/or within the ANR River Corridor. Coverage under the Vermont Department of Environmental Conservation (DEC) Flood Hazard Area & River Corridor General Permit would normally be required but since all permits for this project have been applied for or obtained prior to 3/1/2015, the project falls under the transition in Subchapter 8 of the Vermont Flood Hazard Area and River Corridor Rule - www.watershedmanagement.vt.gov/rivers/docs/FHA&RC_Rule_Adopted_10.24.2014.pdf


Based on information provided in the application for approval under 19 V.S.A. Section 10(12), public notice of which is given by the posting of this permit by the town clerk, it is certified that there is reasonable assurance that the proposed work will be conducted in the manner consistent with applicable conditions of the Federal Pollution Control Act Amendment of 1972, Public Law 92-500.

Recent litigation involving the public trust doctrine raises concern that agency permits for stream alterations, dams or water quality certificates may be challenged for lack of jurisdiction or authority. We want to alert you to the possibility that litigation or legislative action may modify or retroactively affect the agency's decision.

If the project is constructed as described, as shown on the above referenced approved plans and according to the above conditions, there is no reason to expect any violation of the Vermont Water Quality Standards.

Signed this 28th day of October 2021

Peter Walke, Commissioner
Department of Environmental Conservation

by: 
Josh Carvajal, P.E., River Management Engineer

cc: Project e-file

Authorization under the Flood Hazard Area & River Corridor General Permit Reporting Activities - 10 V.S.A. § 754

PERMIT #: FP-3-0047 - REG

Date: 12/20/2021

Applicant: Vermont Agency of Transportation

Contact: Julie Ann Held

Phone: 802-917-4319

Email: julieann.held@vermont.gov

Project Location: Bridge #6 over Walloomsac River

Flooding Source: Walloomsac River

Project Description: The replacement of the existing bridge at this location along with associated infrastructure work including sewer manholes, sewer lining, storm drainage, and signaling.

Based upon the Findings contained in this authorization, the Secretary has determined that the proposed project complies with the requirements of the 2021 Flood Hazard Area & River Corridor General Permit and the Flood Hazard Area & River Corridor Rule (Environmental Protection Rule, Chapter 29) and is hereby approved subject to the conditions of the 2021 Flood Hazard Area & River Corridor General Permit and this authorization.

I. Findings

The Secretary of Natural Resources has determined that:

- (a) The project is located within the special flood hazard area (Zone AE). The project is also located within the river corridor.
- (b) This project is exempt from municipal regulation because it is a State-owned and operated institution or facility.
- (c) This project authorization includes the replacement of the existing bridge and associated infrastructure work. A hydraulic analysis performed for the bridge replacement shows that while the project is still located within the floodway and below the base flood elevation, there will be no impact to flood heights or velocities during the occurrence of the base flood thereby meeting the standards found within the FHARC General Permit. No new encroachments are within the SFHA, Floodway, or River Corridor.
- (d) Based on the information provided by the applicant, the project is an eligible activity and will meet the standards in the above-referenced General Permit, if built as proposed.

II. General Conditions

- (a) **Compliance with General Permit and this Authorization.** The permittee shall comply with this authorization and all the terms and conditions of the 2021 Flood Hazard Area & River Corridor General Permit.
- (b) **Submission of As-Built Information.** The permittee shall submit as-built documentation prepared by a licensed land surveyor or professional engineer to the Floodplain Manager within 180 days of when the project is complete.
- (c) **Access to property.** By conducting any activity under this authorization, the permittee agrees to allow Agency representatives access to the property covered by this authorization, at reasonable times and upon presentation of credentials, for the purpose of ascertaining compliance with the Vermont Flood Hazard Area & River Corridor Rule and the General Permit. This authorization does not grant the permittee the right to enter onto any property not owned by the permittee.
- (d) **Authorization for Substantial Changes.** All activity shall be completed and maintained in accordance with the terms and conditions of the General Permit and this authorization. The permittee shall notify the Secretary of any planned changes to the authorized activity. The Secretary may require the permittee to submit additional information on any proposed changes. The Secretary will notify the permittee if, based on the proposed changes to the authorized activity, a revised application for an individual permit must be submitted.
- (e) **Remedial measures.** The Secretary maintains continuing jurisdiction over the activity authorized under this authorization and may at any time order remedial measures if it appears the activity is not in compliance with the General Permit or this authorization.
- (f) **Compliance with other regulations.** This authorization does not relieve the permittee of the responsibility to comply with any other applicable federal, state, and local laws, regulations, and permits.
- (g) **Legal responsibilities for damages.** The Secretary, by issuing this authorization, accepts no legal responsibility for any damage direct or indirect of whatever nature and by whomever suffered arising out of the approved activity.
- (h) **Revocation.** The Secretary may, after notice and opportunity for a hearing, revoke or suspend, in whole or in part, this authorization for cause, including:
 - (1) Violation of the terms or conditions of the General Permit or this authorization;
 - (2) Obtaining authorization by misrepresentation or failure to fully disclose all relevant facts;
 - (3) A change in any condition that requires either a temporary or permanent reduction or elimination of the authorized activity.
- (i) **Duty to comply; enforcement.** The permittee shall comply with all terms and conditions of the General Permit and this authorization. Any noncompliance constitutes a violation of the Flood Hazard Area & River Corridor Rule and may be cause for an enforcement action and/or revocation and reissuance, modification, or termination of this authorization.
- (j) **Transfer of Authorization.** This authorization may be transferred provided that a notice of transfer is submitted to the Secretary no later than five days prior to the transfer and the notice includes the following:
 - (1) The name, mailing address, and contact information of the present permittee;
 - (2) The name, mailing address, and contact information of the prospective permittee;
 - (3) The proposed date of transfer; and

- (4) A statement signed by the prospective permittee, stating that the prospective permittee has read and is familiar with the terms and conditions of the permit and the authorization and agrees to comply with the permit and authorization.
- (k) **Limitations.** This authorization conveys no vested rights or exclusive privileges. This authorization conveys no title to land nor authorizes any injury to public or private property.
- (l) **Appeals.**
- (1) **Renewable Energy Project.** If this decision relates to a renewable energy plant for which a certificate of public good is required under 30 V.S.A. § 248, any appeal of this decision must be filed with the Vermont Public Utility Commission pursuant to 10 V.S.A. § 8506. This section does not apply to a facility that is subject to 10 V.S.A. § 1004 (dams before the Federal Energy Regulatory Commission), 10 V.S.A. § 1006 (certification of hydroelectric projects), or 10 V.S.A. Chapter 43 (dams). Any appeal under this section must be filed with the Clerk of the Public Utility Commission within 30 days of the date of this decision; the appellant must file with the Clerk an original and six copies of its appeal. The appellant shall provide notice of the filing of an appeal in accordance with 10 V.S.A. § 8504(c)(2), and shall also serve a copy of the Notice of Appeal on the Vermont Department of Public Service. For further information, see the Rules and General Orders of the Public Utility Commission, available online at www.puc.vermont.gov. The address for the Public Utility Commission is 112 State Street, Montpelier, Vermont, 05620-2701 (Tel. # 802-828-2358).
- (2) **All Other Projects.** Pursuant to 10 V.S.A. Chapter 220, any appeal of this decision must be filed with the clerk of the Environmental Division of the Superior Court within 30 days of the date of the decision. The Notice of Appeal must specify the parties taking the appeal and the statutory provision under which each party claims party status; must designate the act or decision appealed from; must name the Environmental Division; and must be signed by the appellant or the appellant's attorney. In addition, the appeal must give the address or location and description of the property, project, or facility with which the appeal is concerned and the name of the applicant or any permit involved in the appeal. The appellant must also serve a copy of the Notice of Appeal in accordance with Rule 5(b)(4)(B) of the Vermont Rules for Environmental Court Proceedings. For further information, see the Vermont Rules for Environmental Court Proceedings, available online at www.vermontjudiciary.org. The address for the Environmental Division is: 32 Cherry St.; 2nd Floor, Suite 303; Burlington, VT 05401. Telephone # 802-951-1740.

If the development is constructed as described and according to the above conditions, there is no reason to expect an adverse impact on either the river corridor or flood hazard area.

This permit shall be effective on the date of signing and shall be valid for a period of three years.

Peter Walke, Commissioner
Vermont Department of Environmental Conservation

By: 

Dated: December 20, 2021

John Broker-Campbell, Floodplain Manager
Rivers Program
Watershed Management Division

Memorandum

To: Project File

From: Marisa Morrison, VTrans Biologist

Date: 4/8/2024

Subject: **US Corps of Engineers (USCOE) General Permit Self Verification Memo**

I have reviewed project Bennington BF 1000 (20) for potential impacts to USCOE jurisdictional areas (wetlands and waterways). I have determined the project qualifies for Self-Verification (SV) under the **COE VT General Permit NAE-2022-00024**. All General Conditions (conditions 1-38 pages 27-38,) of the VTGP apply to this project and a copy of the permit will need to be included in the contract documents. Respective Contractors completing work authorized under this VTGP need to be familiar with all conditions of this permit. Please pay particular attention to conditions 19 & 20 as there are important in-stream time of year restrictions and culvert requirements under the SV process, as well as other special requirements. The VTGP is effective from December 6, 2022, through December 6, 2027.

If the Contractor proposes modified or additional project limits, the project may no longer qualify for coverage under the SV process. It is the Contractor's responsibility to seek coverage of any project changes under the SV process, VTGP, or with a USCOE Individual Permit. Please contact the USCOE at (802) 872-2893 for any questions.

Attached

COE VT GP NAE 2022-00024

USCOE VT Project Office Contact:

U.S. Army Corps of Engineers
New England District,
Vermont Project Office
11 Lincoln Street, Room 210
Essex Junction, Vermont 05452
(802) 872-2893, (802) 879-7638 fax
www.nae.usace.army.mil/missions/regulatory
cenae-r-vt@usace.army.mil

General Permit No.: NAE-2022-00024
Applicant: General Public in the State of Vermont

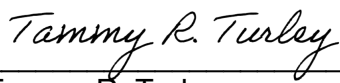
Effective Date: December 6, 2022
Expiration Date: December 6, 2027

**DEPARTMENT OF THE ARMY GENERAL PERMITS
FOR THE STATE OF VERMONT**

The New England District of the U.S. Army Corps of Engineers (USACE) hereby issues twenty-one (21) regional general permits (GPs) for activities subject to USACE jurisdiction in waters of the United States (WOTUS), including navigable waters, within the boundaries of the state of Vermont. These GPs are issued in accordance with USACE regulations at 33 CFR 320–332 (see 33 CFR 325.2(c)(1)). These GPs will provide protection to the aquatic environment and the public interest while effectively authorizing activities that have no more than minimal individual and cumulative adverse environmental effects.

<u>This document contains the following sections:</u>		<u>Page</u>
SECTION I.	JURISDICTION/AUTHORITY TO ISSUE PERMITS	2
SECTION II.	REVIEW CATEGORIES AND APPLICATION PROCEDURES	2-4
SECTION III.	GENERAL PERMITS	4-26
SECTION IV.	GENERAL CONDITIONS	27-38
SECTION V.	CONTACTS	39
SECTION VI.	DEFINITIONS	40-44

In issuing these GPs, the Federal Government does not assume any liability for the following: (a) damages to the permitted project or uses thereof as a result of other permitted or unpermitted activities or from natural causes; (b) damages to the permitted project or uses thereof as a result of current or future activities undertaken by or on behalf of the U.S. in the public interest; (c) damages to persons, property or to other permitted or unpermitted activities or structures caused by the activity authorized by any of the GPs; (d) design or construction deficiencies associated with the permitted work; or (e) damage claims associated with any future modification, suspension or revocation of these permits.



Tammy R. Turley
Chief, Regulatory Division

December 6, 2022

Date

SECTION I. JURISDICTION/AUTHORITY TO ISSUE PERMITS

1. A Department of the Army Permit is required from USACE for the following regulated activities:

a. The construction of any structure in, over, or under any navigable water of the U.S. (see 33 CFR 328), the excavating or dredging from or depositing of material in such waters, or the accomplishment of any other work affecting the course, location, condition, or capacity of such waters. The USACE regulates these activities under Section 10 of the Rivers and Harbors Act of 1899 (see 33 CFR 322); and

b. The discharge of dredged or fill material and certain discharges associated with excavation into WOTUS including wetlands. The USACE regulates these activities under Section 404 of the Clean Water Act (see 33 CFR 323).

2. Related laws: 33 CFR 320.3 includes a list of related laws including, but not limited to, Section 14 of the Rivers and Harbors Act of 1899 (33 USC 408, "Section 408"), Section 401 of the Clean Water Act, Section 402 of the Clean Water Act, Section 307(c) of the Coastal Zone Management Act of 1972, Section 106 of the National Historic Preservation Act of 1966, Section 7 of the Endangered Species Act, the Fish and Wildlife Coordination Act of 1956, the Magnuson-Stevens Fishery Conservation and Management Act, Section 302 of the Marine Protection, Research and Sanctuaries Act of 1972, and Section 7(a) of the Wild and Scenic Rivers Act.

3. In order for an authorization under these GPs to be valid, a Water Quality Certification (WQC) under Section 401 of the CWA (33 USC 1341) or waiver thereof must be obtained from the Vermont Agency of Natural Resources (VT ANR), Watershed Management Division prior to the commencement of work in USACE jurisdiction. The VT ANR has granted an Individual WQC for all activities authorized under these GPs provided those activities meet the criteria as contained in these GPs and USACE notifies VT ANR of projects obtaining written verification under these GPs. The VT ANR will respond within the same response times required of the Federal resource agencies.

SECTION II. REVIEW CATEGORIES AND APPLICATION PROCEDURES

1. In order for activities to qualify for these GPs, they shall meet the terms and conditions of this document, including the eligibility criteria listed in Section III and the general conditions (GCs) listed in Section IV. The USACE will consider any activity requiring USACE authorization to be unauthorized if that activity is under construction or completed and does not comply with all of the terms and conditions of the GPs. The USACE will evaluate unauthorized activities for enforcement action under 33 CFR part 326. Any activity not specifically listed may still be eligible for authorization under these GPs; prospective permittees are advised to contact USACE for specific eligibility determinations.

2. Project proponents are encouraged to contact the USACE Vermont Project Office (VPO) with questions at any time (mailing address: 11 Lincoln Street, Room 210, Essex Junction, Vermont 05452; email: cenae-r-vt@usace.army.mil; phone: (802) 872-2893). Pre-application meetings (see 33 CFR 325.1(b)), whether arranged by USACE or requested by applicants, are encouraged to facilitate the review of projects. Pre-application meetings and/or site visits can help streamline the permit process by alerting the applicant to potentially time-consuming concerns that may arise during the evaluation

of a project (e.g., avoidance, minimization and compensatory mitigation requirements, historic properties, and endangered species).

3. Federal and state jurisdiction may differ in some instances. Applicants are responsible for applying for and obtaining all required federal, state or local approvals (see GC 1). A permit from USACE may be required for specific activities regardless of state of Vermont jurisdiction.

These GPs may also be used to authorize projects that are not regulated by the state of Vermont.

4. How to Obtain/Apply for Authorization:

Project proponents must read each GP and the GCs to see if an activity is eligible for authorization.

a. Self-Verification (SV):

May proceed without application or notification to USACE provided the project proponent verifies that the activity will meet the terms and conditions of applicable GPs. Project proponents shall comply with other federal laws such as the National Historic Preservation Act (NHPA), the Endangered Species Act (ESA) and the Wild and Scenic Rivers Act (WSRA). Consultation with outside experts, such as the State Historic Preservation Officer (SHPO), federally-recognized tribes in the state of Vermont (Tribal Historic Preservation Officers, or THPOs), National Park Service (NPS), and the U.S. Fish and Wildlife Service (USFWS) listed in Appendix V may also be necessary. The USACE relies on the VT ANR Environmental Notice Bulletin (ENB) for notification of SV projects, as applicable.

b. Pre-Construction Notification (PCN):

i. For activities that do not qualify for SV, the applicant must submit a PCN to obtain written verification from USACE before starting work in USACE jurisdiction. Digital submissions are encouraged and preferred and can be submitted directly to USACE staff by email, or at cenae-r-vt@usace.army.mil. Applicants must submit at least the following information:

- A completed USACE application form (ENG Form 4345¹).
- Plans that illustrate the proposed work in reference to the limits of USACE jurisdiction as applicable. Plans should show existing and proposed conditions and contain all other appropriate information.
- Federal wetland delineation documentation (i.e., Wetland Determination Data Forms).
- Any information on federally listed endangered and threatened species and critical habitat that occur or may occur in the project area (See GC 12).
- Any correspondence with the SHPO and THPOs indicating coordination with these entities to ensure compliance with GC 11. Applicants are encouraged to submit a copy of their application materials to the SHPO and the THPOs, at the

¹ Located at www.nae.usace.army.mil/regulatory under “Useful Documents, Forms and Publications.”

same time, or before, they apply to USACE to be reviewed for the presence of historic, archaeological or tribal resources in the permit area that the proposed work may affect.

The USACE will coordinate review of all PCN activities with the interagency review team (IRT) comprised of federal and state agencies and federally recognized tribes to ensure that the proposed activity results in no more than a minimal impact to the aquatic environment. This may require project modifications involving avoidance, minimization, and/or compensatory mitigation for unavoidable impacts to ensure the net effects of a project are minimal.

ii. Emergency Situations: Contact USACE immediately in the event of an emergency to obtain information on the verification process and coordination requirements. The USACE regulation at 33 CFR 325.2(e)(4) states that “an “emergency” is a situation which would result in an unacceptable hazard to life, a significant loss of property, or an immediate, unforeseen and significant economic hardship if corrective action requiring a permit is not undertaken within a time period less than the normal time needed to process the application under standard procedures.” Emergency work is subject to the same terms and conditions of these GPs as non-emergency work, and similarly, must qualify for authorization under these GPs; otherwise, an individual permit (IP) shall be required. Upon notification, USACE will determine if a project qualifies for emergency procedures under the GPs and whether work may proceed prior to submittal of an application. Where an application is required, USACE staff will work with all applicable agencies to expedite verification according to established procedures in emergency situations.

5. Projects that are not authorized by these GPs require an IP (33 CFR 325.5(b)) and project proponents must submit an application directly to USACE. These GPs do not affect the USACE IP review process or activities exempt from USACE permit requirements. The USACE retains discretionary authority on a case-by-case basis to elevate an SV to PCN or an IP, or a PCN to an IP based on concerns for the aquatic environment or for any other factor of the public interest (33 CFR 320.4(a)). Whenever USACE notifies an applicant that a PCN or IP is required, no work in USACE jurisdiction may be conducted until USACE issues the required authorization in writing indicating that work may proceed. For IPs, an individual 401 WQC or waiver is required from the VT ANR. Contact the VT ANR for procedures on how to apply for a WQC.

SECTION III. GENERAL PERMITS

An activity listed below may be authorized by these GPs only if that activity and the permittee satisfy all of the GP’s terms and conditions. Any activity not specifically listed below may still be eligible for the GPs; prospective permittees are advised to contact USACE for specific eligibility determinations.

“Permanent impacts” means WOTUS that are permanently affected by filling, flooding, excavation, drainage or clearing because of the regulated activity. Permanent impacts include permanent discharges of dredged or fill material that change an aquatic area to dry land, increase the bottom elevation of a waterbody, or change the use of a waterbody. Temporary impacts include, but are not limited to, WOTUS that are temporarily filled, flooded, excavated, drained or cleared because of the regulated activity. Temporary

impacts are usually associated with construction activities and often involve the placement of cofferdams and construction mats. These fills are removed when construction is completed. Piling and associated structures do not ordinarily constitute a discharge of fill material. Impacts resulting from activities eligible for exemptions under §404(f) of the CWA are not considered when calculating the impact area.

Vermont General Permits

1. Aids to navigation
2. Repair or maintenance of existing currently serviceable, authorized or grandfathered structures/fills and removal of structures and fills
3. Moorings
4. Pile-supported structures and floats, including boat lifts/hoists and other miscellaneous structures, temporary recreational structures and work
5. Boat ramps and marine railways
6. Utility line activities
7. Dredging, beach nourishment, rock and debris removal and rock relocation
8. U.S. Coast Guard Approved Bridges
9. Shoreline and bank stabilization projects
10. Aquatic habitat restoration, establishment and enhancement activities
11. Fish and wildlife harvesting activities
12. Oil spill and hazardous material cleanup
13. Cleanup of hazardous and toxic waste
14. Scientific measurement devices
15. Survey activities
16. Energy generation and renewable energy generation facilities and hydropower projects
17. New/expanded developments and recreational facilities
18. Linear transportation projects and stream/wetland crossings
19. Mining activities
20. Temporary fill not associated with any other GP activities
21. Agricultural activities

GP 1. AIDS TO NAVIGATION (Section 10): The placement of aids to navigation and regulatory markers that are approved by and installed in accordance with the requirements of the U.S. Coast Guard (USCG). See 33 CFR 66, Chapter I, subchapter C.

Self-Verification Eligible	Pre-Construction Notification Required
Aids to navigation and regulatory markers approved by and installed in accordance with the requirements of the USCG. Not located within a USACE Federal Navigation Project (FNP).	<ol style="list-style-type: none">1. Work not eligible for SV.2. Aids to navigation and regulatory markers or temporary buoys, markers, floats, and similar structures that are located within a USACE FNP.

GP 2. REPAIR OR MAINTENANCE OF EXISTING CURRENTLY SERVICEABLE, AUTHORIZED OR GRANDFATHERED STRUCTURES/FILLS AND REMOVAL OF STRUCTURES AND FILLS

(Sections 10 & 404): (a) Repair, rehabilitation, or replacement of any previously authorized, currently serviceable structure or fill, or of any currently serviceable structure or fill authorized by 33 CFR 330.3 (activities occurring before certain dates), provided that the structure or fill is not to be put to uses differing from those uses specified or contemplated for it in the original permit or the most recently authorized modification. Minor deviations in the structure's configuration or filled area, including those due to changes in materials, construction techniques, requirements of other regulatory agencies, or current construction codes or safety standards that are necessary to make the repair, rehabilitation, or replacement are authorized. Includes removal of structures and fill.

Not authorized under GP 2: Permanent impacts > 5,000 SF in Lake Champlain, Lake Memphremagog, Wallace Pond and adjacent wetlands, and > 1 acre in all other WOTUS.

Self-Verification Eligible

1. Repair, replacement in-kind, or maintenance of existing, currently serviceable, authorized structures or fills with no substantial expansion or change in use:
 - Conditions of the original authorization apply.
 - Minor deviations in fill design allowed.
 - The repair, rehabilitation, or replacement of those structures or fills destroyed or damaged by storms, floods, fire or other discrete events is authorized, provided the repair, rehabilitation, or replacement is commenced, or is under contract to commence, within two years of the date of their destruction or damage. In cases of catastrophic events, such as hurricanes or tornadoes, USACE may waive the two-year limit in writing provided the permittee can demonstrate funding, contract, or other similar delays.
 - Maintenance includes, but it is not limited to, the removal of accumulated sediments and debris in the vicinity of existing structures (such as bridges, culverted road crossings, water intake structures, dams, etc.), provided: (a) removal is the minimum necessary to restore the waterway in the vicinity of the structure to the approximate dimensions that existed when the structure was built; and (b) all dredged or excavated materials are deposited and retained in an upland area.
2. Bulkhead replacement via installation of new bulkhead within 18" of existing bulkhead and backfill.
3. Construction mats of any area necessary to conduct activities that were previously authorized, authorized under SV, or not subject to regulation in all WOTUS.
4. Removal of previously authorized structures or fills and the restoration to pre-construction conditions.

Pre-Construction Notification Required

1. Work not eligible for SV.
 2. Dam and flood control or levee repair, rehabilitation, or replacement which involves a permanent change in the flood elevation or permanent water surface elevation of the impoundment.
 3. The discharge of more than *de minimis* (i.e., inconsequential) quantities of accumulated bottom sediment occurring from or through a dam into downstream waters.
- NOTE 1:** Grandfather dates include structures or work completed before December 18, 1968 and fill placed before July 25, 1975 for USACE purposes only.
- NOTE 2:** This GP authorizes the repair, rehabilitation, or replacement of any previously authorized structure or fill that does not qualify for the CWA §404(f) exemption for maintenance. See 33 CFR 323.4(a)(2).

GP 3. MOORINGS (Section 10): (a) New private, non-commercial, non-rental, single-boat moorings; (b) Minor relocation of previously authorized moorings; (c) Mooring field expansions, boundary reconfigurations, or modifications of previously authorized mooring fields; and (d) Maintenance and replacement of moorings.

Not authorized under GP 3: Moorings or moored vessels that extend within the horizontal limits of FNPs and moorings associated with a new boating facility.

Self-Verification Eligible	Pre-Construction Notification Required
1. Private, non-commercial, non-rental, single-boat moorings. 2. Minor relocation of previously authorized moorings.	1. Work not eligible for SV. 2. New moorings associated with an existing boating facility.

GP 4. PILE-SUPPORTED STRUCTURES AND FLOATS, INCLUDING BOAT LIFTS/HOISTS AND OTHER MISCELLANEOUS STRUCTURES, TEMPORARY RECREATIONAL STRUCTURES AND WORK (Section 10):

(a) New, expansions, reconfigurations, or modifications of structures for navigation access including docks, decks, floats, stairs, and boat/float lifts; and (b) Temporary buoys, markers, and similar structures placed for recreational use during specific events such as water skiing competitions and boat races or seasonal use.

Not authorized under GP 4: (a) Fill or excavation; (b) Structures within FNPs; or (c) Structures associated with a new boating facility.

Self-Verification Eligible	Pre-Construction Notification Required
<p>1. Reconfiguration of existing authorized docks with no additional slips and no expansion, provided those structures do not extend beyond the existing perimeter of the facility.</p> <p>2. Seasonal private, residential pile-supported or float-supported structures for navigational access extending no further waterward than 50 feet beyond mean high water (MHW), not >6 feet wide, and a cumulative dock deck area <500 SF, and not located within 25 feet of the property line.</p> <p>3. Private, bottom-anchored seasonal swim floats that are <400 SF in size.</p> <p>4. Private boat and float lifts.</p> <p>5. Temporary buoys, markers, and similar structures: (a) placed for recreational use during specific events, provided that such structures are removed within 30 days after use has been discontinued and/or; (b) placed during winter events on ice and removed before spring thaw.</p> <p>Provided the above do not extend across >25% of the waterway width at mean low water (MLW).</p>	<p>1. Work not eligible for SV.</p> <p>2. Piers, docks, decks, floats, and similar structures that provide public, community or government recreational uses such as boating, fishing, swimming, access, etc.</p> <p>3. Structures or work in or affecting navigable WOTUS that are not defined under any other GP activity.</p> <p>4. New structures within an existing boating facility, provided those structures do not extend beyond the existing perimeter of the boating facility.</p> <p>5. Temporary buoys, markers, and similar structures that will not be removed within 30 days after use has been discontinued.</p> <p>6. Cordoning off portions of public waters (e.g., swim areas).</p> <p>NOTE: The USACE may require a letter of no objection from the abutter if a structure is to be located within 25 feet of the property line.</p>

GP 5. BOAT RAMPS AND MARINE RAILWAYS (Sections 10 and 404): Activities required for the construction of boat ramps and marine railways including excavation and fill.

Not authorized under GP 5: (a) Permanent impacts \geq 5,000 SF in Lake Champlain, Lake Memphremagog and Wallace Pond and adjacent wetlands, and $>$ 1 acre in all other WOTUS; (b) Temporary impacts $>$ 1 acre in WOTUS; or (c) dredging in navigable WOTUS. (see GP 7).

Self-Verification Eligible	Pre-Construction Notification Required
<p>1. $<$ 5,000 SF of permanent and temporary impacts in waterways and/or wetlands other than Lake Champlain, Lake Memphremagog, Wallace Pond and adjacent wetlands.</p>	<p>1. Work not eligible for SV.</p> <p>2. $<$ 5000 SF permanent impact and $<$ 1 acre of temporary impact and excavation in Lake Champlain, Lake Memphremagog and Wallace Pond and adjacent wetlands.</p> <p>3. Permanent and temporary impacts \geq 5,000 SF and $<$ 1 acre in waterways and/or wetlands, other than Lake Champlain, Lake Memphremagog, Wallace Pond and adjacent wetlands.</p> <p>NOTE: The USACE may require a letter of no objection from the abutter if a structure is to be located within 25 feet of the property line.</p>

GP 6. UTILITY LINE ACTIVITIES (Sections 10 & 404): Activities required for (a) The construction, maintenance, relocation, repair, and removal of utility lines, including outfall and intake structures, and the associated excavation, backfill, or bedding for utility lines; (b) The construction, maintenance or expansion of utility line substation facilities associated with a power/utility line in WOTUS; and (c) The construction and maintenance of foundations for overhead utility line towers, poles, and anchors, provided the foundations are the minimum size necessary, and separate footings for each tower leg (rather than a larger single pad) are used where feasible. This GP authorizes the construction of access roads to facilitate construction of the above activities, provided the activity, in combination with all other activities included in one single and complete project, does not cause the permanent loss of greater than 1 acre of WOTUS. Impacts resulting from mechanized pushing, dragging or other similar activities that redeposit excavated soil material shall be figured into the area limit determination.

Not authorized under GP 6: Permanent and temporary impacts \geq 5,000 SF in Lake Champlain, Lake Memphremagog, Wallace Pond and adjacent wetlands, and $>$ 1 acre in all other WOTUS.

Self-Verification Eligible	Pre-Construction Notification Required
<p>1. $<$ 5,000 SF of permanent and temporary impacts in waterways and/or wetlands other than Lake Champlain, Lake Memphremagog, Wallace Pond and adjacent wetlands.</p> <p>2. Intake structures that are dry hydrants used exclusively for firefighting activities with no stream impoundments.</p> <p>3. Seasonal waterlines installed on the lake or river bottom that are \leq 2 inches in diameter.</p>	<p>1. Work not eligible for SV.</p> <p>2. Overhead utility lines constructed over navigable WOTUS and submarine utility lines that are routed in or under such waters.</p> <p>3. Permanent and temporary impacts are:</p> <ul style="list-style-type: none"> a. $<$ 5,000 SF in Lake Champlain, Lake Memphremagog, Wallace Pond and adjacent wetlands. b. \geq 5,000 SF and $<$ 1 acre in waterways and/or wetlands other than Lake Champlain, Lake Memphremagog, Wallace Pond and adjacent wetlands. <p>4. Work involves stream channelization, relocation or loss of streambed including impoundments.</p> <p>NOTE: Utility lines consisting of aerial electric power transmission lines crossing navigable WOTUS must comply with the applicable minimum clearances specified in 33 CFR 322.5(i).</p>

NOTE: A utility line is defined as any pipe or pipeline for the transportation of any gaseous, liquid, liquescent, or slurry substance, for any purpose, and any cable, line, or wire for the transmission for any purpose of electrical energy, telephone, data, and telegraph messages, and radio and television communication. The term utility line does not include activities that drain a water of the U.S., such as drainage tile or French drains, but it does apply to pipes conveying drainage from another area.

NOTE: Construction mats of any area necessary to conduct activities do not count towards the SV and PCN thresholds and should be removed as soon as work is completed.

GP 7. DREDGING (Section 10), BEACH NOURISHMENT, (Sections 10 & 404); ROCK AND DEBRIS REMOVAL (Section 10) AND ROCK RELOCATION (Sections 10 & 404): (a) New and maintenance dredging, including disposal of dredged material for beach nourishment, provided USACE finds the dredged material to be suitable for such disposal; (b) Beach nourishment not associated with dredging; and (c) Rock removal and relocation for navigation.

Not authorized under GP 7: (a) New and maintenance dredging \geq 5,000 CY; (b) Permanent fill \geq 5,000 SF in Lake Champlain, Lake Memphremagog, Wallace Pond and adjacent wetlands, and $>$ 1 acre in all other WOTUS; (c) Regulated discharges associated with excavation, and disposal $>$ 1/2 acre; and (d) Temporary fill $>$ 1 acre in all WOTUS.

Self-Verification Eligible	Pre-Construction Notification Required
<p>1. No new or maintenance dredging in navigable WOTUS.</p> <p>2. $<$ 5,000 SF of temporary impact associated with dredging in waterways and/or wetlands.</p> <p>3. \leq 200 SF of impact associated with rock removal and relocation.</p> <p>4. Removal of debris (e.g. woody and plant material deposited after a storm event) in navigable WOTUS.</p>	<p>1. Work not eligible for SV.</p> <p>2. New and maintenance dredging up to 5,000 CY with upland disposal or beach nourishment in navigable WOTUS.</p> <p>3. \geq 5,000 SF and $<$ 1 acre of temporary impact associated with dredging in all waterways and/or wetlands.</p> <p>4. Disposal of dredged material for beach nourishment:</p> <ul style="list-style-type: none"> a. $<$ 5,000 SF in Lake Champlain, Lake Memphremagog, Wallace Pond and adjacent wetlands. b. \geq 5,000 SF and $<$ 1 acre in waterways and/or wetlands other than Lake Champlain, Lake Memphremagog, Wallace Pond and adjacent wetlands.

GP 8. U.S. COAST GUARD APPROVED BRIDGES (Section 10 & 404; navigable WOTUS):

Discharges of dredged or fill material incidental to the construction and modification of bridges across navigable WOTUS, including cofferdams, abutments, foundation seals, piers, and temporary construction and access fills provided that the USCG authorizes the construction of the bridge structure under Section 9 of the Rivers and Harbors Act of 1899 or other applicable laws. A USCG Authorization Act Exemption or a STURRA (144h) exemption do not constitute USCG authorization (see GP 18).

Not authorized under GP 8: Causeways and approach fills (see GP 18)

Self-Verification Eligible	Pre-Construction Notification Required
Discharges of dredged or fill material incidental to the construction and modification of bridges.	

GP 9. SHORELINE AND BANK STABILIZATION PROJECTS (Sections 10 & 404): Bank stabilization activities necessary for erosion protection along the banks of lakes, ponds, streams, and any other open waters. Includes bulkheads, seawalls, riprap, revetments or slope protection and similar structures, as well as vegetative planting, soil bioengineering, or alternative techniques that are a combination of the two (e.g. living shorelines), specifically for the purpose of shoreline protection.

Not authorized under GP 9: (a) Bank stabilization \geq 500 LF in total length and/or involving more than an average of 1 CY of fill per linear foot placed below the plane of the ordinary high water mark (OHWM) in Lake Champlain, Lake Memphremagog and Wallace Pond and adjacent wetlands; (b) Stream channelization or relocation activities; or (c) breakwaters, groins and jetties.

Self-Verification Eligible	Pre-Construction Notification Required
<p>1. No fill in Lake Champlain, Lake Memphremagog, Wallace Pond and adjacent wetlands.</p> <p>2. Bank stabilization < 200 linear feet long and does not exceed an average of 1 CY of fill per linear foot placed below the plane of OHWM in WOTUS other than Lake Champlain, Lake Memphremagog, Wallace Pond and adjacent wetlands.</p> <p>3. < 5,000 SF of temporary fill associated with bank stabilization in waterways and/or wetlands, other than Lake Champlain, Lake Memphremagog, Wallace Pond and adjacent wetlands.</p>	<p>1. Work not eligible for SV.</p> <p>2. Bank stabilization <500 linear feet and an average of < 1 CY of fill per linear foot placed below the plane of OHWM in Lake Champlain, Lake Memphremagog, Wallace Pond and adjacent wetlands.</p>

GP 10. AQUATIC HABITAT RESTORATION, ESTABLISHMENT AND ENHANCEMENT ACTIVITIES (Sections 10 and 404): Activities in waters of the United States associated with the restoration, enhancement, and establishment of wetlands and riparian areas; the restoration and enhancement of streams and other open waters; the relocation of non-navigable WOTUS, including streams and associated wetlands for reestablishment of a natural stream morphology and reconnection of the floodplain; and the restoration and enhancement of shellfish, finfish and wildlife, provided those activities result in net increases in aquatic resource functions and services.

Not authorized under GP 10: Stream channelization activities.

Self-Verification Eligible	Pre-Construction Notification Required
<ol style="list-style-type: none"> 1. No fill in Lake Champlain, Lake Memphremagog, Wallace Pond and adjacent wetlands. 2. Permanent and temporary impacts are < 5,000 SF in waterways and/or wetlands. 3. The activity does not convert a stream to wetland or vice versa, or wetland to a pond or uplands. 4. Temporary structures in navigable WOTUS not exceeding 30 days. 	<ol style="list-style-type: none"> 1. Work not eligible for SV. 2. Permanent or temporary impacts are: <ol style="list-style-type: none"> a. In Lake Champlain, Lake Memphremagog, Wallace Pond, adjacent wetlands; or b. ≥ 5,000 SF in all other waterways and/or wetlands. 3. Permanent structures in navigable WOTUS. 4. Sea Lamprey control projects. 5. Water impoundments. 6. Dam removals. 7. Restoration, establishment and/or enhancement activities approved for use by a USACE-approved in-lieu fee program or USACE-approved mitigation bank, with impacts of any size.

GP 11. FISH AND WILDLIFE HARVESTING ACTIVITIES (Sections 10 and 404): Activities in waters of the United States associated with fish and wildlife harvesting devices, such as duck blinds, fish shanties, and small fish aggregating and attraction devices.

Not authorized by GP 11: (a) Artificial reefs; and (b) Permanent and temporary fill > 5,000 SF in all waterways and/or wetlands.

Self-Verification Eligible

Non-fill activities associated with fish and wildlife harvesting devices including duck blinds, fish shanties and small fish aggregating and attraction devices in navigable waters.

Pre-Construction Notification Required

1. Work not eligible for SV.
2. Permanent and temporary impacts < 5,000 SF in all waterways and/or wetlands.

GP 12. OIL SPILL AND HAZARDOUS MATERIAL CLEANUP (Sections 10 and 404): (a)

Activities conducted in response to a discharge or release of oil and hazardous substances that are subject to the National Oil and Hazardous Substances Pollution Contingency Plan (40 CFR 300) including containment, cleanup, and mitigation efforts, provided activities are done under either (i) The Spill Prevent, Control and Countermeasure Plan required by 40 CFR 112.3; (ii) The direction or oversight of the Federal on-site coordinator designated by 40 CFR 300; or (iii) Any approved existing state, regional or local contingency plan, provided that the Regional Response Team concurs with the proposed response efforts or does not object to the response effort; (b) Activities required for the cleanup of oil releases in WOTUS from electrical equipment that are governed by EPA's polychlorinated biphenyl (PCB) spill response regulations at 40 CFR 761; (c) Booms placed in navigable WOTUS; and (d) Use of structures and fills for spill response training exercises. Special Aquatic Sites (SAS) must be restored to their original condition and elevation

Self-Verification Eligible

1. Activities that are conducted in accordance with (a) or (b) above.
2. Booms placed in navigable WOTUS for hazardous and toxic waste containment, absorption and prevention, provided they are removed upon completion of the cleanup.
3. Temporary impacts for spill response training exercises < 1000 SF in navigable WOTUS and < 5000 SF in all other WOTUS, and in place ≤ 30 days.

Pre-Construction Notification Required

1. Work not eligible for SV.
2. Permanent structures or impacts for spill response training exercises.

GP 13. CLEANUP OF HAZARDOUS AND TOXIC WASTE (Sections 10 and 404): Specific activities to effect the containment, stabilization or removal of hazardous or toxic waste materials, including court ordered remedial action plans or related settlements which are performed, ordered or sponsored by a government agency with established legal or regulatory authority. SAS must be restored to their original condition and elevation.

Not authorized under GP 13: (a) the establishment of new disposal sites; or (b) the expansion of existing sites used for the disposal of hazardous or toxic waste.

Self-Verification (SV) Eligible	Pre-Construction Notification Required
<ol style="list-style-type: none"> 1. Permanent and temporary impacts are < 5,000 SF in WOTUS. 2. No fill in navigable WOTUS. 3. Booms placed in navigable WOTUS for oil and hazardous substance containment, absorption and prevention, provided they are removed upon completion of the cleanup. 	<ol style="list-style-type: none"> 1. Work not eligible for SV. 2. Permanent and temporary impacts: <ol style="list-style-type: none"> a. \geq 5,000 SF in all WOTUS; or b. Located in navigable WOTUS. 3. Work involves stream channelization, relocation, impoundments or loss of streambed.

GP 14. SCIENTIFIC MEASUREMENT DEVICES (Sections 10 and 404): Scientific devices for measuring and recording scientific data, such as staff gauges, tide and current gauges, meteorological stations, water recording and biological observation devices, water quality testing and improvement devices, and similar structures. Also eligible are small temporary weirs and flumes constructed primarily to record water quantity and velocity, provided the discharge is < 25 CY.

Not authorized under GP 14: (a) Permanent and temporary impacts > 1/2 acre in navigable WOTUS; and (b) Permanent and temporary impacts > 1 acre in all other WOTUS.

Self-Verification Eligible	Pre-Construction Notification Required
<p>1. Permanent and temporary impacts are ≤ 1,000 SF in WOTUS.</p> <p>2. Temporary structures in navigable WOTUS.</p> <p>Provided the activity does not:</p> <ul style="list-style-type: none"> • Restrict or concentrate movement of aquatic organisms; • Result in a hazard to navigation. 	<p>1. Work not eligible for SV.</p> <p>2. Permanent and temporary impacts > 1000 SF in WOTUS.</p> <p>3. Permanent structures in navigable WOTUS.</p> <p>4. The activity involves permanent biological sampling devices in non-navigable WOTUS, temporary or permanent biological sampling devices in navigable WOTUS, or weirs and flumes.</p>

NOTE: Upon completion of the use of the device to measure and record scientific data, the measuring device, and any other structures or fills associated with that device (e.g., foundations, anchors, buoys, lines, etc.), must be removed to the maximum extent practicable.

GP 15. SURVEY ACTIVITIES (Sections 10 and 404): Survey activities such as soil borings, core sampling, seismic exploratory operations, plugging of seismic shot holes, and other exploratory-type bore holes, exploratory trenching and historic resources surveys.

Not authorized under GP 15: (a) Permanent impacts > 5,000 SF in Lake Champlain, Lake Memphremagog and Wallace Pond, and > 1 acre in all other waterways and/or wetlands, (b) Temporary impacts > 1 acre in all WOTUS, excluding temporary mats.

Self-Verification Eligible	Pre-Construction Notification Required
<ol style="list-style-type: none"> 1. No fill in Lake Champlain, Lake Memphremagog and Wallace Pond. 2. < 5,000 SF of permanent and temporary impacts in waterways and/or wetlands other than Lake Champlain, Lake Memphremagog and Wallace Pond. 3. No impacts, other than soil borings or core sampling, in navigable WOTUS. 4. No permanent structures or drilling and discharge of excavated material from test wells for oil and gas exploration allowed. 	<ol style="list-style-type: none"> 1. Work not eligible for SV. 2. < 5000 SF permanent impact and < 1 acre of temporary impact in Lake Champlain, Lake Memphremagog and Wallace Pond and adjacent wetlands. 3. Permanent and temporary impacts are \geq 5,000 SF and < 1 acre of impact in waterways and/or wetlands, other than Lake Champlain, Lake Memphremagog, Wallace Pond and adjacent wetlands.
<p>NOTE: The area in which the exploratory trench is dug must be restored to its preconstruction elevation upon completion of the work and must not drain a water of the United States. In wetlands, the top 6 to 12 inches of the trench should normally be backfilled with topsoil from the trench.</p> <p>NOTE: Construction mats of any area necessary to conduct activities do not count towards the SV and PCN thresholds and should be removed as soon as work is completed.</p>	

GP 16. ENERGY GENERATION AND RENEWABLE ENERGY GENERATION FACILITIES AND HYDROPOWER PROJECTS (Sections 10 and 404): Structures and work in navigable WOTUS and discharges of dredged or fill material into WOTUS for the construction, expansion, modification or removal of: (a) land-based renewable energy production facilities, including attendant features; (b) water-based wind production facilities or hydrokinetic renewable energy generation projects and their attendant features; and (c) discharges of dredged or fill material associated with hydropower projects.

Attendant features may include, but are not limited to, land-based collection and distribution facilities, control facilities, and parking lots. For each single and complete project in (b) above, no more than 10 generation units (e.g., wind turbines or hydrokinetic devices) are authorized in navigable WOTUS.

Not authorized under GP 16: Permanent and temporary impacts that are (a) > 1 acre in non-navigable WOTUS; (b) > 5,000 SF in navigable WOTUS; and (c) > 5,000 SF in wetlands adjacent to Lake Champlain, Lake Memphremagog, and Wallace Pond.

Self-Verification Eligible	Pre-Construction Notification Required
<p>For land-based facilities: 1. < 5,000 SF of permanent and temporary impacts in non-navigable WOTUS.</p>	<ol style="list-style-type: none"> 1. Work not eligible for SV. 2. Permanent and temporary impacts are: <ol style="list-style-type: none"> a. ≥ 5000 SF and < 1 acre in non-navigable WOTUS, and b. < 5000 SF in navigable WOTUS. 3. Work involves stream channelization, relocation or loss of streambed including impoundments.

NOTE: Utility lines constructed to transfer the energy from the land-based renewable generation or collection facility to a distribution system, regional grid, or other facility may be authorized by GP 6.

NOTE: Construction mats of any area necessary to conduct activities do not count towards the SV and PCN thresholds and should be removed as soon as work is completed.

GP 17. NEW/EXPANDED DEVELOPMENT AND RECREATIONAL FACILITIES (Sections 10 and 404): Discharges of dredged or fill material for the construction or expansion of developments and/or recreational facilities. This GP authorizes attendant features that are necessary for the use of the development. Attendant features may include but are not limited to roads, parking lots, garages, yards, utility lines, storm water management facilities, and septic fields. Fill area includes all temporary and permanent fill, and regulated discharges associated with excavation.

Not authorized under GP 17: Permanent and temporary impacts > 5,000 SF in Lake Champlain, Lake Memphremagog, Wallace Pond and adjacent wetlands, and > 1 acre in all other waterways and/or wetlands.

Self-Verification Eligible	Pre-Construction Notification Required
<p>1. < 5,000 SF of permanent and temporary impacts in waterways and/or wetlands other than Lake Champlain, Lake Memphremagog and Wallace Pond and adjacent wetlands.</p>	<p>1. Work not eligible for SV.</p> <p>2. Permanent and temporary impacts are:</p> <ul style="list-style-type: none"> a. < 5,000 SF in Lake Champlain, Lake Memphremagog, Wallace Pond and adjacent wetlands. b. ≥ 5,000 SF and < 1 acre in waterways and/or wetlands other than Lake Champlain, Lake Memphremagog, Wallace Pond and adjacent wetlands. <p>3. Work involves stream channelization, relocation, or loss of streambed, including impoundments.</p>

NOTE: Construction mats of any area necessary to conduct activities do not count towards the SV and PCN thresholds and should be removed as soon as work is completed.

GP 18. LINEAR TRANSPORTATION PROJECTS AND STREAM/WETLAND CROSSINGS

(Sections 10 & 404): Activities required for the construction, expansion, modification, or improvement of linear transportation projects (e.g., driveways, roads, highways, railways, trails, airport runways, and taxiways), and attendant features. Any stream channel modification is limited to the minimum necessary to construct or protect the linear transportation project; such modifications must be in the immediate vicinity of the project.

Not authorized under GP 18: Permanent and temporary impacts > 5,000 SF in Lake Champlain, Lake Memphremagog, Wallace Pond and adjacent wetlands, and > 1 acre in all other waterways and/or wetlands.

Self-Verification Eligible	Pre-Construction Notification Required
<p>1. < 5,000 SF of permanent and temporary impacts in waterways and/or wetlands other than Lake Champlain, Lake Memphremagog and Wallace Pond and adjacent wetlands.</p> <p>2. Permanent and temporary stream crossings that comply with GC 20.</p> <p>3. Existing crossings (e.g., culverts, elliptical or arch pipes, etc.) are not modified by (a) decreasing the diameter of the crossing or (b) changing the friction coefficient, such as through sliplining (retrofitting an existing culvert by inserting a smaller diameter pipe), culvert relining or invert lining.</p>	<p>1. Work not eligible for SV.</p> <p>2. Permanent and temporary impacts are:</p> <ul style="list-style-type: none">a. < 5,000 SF in Lake Champlain, Lake Memphremagog, Wallace Pond and adjacent wetlands.b. ≥ 5,000 SF and < 1 acre in waterways and/or wetlands other than Lake Champlain, Lake Memphremagog, Wallace Pond and adjacent wetlands. <p>3. Work involves stream channelization, relocation or loss of streambed including impoundments.</p> <p>NOTE: Time of year for instream work is not limited for PCN authorizations unless specifically required by special conditions.</p>

NOTE: Non-linear features commonly associated with transportation projects, such as vehicle maintenance or storage buildings, parking lots, train stations, or aircraft hangars may be authorized by GP 17.

NOTE: Construction mats of any area necessary to conduct activities do not count towards the SV and PCN thresholds and should be removed as soon as work is completed.

GP 19. MINING ACTIVITIES (Sections 10 and 404): Discharges of dredged or fill material into WOTUS for mining activities.

Not authorized under GP 16: Permanent and temporary impacts > 5,000 SF in Lake Champlain, Lake Memphremagog, Wallace Pond and adjacent wetlands, and > 1 acre in all other waterways and/or wetlands.

Self-Verification Eligible	Pre-Construction Notification Required
<p>1. The activity does not occur in, over, or under navigable WOTUS.</p> <p>2. < 5,000 SF of permanent and temporary impacts in waterways and/or wetlands other than Lake Champlain, Lake Memphremagog, Wallace Pond and adjacent wetlands.</p>	<p>1. Work not eligible for SV.</p> <p>2. Permanent and temporary impacts are:</p> <ul style="list-style-type: none"> a. < 5,000 SF in Lake Champlain, Lake Memphremagog, Wallace Pond and adjacent wetlands. b. ≥ 5,000 SF and < 1 acre in waterways and/or wetlands other than Lake Champlain, Lake Memphremagog, Wallace Pond and adjacent wetlands. <p>3. Work occurs in a navigable WOTUS.</p> <p>4. Work involves stream channelization, relocation, impoundment, loss of streambed, or discharge of tailings into streams.</p>

GP 20. TEMPORARY FILL NOT ASSOCIATED WITH ANY OTHER GP ACTIVITIES (Sections 10 and 404): Temporary structures, work, and discharges, including cofferdams, necessary for construction activities or access fills or dewatering of construction sites that are not authorized under another GP activity.

Not authorized under GP 20: (a) Permanent structures or impacts; (b) Temporary impacts > 1 acre in WOTUS; (c) use of cofferdams to dewater wetlands or other aquatic areas to change their use; or (d) Structures or fill left in place after construction is completed.

Self-Verification Eligible	Pre-Construction Notification Required
1. Temporary impacts including land clearing in WOTUS are ≤ 5000 SF.	1. Work not eligible for SV.

NOTE: Temporary stream crossings may be authorized under GP 18.

NOTE: Construction mats of any area necessary to conduct activities do not count towards the SV and PCN thresholds and should be removed as soon as work is completed.

GP 21. AGRICULTURAL ACTIVITIES (Section 404): Discharges of dredged or fill material into WOTUS for agricultural activities, including the construction of building pads for farm buildings. Authorized activities include: (a) installation, placement, or construction of drainage tiles, ditches, or levees; mechanized land clearing; land leveling; the relocation of existing serviceable drainage ditches; and similar activities; (b) discharges of dredged or fill material to relocate existing serviceable drainage ditches constructed in streams.

Not authorized under GP 21: (a) Permanent impacts > 1 acre in non-navigable WOTUS; (b) Work in navigable WOTUS; or (c) Construction of farm ponds in perennial streams.

Self-Verification Eligible	Pre-Construction Notification Required
<p>1. For those activities subject to USACE jurisdiction, < 5,000 SF of permanent and temporary impacts.</p>	<p>1. ≥ 5,000 SF to < 1 acre of permanent and temporary impacts.</p> <p>2. Work involves stream channelization, relocation or loss of streambed including impoundments.</p>

SECTION IV. GENERAL CONDITIONS

1. Other Permits. Permittees shall obtain other federal, state, or local authorizations as required by law. Permittees are responsible for applying for and obtaining all required state or local approvals. Work that is not regulated by the state of Vermont, but is subject to USACE jurisdiction, may be eligible for these General Permits (GPs).

2. Federal Jurisdictional Boundaries.

a. Applicability of these GPs shall be evaluated with reference to federal jurisdictional boundaries. Activities shall be evaluated with reference to “WOTUS” under the Clean Water Act (33 CFR 328) and “navigable WOTUS” under §10 of the Rivers and Harbors Act of 1899 (33 CFR 329). Applicants are responsible for ensuring that the boundaries used satisfy the federal criteria defined at 33 CFR 328-329. These sections prescribe the policy, practice and procedures to be used in determining the extent of USACE jurisdiction. Note: WOTUS includes all waters pursuant to 33 CFR 328.3(a), and adjacent wetlands as that term is defined in 33 CFR 328.3(c).

b. Applicants shall identify all aquatic resources on the project site. All aquatic resources are presumed to be WOTUS unless an approved jurisdictional determination has been obtained from USACE that determines otherwise. Wetlands shall be delineated in accordance with the Corps of Engineers Wetlands Delineation Manual and the most recent Northcentral/Northeast Regional Supplement.

3. Mitigation (Avoidance, Minimization, and Compensatory Mitigation).

a. Activities shall be designed and constructed to avoid and minimize direct, indirect, secondary, and cumulative adverse effects, both temporary and permanent, to WOTUS to the maximum extent practicable at the project site (i.e., on site). Consideration of mitigation (avoiding, minimizing, rectifying, reducing, or compensating) is required to the extent necessary to ensure that the adverse effects to the aquatic environment are no more than minimal.

b. Applicants should consider riparian/forested buffers for stormwater management and low impact development (LID) best management practices (BMPs) to reduce impervious cover and manage stormwater to minimize impacts to the maximum extent practicable.

c. Compensatory mitigation¹ for effects to WOTUS, including direct, secondary and temporal², may be required for projects with permanent and temporary impacts that exceed the SV area limits to offset unavoidable impacts, which remain after all appropriate and practicable avoidance and minimization has been achieved, and to ensure that the adverse effects to the aquatic environment are no more than minimal. Proactive restoration projects or temporary impact work with no secondary effects may generally be excluded from this requirement.

d. Mitigation proposals shall follow the guidelines found in the Compensatory Mitigation for Losses of Aquatic Resources; Final Rule April 10, 2008; 33 CFR 332. Permittees considering the use of a monetary payment in-lieu of permittee-responsible mitigation as compensation for unavoidable impacts to WOTUS in the state of Vermont may utilize the Vermont In-Lieu Fee Program.

¹ Compensatory mitigation projects provided to offset losses of aquatic resources must comply with the applicable provisions of 33 CFR 332. Also reference the New England District Compensatory Mitigation Guidance at

<http://www.nae.usace.army.mil/Missions/Regulatory/Mitigation.aspx>.

² Temporal loss: The time lag between the losses of aquatic resource functions caused by the permitted impacts and the replacement of aquatic resource functions at the compensatory mitigation site(s) (33 CFR 332.2).

e. Mitigation will likely be required for fills >5,000 SF. Information is provided at <https://www.nae.usace.army.mil/Missions/Regulatory/Mitigation/>.

4. Discretionary Authority. Notwithstanding compliance with the terms and conditions of this permit, USACE retains discretionary authority to require an IP review based on concerns for the aquatic environment or for any other factor of the public interest (33 CFR 320.4(a)). This authority is invoked on a case-by-case basis whenever USACE determines that the potential consequences of the proposal warrant IP review based on the concerns stated above. This authority may be invoked for projects with cumulative adverse environmental effects that are more than minimal, or if there is a special resource or concern associated with a particular project. Whenever USACE notifies an applicant that an IP may be required, authorization under these GPs is voided and no work may be conducted until a USACE IP is obtained or until USACE notifies the applicant that further review has demonstrated that the work may be reviewed under these GPs.

5. Fills Within 100-Year Floodplains. The activity shall comply with applicable Federal Emergency Management Agency (FEMA)-approved state of Vermont or municipal floodplain management requirements. Permittees should contact FEMA and/or the state of Vermont Floodplain Management Program regarding floodplain management requirements (see Section V for Federal and state-specific contact info).

6. Single and Complete Project. The term “single and complete project” is defined at 33 CFR 330.2(i) as the total project proposed or accomplished by one owner/developer or partnership or other association of owners/developers. The GPs shall not be used for piecemeal work and shall be applied to single and complete projects.

a. For non-linear projects, a single and complete project must have independent utility. Portions of a multi-phase project that depend upon other phases of the project do not have independent utility. Phases of a project that would be constructed even if the other phases were not built can be considered as separate single and complete projects with independent utility.

b. Unless USACE determines the activity has independent utility, all components of a single project and/or all planned phases of a multi-phased project (e.g., subdivisions should include all work such as roads, utilities, and lot development) shall be treated together as constituting one single and complete project.

c. For linear projects such as power lines or pipelines with multiple crossings, a “single and complete project” is all crossings of a single water of the U.S. (i.e. single waterbody) at a specific location. For linear projects crossing a single waterbody several times at separate and distant locations, each crossing is considered a single and complete project. However, individual channels in a braided stream or river, or individual arms of a large, irregularly-shaped wetland or lake, etc., are not separate waterbodies, and crossings of such features cannot be considered separately. If any crossing requires a PCN review or an IP review, then the entire linear project shall be reviewed as one project under PCN or the IP procedures.

7. Use of Multiple General Permits. The use of more than one GP for a single and complete project is prohibited, except when the acreage loss of WOTUS authorized by the GPs does not exceed the acreage limit of the GPs with the highest specified acreage limit. For example, if a road crossing over waters is constructed under GP 18, with an associated utility line crossing authorized by GP 6, if the maximum acreage loss of WOTUS for the total project is ≥ 1 acre it shall be evaluated as an IP.

8. USACE Property and Federal Projects.

- a. Corps projects and property can be found at: www.nae.usace.army.mil/Missions/Civil-Works and www.nan.usace.army.mil/missions/civil-works
- b. In addition to any authorization under these GPs, proponents must contact the USACE Real Estate Division at (978) 318-8585 for work occurring on or potentially affecting USACE properties and/or USACE-controlled easements to initiate reviews and determine what real estate instruments are necessary to perform work. Permittees may not commence work on USACE properties and/or USACE-controlled easements until they have received any required USACE real estate documents evidencing site-specific permission to work.
- c. Any proposed temporary or permanent modification or use of a Federal project (including but not limited to a levee, dike, floodwall, channel, anchorage, seawall, bulkhead, jetty, wharf, pier or other work built but not necessarily owned by the United States), or any use which would obstruct or impair the usefulness of the Federal project in any manner, and/or would involve changes to the authorized Federal project's scope, purpose, and/or functioning, is not eligible for SV and will also require review and approval by USACE pursuant to Section 14 of the Rivers and Harbors Act of 1899 (33 USC 408) (Section 408).
- d. A PCN is required for all work in, over, under, or within a distance of three times the authorized depth of a USACE FNP and may also require permission under Section 408.
- e. Any structure or work that extends closer than a distance of three times the project's authorized depth to the horizontal limits of any FNP shall be subject to removal at the owner's expense prior to any future USACE dredging or the performance of periodic hydrographic surveys.
- f. Where a Section 408 permission is required, written verification for the PCN will not be issued prior to the decision on the Section 408 permission request.

9. National Lands. Activities that impinge upon the value of any National Wildlife Refuge, National Forest, or any area administered by the NPS, USFWS or U.S. Forest Service (USFS) are not eligible for SV and require either a PCN or IP.

10. Wild and Scenic Rivers.

- a. The following activities in designated rivers of the National Wild and Scenic River (WSR) System, or in a river designated by Congress as a "study river" for possible inclusion in the system, require a PCN unless the NPS has determined in writing to the proponent that the proposed work will not adversely affect the WSR designation or study status:
 - i. Activities that occur in WSR segments, in and 0.25 miles up or downstream of WSR segments, or in tributaries within 0.25 miles of WSR segments;
 - ii. Activities that occur in wetlands within 0.25 miles of WSR segments;
 - iii. Activities that have the potential to alter free-flowing characteristics in WSR segments.
- b. As of December 19, 2014, affected rivers in Vermont include: the Missisquoi River, from its headwaters at the Lowell/Westfield town line to the Canadian border in Troy (20.5 miles) and from the Canadian border in East Richford to Enosburgh Falls (14.6 miles); and the Trout River.

11. Historic Properties.

- a. No undertaking shall cause effects (defined at 33 CFR 325 Appendix C and 36 CFR 800) on properties listed on, determined to be eligible for listing on, or potentially eligible for listing on

the National Register of Historic Places³, including previously unknown historic properties within the permit area, unless USACE or another Federal action agency has satisfied the consultation requirements of Section 106 of the National Historic Preservation Act (NHPA). The SHPO, THPO and the National Register of Historic Places can assist with locating information on: i) previously identified historic properties; and ii) areas with potential for the presence of historic resources, which may require identification and evaluation by qualified historic preservation and/or archaeological consultants in consultation with USACE and the SHPO and/or THPO(s).

b. For activities eligible for SV, proponents must ensure and document that the activity will not cause effects as stated in 11(a).

c. Permittees must submit a PCN to USACE as soon as possible if the authorized activity may cause effects as stated in 11(a) to ensure that USACE is aware of any potential effects of the permitted activity on any historic property or cultural resource so that the consultation requirements of Section 106 of NHPA can be satisfied.

d. If a project proponent discovers any previously unknown historic, cultural, or archeological remains or artifacts while accomplishing the activity authorized by this permit, they must immediately notify the District Engineer of what they have found, and to the maximum extent practicable, avoid construction activities that may affect the remains and artifacts until the required coordination has been completed. The District Engineer will initiate the Federal, Tribal and state coordination required to determine if the items or remains warrant a recovery effort or if the site is eligible for listing in the National Register of Historic Places.

e. Federal agencies should follow their own procedures for complying with the requirements of Section 106 NHPA. Along with the application, Federal applicants shall provide USACE with the appropriate documentation to demonstrate compliance with those requirements.

f. Federal and non-federal applicants should coordinate with USACE before conducting any onsite archeological work (reconnaissance, surveys, recovery, etc.) requested by the SHPO or the THPO, as USACE will determine the permit area for the consideration of historic properties based on 33 CFR 325 Appendix C. This is to ensure that work done is in accordance with USACE requirements.

12. Federal Threatened and Endangered Species.

a. No activity is authorized under any GP which: i) is likely to directly or indirectly jeopardize the continued existence of a threatened or endangered species or a species proposed for such designation, as identified under the Federal Endangered Species Act (ESA), or which will directly or indirectly destroy or adversely modify the critical habitat of such species; or ii) “may affect” a listed species or critical habitat, unless ESA section 7 consultation addressing the effects of the proposed activity has been completed; or iii) is “likely to adversely affect” a listed species or critical habitat unless Section 7 consultation has been completed by USACE or another lead action agency in coordination with USACE; or iii) violates the ESA.

b. All prospective permittees shall obtain an Official Species List from the USFWS’s Information for Planning and Consultation (IPAC) found at: <https://ecos.fws.gov/ipac/>. This is applicable to SV eligible and PCN activities.

c. Non-federal permittees must submit a PCN if any listed species or designated critical habitat might be affected or is in the vicinity of the activity, or if the activity is located in designated critical habitat, and shall not begin work on the activity until notified by the district engineer that the requirements of the ESA have been satisfied and that the activity is authorized.

³ The majority of historic properties are not listed on the National Register of Historic Places and may require identification and evaluation by qualified historic preservation and/or archaeological consultants in consultation with USACE and the SHPO and/or THPO.

An activity may remain eligible for SV if the only listed species affected is the northern long-eared bat (*Myotis septentrionalis*), and

- (i) the activity: 1) will not remove trees ≥ 3 inches dbh at any time of the year; or ≤ 10 trees ≥ 3 inches dbh between November 1 – March 31; and 2) is not within the “buffer” of a NLEB hibernacula or maternity roost tree; and 3) does not involve work on bridges or existing riprap associated with dams; or
- (ii) only after Section 7 consultation has been completed by USACE under the 4(d) Rule Streamlined Consultation.

d. Federal agencies shall follow their own procedures for complying with the requirements of the ESA while ensuring that USACE and any other federal action agencies are included in the consultation process.

e. Non-federal representatives designated by USACE to conduct informal consultation or prepare a biological assessment shall follow the requirements in the designation document(s) and the ESA. Non-federal representatives shall also provide USACE with the appropriate documentation to demonstrate compliance with those requirements. USACE will review the documentation and determine whether it is sufficient to address ESA compliance for the GP activity, or whether additional ESA consultation is necessary.

f. The requirements to comply with Section 7 of the ESA may be satisfied by a programmatic agreement (PA) or programmatic consultation (PC) with USACE, the New England District, or another federal agency. New England District PAs and PCs are found at:

www.nae.usace.army.mil/Missions/Regulatory

13. Navigation.

a. No activity may cause more than a minimal adverse effect on navigation.

b. Any safety lights and signals prescribed by the U.S. Coast Guard, through regulations must be installed and maintained at the permittee's expense on authorized facilities in navigable WOTUS.

c. Any structure or work that extends closer to the horizontal limits of any USACE FNP than a distance of three times the project's authorized depth shall be subject to removal at the owner's expense prior to any future USACE dredging or the performance of periodic hydrographic surveys. This is applicable to SV eligible and PCN activities.

d. There shall be no unreasonable interference with navigation by the existence or use of the activity authorized herein, and no attempt shall be made by the permittee to prevent the full and free use by the public of all navigable waters at or adjacent to the activity authorized herein.

e. The permittee understands and agrees that if future U.S. operations require the removal, relocation, or other alteration of the structure or work herein authorized, or if, in the opinion of the Secretary of the Army or his authorized representative, said structure or work shall cause unreasonable obstruction to the free navigation of the navigable waters, the permittee will be required, upon due notice from USACE, to remove, relocate, or alter the structural work or obstructions caused thereby, without expense to the U.S. No claim shall be made against the U.S. on account of any such removal or alteration.

f. A PCN is required for all work in, over or under an FNP or its buffer zone unless otherwise indicated in Section III as the work may also require a Section 408 permit.

14. Heavy Equipment in Wetlands. Operating heavy equipment (drill rigs, fixed cranes, etc.) within wetlands shall be minimized, and such equipment shall not be stored, maintained or repaired in wetlands, to the maximum extent practicable. Where construction requires heavy equipment operation in wetlands, the equipment shall: a) have low ground pressure (typically < 3

psi); b) be placed on swamp/construction/timber mats (herein referred to as “construction mats” or “mats”) that are adequate to support the equipment in such a way as to minimize disturbance of wetland soil and vegetation; or c) be operated on adequately dry or frozen wetlands such that shear pressure does not cause subsidence of the wetlands immediately beneath equipment and upheaval of adjacent wetlands. Construction mats are to be placed in the wetland from the upland or from equipment positioned on swamp mats if working within a wetland. Construction mats should be carried, and not dragged, into position, where feasible. Other support structures that are capable of safely supporting equipment may be used with written USACE authorization. Similarly, the permittee may request written authorization from USACE to waive use of mats during frozen or dry conditions. An adequate supply of spill containment equipment shall be maintained on site. Construction mats should be managed in accordance with the following construction mat best management practices:

- Mats should be in good condition to ensure proper installation, use and removal.
- Where feasible, mats should be carried and not dragged unless they are being used as a grading implement.
- Where feasible, place mats in a location that would minimize the amount needed for the wetland crossing.
- Minimize impacts to wetland areas during installation, use, and removal.
- Install adequate erosion and sediment controls at approaches to mats to promote a smooth transition to, and minimize sediment tracking onto, mats.
- In most cases, mats should be placed along the travel area so that the individual boards are resting perpendicular to the direction of traffic. No gaps should exist between mats. Mats should be placed far enough on either side of the resource area to rest on firm ground.
- Provide standard construction mat BMP details to work crews.
- Construction mats shall be thoroughly cleaned before re-use to minimize spread of invasive species.

15. Temporary Fill.

a. Temporary fill, construction mats and corduroy roads shall be entirely removed as soon as they are no longer needed to construct the authorized work. Temporary fill shall be placed in its original location or disposed of at an upland site and suitably contained to prevent its subsequent erosion into WOTUS.

b. All temporary fill and disturbed soils shall be stabilized to prevent its eroding into WOTUS where it is not authorized. Work shall include phased or staged development to ensure only areas under active development are exposed and to allow for stabilization practices as soon as practicable. Temporary fill must be placed in a manner that will prevent it from being eroded by expected high flows.

c. Unconfined temporary fill authorized for discharge into WOTUS shall consist of material that minimizes impacts to water quality (e.g. washed stone, stone, etc.).

d. Appropriate measures must be taken to maintain normal downstream flows and minimize flooding to the maximum extent practicable when temporary structures, work, and discharges of dredged or fill material, including cofferdams, are necessary for construction activities, access fills, or dewatering of construction sites. Materials shall be placed in a location and manner that does not adversely impact surface or subsurface water flow into or out of the wetland. Temporary fill authorized for discharge into wetlands shall be placed on geotextile fabric or other appropriate material laid on the pre-construction wetland grade where practicable to minimize impacts and to facilitate restoration to the original grade. Construction mats are excluded from this requirement.

e. Construction debris and/or deteriorated materials shall not be located in WOTUS.

16. Restoration of Wetland Areas.

a. Upon completion of construction, all disturbed wetland areas (the disturbance of these areas must be authorized) shall be stabilized with a wetland seed mix containing only plant species native to New England and shall not contain any species listed in the “Invasive and Other Unacceptable Plant Species” Appendix D in the “New England District Compensatory Mitigation Guidance” found at <http://www.nae.usace.army.mil/Missions/Regulatory/Mitigation.aspx>.

b. The introduction or spread of invasive plant species in disturbed areas shall be controlled. If construction mats are to be used, they shall be thoroughly cleaned before re-use.

c. In areas of authorized temporary disturbance, if trees are cut they shall be cut at or above ground level and not uprooted in order to prevent disruption to the wetland soil structure and to allow stump sprouts to revegetate the work area, unless otherwise authorized.

d. Wetland areas where permanent disturbance is not authorized shall be restored to their original condition and elevation, which under no circumstances shall be higher than the pre-construction elevation. Original condition means careful protection and/or removal of existing soil and vegetation, and replacement back to the original location such that the original soil layering and vegetation schemes are approximately the same, unless otherwise authorized.

17. Bank Stabilization. Projects involving construction or reconstruction/maintenance of bank stabilization structures within USACE jurisdiction should be designed to minimize environmental effects, effects to neighboring properties, scour, etc. to the maximum extent practicable. For example, vertical bulkheads should only be used in situations where reflected wave energy can be tolerated. This generally eliminates bodies of water where the reflected wave energy may interfere with or impact on harbors, marinas, or other developed shore areas. A revetment is sloped and is typically employed to absorb the direct impact of waves more effectively than a vertical seawall. It typically has a less adverse effect on the beach in front of it, abutting properties and wildlife.

18. Soil Erosion and Sediment Controls.

a. Appropriate soil erosion and sediment controls⁴ (hereinafter referred to as “controls”) must be used and maintained in effective operating condition during construction, and all exposed soil and other fills, as well as any work below the OHWM, must be permanently stabilized at the earliest practicable date. Permittees are encouraged to perform work within WOTUS during periods of low-flow or no-flow. Areas of temporary fill and/or cofferdams must be included in total waterway/wetlands impacts to determine applicability of the GPs.

b. No dewatering shall occur with direct discharge to waters or wetlands. Excess water in isolated work areas shall be pumped or directed to a sedimentation basin, tank or other dewatering structures in an upland area adequately separated from waters or wetlands where suspended solids shall be removed prior to discharge back into waters or wetlands. All discharge points back into waters and wetlands shall use appropriate energy dissipaters and erosion and sedimentation control BMPs.

c. Temporary controls shall be removed upon completion of work, but not until all exposed soil and other fills, as well as any work waterward of the OHWM, are permanently stabilized at the

⁴ Appropriate soil erosion, sediment and turbidity controls include cofferdams, bypass pumping around barriers immediately up and downstream of the work footprint (i.e., dam and pump), installation of sediment control barriers (i.e., silt fence, vegetated filter strips, geotextile silt fences, filter tubes, erosion control mixes, hay bales or other devices) downhill of all exposed areas, stream fords, retention of existing vegetated buffers, application of temporary mulching during construction, phased construction, and permanent seeding and stabilization, etc.

earliest practicable date. Sediment and debris collected by these devices shall be removed and placed at an upland location in a manner that will prevent its later erosion into a waterway or wetland. Controls may be left in place if they are biodegradable, and flows and aquatic life movements are not disrupted.

d. The material within sandbags shall not be released during their removal, and trenches must be backfilled as soon as practicable to reduce turbidity impact duration.

19. Aquatic Life Movements and Management of Water Flows.

a. No activity may substantially disrupt the necessary life cycle movements of those species of aquatic life indigenous to the waterbody, including those species that normally migrate through the area, unless the activity's primary purpose is to impound water. Unless otherwise stated, activities permanently impounding water in a stream require a PCN to ensure impacts to aquatic life species are avoided and minimized. All permanent and temporary crossings of waterbodies and wetlands shall be:

- i. Suitably culverted, bridged, or otherwise designed and constructed to maintain low flows to sustain the movement of aquatic species; and
- ii. Properly aligned and constructed to prevent bank erosion or streambed scour both adjacent to and inside the crossing.

b. To avoid adverse impacts on aquatic organisms, the low flow channel/thalweg shall remain unobstructed during periods of low flow, except when it is necessary to perform the authorized work.

c. To the maximum extent practicable, the pre-construction course, condition, capacity, and location of open waters must be maintained for each activity, including stream channelization and storm water management activities. The activity must be constructed to withstand expected high flows. The activity shall not restrict or impede the passage of normal or high flows, unless the primary purpose of the activity is to impound water or manage high flows. The activity may alter the preconstruction course, condition, capacity, and location of open waters if it benefits the aquatic environment (e.g., stream restoration or relocation activities).

d. Activities that temporarily or permanently impact upstream or downstream flood conditions require a PCN.

20. Waterway/Wetland Work and Crossings.

a. All permanent crossings of rivers, streams, brooks, etc. (hereon referred to as "streams") shall meet the following performance standards in order to qualify for SV:

- i. Design the structure to maintain a streambed composition and form throughout the culvert similar to and continuous with the adjacent reaches. To do this:
 - Design and install streambed material and bedforms if not adequately supplied and developed naturally,
 - Design profile and alignment through structure similar to those of adjacent stream reaches,
 - Design culvert elevation to remain embedded for the life of the structure and in consideration of future channel conditions.
- ii. Maintain velocities, turbulence and depths within the structure similar to those found in adjacent stream reaches across a range of desired flows.

b. The requirements to comply with the performance standards in GC 20a. above in order to proceed as a SV project do not apply to the following:

- i. Temporary crossings in place for less than 90 days. Temporary culverts must be embedded unless they're installed during low flow (July 1 – October 1) and it's placed on geotextile fabric laid on the stream bed to ensure restoration to the original grade.

c. Applicants proposing new crossings, or maintenance or replacement of serviceable crossings should refer to the Guidelines for the Design of Stream/Road Crossings for Passage of Aquatic Organisms in Vermont.

d. Applicants shall use the least intrusive and environmentally damaging method to construct the stream crossing, following this sequential minimization process: bridge spans, open bottom arches or embedded culverts.

e. Permanent and temporary crossings of waterbodies and wetlands shall be installed in such a manner as to preserve hydraulic and ecological connectivity, on either side of the crossing. The permittee shall take necessary measures to correct wetland damage due to lack of hydraulic connectivity.

f. Projects using retrofit methods increasing flow velocity or slip lining (retrofitting an existing culvert by inserting a smaller diameter pipe) require a PCN, either as new or maintenance activities.

g. No projects involving open trench excavation in flowing waters, except riprap installation, are allowed under SV. Open trench excavation projects may qualify for SV provided (1) the work doesn't occur in flowing waters (requires using management techniques such as temporary flume pipes, culverts, cofferdams, etc.) and (2) normal flows are maintained upstream and downstream of the project area.

h. For projects that otherwise meet the terms of SV, in-stream construction work shall be conducted only during the low flow period of July 1 to October 1 in any year. Projects that are conducted outside that time period require a PCN, regardless of the waterway and/or wetland impact area.

21. Discharge of Pollutants. All activities involving any discharge of pollutants into WOTUS authorized under these GPs shall comply with applicable water quality standards, effluent limitations, standards of performance, prohibitions, and pretreatment standards and management practices established pursuant to the CWA (33 U.S.C. 1251), and applicable state and local laws. If applicable water quality standards, limitations, etc., are revised or modified during the term of this permit, the authorized work shall be modified to conform with these standards within 6 months of the effective date of such revision or modification, or within a longer period of time deemed reasonable by the District Engineer in consultation with the Regional Administrator of the EPA. Applicants may presume that State Water Quality Standards are met with the issuance of a 401 WQC or waiver (Applicable only to the Section 404 activity).

22. Spawning, Breeding, and Migratory Areas.

a. Jurisdictional activities and impacts such as excavations, discharges of dredged or fill material, and/or suspended sediment producing activities in jurisdictional waters that provide value as fish migratory areas, fish and shellfish spawning or nursery areas, or amphibian and migratory bird breeding areas, during spawning or breeding seasons shall be avoided and minimized to the maximum extent practicable.

b. Jurisdictional activities in WOTUS that provide value as breeding areas for migratory birds must be avoided to the maximum extent practicable. The permittee is responsible for obtaining any "take" permits required under the USFWS's regulations governing compliance with the Migratory Bird Treaty Act or the Bald and Golden Eagle Protection Act. The permittee should contact the appropriate local office of the USFWS to determine if such "take" permits are required for a particular activity.

23. Storage of Seasonal Structures. Seasonal or recreational structures such as pier sections, floats, etc., that are removed from the waterway for a portion of the year shall be stored in an upland location, located above the OHWM and not in wetlands.

24. Environmental Functions and Values. The permittee shall make every reasonable effort to carry out the construction or operation of the work authorized herein in a manner that minimizes any adverse impacts on existing fish, wildlife, and the environmental functions to the extent practicable. The permittee will discourage the establishment or spread of plant species identified as non-native invasive species by any federal or state agency.

25. Vernal Pools.

a. On projects requiring a PCN, vernal pools must be identified on the plan showing aquatic resource delineations.

b. A PCN is required if a discharge of dredged or fill material is proposed in a vernal pool located within WOTUS.

c. Adverse impacts to vernal pools, vernal pool envelopes, and critical terrestrial habitats should be avoided and minimized to the maximum extent practicable.

d. GC 25(b) and (c) do not apply to projects that are within a municipality that meets the provisions of a USACE-approved VP Special Area Management Plan (VP SAMP) and are otherwise eligible for SV, and the applicant meets the requirements to utilize the VP SAMP.

26. Invasive Species. The introduction, spread, or the increased risk of invasion of invasive plant or animal species on the project site, into new or disturbed areas, or areas adjacent to the project site caused by the site work shall be avoided. Hence, swamp and timber mats and construction equipment shall be thoroughly cleaned before reuse/relocation.

27. Permit/Authorization Letter On-Site. For PCN projects, the permittee shall ensure that a copy of these GPs and the accompanying authorization letter are at the work site (and the project office) whenever work is being performed, and that all personnel with operational control of the site ensure that all appropriate personnel performing work are fully aware of its terms and conditions. The entire permit authorization shall be made a part of any and all contracts and sub-contracts for work that affect areas of USACE jurisdiction at the site of the work authorized by these GPs. This shall be achieved by including the entire permit authorization in the specifications for work. The term "entire permit authorization" means these GPs, including general conditions and the authorization letter (including its drawings, plans, appendices and other attachments), and also includes permit modifications. If the authorization letter is issued after the construction specifications, but before receipt of bids or quotes, the entire permit authorization shall be included as an addendum to the specifications. If the authorization letter is issued after receipt of bids or quotes, the entire permit authorization shall be included in the contract or sub-contract as a change order. Although the permittee may assign various aspects of the work to different contractors or sub-contractors, all contractors and sub-contractors shall be obligated by contract to comply with all environmental protection provisions contained within the entire authorization letter, and no contract or sub-contract shall require or allow unauthorized work in areas of USACE jurisdiction.

28. Inspections. The permittee shall allow USACE to make periodic inspections at any time deemed necessary in order to ensure that the work is being or has been performed in accordance with the terms and conditions of this permit. To facilitate these inspections, the permittee shall complete and return the Work Start Notification Form and the Compliance Certification Form to

USACE when provided with a PCN verification letter. The USACE may also require post-construction engineering drawings for completed work or post-dredging survey drawings for any dredging work.

29. Maintenance. The permittee shall maintain the activity authorized by these GPs in good condition and in conformance with the terms and conditions of this permit. This does not include maintenance of dredging projects. Maintenance dredging is subject to the review thresholds in General Permit 7 in Appendix A, as well as any conditions included in a written USACE authorization. Maintenance dredging includes only those areas and depths previously authorized and dredged. Some maintenance activities may not be subject to regulation under Section 404 in accordance with 33 CFR 323.4(a)(2).

30. Property Rights. Per 33 CFR 320.4(g)(6), these GPs do not convey any property rights, either in real estate or material, or any exclusive privileges, nor does it authorize any injury to property or invasion of rights or any infringement of federal, state, or local laws or regulations.

31. Transfer of GP Verifications. If the permittee sells the property associated with a GP verification, the permittee may transfer the GP verification to the new owner by submitting a letter to USACE to validate the transfer. A copy of the GP verification shall be attached to the letter, the letter shall contain the name, address, phone number and email of the transferee (new owner), shall include the following statement and signature, and be emailed to cenae-r-vt@usace.army.mil or mailed to: U.S. Army Corps of Engineers, Vermont Project Office, 11 Lincoln Street, Room 210, Essex Junction, Vermont 05452.

When the structures or work authorized by this general permit are still in existence at the time the property is transferred, the terms and conditions of this general permit, including any special conditions, will continue to be binding on the new owner(s) of the property. To validate the transfer of this general permit and the associated liabilities associated with compliance with its terms and conditions, have the transferee sign and date below.

_____ (Transferee Printed Name)
_____ (Transferee Signature)
_____ (Date)

32. Modification, Suspension, and Revocation. These GPs and any individual authorizations issued thereof may be modified, suspended, or revoked in whole or in part pursuant to the policies and procedures of 33 CFR 325.7, and any such action shall not be the basis for any claim for damages against the United States.

33. Special Conditions. The USACE may impose other special conditions on a project authorized pursuant to these GPs that are determined necessary to minimize adverse navigational and/or environmental effects or based on any other factor of the public interest. These may be based on concerns from the VT ANR, SHPO, THPO or a Federal resource agency. Failure to comply with all conditions of the authorization, including special conditions, will constitute a permit violation and may subject the permittee to criminal, civil, or administrative penalties and/or restoration.

34. False or Incomplete Information. If USACE makes a determination regarding the eligibility of a project under this permit and subsequently discovers that it has relied on false, incomplete, or inaccurate information provided by the permittee, the authorization will not be valid, and the U.S. government may institute appropriate legal proceedings.

35. Abandonment. If the permittee decides to abandon the activity authorized under this GP, unless such abandonment is merely the transfer of property to a third party, he/she may be required to restore the area to the satisfaction of USACE.

36. Enforcement cases. These GPs do not apply to any existing or proposed activity in USACE jurisdiction associated with an ongoing USACE or EPA enforcement action, until such time as the enforcement action is resolved or USACE determines that the activity may proceed independently without compromising the enforcement action.

37. Water Quality. Applicants shall satisfy any conditions imposed by the State of Vermont and EPA, where applicable, in their Clean Water Act Section 401 WQC for these GPs, or in any Individual Section 401 WQC. See Section V. for state-specific contact information and to determine if any action is required to obtain a 401 WQC. USACE may require additional water quality management measures to ensure that the authorized activity does not cause or contribute to a violation of water quality standards. All projects authorized by these GPs shall be designed, constructed and operated to minimize or eliminate the discharge of pollutants.

38. Duration of Authorization.

a. These GPs expire five years from the date issued as listed at the top of the cover sheet. Activities authorized by these GPs that have either commenced (i.e., are under construction) or are under contract to commence in reliance upon this authorization will have an additional year from the expiration date to complete the work. The permittee must be able to document to USACE's satisfaction that the project was under construction or under contract by the expiration date of these GPs. If work is not completed within the one-year extended timeframe, the permittee must contact USACE. The USACE may issue a new authorization, provided the project meets the terms and conditions of the GPs in effect at the time.

b. Activities authorized under these GPs will remain authorized until the GPs expire, unless discretionary authority has been exercised on a case-by-case basis to modify, suspend, or revoke the authorization in accordance with 33 CFR 325.2(e)(2). Activities completed under the SV or PCN authorizations of these GPs will continue to be authorized after its expiration date.

V. CONTACTS FOR VERMONT GENERAL PERMITS

1. Federal

U.S. Army Corps of Engineers

New England District, Regulatory Division
Vermont Project Office
11 Lincoln Street, Room 210
Essex Junction, Vermont 05452
(802) 872-2893, (802) 879-7638 fax
www.nae.usace.army.mil/missions/regulatory
cenae-r-vt@usace.army.mil

U.S. Environmental Protection Agency

5 Post Office Square, Suite 100
Boston, Massachusetts 02109
(617) 918-1692

U.S. Fish and Wildlife Service

70 Commercial Street, Suite 300
Concord, New Hampshire 03301-5087
(603) 223-2541

National Park Service

North Atlantic Region
15 State Street
Boston, Massachusetts 02109
(617) 223-5203

2. Historic Resources

State Historic Preservation Officer
Division for Historic Preservation
National Life Building
Drawer 20
Montpelier, Vermont 05620-0501
(802) 828-3211

Tribal Historic Preservation Officer
c/o Stockbridge-Munsee Community
86 Spring Street
Williamstown, Massachusetts 01267
(413) 884-6048
Area of concern: Addison, Rutland and
Bennington Counties
thpo@mohican-nsn.gov

Tribal Historic Preservation Officer
c/o Wampanoag Tribe of Gay Head (Aquinnah)
20 Black Brook Road
Aquinnah, Massachusetts 02535
(508) 645-9265 THPO@wampanoagtribe-nsn.gov
Area of Concern: All Vermont counties except Addison, Rutland and Bennington

3. Vermont Agency of Natural Resources

Department of Environmental Conservation

Wetlands Program
Watershed Management Division
1 National Life Drive, Main 2
Montpelier, VT 05620-3522

Department of Environmental Conservation

River Management Program
Watershed Management Division
1 National Life Drive, Main 2
Montpelier, VT 05620-3522

Department of Environmental Conservation

Lakes and Ponds Program
Watershed Management Division
1 National Life Drive, Main 2
Montpelier, VT 05620-3522

Department of Environmental Conservation

Dam Safety Program
Facilities Engineering Division
1 National Life Drive, Main 2
Montpelier, VT 05620-3522

Vermont Department of Fish & Wildlife

1 National Life Drive, Main 2
Montpelier, VT 05620-3522

State endangered species
Vermont Department of Fish & Wildlife
Nongame and Natural Heritage Program
1 National Life Drive, Main 2
Montpelier, VT 05620-3522

VI. DEFINITIONS

Action Area: The “Endangered Species Consultation Handbook – Procedures for Conducting Consultation and Conference Activities Under Section 7 of the ESA,” defines action area as “all areas to be affected directly or indirectly by the federal action and not merely the immediate area involved in the action. [50 CFR 402.02].”

Artificial Reef: A structure which is constructed or placed in waters for the purpose of enhancing fishery resources and commercial and recreational fishing opportunities.

Attendant Features: Occurring with or as a result of; accompanying.

Biodegradable: A material that decomposes into elements found in nature within a reasonably short period of time and will not leave a residue of plastic or a petroleum derivative in the environment after degradation. In contrast, degradable plastics break down into plastic fragments that remain in the environment after degradation. Examples of biodegradable materials include jute, sisal, cotton, straw, burlap, coconut husk fiber (coir) or excelsior. In contrast, degradable plastics break down into plastic fragments that remain in the environment after degradation. Photodegradable, UV degradable or Oxo- (bio)degradable plastics are not considered biodegradable under this GP.

Boating facilities: These provide, rent, or sell mooring space, such as marinas, boat/yacht clubs, boat yards, dockminiums, town facilities, etc. Not classified as boating facilities are piers shared between two abutting properties or town mooring fields that charge an equitable user fee based on the actual costs incurred.

Compensatory mitigation: The restoration (reestablishment or rehabilitation), establishment (creation), enhancement, and/or, in certain circumstances, preservation of aquatic resources for the purposes of offsetting unavoidable adverse impacts which remain after all appropriate and practicable avoidance and minimization has been achieved.

Construction mats: Construction, swamp and timber mats (herein referred to as “construction mats”) are generic terms used to describe structures that distribute equipment weight to prevent wetland damage while facilitating passage and providing work platforms for workers and equipment. They are comprised of sheets or mats made from a variety of materials in various sizes. A timber mat consists of large timbers bolted or cabled together.

Currently serviceable: Useable as is or with some minor maintenance, but not so degraded as to essentially require reconstruction.

Direct effects: The loss of aquatic ecosystem within the footprint of the discharge of dredged or fill material. Direct effects are caused by the action and occur at the same time and place.

Dredged material and discharge of dredged material: These are defined at 33 CFR 323.2(c) and (d). The term “dredged material” means material that is excavated or dredged from waters of the United States.

Discharge: The term “discharge” means any discharge of dredged or fill material into waters of the United States.

Enhancement: The manipulation of the physical, chemical, or biological characteristics of an aquatic resource to heighten, intensify, or improve a specific aquatic resource function(s). Enhancement results in the gain of selected aquatic resource function(s), but may also lead to a decline in other aquatic resource function(s). Enhancement does not result in a gain in aquatic resource area.

Ephemeral stream: A stream with flowing water only during, and for a short duration after, precipitation events in a typical year. Ephemeral stream beds are located above the water table year-round. Groundwater is not a source of water for the stream. Runoff from rainfall is the primary source of water for stream flow.

Establishment (creation): The manipulation of the physical, chemical or biological characteristics present to develop an aquatic resource that did not previously exist at an upland site. Establishment results in a gain in aquatic resource area.

Expansions: Work that increases the footprint of fill, depth of basin or drainage feature, structures or floats, or slip capacity.

Fill material & discharge of fill material: These are defined at 33 CFR 323.2(e) and (f). The term fill material is defined as material placed in WOTUS where the material has the effect of either replacing any portion of a water of the U.S. with dry land or changing the bottom elevation of any portion of a water of the U.S.

Federal navigation projects (FNPs): These areas are maintained by USACE, authorized, constructed and maintained on the premise that they will be accessible and available to all on equal terms. They are comprised of USACE Federal anchorages, Federal channels and Federal turning basins. The following are FNPs in VT, and more information, including the limits, is provided at www.nae.usace.army.mil/missions/navigation and www.nan.usace.army.mil/Missions/Civil-Works/:

- Burlington Harbor
- Channel Between the North and South Hero Islands
- Gordons Landing
- Narrows of Lake Champlain
- Otter Creek
- St. Albans Harbor
- Swanton Harbor

Flume: An open artificial water channel, in the form of a gravity chute that leads water from a diversion dam or weir completely aside a natural flow. A flume can be used to measure the rate of flow.

Historic Property: Any prehistoric or historic district, site (including archaeological site), building, structure, or other object included in, or eligible for inclusion in, the National Register of Historic Places maintained by the Secretary of the Interior. This term includes artifacts, records, and remains that are related to and located within such properties. The term includes properties of traditional religious and cultural importance to an Indian tribe or Native Hawaiian organization and that meet the National Register criteria (36 CFR 60).

Independent utility: A test to determine what constitutes a single and complete non-linear project in the USACE regulatory program. A project is considered to have independent utility if it would be constructed absent the construction of other projects in the project area. Portions of a multi-phase project that depend upon other phases of the project do not have independent utility. Phases of a project that would be constructed even if the other phases were not built can be considered as separate single and complete projects with independent utility.

Indirect effects: Effects that are caused by the activity and are later in time or farther removed in distance, but are still reasonably foreseeable.

Individual Permit: A Department of the Army authorization that is issued following a case-by-case evaluation of a specific structure or work in accordance with the procedures of 33 CFR 322, or a specific project involving the proposed discharge(s) in accordance with the procedures of 33 CFR 323, and in accordance with the procedures of 33 CFR 325 and a determination that the proposed discharge is in the public interest pursuant to 33 CFR 320.

Intermittent stream: A stream with flowing water during certain times of the year, when groundwater provides water for stream flow. During dry periods, intermittent streams may not have flowing water. Runoff from rainfall is a supplemental source of water for stream flow.

Maintenance: Maintenance does not include any modification that changes the character, scope, or size of the original fill design.

Mechanized land clearing: Land clearing activities using mechanized equipment such as backhoes or bulldozers with shear blades, rakes or discs constitute point source discharges and are subject to section 404 jurisdiction when they take place in wetlands or waters of the U.S (Regulatory Guidance Letter 90-05).

Minor deviations: Deviations in the structure's configuration or filled area, including those due to changes in materials, construction techniques, or current construction codes or safety standards, which are necessary to make repair, rehabilitation, or replacement are permitted, provided the adverse environmental effects resulting from such repair, rehabilitation, or replacement are minimal.

Navigable waters of the United States: These are a subset of WOTUS and are defined at 33 CFR 329. The jurisdictional limits (33 CFR 329.11) extend laterally to the entire water surface and bed of a navigable waterbody, which include all the land and waters below OHWM. Jurisdiction thus extends to the edge (as determined above) of all such waterbodies, even though portions of the waterbody may be extremely shallow or obstructed by shoals, vegetation or other barriers. Marshlands and similar areas are thus considered navigable in law, but only so far as the area is subject to inundation by the ordinary high waters. In Vermont these waters are: the Connecticut River, Lake Champlain, Lake Memphremagog, Wallace Pond, Ompompanoosuc River (to mile 3.8), Waits River (to mile 0.9), the Black River (mouth to mile 25 in Craftsbury), the Battenkill River (to mile 50 in Manchester), the Lamoille River (mouth to mile 79 in Greensboro), the Missisquoi River (including the North Branch, from the mouth to mile 88.5 in Lowell), Otter Creek (mouth to mile 63.8 in Procter), Winooski River (mouth to Marshfield), Moose River (from Passumpsic River to the Victory Town Line), Nulhegan River (mouth to its source including the East Branch, the Black Branch and the Yellow Branch), Paul Stream (mouth to the source), East Branch of the Passumpsic River (from the confluence with the Passumpsic River to East Haven), Passumpsic River (mouth to confluence with the East Branch), White River (mouth to its source), Wells River (mouth to Groton Pond).

Ordinary High Water Mark (OHWM): A line on the shore established by the fluctuations of water and indicated by physical characteristics, or by other appropriate means that consider the characteristics of the surrounding areas. See 33 CFR 328.3(e).

Perennial stream: A stream with flowing water year-round during a typical year. The water table is located above the stream bed for most of the year. Groundwater is the primary source of water for stream flow. Runoff from rainfall is a supplemental source of water for stream flow.

Practicable: Available and capable of being done after taking into consideration cost, existing technology, and logistics in light of overall project purposes.

Permanent impacts: Permanent impacts means WOTUS that are permanently affected by filling, flooding, excavation, or drainage because of the regulated activity. Permanent impacts include permanent discharges of dredged or fill material that change an aquatic area to dry land, increase the bottom elevation of a waterbody, or change the use of a waterbody.

Preservation: The removal of a threat to, or preventing the decline of, aquatic resources by an action in or near those aquatic resources. This term includes activities commonly associated with the protection and maintenance of aquatic resources through the implementation of appropriate legal and physical mechanisms. Preservation does not result in a gain of aquatic resource area or functions.

Re-establishment: The manipulation of the physical, chemical, or biological characteristics of a site with the goal of returning natural/historic functions to a former aquatic resource. Reestablishment results in rebuilding a former aquatic resource and results in a gain in aquatic resource area and functions.

Rehabilitation: The manipulation of the physical, chemical, or biological characteristics of a site with the goal of repairing natural/historic functions to a degraded aquatic resource.

Rehabilitation results in a gain in aquatic resource function, but does not result in a gain in aquatic resource area.

Restoration: The manipulation of the physical, chemical, or biological characteristics of a site with the goal of returning natural/historic functions to a former or degraded aquatic resource. For the purpose of tracking net gains in an aquatic resource area, restoration is divided into two categories: reestablishment and rehabilitation.

Secondary effects: These are effects on an aquatic ecosystem that are associated with a discharge of dredged or fill materials, but do not result from the actual placement of the dredged or fill material. Information about secondary effects on aquatic ecosystems shall be considered prior to the time final Section 404 action is taken by permitting authorities. Some examples of secondary effects on an aquatic ecosystem are a) aquatic areas drained, flooded, fragmented, or mechanically cleared, b) fluctuating water levels in an impoundment and downstream associated with the operation of a dam, c) septic tank leaching and surface runoff from residential or commercial developments on fill, and d) leachate and runoff from a sanitary landfill located in WOTUS See 40 CFR 230.11(h).

Special aquatic sites (SAS): These include inland wetlands, mud flats, vegetated shallows (submerged aquatic vegetation), and riffle and pool complexes. These are defined at 40 CFR 230.3 and listed in 40 CFR 230 Subpart E.

Streambed: The substrate of the stream channel between the OHW marks. The substrate may be bedrock or inorganic particles that range in size from clay to boulders. Wetlands contiguous to the streambed, but outside of the OHW marks, are not considered part of the streambed.

Stream channelization: The manipulation of a stream's course, condition, capacity, or location that causes more than minimal interruption of normal stream processes. A channelized stream remains a water of the United States.

Structure: An object that is arranged in a definite pattern of organization. Examples of structures include, without limitation, any pier, boat dock, boat ramp, wharf, dolphin, weir, boom, breakwater, bulkhead, revetment, riprap, jetty, artificial island, artificial reef, permanent mooring structure, power transmission line, permanently moored floating vessel, piling, aid to navigation, or any other manmade obstacle or obstruction.

Temporary impacts: Temporary impacts include, but are not limited to, WOTUS that are temporarily filled, flooded, excavated, drained or mechanically cleared because of the regulated activity.

Utility Line: Any pipe or pipeline for the transportation of any gaseous, liquid, liquescent, or slurry substance, for any purpose, and any cable, line, or wire for the transmission for any purpose of electrical energy, telephone, data, and telegraph messages, and radio and television communication. The term "utility line" does not include activities that drain a water of the U.S., such as drainage tile or French drains, but it does apply to pipes conveying drainage from another area.

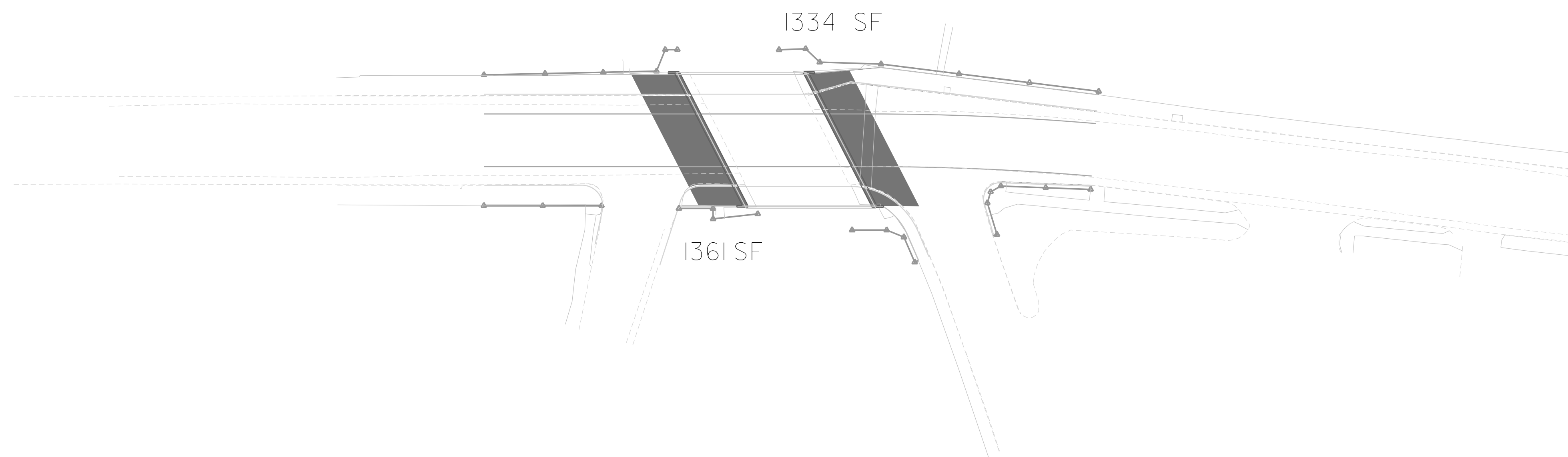
Vegetated shallows: Permanently inundated areas that under normal circumstances support communities of rooted aquatic vegetation in rivers and lakes. Note: These areas are also commonly referred to as submerged aquatic vegetation (SAV).

Vernal pools (VPs): For the purposes of these GPs, VPs are depressional wetland basins that typically go dry in most years and may contain inlets or outlets, typically of intermittent flow. Vernal pools range in both size and depth depending upon landscape position and parent material(s). In most years, VPs support one or more of the following obligate indicator species: wood frog, spotted salamander, blue-spotted salamander, marbled salamander, Jefferson's salamander and fairy shrimp. However, they should preclude sustainable populations of predatory fish.

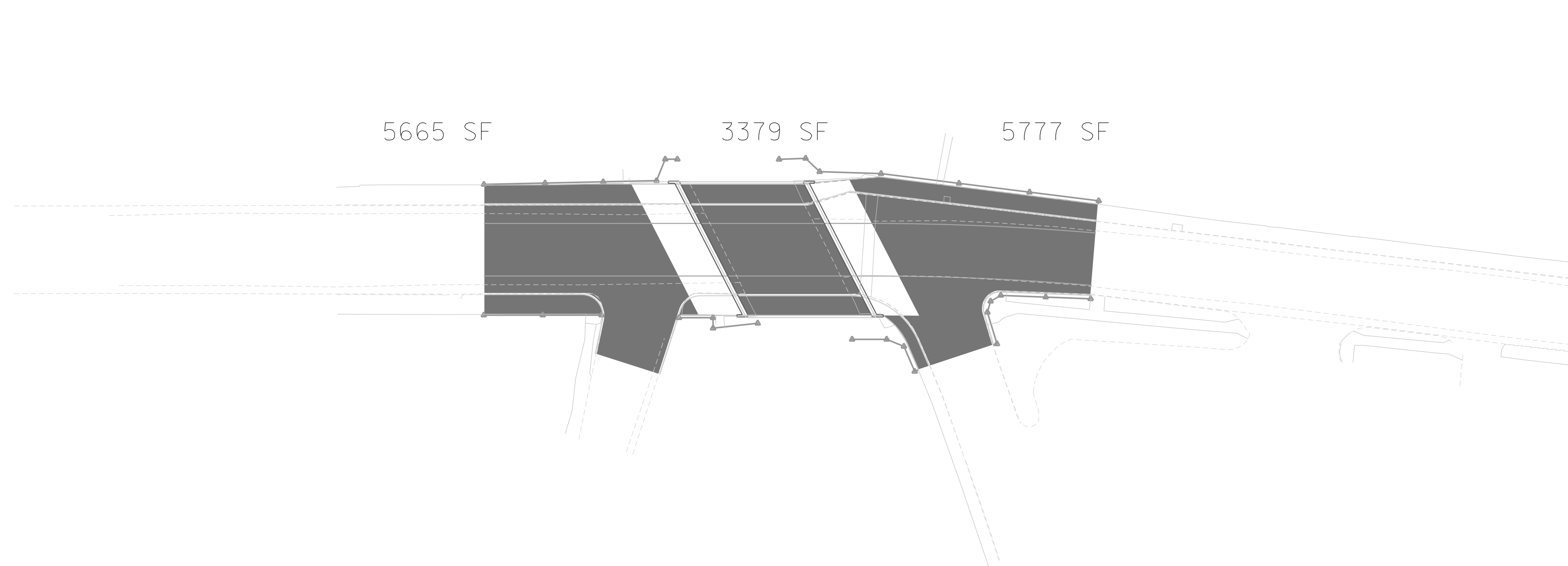
Water diversions: Water diversions are activities such as bypass pumping (e.g., “dam and pump”) or water withdrawals. Temporary flume pipes, culverts or cofferdams where normal flows are maintained within the stream boundary’s confines aren’t water diversions. “Normal flows” are defined as no change in flow from pre-project conditions.

Weir: A barrier across a river designed to alter the flow characteristics. In most cases, weirs take the form of a barrier, smaller than most conventional dams, across a river that causes water to pool behind the structure (not unlike a dam) and allows water to flow over the top. Weirs are commonly used to alter the flow regime of the river, prevent flooding, measure discharge and help render a river navigable.

Waters of the United States (WOTUS): Waters of the United States are defined in 33 CFR 328.3. These waters include more than navigable WOTUS and are the waters where permits are required for the discharge of dredged or fill material pursuant to Section 404 of the Clean Water Act. WOTUS include jurisdictional wetlands.



BENNINGTON BF 1000(20)
REDEVELOPMENT OF EXISTING IMPERVIOUS SURFACE
(1361 SF + 1334 SF = 2695 SF)



BENNINGTON BF 1000(20)
IMPERVIOUS SURFACE THAT IS NOT EXPANSION OR REDEVELOPMENT
(5665 SF + 3379 SF + 5777 SF = 14821 SF)

- 200 VT ROUTE 9 STA. 13+55, LT. TO 13+56, RT.
NEW 18" X 33.0' CPEP (SL), INV. IN 726.79 INV. OUT 726.61
- 201 BEECH ST STA. 30+91, LT. TO VT ROUTE 9 STA. 13+54, RT.
NEW 18" X 37.0' CPEP (SL), INV. IN 726.50 INV. OUT 726.30
- 202 BEECH STREET STA. 30+91, LT. TO 31+00, LT.
NEW 18" X 36.0' CPEP (SL), INV. IN 726.20 INV. OUT 726.00

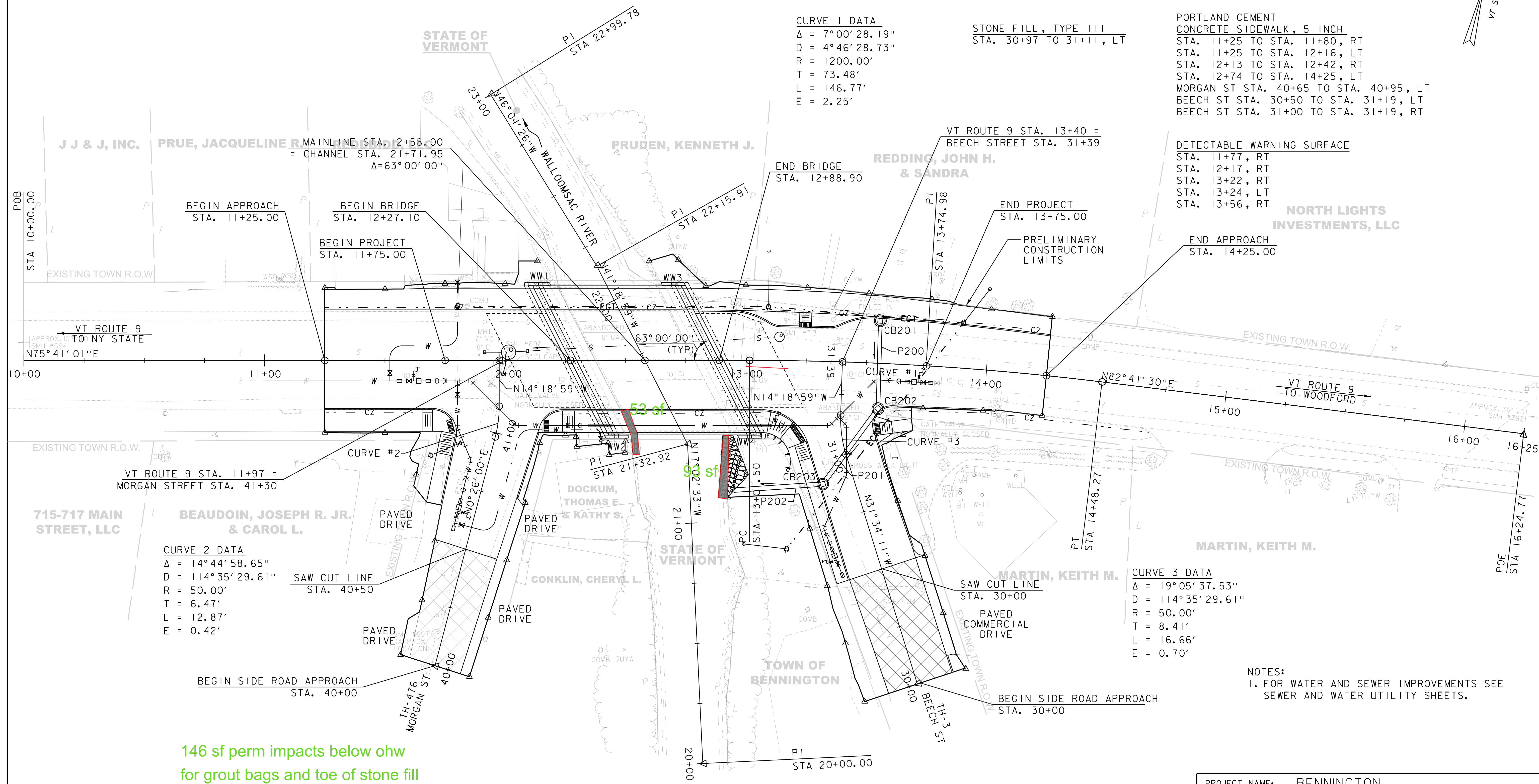
STRUCTURE NO.	STATION	STATION	COMMENTS
CB201	VT ROUTE 9 13+55, LT	4' DIA.	DEEP SUMP CATCH BASIN, TYPE "D" GRATE, RIM 731.0', OFFSET 17.7'
CB202	VT ROUTE 9 13+56, RT	4' DIA.	CATCH BASIN, TYPE "D" GRATE, RIM 731.1', OFFSET 18.8'
CB203	BEECH ST 30+91, LT	4' DIA.	CATCH BASIN, TYPE "D" GRATE, RIM 731.0', OFFSET 12.8'

GROUT BAGS
STA. 21+30.00, LT. TO STA. 21+57.00, LT.

REMOVAL OF EXISTING CURB & PRECAST REINFORCED CONCRETE CURB, TRYPE B
STA. 11+25 TO STA. 11+80, RT
STA. 11+25 TO STA. 12+16, LT
STA. 12+13 TO STA. 12+38, RT
STA. 12+78 TO STA. 14+25, LT
STA. 13+61 TO STA. 14+05, RT
MORGAN ST STA. 40+65 TO STA. 40+95, LT
MORGAN ST STA. 40+76 TO STA. 41+03, RT
BEECH ST STA. 30+50 TO STA. 31+19, LT
BEECH ST STA. 31+00 TO STA. 31+19, RT

PORTLAND CEMENT CONCRETE SIDEWALK, 5 INCH
STA. 11+25 TO STA. 11+80, RT
STA. 11+25 TO STA. 12+16, LT
STA. 12+13 TO STA. 12+42, RT
STA. 12+74 TO STA. 14+25, LT
MORGAN ST STA. 40+65 TO STA. 40+95, LT
BEECH ST STA. 30+50 TO STA. 31+19, LT
BEECH ST STA. 31+00 TO STA. 31+19, RT

DETECTABLE WARNING SURFACE
STA. 11+77, RT
STA. 12+17, RT
STA. 13+22, RT
STA. 13+24, LT
STA. 13+56, RT



CURVE 1 DATA
Δ = 7°00' 28.19"
D = 4°46' 28.73"
R = 1200.00'
T = 73.48'
L = 146.77'
E = 2.25'

STONE FILL, TYPE III
STA. 30+97 TO 31+11, LT

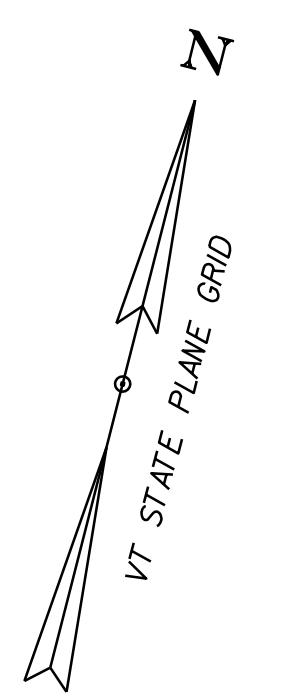
CURVE 2 DATA
Δ = 14°44' 58.65"
D = 114°35' 29.61"
R = 50.00'
T = 6.47'
L = 12.87'
E = 0.42'

CURVE 3 DATA
Δ = 19°05' 37.53"
D = 114°35' 29.61"
R = 50.00'
T = 8.41'
L = 16.66'
E = 0.70'

146 sf perm impacts below ohw
for grout bags and toe of stone fill

NOTES:
1. FOR WATER AND SEWER IMPROVEMENTS SEE SEWER AND WATER UTILITY SHEETS.

PROJECT NAME:	BENNINGTON
PROJECT NUMBER:	BF 1000(20)
FILE NAME:	z12j606bdr.dgn
PROJECT LEADER:	T. KNIGHT
DESIGNED BY:	K. RICHARDSON
LAYOUT SHEET	
PLOT DATE:	6/16/2021
DRAWN BY:	G. BURGMEIER
CHECKED BY:	T. KNIGHT
SHEET	8 OF 49



- 200 VT ROUTE 9 STA. 13+55, LT. TO 13+56, RT.
NEW 18" X 33.0' CPEP (SL), INV. IN 726.79 INV. OUT 726.61
- 201 BEECH ST STA. 30+91, LT. TO VT ROUTE 9 STA. 13+54, RT.
NEW 18" X 37.0' CPEP (SL), INV. IN 726.50 INV. OUT 726.30
- 202 BEECH STREET STA. 30+91, LT. TO 31+00, LT.
NEW 18" X 36.0' CPEP (SL), INV. IN 726.20 INV. OUT 726.00

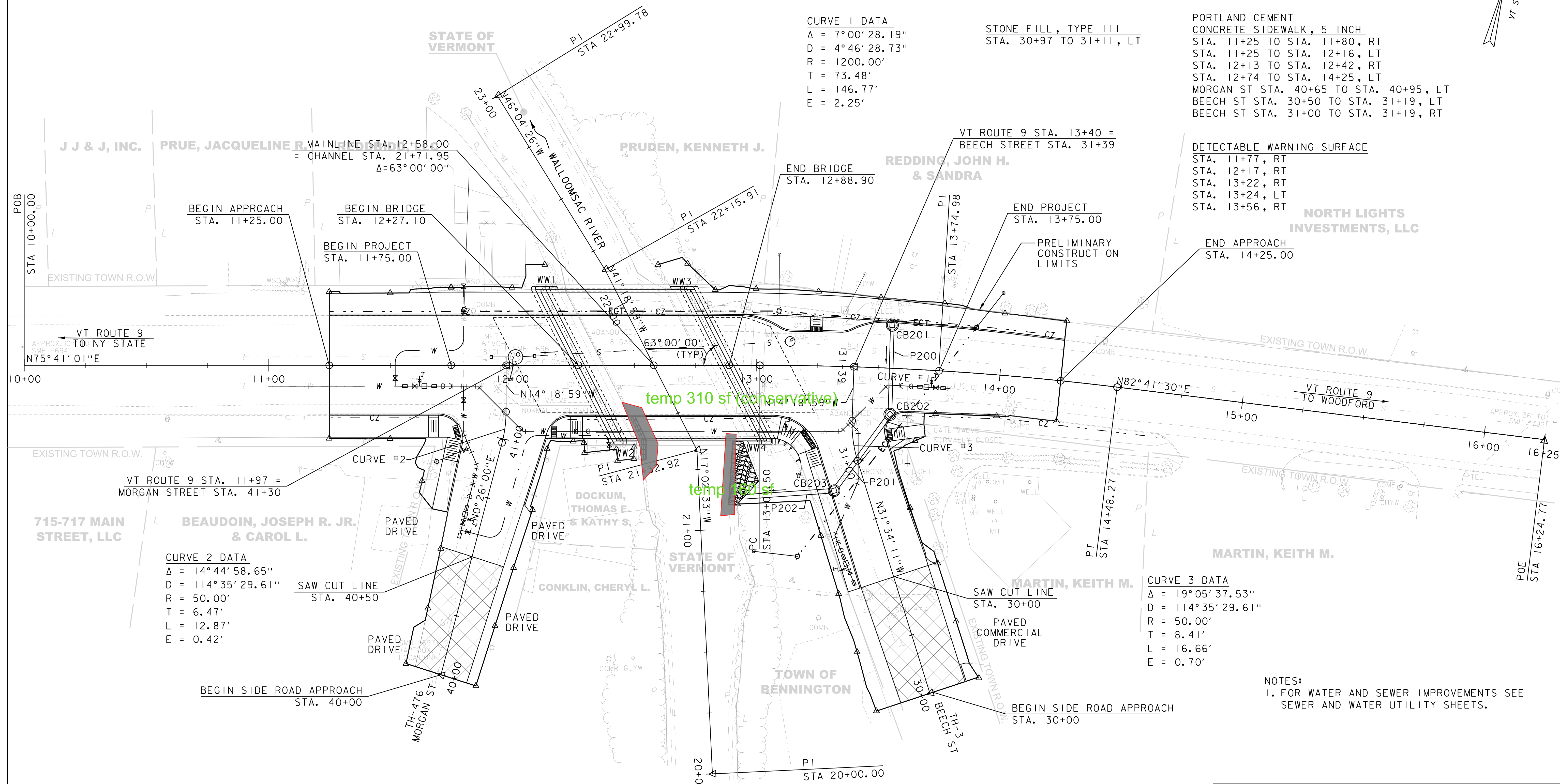
STRUCTURE NO.	STATION	STATION	COMMENTS
CB201	VT ROUTE 9 13+55, LT	4' DIA. DEEP SUMP CATCH BASIN, TYPE "D" GRATE, RIM 731.0', OFFSET 17.7'	
CB202	VT ROUTE 9 13+56, RT	4' DIA. CATCH BASIN, TYPE "D" GRATE, RIM 731.1', OFFSET 18.8'	
CB203	BEECH ST 30+91, LT	4' DIA. CATCH BASIN, TYPE "D" GRATE, RIM 731.0', OFFSET 12.8'	

GROUT BAGS
STA. 21+30.00, LT. TO STA. 21+57.00, LT.

REMOVAL OF EXISTING CURB & PRECAST REINFORCED CONCRETE CURB, TYPE B
STA. 11+25 TO STA. 11+80, RT
STA. 11+25 TO STA. 12+16, LT
STA. 12+13 TO STA. 12+38, RT
STA. 12+78 TO STA. 14+25, LT
STA. 13+61 TO STA. 14+05, RT
MORGAN ST STA. 40+65 TO STA. 40+95, LT
MORGAN ST STA. 40+76 TO STA. 41+03, RT
BEECH ST STA. 30+50 TO STA. 31+19, LT
BEECH ST STA. 31+00 TO STA. 31+19, RT

PORTLAND CEMENT CONCRETE SIDEWALK, 5 INCH
STA. 11+25 TO STA. 11+80, RT
STA. 11+25 TO STA. 12+16, LT
STA. 12+13 TO STA. 12+42, RT
STA. 12+74 TO STA. 14+25, LT
MORGAN ST STA. 40+65 TO STA. 40+95, LT
BEECH ST STA. 30+50 TO STA. 31+19, LT
BEECH ST STA. 31+00 TO STA. 31+19, RT

DETECTABLE WARNING SURFACE
STA. 11+77, RT
STA. 12+17, RT
STA. 13+22, RT
STA. 13+24, LT
STA. 13+56, RT



CURVE 1 DATA
 $\Delta = 7^{\circ}00'28.19''$
 $D = 4^{\circ}46'28.73''$
 $R = 1200.00'$
 $T = 73.48'$
 $L = 146.77'$
 $E = 2.25'$

STONE FILL, TYPE III
STA. 30+97 TO 31+11, LT

CURVE 2 DATA
 $\Delta = 14^{\circ}44'58.65''$
 $D = 114^{\circ}35'29.61''$
 $R = 50.00'$
 $T = 6.47'$
 $L = 12.87'$
 $E = 0.42'$

CURVE 3 DATA
 $\Delta = 19^{\circ}05'37.53''$
 $D = 114^{\circ}35'29.61''$
 $R = 50.00'$
 $T = 8.41'$
 $L = 16.66'$
 $E = 0.70'$

470 sf temp impact below ohw
for installation of stone fill and grout bags

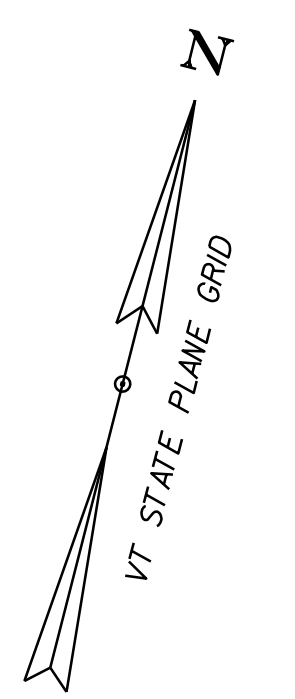
temp 310 sf (conservative)

temp 321 sf

NOTES:
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SHEET	8 OF 49



**REQUIRED CONTRACT PROVISIONS
FEDERAL-AID CONSTRUCTION CONTRACTS**

- I. General
- II. Nondiscrimination
- III. Non-segregated Facilities
- IV. Davis-Bacon and Related Act Provisions
- V. Contract Work Hours and Safety Standards Act Provisions
- VI. Subletting or Assigning the Contract
- VII. Safety: Accident Prevention
- VIII. False Statements Concerning Highway Projects
- IX. Implementation of Clean Air Act and Federal Water Pollution Control Act
- X. Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion
- XI. Certification Regarding Use of Contract Funds for Lobbying
- XII. Use of United States-Flag Vessels:

ATTACHMENTS

A. Employment and Materials Preference for Appalachian Development Highway System or Appalachian Local Access Road Contracts (included in Appalachian contracts only)

I. GENERAL

1. Form FHWA-1273 must be physically incorporated in each construction contract funded under title 23, United States Code, as required in 23 CFR 633.102(b) (excluding emergency contracts solely intended for debris removal). The contractor (or subcontractor) must insert this form in each subcontract and further require its inclusion in all lower tier subcontracts (excluding purchase orders, rental agreements and other agreements for supplies or services). 23 CFR 633.102(e).

The applicable requirements of Form FHWA-1273 are incorporated by reference for work done under any purchase order, rental agreement or agreement for other services. The prime contractor shall be responsible for compliance by any subcontractor, lower-tier subcontractor or service provider. 23 CFR 633.102(e).

Form FHWA-1273 must be included in all Federal-aid design-build contracts, in all subcontracts and in lower tier subcontracts (excluding subcontracts for design services, purchase orders, rental agreements and other agreements for supplies or services) in accordance with 23 CFR 633.102. The design-builder shall be responsible for compliance by any subcontractor, lower-tier subcontractor or service provider.

Contracting agencies may reference Form FHWA-1273 in solicitation-for-bids or request-for-proposals documents, however, the Form FHWA-1273 must be physically incorporated (not referenced) in all contracts, subcontracts and lower-tier subcontracts (excluding purchase orders, rental agreements and other agreements for supplies or services related to a construction contract). 23 CFR 633.102(b).

2. Subject to the applicability criteria noted in the following sections, these contract provisions shall apply to all work

performed on the contract by the contractor's own organization and with the assistance of workers under the contractor's immediate superintendence and to all work performed on the contract by piecework, station work, or by subcontract. 23 CFR 633.102(d).

3. A breach of any of the stipulations contained in these Required Contract Provisions may be sufficient grounds for withholding of progress payments, withholding of final payment, termination of the contract, suspension / debarment or any other action determined to be appropriate by the contracting agency and FHWA.

4. Selection of Labor: During the performance of this contract, the contractor shall not use convict labor for any purpose within the limits of a construction project on a Federal-aid highway unless it is labor performed by convicts who are on parole, supervised release, or probation. 23 U.S.C. 114(b). The term Federal-aid highway does not include roadways functionally classified as local roads or rural minor collectors. 23 U.S.C. 101(a).

II. NONDISCRIMINATION (23 CFR 230.107(a); 23 CFR Part 230, Subpart A, Appendix A; EO 11246)

The provisions of this section related to 23 CFR Part 230, Subpart A, Appendix A are applicable to all Federal-aid construction contracts and to all related construction subcontracts of \$10,000 or more. The provisions of 23 CFR Part 230 are not applicable to material supply, engineering, or architectural service contracts.

In addition, the contractor and all subcontractors must comply with the following policies: Executive Order 11246, 41 CFR Part 60, 29 CFR Parts 1625-1627, 23 U.S.C. 140, Section 504 of the Rehabilitation Act of 1973, as amended (29 U.S.C. 794), Title VI of the Civil Rights Act of 1964, as amended (42 U.S.C. 2000d et seq.), and related regulations including 49 CFR Parts 21, 26, and 27; and 23 CFR Parts 200, 230, and 633.

The contractor and all subcontractors must comply with: the requirements of the Equal Opportunity Clause in 41 CFR 60-1.4(b) and, for all construction contracts exceeding \$10,000, the Standard Federal Equal Employment Opportunity Construction Contract Specifications in 41 CFR 60-4.3.

Note: The U.S. Department of Labor has exclusive authority to determine compliance with Executive Order 11246 and the policies of the Secretary of Labor including 41 CFR Part 60, and 29 CFR Parts 1625-1627. The contracting agency and the FHWA have the authority and the responsibility to ensure compliance with 23 U.S.C. 140, Section 504 of the Rehabilitation Act of 1973, as amended (29 U.S.C. 794), and Title VI of the Civil Rights Act of 1964, as amended (42 U.S.C. 2000d et seq.), and related regulations including 49 CFR Parts 21, 26, and 27; and 23 CFR Parts 200, 230, and 633.

The following provision is adopted from 23 CFR Part 230, Subpart A, Appendix A, with appropriate revisions to conform to the U.S. Department of Labor (US DOL) and FHWA requirements.

1. Equal Employment Opportunity: Equal Employment Opportunity (EEO) requirements not to discriminate and to take affirmative action to assure equal opportunity as set forth under laws, executive orders, rules, regulations (see 28 CFR Part 35, 29 CFR Part 1630, 29 CFR Parts 1625-1627, 41 CFR Part 60 and 49 CFR Part 27) and orders of the Secretary of Labor as modified by the provisions prescribed herein, and imposed pursuant to 23 U.S.C. 140, shall constitute the EEO and specific affirmative action standards for the contractor's project activities under this contract. The provisions of the Americans with Disabilities Act of 1990 (42 U.S.C. 12101 et seq.) set forth under 28 CFR Part 35 and 29 CFR Part 1630 are incorporated by reference in this contract. In the execution of this contract, the contractor agrees to comply with the following minimum specific requirement activities of EEO:

a. The contractor will work with the contracting agency and the Federal Government to ensure that it has made every good faith effort to provide equal opportunity with respect to all of its terms and conditions of employment and in their review of activities under the contract. 23 CFR 230.409 (g)(4) & (5).

b. The contractor will accept as its operating policy the following statement:

"It is the policy of this Company to assure that applicants are employed, and that employees are treated during employment, without regard to their race, religion, sex, sexual orientation, gender identity, color, national origin, age or disability. Such action shall include: employment, upgrading, demotion, or transfer; recruitment or recruitment advertising; layoff or termination; rates of pay or other forms of compensation; and selection for training, including apprenticeship, pre-apprenticeship, and/or on-the-job training."

2. EEO Officer: The contractor will designate and make known to the contracting officers an EEO Officer who will have the responsibility for and must be capable of effectively administering and promoting an active EEO program and who must be assigned adequate authority and responsibility to do so.

3. Dissemination of Policy: All members of the contractor's staff who are authorized to hire, supervise, promote, and discharge employees, or who recommend such action or are substantially involved in such action, will be made fully cognizant of and will implement the contractor's EEO policy and contractual responsibilities to provide EEO in each grade and classification of employment. To ensure that the above agreement will be met, the following actions will be taken as a minimum:

a. Periodic meetings of supervisory and personnel office employees will be conducted before the start of work and then not less often than once every six months, at which time the contractor's EEO policy and its implementation will be reviewed and explained. The meetings will be conducted by the EEO Officer or other knowledgeable company official.

b. All new supervisory or personnel office employees will be given a thorough indoctrination by the EEO Officer, covering all major aspects of the contractor's EEO obligations within thirty days following their reporting for duty with the contractor.

c. All personnel who are engaged in direct recruitment for the project will be instructed by the EEO Officer in the contractor's procedures for locating and hiring minorities and women.

d. Notices and posters setting forth the contractor's EEO policy will be placed in areas readily accessible to employees, applicants for employment and potential employees.

e. The contractor's EEO policy and the procedures to implement such policy will be brought to the attention of employees by means of meetings, employee handbooks, or other appropriate means.

4. Recruitment: When advertising for employees, the contractor will include in all advertisements for employees the notation: "An Equal Opportunity Employer." All such advertisements will be placed in publications having a large circulation among minorities and women in the area from which the project work force would normally be derived.

a. The contractor will, unless precluded by a valid bargaining agreement, conduct systematic and direct recruitment through public and private employee referral sources likely to yield qualified minorities and women. To meet this requirement, the contractor will identify sources of potential minority group employees and establish with such identified sources procedures whereby minority and women applicants may be referred to the contractor for employment consideration.

b. In the event the contractor has a valid bargaining agreement providing for exclusive hiring hall referrals, the contractor is expected to observe the provisions of that agreement to the extent that the system meets the contractor's compliance with EEO contract provisions. Where implementation of such an agreement has the effect of discriminating against minorities or women, or obligates the contractor to do the same, such implementation violates Federal nondiscrimination provisions.

c. The contractor will encourage its present employees to refer minorities and women as applicants for employment. Information and procedures with regard to referring such applicants will be discussed with employees.

5. Personnel Actions: Wages, working conditions, and employee benefits shall be established and administered, and personnel actions of every type, including hiring, upgrading, promotion, transfer, demotion, layoff, and termination, shall be taken without regard to race, color, religion, sex, sexual orientation, gender identity, national origin, age or disability. The following procedures shall be followed:

a. The contractor will conduct periodic inspections of project sites to ensure that working conditions and employee facilities do not indicate discriminatory treatment of project site personnel.

b. The contractor will periodically evaluate the spread of wages paid within each classification to determine any evidence of discriminatory wage practices.

c. The contractor will periodically review selected personnel actions in depth to determine whether there is evidence of discrimination. Where evidence is found, the contractor will promptly take corrective action. If the review indicates that the discrimination may extend beyond the actions reviewed, such corrective action shall include all affected persons.

d. The contractor will promptly investigate all complaints of alleged discrimination made to the contractor in connection with its obligations under this contract, will attempt to resolve such complaints, and will take appropriate corrective action

within a reasonable time. If the investigation indicates that the discrimination may affect persons other than the complainant, such corrective action shall include such other persons. Upon completion of each investigation, the contractor will inform every complainant of all of their avenues of appeal.

6. Training and Promotion:

a. The contractor will assist in locating, qualifying, and increasing the skills of minorities and women who are applicants for employment or current employees. Such efforts should be aimed at developing full journey level status employees in the type of trade or job classification involved.

b. Consistent with the contractor's work force requirements and as permissible under Federal and State regulations, the contractor shall make full use of training programs (i.e., apprenticeship and on-the-job training programs for the geographical area of contract performance). In the event a special provision for training is provided under this contract, this subparagraph will be superseded as indicated in the special provision. The contracting agency may reserve training positions for persons who receive welfare assistance in accordance with 23 U.S.C. 140(a).

c. The contractor will advise employees and applicants for employment of available training programs and entrance requirements for each.

d. The contractor will periodically review the training and promotion potential of employees who are minorities and women and will encourage eligible employees to apply for such training and promotion.

7. Unions: If the contractor relies in whole or in part upon unions as a source of employees, the contractor will use good faith efforts to obtain the cooperation of such unions to increase opportunities for minorities and women. 23 CFR 230.409. Actions by the contractor, either directly or through a contractor's association acting as agent, will include the procedures set forth below:

a. The contractor will use good faith efforts to develop, in cooperation with the unions, joint training programs aimed toward qualifying more minorities and women for membership in the unions and increasing the skills of minorities and women so that they may qualify for higher paying employment.

b. The contractor will use good faith efforts to incorporate an EEO clause into each union agreement to the end that such union will be contractually bound to refer applicants without regard to their race, color, religion, sex, sexual orientation, gender identity, national origin, age, or disability.

c. The contractor is to obtain information as to the referral practices and policies of the labor union except that to the extent such information is within the exclusive possession of the labor union and such labor union refuses to furnish such information to the contractor, the contractor shall so certify to the contracting agency and shall set forth what efforts have been made to obtain such information.

d. In the event the union is unable to provide the contractor with a reasonable flow of referrals within the time limit set forth in the collective bargaining agreement, the contractor will, through independent recruitment efforts, fill the employment vacancies without regard to race, color, religion, sex, sexual orientation, gender identity, national origin, age, or disability; making full efforts to obtain qualified and/or qualifiable minorities and women. The failure of a union to provide

sufficient referrals (even though it is obligated to provide exclusive referrals under the terms of a collective bargaining agreement) does not relieve the contractor from the requirements of this paragraph. In the event the union referral practice prevents the contractor from meeting the obligations pursuant to Executive Order 11246, as amended, and these special provisions, such contractor shall immediately notify the contracting agency.

8. Reasonable Accommodation for Applicants / Employees with Disabilities: The contractor must be familiar with the requirements for and comply with the Americans with Disabilities Act and all rules and regulations established thereunder. Employers must provide reasonable accommodation in all employment activities unless to do so would cause an undue hardship.

9. Selection of Subcontractors, Procurement of Materials and Leasing of Equipment: The contractor shall not discriminate on the grounds of race, color, religion, sex, sexual orientation, gender identity, national origin, age, or disability in the selection and retention of subcontractors, including procurement of materials and leases of equipment. The contractor shall take all necessary and reasonable steps to ensure nondiscrimination in the administration of this contract.

a. The contractor shall notify all potential subcontractors, suppliers, and lessors of their EEO obligations under this contract.

b. The contractor will use good faith efforts to ensure subcontractor compliance with their EEO obligations.

10. Assurances Required:

a. The requirements of 49 CFR Part 26 and the State DOT's FHWA-approved Disadvantaged Business Enterprise (DBE) program are incorporated by reference.

b. The contractor, subrecipient or subcontractor shall not discriminate on the basis of race, color, national origin, or sex in the performance of this contract. The contractor shall carry out applicable requirements of 49 CFR part 26 in the award and administration of DOT-assisted contracts. Failure by the contractor to carry out these requirements is a material breach of this contract, which may result in the termination of this contract or such other remedy as the recipient deems appropriate, which may include, but is not limited to:

- (1) Withholding monthly progress payments;
- (2) Assessing sanctions;
- (3) Liquidated damages; and/or
- (4) Disqualifying the contractor from future bidding as non-responsible.

c. The Title VI and nondiscrimination provisions of U.S. DOT Order 1050.2A at Appendixes A and E are incorporated by reference. 49 CFR Part 21.

11. Records and Reports: The contractor shall keep such records as necessary to document compliance with the EEO requirements. Such records shall be retained for a period of three years following the date of the final payment to the contractor for all contract work and shall be available at reasonable times and places for inspection by authorized representatives of the contracting agency and the FHWA.

a. The records kept by the contractor shall document the following:

(1) The number and work hours of minority and non-minority group members and women employed in each work classification on the project;

(2) The progress and efforts being made in cooperation with unions, when applicable, to increase employment opportunities for minorities and women; and

(3) The progress and efforts being made in locating, hiring, training, qualifying, and upgrading minorities and women.

b. The contractors and subcontractors will submit an annual report to the contracting agency each July for the duration of the project indicating the number of minority, women, and non-minority group employees currently engaged in each work classification required by the contract work. This information is to be reported on [Form FHWA-1391](#). The staffing data should represent the project work force on board in all or any part of the last payroll period preceding the end of July. If on-the-job training is being required by special provision, the contractor will be required to collect and report training data. The employment data should reflect the work force on board during all or any part of the last payroll period preceding the end of July.

III. NONSEGREGATED FACILITIES

This provision is applicable to all Federal-aid construction contracts and to all related construction subcontracts of more than \$10,000. 41 CFR 60-1.5.

As prescribed by 41 CFR 60-1.8, the contractor must ensure that facilities provided for employees are provided in such a manner that segregation on the basis of race, color, religion, sex, sexual orientation, gender identity, or national origin cannot result. The contractor may neither require such segregated use by written or oral policies nor tolerate such use by employee custom. The contractor's obligation extends further to ensure that its employees are not assigned to perform their services at any location under the contractor's control where the facilities are segregated. The term "facilities" includes waiting rooms, work areas, restaurants and other eating areas, time clocks, restrooms, washrooms, locker rooms and other storage or dressing areas, parking lots, drinking fountains, recreation or entertainment areas, transportation, and housing provided for employees. The contractor shall provide separate or single-user restrooms and necessary dressing or sleeping areas to assure privacy between sexes.

IV. DAVIS-BACON AND RELATED ACT PROVISIONS

This section is applicable to all Federal-aid construction projects exceeding \$2,000 and to all related subcontracts and lower-tier subcontracts (regardless of subcontract size), in accordance with 29 CFR 5.5. The requirements apply to all projects located within the right-of-way of a roadway that is functionally classified as Federal-aid highway. 23 U.S.C. 113. This excludes roadways functionally classified as local roads or rural minor collectors, which are exempt. 23 U.S.C. 101. Where applicable law requires that projects be treated as a project on a Federal-aid highway, the provisions of this subpart will apply regardless of the location of the project. Examples include: Surface Transportation Block Grant Program projects funded under 23 U.S.C. 133 [excluding recreational trails projects], the Nationally Significant Freight and Highway

Projects funded under 23 U.S.C. 117, and National Highway Freight Program projects funded under 23 U.S.C. 167.

The following provisions are from the U.S. Department of Labor regulations in 29 CFR 5.5 "Contract provisions and related matters" with minor revisions to conform to the FHWA-1273 format and FHWA program requirements.

1. Minimum wages (29 CFR 5.5)

a. *Wage rates and fringe benefits.* All laborers and mechanics employed or working upon the site of the work (or otherwise working in construction or development of the project under a development statute), will be paid unconditionally and not less often than once a week, and without subsequent deduction or rebate on any account (except such payroll deductions as are permitted by regulations issued by the Secretary of Labor under the Copeland Act ([29 CFR part 3](#))), the full amount of basic hourly wages and bona fide fringe benefits (or cash equivalents thereof) due at time of payment computed at rates not less than those contained in the wage determination of the Secretary of Labor which is attached hereto and made a part hereof, regardless of any contractual relationship which may be alleged to exist between the contractor and such laborers and mechanics. As provided in paragraphs (d) and (e) of 29 CFR 5.5, the appropriate wage determinations are effective by operation of law even if they have not been attached to the contract. Contributions made or costs reasonably anticipated for bona fide fringe benefits under the Davis-Bacon Act ([40 U.S.C. 3141\(2\)\(B\)](#)) on behalf of laborers or mechanics are considered wages paid to such laborers or mechanics, subject to the provisions of paragraph 1.e. of this section; also, regular contributions made or costs incurred for more than a weekly period (but not less often than quarterly) under plans, funds, or programs which cover the particular weekly period, are deemed to be constructively made or incurred during such weekly period. Such laborers and mechanics must be paid the appropriate wage rate and fringe benefits on the wage determination for the classification(s) of work actually performed, without regard to skill, except as provided in paragraph 4. of this section. Laborers or mechanics performing work in more than one classification may be compensated at the rate specified for each classification for the time actually worked therein: *Provided*, That the employer's payroll records accurately set forth the time spent in each classification in which work is performed. The wage determination (including any additional classifications and wage rates conformed under paragraph 1.c. of this section) and the Davis-Bacon poster (WH-1321) must be posted at all times by the contractor and its subcontractors at the site of the work in a prominent and accessible place where it can be easily seen by the workers.

b. *Frequently recurring classifications.* (1) In addition to wage and fringe benefit rates that have been determined to be prevailing under the procedures set forth in [29 CFR part 1](#), a wage determination may contain, pursuant to § 1.3(f), wage and fringe benefit rates for classifications of laborers and mechanics for which conformance requests are regularly submitted pursuant to paragraph 1.c. of this section, provided that:

(i) The work performed by the classification is not performed by a classification in the wage determination for which a prevailing wage rate has been determined;

(ii) The classification is used in the area by the construction industry; and

(iii) The wage rate for the classification bears a reasonable relationship to the prevailing wage rates contained in the wage determination.

(2) The Administrator will establish wage rates for such classifications in accordance with paragraph 1.c.(1)(iii) of this section. Work performed in such a classification must be paid at no less than the wage and fringe benefit rate listed on the wage determination for such classification.

c. *Conformance.* (1) The contracting officer must require that any class of laborers or mechanics, including helpers, which is not listed in the wage determination and which is to be employed under the contract be classified in conformance with the wage determination. Conformance of an additional classification and wage rate and fringe benefits is appropriate only when the following criteria have been met:

(i) The work to be performed by the classification requested is not performed by a classification in the wage determination; and

(ii) The classification is used in the area by the construction industry; and

(iii) The proposed wage rate, including any bona fide fringe benefits, bears a reasonable relationship to the wage rates contained in the wage determination.

(2) The conformance process may not be used to split, subdivide, or otherwise avoid application of classifications listed in the wage determination.

(3) If the contractor and the laborers and mechanics to be employed in the classification (if known), or their representatives, and the contracting officer agree on the classification and wage rate (including the amount designated for fringe benefits where appropriate), a report of the action taken will be sent by the contracting officer by email to DBAconformance@dol.gov. The Administrator, or an authorized representative, will approve, modify, or disapprove every additional classification action within 30 days of receipt and so advise the contracting officer or will notify the contracting officer within the 30-day period that additional time is necessary.

(4) In the event the contractor, the laborers or mechanics to be employed in the classification or their representatives, and the contracting officer do not agree on the proposed classification and wage rate (including the amount designated for fringe benefits, where appropriate), the contracting officer will, by email to DBAconformance@dol.gov, refer the questions, including the views of all interested parties and the recommendation of the contracting officer, to the Administrator for determination. The Administrator, or an authorized representative, will issue a determination within 30 days of receipt and so advise the contracting officer or will notify the contracting officer within the 30-day period that additional time is necessary.

(5) The contracting officer must promptly notify the contractor of the action taken by the Wage and Hour Division

under paragraphs 1.c.(3) and (4) of this section. The contractor must furnish a written copy of such determination to each affected worker or it must be posted as a part of the wage determination. The wage rate (including fringe benefits where appropriate) determined pursuant to paragraph 1.c.(3) or (4) of this section must be paid to all workers performing work in the classification under this contract from the first day on which work is performed in the classification.

d. *Fringe benefits not expressed as an hourly rate.* Whenever the minimum wage rate prescribed in the contract for a class of laborers or mechanics includes a fringe benefit which is not expressed as an hourly rate, the contractor may either pay the benefit as stated in the wage determination or may pay another bona fide fringe benefit or an hourly cash equivalent thereof.

e. *Unfunded plans.* If the contractor does not make payments to a trustee or other third person, the contractor may consider as part of the wages of any laborer or mechanic the amount of any costs reasonably anticipated in providing bona fide fringe benefits under a plan or program, *Provided*, That the Secretary of Labor has found, upon the written request of the contractor, in accordance with the criteria set forth in § 5.28, that the applicable standards of the Davis-Bacon Act have been met. The Secretary of Labor may require the contractor to set aside in a separate account assets for the meeting of obligations under the plan or program.

f. *Interest.* In the event of a failure to pay all or part of the wages required by the contract, the contractor will be required to pay interest on any underpayment of wages.

2. Withholding (29 CFR 5.5)

a. *Withholding requirements.* The contracting agency may, upon its own action, or must, upon written request of an authorized representative of the Department of Labor, withhold or cause to be withheld from the contractor so much of the accrued payments or advances as may be considered necessary to satisfy the liabilities of the prime contractor or any subcontractor for the full amount of wages and monetary relief, including interest, required by the clauses set forth in this section for violations of this contract, or to satisfy any such liabilities required by any other Federal contract, or federally assisted contract subject to Davis-Bacon labor standards, that is held by the same prime contractor (as defined in § 5.2). The necessary funds may be withheld from the contractor under this contract, any other Federal contract with the same prime contractor, or any other federally assisted contract that is subject to Davis-Bacon labor standards requirements and is held by the same prime contractor, regardless of whether the other contract was awarded or assisted by the same agency, and such funds may be used to satisfy the contractor liability for which the funds were withheld. In the event of a contractor's failure to pay any laborer or mechanic, including any apprentice or helper working on the site of the work all or part of the wages required by the contract, or upon the contractor's failure to submit the required records as discussed in paragraph 3.d. of this section, the contracting agency may on its own initiative and after written notice to the contractor, take such action as may be necessary to cause the suspension of any further payment, advance, or guarantee of funds until such violations have ceased.

b. *Priority to withheld funds.* The Department has priority to funds withheld or to be withheld in accordance with paragraph

2.a. of this section or Section V, paragraph 3.a., or both, over claims to those funds by:

- (1) A contractor's surety(ies), including without limitation performance bond sureties and payment bond sureties;
- (2) A contracting agency for its procurement costs;
- (3) A trustee(s) (either a court-appointed trustee or a U.S. trustee, or both) in bankruptcy of a contractor, or a contractor's bankruptcy estate;
- (4) A contractor's assignee(s);
- (5) A contractor's successor(s); or
- (6) A claim asserted under the Prompt Payment Act, [31 U.S.C. 3901–3907](#).

3. Records and certified payrolls (29 CFR 5.5)

a. *Basic record requirements (1) Length of record retention.* All regular payrolls and other basic records must be maintained by the contractor and any subcontractor during the course of the work and preserved for all laborers and mechanics working at the site of the work (or otherwise working in construction or development of the project under a development statute) for a period of at least 3 years after all the work on the prime contract is completed.

(2) *Information required.* Such records must contain the name; Social Security number; last known address, telephone number, and email address of each such worker; each worker's correct classification(s) of work actually performed; hourly rates of wages paid (including rates of contributions or costs anticipated for bona fide fringe benefits or cash equivalents thereof of the types described in [40 U.S.C. 3141\(2\)\(B\)](#) of the Davis-Bacon Act); daily and weekly number of hours actually worked in total and on each covered contract; deductions made; and actual wages paid.

(3) *Additional records relating to fringe benefits.* Whenever the Secretary of Labor has found under paragraph 1.e. of this section that the wages of any laborer or mechanic include the amount of any costs reasonably anticipated in providing benefits under a plan or program described in [40 U.S.C. 3141\(2\)\(B\)](#) of the Davis-Bacon Act, the contractor must maintain records which show that the commitment to provide such benefits is enforceable, that the plan or program is financially responsible, and that the plan or program has been communicated in writing to the laborers or mechanics affected, and records which show the costs anticipated or the actual cost incurred in providing such benefits.

(4) *Additional records relating to apprenticeship.* Contractors with apprentices working under approved programs must maintain written evidence of the registration of apprenticeship programs, the registration of the apprentices, and the ratios and wage rates prescribed in the applicable programs.

b. *Certified payroll requirements (1) Frequency and method of submission.* The contractor or subcontractor must submit weekly, for each week in which any DBA- or Related Acts-covered work is performed, certified payrolls to the contracting

agency. The prime contractor is responsible for the submission of all certified payrolls by all subcontractors. A contracting agency or prime contractor may permit or require contractors to submit certified payrolls through an electronic system, as long as the electronic system requires a legally valid electronic signature; the system allows the contractor, the contracting agency, and the Department of Labor to access the certified payrolls upon request for at least 3 years after the work on the prime contract has been completed; and the contracting agency or prime contractor permits other methods of submission in situations where the contractor is unable or limited in its ability to use or access the electronic system.

(2) *Information required.* The certified payrolls submitted must set out accurately and completely all of the information required to be maintained under paragraph 3.a.(2) of this section, except that full Social Security numbers and last known addresses, telephone numbers, and email addresses must not be included on weekly transmittals. Instead, the certified payrolls need only include an individually identifying number for each worker (e.g., the last four digits of the worker's Social Security number). The required weekly certified payroll information may be submitted using Optional Form WH-347 or in any other format desired. Optional Form WH-347 is available for this purpose from the Wage and Hour Division website at <https://www.dol.gov/sites/dolgov/files/WHD/legacy/files/wh347.pdf> or its successor website. It is not a violation of this section for a prime contractor to require a subcontractor to provide full Social Security numbers and last known addresses, telephone numbers, and email addresses to the prime contractor for its own records, without weekly submission by the subcontractor to the contracting agency.

(3) *Statement of Compliance.* Each certified payroll submitted must be accompanied by a "Statement of Compliance," signed by the contractor or subcontractor, or the contractor's or subcontractor's agent who pays or supervises the payment of the persons working on the contract, and must certify the following:

(i) That the certified payroll for the payroll period contains the information required to be provided under paragraph 3.b. of this section, the appropriate information and basic records are being maintained under paragraph 3.a. of this section, and such information and records are correct and complete;

(ii) That each laborer or mechanic (including each helper and apprentice) working on the contract during the payroll period has been paid the full weekly wages earned, without rebate, either directly or indirectly, and that no deductions have been made either directly or indirectly from the full wages earned, other than permissible deductions as set forth in [29 CFR part 3](#); and

(iii) That each laborer or mechanic has been paid not less than the applicable wage rates and fringe benefits or cash equivalents for the classification(s) of work actually performed, as specified in the applicable wage determination incorporated into the contract.

(4) *Use of Optional Form WH-347.* The weekly submission of a properly executed certification set forth on the reverse side of Optional Form WH-347 will satisfy the requirement for submission of the "Statement of Compliance" required by paragraph 3.b.(3) of this section.

(5) *Signature.* The signature by the contractor, subcontractor, or the contractor's or subcontractor's agent must be an original handwritten signature or a legally valid electronic signature.

(6) *Falsification.* The falsification of any of the above certifications may subject the contractor or subcontractor to civil or criminal prosecution under [18 U.S.C. 1001](#) and [31 U.S.C. 3729](#).

(7) *Length of certified payroll retention.* The contractor or subcontractor must preserve all certified payrolls during the course of the work and for a period of 3 years after all the work on the prime contract is completed.

c. *Contracts, subcontracts, and related documents.* The contractor or subcontractor must maintain this contract or subcontract and related documents including, without limitation, bids, proposals, amendments, modifications, and extensions. The contractor or subcontractor must preserve these contracts, subcontracts, and related documents during the course of the work and for a period of 3 years after all the work on the prime contract is completed.

d. *Required disclosures and access (1) Required record disclosures and access to workers.* The contractor or subcontractor must make the records required under paragraphs 3.a. through 3.c. of this section, and any other documents that the contracting agency, the State DOT, the FHWA, or the Department of Labor deems necessary to determine compliance with the labor standards provisions of any of the applicable statutes referenced by § 5.1, available for inspection, copying, or transcription by authorized representatives of the contracting agency, the State DOT, the FHWA, or the Department of Labor, and must permit such representatives to interview workers during working hours on the job.

(2) *Sanctions for non-compliance with records and worker access requirements.* If the contractor or subcontractor fails to submit the required records or to make them available, or refuses to permit worker interviews during working hours on the job, the Federal agency may, after written notice to the contractor, sponsor, applicant, owner, or other entity, as the case may be, that maintains such records or that employs such workers, take such action as may be necessary to cause the suspension of any further payment, advance, or guarantee of funds. Furthermore, failure to submit the required records upon request or to make such records available, or to permit worker interviews during working hours on the job, may be grounds for debarment action pursuant to § 5.12. In addition, any contractor or other person that fails to submit the required records or make those records available to WHD within the time WHD requests that the records be produced will be precluded from introducing as evidence in an administrative proceeding under [29 CFR part 6](#) any of the required records that were not provided or made available to WHD. WHD will take into consideration a reasonable request from the contractor or person for an extension of the time for submission of records. WHD will determine the reasonableness of the request and may consider, among other things, the location of the records and the volume of production.

(3) *Required information disclosures.* Contractors and subcontractors must maintain the full Social Security number and last known address, telephone number, and email address

of each covered worker, and must provide them upon request to the contracting agency, the State DOT, the FHWA, the contractor, or the Wage and Hour Division of the Department of Labor for purposes of an investigation or other compliance action.

4. Apprentices and equal employment opportunity (29 CFR 5.5)

a. *Apprentices (1) Rate of pay.* Apprentices will be permitted to work at less than the predetermined rate for the work they perform when they are employed pursuant to and individually registered in a bona fide apprenticeship program registered with the U.S. Department of Labor, Employment and Training Administration, Office of Apprenticeship (OA), or with a State Apprenticeship Agency recognized by the OA. A person who is not individually registered in the program, but who has been certified by the OA or a State Apprenticeship Agency (where appropriate) to be eligible for probationary employment as an apprentice, will be permitted to work at less than the predetermined rate for the work they perform in the first 90 days of probationary employment as an apprentice in such a program. In the event the OA or a State Apprenticeship Agency recognized by the OA withdraws approval of an apprenticeship program, the contractor will no longer be permitted to use apprentices at less than the applicable predetermined rate for the work performed until an acceptable program is approved.

(2) *Fringe benefits.* Apprentices must be paid fringe benefits in accordance with the provisions of the apprenticeship program. If the apprenticeship program does not specify fringe benefits, apprentices must be paid the full amount of fringe benefits listed on the wage determination for the applicable classification. If the Administrator determines that a different practice prevails for the applicable apprentice classification, fringe benefits must be paid in accordance with that determination.

(3) *Apprenticeship ratio.* The allowable ratio of apprentices to journeyworkers on the job site in any craft classification must not be greater than the ratio permitted to the contractor as to the entire work force under the registered program or the ratio applicable to the locality of the project pursuant to paragraph 4.a.(4) of this section. Any worker listed on a payroll at an apprentice wage rate, who is not registered or otherwise employed as stated in paragraph 4.a.(1) of this section, must be paid not less than the applicable wage rate on the wage determination for the classification of work actually performed. In addition, any apprentice performing work on the job site in excess of the ratio permitted under this section must be paid not less than the applicable wage rate on the wage determination for the work actually performed.

(4) *Reciprocity of ratios and wage rates.* Where a contractor is performing construction on a project in a locality other than the locality in which its program is registered, the ratios and wage rates (expressed in percentages of the journeyworker's hourly rate) applicable within the locality in which the construction is being performed must be observed. If there is no applicable ratio or wage rate for the locality of the project, the ratio and wage rate specified in the contractor's registered program must be observed.

b. *Equal employment opportunity.* The use of apprentices and journeyworkers under this part must be in conformity with

the equal employment opportunity requirements of Executive Order 11246, as amended, and [29 CFR part 30](#).

c. Apprentices and Trainees (programs of the U.S. DOT).

Apprentices and trainees working under apprenticeship and skill training programs which have been certified by the Secretary of Transportation as promoting EEO in connection with Federal-aid highway construction programs are not subject to the requirements of paragraph 4 of this Section IV. 23 CFR 230.111(e)(2). The straight time hourly wage rates for apprentices and trainees under such programs will be established by the particular programs. The ratio of apprentices and trainees to journeyworkers shall not be greater than permitted by the terms of the particular program.

5. Compliance with Copeland Act requirements. The contractor shall comply with the requirements of 29 CFR part 3, which are incorporated by reference in this contract as provided in 29 CFR 5.5.

6. Subcontracts. The contractor or subcontractor must insert FHWA-1273 in any subcontracts, along with the applicable wage determination(s) and such other clauses or contract modifications as the contracting agency may by appropriate instructions require, and a clause requiring the subcontractors to include these clauses and wage determination(s) in any lower tier subcontracts. The prime contractor is responsible for the compliance by any subcontractor or lower tier subcontractor with all the contract clauses in this section. In the event of any violations of these clauses, the prime contractor and any subcontractor(s) responsible will be liable for any unpaid wages and monetary relief, including interest from the date of the underpayment or loss, due to any workers of lower-tier subcontractors, and may be subject to debarment, as appropriate. 29 CFR 5.5.

7. Contract termination: debarment. A breach of the contract clauses in 29 CFR 5.5 may be grounds for termination of the contract, and for debarment as a contractor and a subcontractor as provided in 29 CFR 5.12.

8. Compliance with Davis-Bacon and Related Act requirements. All rulings and interpretations of the Davis-Bacon and Related Acts contained in 29 CFR parts 1, 3, and 5 are herein incorporated by reference in this contract as provided in 29 CFR 5.5.

9. Disputes concerning labor standards. As provided in 29 CFR 5.5, disputes arising out of the labor standards provisions of this contract shall not be subject to the general disputes clause of this contract. Such disputes shall be resolved in accordance with the procedures of the Department of Labor set forth in 29 CFR parts 5, 6, and 7. Disputes within the meaning of this clause include disputes between the contractor (or any of its subcontractors) and the contracting agency, the U.S. Department of Labor, or the employees or their representatives.

10. Certification of eligibility. a. By entering into this contract, the contractor certifies that neither it nor any person or firm who has an interest in the contractor's firm is a person or firm ineligible to be awarded Government contracts by virtue of [40 U.S.C. 3144\(b\)](#) or § 5.12(a).

b. No part of this contract shall be subcontracted to any person or firm ineligible for award of a Government contract by virtue of [40 U.S.C. 3144\(b\)](#) or § 5.12(a).

c. The penalty for making false statements is prescribed in the U.S. Code, Title 18 Crimes and Criminal Procedure, [18 U.S.C. 1001](#).

11. Anti-retaliation. It is unlawful for any person to discharge, demote, intimidate, threaten, restrain, coerce, blacklist, harass, or in any other manner discriminate against, or to cause any person to discharge, demote, intimidate, threaten, restrain, coerce, blacklist, harass, or in any other manner discriminate against, any worker or job applicant for:

a. Notifying any contractor of any conduct which the worker reasonably believes constitutes a violation of the DBA, Related Acts, this part, or [29 CFR part 1](#) or [3](#);

b. Filing any complaint, initiating or causing to be initiated any proceeding, or otherwise asserting or seeking to assert on behalf of themselves or others any right or protection under the DBA, Related Acts, this part, or [29 CFR part 1](#) or [3](#);

c. Cooperating in any investigation or other compliance action, or testifying in any proceeding under the DBA, Related Acts, this part, or [29 CFR part 1](#) or [3](#); or

d. Informing any other person about their rights under the DBA, Related Acts, this part, or [29 CFR part 1](#) or [3](#).

V. CONTRACT WORK HOURS AND SAFETY STANDARDS ACT

Pursuant to 29 CFR 5.5(b), the following clauses apply to any Federal-aid construction contract in an amount in excess of \$100,000 and subject to the overtime provisions of the Contract Work Hours and Safety Standards Act. These clauses shall be inserted in addition to the clauses required by 29 CFR 5.5(a) or 29 CFR 4.6. As used in this paragraph, the terms laborers and mechanics include watchpersons and guards.

1. Overtime requirements. No contractor or subcontractor contracting for any part of the contract work which may require or involve the employment of laborers or mechanics shall require or permit any such laborer or mechanic in any workweek in which he or she is employed on such work to work in excess of forty hours in such workweek unless such laborer or mechanic receives compensation at a rate not less than one and one-half times the basic rate of pay for all hours worked in excess of forty hours in such workweek. 29 CFR 5.5.

2. Violation; liability for unpaid wages; liquidated damages. In the event of any violation of the clause set forth in paragraph 1. of this section the contractor and any subcontractor responsible therefor shall be liable for the unpaid wages and interest from the date of the underpayment. In addition, such contractor and subcontractor shall be liable to the United States (in the case of work done under contract for the District of Columbia or a territory, to such District or to such territory), for liquidated damages. Such liquidated damages shall be computed with respect to each individual laborer or

mechanic, including watchpersons and guards, employed in violation of the clause set forth in paragraph 1. of this section, in the sum currently provided in 29 CFR 5.5(b)(2)* for each calendar day on which such individual was required or permitted to work in excess of the standard workweek of forty hours without payment of the overtime wages required by the clause set forth in paragraph 1. of this section.

* \$31 as of January 15, 2023 (See 88 FR 88 FR 2210) as may be adjusted annually by the Department of Labor, pursuant to the Federal Civil Penalties Inflation Adjustment Act of 1990.

3. Withholding for unpaid wages and liquidated damages

a. *Withholding process.* The FHWA or the contracting agency may, upon its own action, or must, upon written request of an authorized representative of the Department of Labor, withhold or cause to be withheld from the contractor so much of the accrued payments or advances as may be considered necessary to satisfy the liabilities of the prime contractor or any subcontractor for any unpaid wages; monetary relief, including interest; and liquidated damages required by the clauses set forth in this section on this contract, any other Federal contract with the same prime contractor, or any other federally assisted contract subject to the Contract Work Hours and Safety Standards Act that is held by the same prime contractor (as defined in § 5.2). The necessary funds may be withheld from the contractor under this contract, any other Federal contract with the same prime contractor, or any other federally assisted contract that is subject to the Contract Work Hours and Safety Standards Act and is held by the same prime contractor, regardless of whether the other contract was awarded or assisted by the same agency, and such funds may be used to satisfy the contractor liability for which the funds were withheld.

b. *Priority to withheld funds.* The Department has priority to funds withheld or to be withheld in accordance with Section IV paragraph 2.a. or paragraph 3.a. of this section, or both, over claims to those funds by:

- (1) A contractor's surety(ies), including without limitation performance bond sureties and payment bond sureties;
- (2) A contracting agency for its procurement costs;
- (3) A trustee(s) (either a court-appointed trustee or a U.S. trustee, or both) in bankruptcy of a contractor, or a contractor's bankruptcy estate;
- (4) A contractor's assignee(s);
- (5) A contractor's successor(s); or
- (6) A claim asserted under the Prompt Payment Act, [31 U.S.C. 3901](#)–3907.

4. Subcontracts. The contractor or subcontractor must insert in any subcontracts the clauses set forth in paragraphs 1. through 5. of this section and a clause requiring the subcontractors to include these clauses in any lower tier subcontracts. The prime contractor is responsible for compliance by any subcontractor or lower tier subcontractor with the clauses set forth in paragraphs 1. through 5. In the

event of any violations of these clauses, the prime contractor and any subcontractor(s) responsible will be liable for any unpaid wages and monetary relief, including interest from the date of the underpayment or loss, due to any workers of lower-tier subcontractors, and associated liquidated damages and may be subject to debarment, as appropriate.

5. Anti-retaliation. It is unlawful for any person to discharge, demote, intimidate, threaten, restrain, coerce, blacklist, harass, or in any other manner discriminate against, or to cause any person to discharge, demote, intimidate, threaten, restrain, coerce, blacklist, harass, or in any other manner discriminate against, any worker or job applicant for:

a. Notifying any contractor of any conduct which the worker reasonably believes constitutes a violation of the Contract Work Hours and Safety Standards Act (CWHSSA) or its implementing regulations in this part;

b. Filing any complaint, initiating or causing to be initiated any proceeding, or otherwise asserting or seeking to assert on behalf of themselves or others any right or protection under CWHSSA or this part;

c. Cooperating in any investigation or other compliance action, or testifying in any proceeding under CWHSSA or this part; or

d. Informing any other person about their rights under CWHSSA or this part.

VI. SUBLETTING OR ASSIGNING THE CONTRACT

This provision is applicable to all Federal-aid construction contracts on the National Highway System pursuant to 23 CFR 635.116.

1. The contractor shall perform with its own organization contract work amounting to not less than 30 percent (or a greater percentage if specified elsewhere in the contract) of the total original contract price, excluding any specialty items designated by the contracting agency. Specialty items may be performed by subcontract and the amount of any such specialty items performed may be deducted from the total original contract price before computing the amount of work required to be performed by the contractor's own organization (23 CFR 635.116).

a. The term "perform work with its own organization" in paragraph 1 of Section VI refers to workers employed or leased by the prime contractor, and equipment owned or rented by the prime contractor, with or without operators. Such term does not include employees or equipment of a subcontractor or lower tier subcontractor, agents of the prime contractor, or any other assignees. The term may include payments for the costs of hiring leased employees from an employee leasing firm meeting all relevant Federal and State regulatory requirements. Leased employees may only be included in this term if the prime contractor meets all of the following conditions: (based on longstanding interpretation)

- (1) the prime contractor maintains control over the supervision of the day-to-day activities of the leased employees;
- (2) the prime contractor remains responsible for the quality of the work of the leased employees;

- (3) the prime contractor retains all power to accept or exclude individual employees from work on the project; and
- (4) the prime contractor remains ultimately responsible for the payment of predetermined minimum wages, the submission of payrolls, statements of compliance and all other Federal regulatory requirements.

b. "Specialty Items" shall be construed to be limited to work that requires highly specialized knowledge, abilities, or equipment not ordinarily available in the type of contracting organizations qualified and expected to bid or propose on the contract as a whole and in general are to be limited to minor components of the overall contract. 23 CFR 635.102.

2. Pursuant to 23 CFR 635.116(a), the contract amount upon which the requirements set forth in paragraph (1) of Section VI is computed includes the cost of material and manufactured products which are to be purchased or produced by the contractor under the contract provisions.

3. Pursuant to 23 CFR 635.116(c), the contractor shall furnish (a) a competent superintendent or supervisor who is employed by the firm, has full authority to direct performance of the work in accordance with the contract requirements, and is in charge of all construction operations (regardless of who performs the work) and (b) such other of its own organizational resources (supervision, management, and engineering services) as the contracting officer determines is necessary to assure the performance of the contract.

4. No portion of the contract shall be sublet, assigned or otherwise disposed of except with the written consent of the contracting officer, or authorized representative, and such consent when given shall not be construed to relieve the contractor of any responsibility for the fulfillment of the contract. Written consent will be given only after the contracting agency has assured that each subcontract is evidenced in writing and that it contains all pertinent provisions and requirements of the prime contract. (based on long-standing interpretation of 23 CFR 635.116).

5. The 30-percent self-performance requirement of paragraph (1) is not applicable to design-build contracts; however, contracting agencies may establish their own self-performance requirements. 23 CFR 635.116(d).

VII. SAFETY: ACCIDENT PREVENTION

This provision is applicable to all Federal-aid construction contracts and to all related subcontracts.

1. In the performance of this contract the contractor shall comply with all applicable Federal, State, and local laws governing safety, health, and sanitation (23 CFR Part 635). The contractor shall provide all safeguards, safety devices and protective equipment and take any other needed actions as it determines, or as the contracting officer may determine, to be reasonably necessary to protect the life and health of employees on the job and the safety of the public and to protect property in connection with the performance of the work covered by the contract. 23 CFR 635.108.

2. It is a condition of this contract, and shall be made a condition of each subcontract, which the contractor enters into pursuant to this contract, that the contractor and any subcontractor shall not permit any employee, in performance of the contract, to work in surroundings or under conditions which are unsanitary, hazardous or dangerous to his/her health or safety, as determined under construction safety and

health standards (29 CFR Part 1926) promulgated by the Secretary of Labor, in accordance with Section 107 of the Contract Work Hours and Safety Standards Act (40 U.S.C. 3704). 29 CFR 1926.10.

3. Pursuant to 29 CFR 1926.3, it is a condition of this contract that the Secretary of Labor or authorized representative thereof, shall have right of entry to any site of contract performance to inspect or investigate the matter of compliance with the construction safety and health standards and to carry out the duties of the Secretary under Section 107 of the Contract Work Hours and Safety Standards Act (40 U.S.C. 3704).

VIII. FALSE STATEMENTS CONCERNING HIGHWAY PROJECTS

This provision is applicable to all Federal-aid construction contracts and to all related subcontracts.

In order to assure high quality and durable construction in conformity with approved plans and specifications and a high degree of reliability on statements and representations made by engineers, contractors, suppliers, and workers on Federal-aid highway projects, it is essential that all persons concerned with the project perform their functions as carefully, thoroughly, and honestly as possible. Willful falsification, distortion, or misrepresentation with respect to any facts related to the project is a violation of Federal law. To prevent any misunderstanding regarding the seriousness of these and similar acts, Form FHWA-1022 shall be posted on each Federal-aid highway project (23 CFR Part 635) in one or more places where it is readily available to all persons concerned with the project:

18 U.S.C. 1020 reads as follows:

"Whoever, being an officer, agent, or employee of the United States, or of any State or Territory, or whoever, whether a person, association, firm, or corporation, knowingly makes any false statement, false representation, or false report as to the character, quality, quantity, or cost of the material used or to be used, or the quantity or quality of the work performed or to be performed, or the cost thereof in connection with the submission of plans, maps, specifications, contracts, or costs of construction on any highway or related project submitted for approval to the Secretary of Transportation; or

Whoever knowingly makes any false statement, false representation, false report or false claim with respect to the character, quality, quantity, or cost of any work performed or to be performed, or materials furnished or to be furnished, in connection with the construction of any highway or related project approved by the Secretary of Transportation; or

Whoever knowingly makes any false statement or false representation as to material fact in any statement, certificate, or report submitted pursuant to provisions of the Federal-aid Roads Act approved July 11, 1916, (39 Stat. 355), as amended and supplemented;

Shall be fined under this title or imprisoned not more than 5 years or both."

IX. IMPLEMENTATION OF CLEAN AIR ACT AND FEDERAL WATER POLLUTION CONTROL ACT (42 U.S.C. 7606; 2 CFR 200.88; EO 11738)

This provision is applicable to all Federal-aid construction contracts in excess of \$150,000 and to all related subcontracts. 48 CFR 2.101; 2 CFR 200.327.

By submission of this bid/proposal or the execution of this contract or subcontract, as appropriate, the bidder, proposer, Federal-aid construction contractor, subcontractor, supplier, or vendor agrees to comply with all applicable standards, orders or regulations issued pursuant to the Clean Air Act (42 U.S.C. 7401-7671q) and the Federal Water Pollution Control Act, as amended (33 U.S.C. 1251-1387). Violations must be reported to the Federal Highway Administration and the Regional Office of the Environmental Protection Agency. 2 CFR Part 200, Appendix II.

The contractor agrees to include or cause to be included the requirements of this Section in every subcontract, and further agrees to take such action as the contracting agency may direct as a means of enforcing such requirements. 2 CFR 200.327.

X. CERTIFICATION REGARDING DEBARMENT, SUSPENSION, INELIGIBILITY AND VOLUNTARY EXCLUSION

This provision is applicable to all Federal-aid construction contracts, design-build contracts, subcontracts, lower-tier subcontracts, purchase orders, lease agreements, consultant contracts or any other covered transaction requiring FHWA approval or that is estimated to cost \$25,000 or more – as defined in 2 CFR Parts 180 and 1200. 2 CFR 180.220 and 1200.220.

1. Instructions for Certification – First Tier Participants:

- a. By signing and submitting this proposal, the prospective first tier participant is providing the certification set out below.
- b. The inability of a person to provide the certification set out below will not necessarily result in denial of participation in this covered transaction. The prospective first tier participant shall submit an explanation of why it cannot provide the certification set out below. The certification or explanation will be considered in connection with the department or agency's determination whether to enter into this transaction. However, failure of the prospective first tier participant to furnish a certification or an explanation shall disqualify such a person from participation in this transaction. 2 CFR 180.320.
- c. The certification in this clause is a material representation of fact upon which reliance was placed when the contracting agency determined to enter into this transaction. If it is later determined that the prospective participant knowingly rendered an erroneous certification, in addition to other remedies available to the Federal Government, the contracting agency may terminate this transaction for cause of default. 2 CFR 180.325.
- d. The prospective first tier participant shall provide immediate written notice to the contracting agency to whom this proposal is submitted if any time the prospective first tier participant learns that its certification was erroneous when submitted or has become erroneous by reason of changed circumstances. 2 CFR 180.345 and 180.350.

e. The terms "covered transaction," "debarred," "suspended," "ineligible," "participant," "person," "principal," and "voluntarily excluded," as used in this clause, are defined in 2 CFR Parts 180, Subpart I, 180.900-180.1020, and 1200. "First Tier Covered Transactions" refers to any covered transaction between a recipient or subrecipient of Federal funds and a participant (such as the prime or general contract). "Lower Tier Covered Transactions" refers to any covered transaction under a First Tier Covered Transaction (such as subcontracts). "First Tier Participant" refers to the participant who has entered into a covered transaction with a recipient or subrecipient of Federal funds (such as the prime or general contractor). "Lower Tier Participant" refers any participant who has entered into a covered transaction with a First Tier Participant or other Lower Tier Participants (such as subcontractors and suppliers).

f. The prospective first tier participant agrees by submitting this proposal that, should the proposed covered transaction be entered into, it shall not knowingly enter into any lower tier covered transaction with a person who is debarred, suspended, declared ineligible, or voluntarily excluded from participation in this covered transaction, unless authorized by the department or agency entering into this transaction. 2 CFR 180.330.

g. The prospective first tier participant further agrees by submitting this proposal that it will include the clause titled "Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion-Lower Tier Covered Transactions," provided by the department or contracting agency, entering into this covered transaction, without modification, in all lower tier covered transactions and in all solicitations for lower tier covered transactions exceeding the \$25,000 threshold. 2 CFR 180.220 and 180.300.

h. A participant in a covered transaction may rely upon a certification of a prospective participant in a lower tier covered transaction that is not debarred, suspended, ineligible, or voluntarily excluded from the covered transaction, unless it knows that the certification is erroneous. 2 CFR 180.300; 180.320, and 180.325. A participant is responsible for ensuring that its principals are not suspended, debarred, or otherwise ineligible to participate in covered transactions. 2 CFR 180.335. To verify the eligibility of its principals, as well as the eligibility of any lower tier prospective participants, each participant may, but is not required to, check the System for Award Management website (<https://www.sam.gov/>). 2 CFR 180.300, 180.320, and 180.325.

i. Nothing contained in the foregoing shall be construed to require the establishment of a system of records in order to render in good faith the certification required by this clause. The knowledge and information of the prospective participant is not required to exceed that which is normally possessed by a prudent person in the ordinary course of business dealings.

j. Except for transactions authorized under paragraph (f) of these instructions, if a participant in a covered transaction knowingly enters into a lower tier covered transaction with a person who is suspended, debarred, ineligible, or voluntarily excluded from participation in this transaction, in addition to other remedies available to the Federal Government, the department or agency may terminate this transaction for cause or default. 2 CFR 180.325.

* * * * *

2. Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion – First Tier Participants:

a. The prospective first tier participant certifies to the best of its knowledge and belief, that it and its principals:

(1) Are not presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from participating in covered transactions by any Federal department or agency, 2 CFR 180.335;.

(2) Have not within a three-year period preceding this proposal been convicted of or had a civil judgment rendered against them for commission of fraud or a criminal offense in connection with obtaining, attempting to obtain, or performing a public (Federal, State, or local) transaction or contract under a public transaction; violation of Federal or State antitrust statutes or commission of embezzlement, theft, forgery, bribery, falsification or destruction of records, making false statements, or receiving stolen property, 2 CFR 180.800;

(3) Are not presently indicted for or otherwise criminally or civilly charged by a governmental entity (Federal, State or local) with commission of any of the offenses enumerated in paragraph (a)(2) of this certification, 2 CFR 180.700 and 180.800; and

(4) Have not within a three-year period preceding this application/proposal had one or more public transactions (Federal, State or local) terminated for cause or default. 2 CFR 180.335(d).

(5) Are not a corporation that has been convicted of a felony violation under any Federal law within the two-year period preceding this proposal (USDOT Order 4200.6 implementing appropriations act requirements); and

(6) Are not a corporation with any unpaid Federal tax liability that has been assessed, for which all judicial and administrative remedies have been exhausted, or have lapsed, and that is not being paid in a timely manner pursuant to an agreement with the authority responsible for collecting the tax liability (USDOT Order 4200.6 implementing appropriations act requirements).

b. Where the prospective participant is unable to certify to any of the statements in this certification, such prospective participant should attach an explanation to this proposal. 2 CFR 180.335 and 180.340.

3. Instructions for Certification - Lower Tier Participants:

(Applicable to all subcontracts, purchase orders, and other lower tier transactions requiring prior FHWA approval or estimated to cost \$25,000 or more - 2 CFR Parts 180 and 1200). 2 CFR 180.220 and 1200.220.

a. By signing and submitting this proposal, the prospective lower tier participant is providing the certification set out below.

b. The certification in this clause is a material representation of fact upon which reliance was placed when this transaction was entered into. If it is later determined that the prospective lower tier participant knowingly rendered an erroneous certification, in addition to other remedies available to the Federal Government, the department, or agency with which

this transaction originated may pursue available remedies, including suspension and/or debarment.

c. The prospective lower tier participant shall provide immediate written notice to the person to which this proposal is submitted if at any time the prospective lower tier participant learns that its certification was erroneous by reason of changed circumstances. 2 CFR 180.365.

d. The terms "covered transaction," "debarred," "suspended," "ineligible," "participant," "person," "principal," and "voluntarily excluded," as used in this clause, are defined in 2 CFR Parts 180, Subpart I, 180.900 – 180.1020, and 1200. You may contact the person to which this proposal is submitted for assistance in obtaining a copy of those regulations. "First Tier Covered Transactions" refers to any covered transaction between a recipient or subrecipient of Federal funds and a participant (such as the prime or general contract). "Lower Tier Covered Transactions" refers to any covered transaction under a First Tier Covered Transaction (such as subcontracts). "First Tier Participant" refers to the participant who has entered into a covered transaction with a recipient or subrecipient of Federal funds (such as the prime or general contractor). "Lower Tier Participant" refers any participant who has entered into a covered transaction with a First Tier Participant or other Lower Tier Participants (such as subcontractors and suppliers).

e. The prospective lower tier participant agrees by submitting this proposal that, should the proposed covered transaction be entered into, it shall not knowingly enter into any lower tier covered transaction with a person who is debarred, suspended, declared ineligible, or voluntarily excluded from participation in this covered transaction, unless authorized by the department or agency with which this transaction originated. 2 CFR 1200.220 and 1200.332.

f. The prospective lower tier participant further agrees by submitting this proposal that it will include this clause titled "Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion-Lower Tier Covered Transaction," without modification, in all lower tier covered transactions and in all solicitations for lower tier covered transactions exceeding the \$25,000 threshold. 2 CFR 180.220 and 1200.220.

g. A participant in a covered transaction may rely upon a certification of a prospective participant in a lower tier covered transaction that is not debarred, suspended, ineligible, or voluntarily excluded from the covered transaction, unless it knows that the certification is erroneous. A participant is responsible for ensuring that its principals are not suspended, debarred, or otherwise ineligible to participate in covered transactions. To verify the eligibility of its principals, as well as the eligibility of any lower tier prospective participants, each participant may, but is not required to, check the System for Award Management website (<https://www.sam.gov/>), which is compiled by the General Services Administration. 2 CFR 180.300, 180.320, 180.330, and 180.335.

h. Nothing contained in the foregoing shall be construed to require establishment of a system of records in order to render in good faith the certification required by this clause. The knowledge and information of participant is not required to exceed that which is normally possessed by a prudent person in the ordinary course of business dealings.

i. Except for transactions authorized under paragraph e of these instructions, if a participant in a covered transaction knowingly enters into a lower tier covered transaction with a person who is suspended, debarred, ineligible, or voluntarily

excluded from participation in this transaction, in addition to other remedies available to the Federal Government, the department or agency with which this transaction originated may pursue available remedies, including suspension and/or debarment. 2 CFR 180.325.

4. Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion--Lower Tier Participants:

a. The prospective lower tier participant certifies, by submission of this proposal, that neither it nor its principals:

(1) is presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from participating in covered transactions by any Federal department or agency, 2 CFR 180.355;

(2) is a corporation that has been convicted of a felony violation under any Federal law within the two-year period preceding this proposal (USDOT Order 4200.6 implementing appropriations act requirements); and

(3) is a corporation with any unpaid Federal tax liability that has been assessed, for which all judicial and administrative remedies have been exhausted, or have lapsed, and that is not being paid in a timely manner pursuant to an agreement with the authority responsible for collecting the tax liability. (USDOT Order 4200.6 implementing appropriations act requirements)

b. Where the prospective lower tier participant is unable to certify to any of the statements in this certification, such prospective participant should attach an explanation to this proposal.

XI. CERTIFICATION REGARDING USE OF CONTRACT FUNDS FOR LOBBYING

This provision is applicable to all Federal-aid construction contracts and to all related subcontracts which exceed \$100,000. 49 CFR Part 20, App. A.

1. The prospective participant certifies, by signing and submitting this bid or proposal, to the best of his or her knowledge and belief, that:

a. No Federal appropriated funds have been paid or will be paid, by or on behalf of the undersigned, to any person for influencing or attempting to influence an officer or employee of any Federal agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with the awarding of any Federal contract, the making of any Federal grant, the making of any Federal loan, the entering into of any cooperative agreement, and the extension, continuation, renewal, amendment, or modification of any Federal contract, grant, loan, or cooperative agreement.

b. If any funds other than Federal appropriated funds have been paid or will be paid to any person for influencing or attempting to influence an officer or employee of any Federal agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with this Federal contract, grant, loan, or

cooperative agreement, the undersigned shall complete and submit Standard Form-LLL, "Disclosure Form to Report Lobbying," in accordance with its instructions.

2. This certification is a material representation of fact upon which reliance was placed when this transaction was made or entered into. Submission of this certification is a prerequisite for making or entering into this transaction imposed by 31 U.S.C. 1352. Any person who fails to file the required certification shall be subject to a civil penalty of not less than \$10,000 and not more than \$100,000 for each such failure.

3. The prospective participant also agrees by submitting its bid or proposal that the participant shall require that the language of this certification be included in all lower tier subcontracts, which exceed \$100,000 and that all such recipients shall certify and disclose accordingly.

XII. USE OF UNITED STATES-FLAG VESSELS:

This provision is applicable to all Federal-aid construction contracts, design-build contracts, subcontracts, lower-tier subcontracts, purchase orders, lease agreements, or any other covered transaction. 46 CFR Part 381.

This requirement applies to material or equipment that is acquired for a specific Federal-aid highway project. 46 CFR 381.7. It is not applicable to goods or materials that come into inventories independent of an FHWA funded-contract.

When oceanic shipments (or shipments across the Great Lakes) are necessary for materials or equipment acquired for a specific Federal-aid construction project, the bidder, proposer, contractor, subcontractor, or vendor agrees:

1. To utilize privately owned United States-flag commercial vessels to ship at least 50 percent of the gross tonnage (computed separately for dry bulk carriers, dry cargo liners, and tankers) involved, whenever shipping any equipment, material, or commodities pursuant to this contract, to the extent such vessels are available at fair and reasonable rates for United States-flag commercial vessels. 46 CFR 381.7.

2. To furnish within 20 days following the date of loading for shipments originating within the United States or within 30 working days following the date of loading for shipments originating outside the United States, a legible copy of a rated, 'on-board' commercial ocean bill-of-lading in English for each shipment of cargo described in paragraph (b)(1) of this section to both the Contracting Officer (through the prime contractor in the case of subcontractor bills-of-lading) and to the Office of Cargo and Commercial Sealift (MAR-620), Maritime Administration, Washington, DC 20590. (MARAD requires copies of the ocean carrier's (master) bills of lading, certified onboard, dated, with rates and charges. These bills of lading may contain business sensitive information and therefore may be submitted directly to MARAD by the Ocean Transportation Intermediary on behalf of the contractor). 46 CFR 381.7.

**ATTACHMENT A - EMPLOYMENT AND MATERIALS
PREFERENCE FOR APPALACHIAN DEVELOPMENT
HIGHWAY SYSTEM OR APPALACHIAN LOCAL ACCESS
ROAD CONTRACTS (23 CFR 633, Subpart B, Appendix B)**

This provision is applicable to all Federal-aid projects funded under the Appalachian Regional Development Act of 1965.

1. During the performance of this contract, the contractor undertaking to do work which is, or reasonably may be, done as on-site work, shall give preference to qualified persons who regularly reside in the labor area as designated by the DOL wherein the contract work is situated, or the subregion, or the Appalachian counties of the State wherein the contract work is situated, except:

a. To the extent that qualified persons regularly residing in the area are not available.

b. For the reasonable needs of the contractor to employ supervisory or specially experienced personnel necessary to assure an efficient execution of the contract work.

c. For the obligation of the contractor to offer employment to present or former employees as the result of a lawful collective bargaining contract, provided that the number of nonresident persons employed under this subparagraph (1c) shall not exceed 20 percent of the total number of employees employed by the contractor on the contract work, except as provided in subparagraph (4) below.

2. The contractor shall place a job order with the State Employment Service indicating (a) the classifications of the laborers, mechanics and other employees required to perform the contract work, (b) the number of employees required in each classification, (c) the date on which the participant estimates such employees will be required, and (d) any other pertinent information required by the State Employment Service to complete the job order form. The job order may be placed with the State Employment Service in writing or by telephone. If during the course of the contract work, the information submitted by the contractor in the original job order is substantially modified, the participant shall promptly notify the State Employment Service.

3. The contractor shall give full consideration to all qualified job applicants referred to him by the State Employment Service. The contractor is not required to grant employment to any job applicants who, in his opinion, are not qualified to perform the classification of work required.

4. If, within one week following the placing of a job order by the contractor with the State Employment Service, the State Employment Service is unable to refer any qualified job applicants to the contractor, or less than the number requested, the State Employment Service will forward a certificate to the contractor indicating the unavailability of applicants. Such certificate shall be made a part of the contractor's permanent project records. Upon receipt of this certificate, the contractor may employ persons who do not normally reside in the labor area to fill positions covered by the certificate, notwithstanding the provisions of subparagraph (1c) above.

5. The provisions of 23 CFR 633.207(e) allow the contracting agency to provide a contractual preference for the use of mineral resource materials native to the Appalachian region.

6. The contractor shall include the provisions of Sections 1 through 4 of this Attachment A in every subcontract for work which is, or reasonably may be, done as on-site work.

CERTIFICATION FOR FEDERAL-AID CONTRACTS

The prospective bidder, by signing and submitting this bid proposal, certifies, to the best of his or her knowledge and belief, that:

- (1) No Federal appropriated funds have been paid or will be paid, by or on behalf of the undersigned, to any person or influencing or attempting to influence an officer or employee of any Federal agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with the awarding of any Federal contract, the making of any Federal grant, the making of any Federal loan, the entering into of any cooperative agreement, and the extension, continuation, renewal, amendment, or modification of any Federal contract, grant, loan, or cooperative agreement.
- (2) If any funds other than Federal appropriated funds have been paid or will be paid to any person for influencing or attempting to influence an officer or employee of any Federal agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with this Federal contract, grant, loan, or cooperative agreement, the undersigned shall complete and submit Standard Form-LLL, "Disclosure Form to Report Lobbying," in accordance with its instructions.

This certification is a material representation of fact upon which reliance was placed when this transaction was made or entered to. Submission of this certification is a prerequisite for making or entering into this transaction imposed by Section 1352, Title 31, U.S. Code. Any person who fails to file the required certification shall be subject to a civil penalty of not less than \$10,000 and not more than \$100,000 for each such failure.

The prospective participant also agrees by submitting his or her bid or proposal that he or she shall require that the language of this certification be included in all lower tier subcontracts, which exceed \$100,000 and that all such sub-recipients shall certify and disclose accordingly.

"General Decision Number: VT20240049 01/05/2024

Superseded General Decision Number: VT20230049

State: Vermont

Construction Type: Highway

County: Bennington County in Vermont.

HIGHWAY CONSTRUCTION PROJECTS (excluding tunnels, building structures in rest area projects & railroad construction; bascule, suspension & spandrel arch bridges designed for commercial navigation, bridges involving marine construction; and other major bridges).

Note: Contracts subject to the Davis-Bacon Act are generally required to pay at least the applicable minimum wage rate required under Executive Order 14026 or Executive Order 13658. Please note that these Executive Orders apply to covered contracts entered into by the federal government that are subject to the Davis-Bacon Act itself, but do not apply to contracts subject only to the Davis-Bacon Related Acts, including those set forth at 29 CFR 5.1(a)(1).

<p>If the contract is entered into on or after January 30, 2022, or the contract is renewed or extended (e.g., an option is exercised) on or after January 30, 2022:</p>	<ul style="list-style-type: none"> . Executive Order 14026 generally applies to the contract. . The contractor must pay all covered workers at least \$17.20 per hour (or the applicable wage rate listed on this wage determination, if it is higher) for all hours spent performing on the contract in 2024.
<p>If the contract was awarded on or between January 1, 2015 and January 29, 2022, and the contract is not renewed or extended on or after January 30, 2022:</p>	<ul style="list-style-type: none"> . Executive Order 13658 generally applies to the contract. . The contractor must pay all covered workers at least \$12.90 per hour (or the applicable wage rate listed on this wage determination, if it is higher) for all hours spent performing on that contract in 2024.

The applicable Executive Order minimum wage rate will be adjusted annually. If this contract is covered by one of the Executive Orders and a classification considered necessary for performance of work on the contract does not appear on this wage determination, the contractor must still submit a conformance request.

Additional information on contractor requirements and worker protections under the Executive Orders is available at <http://www.dol.gov/whd/govcontracts>.

Modification Number Publication Date
 0 01/05/2024

SUVT2017-010 08/06/2019

	Rates	Fringes
CARPENTER, Includes Form Work....	\$ 20.46	3.65
CEMENT MASON/CONCRETE FINISHER...	\$ 25.34	0.00
ELECTRICIAN.....	\$ 28.28	1.90
HIGHWAY/PARKING LOT STRIPING: Painter.....	\$ 23.76	5.43
INSTALLER - SIGN.....	\$ 18.50	5.52
IRONWORKER, REINFORCING.....	\$ 21.00	4.92
IRONWORKER, STRUCTURAL.....	\$ 28.97	8.72
LABORER: Common or General, Including Asphalt Raking, Shoveling, Spreading and Concrete Work.....	\$ 18.63	3.92
OPERATOR: Backhoe/Excavator/Trackhoe.....	\$ 21.63	2.45
OPERATOR: Bobcat/Skid Steer/Skid Loader.....	\$ 21.15	12.05
OPERATOR: Broom/Sweeper.....	\$ 19.94	6.29
OPERATOR: Bulldozer.....	\$ 20.71	0.92
OPERATOR: Crane.....	\$ 22.62	3.78
OPERATOR: Drill.....	\$ 20.23	4.50
OPERATOR: Grader/Blade.....	\$ 20.91	5.79
OPERATOR: Loader.....	\$ 24.13	5.23
OPERATOR: Mechanic.....	\$ 20.45	4.54
OPERATOR: Milling Machine.....	\$ 28.76	16.77
OPERATOR: Paver (Asphalt, Aggregate, and Concrete).....	\$ 21.32	7.24
OPERATOR: Pounder.....	\$ 21.18	0.00
OPERATOR: Roller.....	\$ 21.43	6.47
OPERATOR: Screed.....	\$ 24.50	8.77
TRAFFIC CONTROL: Flagger.....	\$ 16.16 **	6.18
TRAFFIC CONTROL: Laborer-Cones/ Barricades/Barrels - Setter/Mover/Sweeper.....	\$ 17.42	7.11

TRUCK DRIVER, Includes all axles including Dump Trucks.....\$ 18.54	3.32
TRUCK DRIVER: Distributor Truck.....\$ 22.32	0.00

WELDERS - Receive rate prescribed for craft performing operation to which welding is incidental.

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** Workers in this classification may be entitled to a higher minimum wage under Executive Order 14026 (\$17.20) or 13658 (\$12.90). Please see the Note at the top of the wage determination for more information. Please also note that the minimum wage requirements of Executive Order 14026 are not currently being enforced as to any contract or subcontract to which the states of Texas, Louisiana, or Mississippi, including their agencies, are a party.

Note: Executive Order (EO) 13706, Establishing Paid Sick Leave for Federal Contractors applies to all contracts subject to the Davis-Bacon Act for which the contract is awarded (and any solicitation was issued) on or after January 1, 2017. If this contract is covered by the EO, the contractor must provide employees with 1 hour of paid sick leave for every 30 hours they work, up to 56 hours of paid sick leave each year. Employees must be permitted to use paid sick leave for their own illness, injury or other health-related needs, including preventive care; to assist a family member (or person who is like family to the employee) who is ill, injured, or has other health-related needs, including preventive care; or for reasons resulting from, or to assist a family member (or person who is like family to the employee) who is a victim of, domestic violence, sexual assault, or stalking. Additional information on contractor requirements and worker protections under the EO is available at <https://www.dol.gov/agencies/whd/government-contracts>.

Unlisted classifications needed for work not included within the scope of the classifications listed may be added after award only as provided in the labor standards contract clauses (29CFR 5.5 (a) (1) (iii)).

The body of each wage determination lists the classification and wage rates that have been found to be prevailing for the cited type(s) of construction in the area covered by the wage determination. The classifications are listed in alphabetical order of ""identifiers"" that indicate whether the particular rate is a union rate (current union negotiated rate for local), a survey rate (weighted average rate) or a union average rate (weighted union average rate).

Union Rate Identifiers

A four letter classification abbreviation identifier enclosed in dotted lines beginning with characters other than ""SU"" or ""UAVG"" denotes that the union classification and rate were prevailing for that classification in the survey. Example: PLUM0198-005 07/01/2014. PLUM is an abbreviation identifier of

the union which prevailed in the survey for this classification, which in this example would be Plumbers. 0198 indicates the local union number or district council number where applicable, i.e., Plumbers Local 0198. The next number, 005 in the example, is an internal number used in processing the wage determination. 07/01/2014 is the effective date of the most current negotiated rate, which in this example is July 1, 2014.

Union prevailing wage rates are updated to reflect all rate changes in the collective bargaining agreement (CBA) governing this classification and rate.

Survey Rate Identifiers

Classifications listed under the "SU" identifier indicate that no one rate prevailed for this classification in the survey and the published rate is derived by computing a weighted average rate based on all the rates reported in the survey for that classification. As this weighted average rate includes all rates reported in the survey, it may include both union and non-union rates. Example: SULA2012-007 5/13/2014. SU indicates the rates are survey rates based on a weighted average calculation of rates and are not majority rates. LA indicates the State of Louisiana. 2012 is the year of survey on which these classifications and rates are based. The next number, 007 in the example, is an internal number used in producing the wage determination. 5/13/2014 indicates the survey completion date for the classifications and rates under that identifier.

Survey wage rates are not updated and remain in effect until a new survey is conducted.

Union Average Rate Identifiers

Classification(s) listed under the UAVG identifier indicate that no single majority rate prevailed for those classifications; however, 100% of the data reported for the classifications was union data. EXAMPLE: UAVG-OH-0010 08/29/2014. UAVG indicates that the rate is a weighted union average rate. OH indicates the state. The next number, 0010 in the example, is an internal number used in producing the wage determination. 08/29/2014 indicates the survey completion date for the classifications and rates under that identifier.

A UAVG rate will be updated once a year, usually in January of each year, to reflect a weighted average of the current negotiated/CBA rate of the union locals from which the rate is based.

WAGE DETERMINATION APPEALS PROCESS

1.) Has there been an initial decision in the matter? This can be:

- * an existing published wage determination
- * a survey underlying a wage determination
- * a Wage and Hour Division letter setting forth a position on a wage determination matter
- * a conformance (additional classification and rate) ruling

On survey related matters, initial contact, including requests for summaries of surveys, should be with the Wage and Hour National Office because National Office has responsibility for the Davis-Bacon survey program. If the response from this initial contact is not satisfactory, then the process described in 2.) and 3.) should be followed.

With regard to any other matter not yet ripe for the formal process described here, initial contact should be with the Branch of Construction Wage Determinations. Write to:

Branch of Construction Wage Determinations
Wage and Hour Division
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

2.) If the answer to the question in 1.) is yes, then an interested party (those affected by the action) can request review and reconsideration from the Wage and Hour Administrator (See 29 CFR Part 1.8 and 29 CFR Part 7). Write to:

Wage and Hour Administrator
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

The request should be accompanied by a full statement of the interested party's position and by any information (wage payment data, project description, area practice material, etc.) that the requestor considers relevant to the issue.

3.) If the decision of the Administrator is not favorable, an interested party may appeal directly to the Administrative Review Board (formerly the Wage Appeals Board). Write to:

Administrative Review Board
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

4.) All decisions by the Administrative Review Board are final.

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END OF GENERAL DECISION"

DISADVANTAGED BUSINESS ENTERPRISE (DBE) POLICY CONTRACT REQUIREMENTS

Disadvantaged Business Enterprise (DBE) Policy. It shall be the policy of the Vermont Agency of Transportation (VTrans) to ensure nondiscriminatory opportunity for Disadvantaged Business Enterprises (DBEs) to participate in the performance of all contracts and subcontracts financed with Federal funds as specified by the regulations of the United States Department of Transportation (USDOT), Federal Highway Administration and as set forth below.

1. **Policy.** It is the policy of USDOT that DBEs as defined in 49 Code of Federal Regulation (CFR) Part 26 shall have the maximum opportunity to participate in the performance of contracts financed in whole or in part with Federal funds. Consequently, the DBE requirements of 49 CFR Part 26 and 23 CFR, Chapter 1, Part 230, Subpart b apply to this contract.
2. **DBE Obligation.** The State and its Contractors agree to ensure that DBEs as defined in 49 CFR Part 26, have the maximum opportunity to participate in the performance of contracts and subcontracts financed in whole or in part with Federal funds. **Each subcontract the prime contractor signs with a subcontractor must include this assurance:** *The contractor, sub recipient or subcontractor shall not discriminate on the basis of race, color, national origin, or sex in the award and performance of this contract. The contractor shall carry out applicable requirements of 49 CFR Part 26 in the award and administration of USDOT-assisted contracts. Failure by the contractor to carry out these requirements is a material breach of this contract, which may result in the termination of this contract or such other remedy, as VTrans deems appropriate.*
3. **Sanctions for Noncompliance.** The Contractor is hereby advised that failure of the Contractor, or any Subcontractor performing work under this contract, to carry out the requirements set forth in paragraphs 1 and 2 above shall constitute a breach of contract and after the notification of the Vermont Agency of Transportation, Secretary of Transportation, may result in termination of this contract by the State or such remedy as the State deems necessary.
4. **Inclusion in Subcontracts.** The Contractor shall insert in each of its subcontracts this Disadvantaged Business Enterprise (DBE) Policy and also a clause requiring its subcontractors to include this same Policy in any lower tier subcontracts which they may enter into, together with a clause requiring the inclusion of the Policy in any further subcontract that may in turn be made. This Policy shall not be incorporated by reference.

Disadvantaged Business Enterprise (DBE) Program Goals. The Vermont Agency of Transportation (VTrans) is required to set an overall DBE goal for participation in all transportation related Federal-aid projects. The goal is determined following guidelines set forth in 49 CFR 26.45, and based on the availability of ready, willing and able DBEs who submitted bids and quotes for transportation related projects, compared as a percentage of all available contractors who submitted bids and quotes for transportation related projects during the same time period. The DBE goal may be adjusted to take into account other factors impacting DBE utilization, in an effort to narrowly tailor the overall DBE goal. The detailed goal setting methodology and current overall DBE goal may be viewed on the VTrans website at:

<http://vtrans.vermont.gov/civil-rights/doing-business/dbe-center/program-goals>

The VTrans overall DBE goal is currently achieved by a combination of contract specific goals and a race/gender neutral policy. Contractors should be proactive and solicit bids and quotes from certified DBEs for use when submitting their own bids and employ certified DBEs when participating on transportation related projects.

Disadvantaged Business Enterprise (DBE) Definition. A DBE is defined as a business that is owned and controlled by one or more socially and economically disadvantaged person(s). For the purposes of this definition:

- (1) "Socially and economically disadvantaged person" means an individual who is a citizen or lawful permanent resident of the United States and who is a Woman, Black, Hispanic, Portuguese, Native American, Asian American, or a member of another group, or an individual found to be disadvantaged by the Small Business Administration pursuant to Section 3 of the Small Business Act.
- (2) "Owned and controlled" means a business which is:
 - a. A sole proprietorship legitimately owned and controlled by an individual who is a disadvantaged person.
 - b. A partnership, joint venture or limited liability company in which at least 51% of the beneficial ownership interests legitimately is held by a disadvantaged person(s).
 - c. A corporation or other entity in which at least 51% of the voting interest and 51% of the beneficial ownership interests legitimately are held by a disadvantaged person(s).

The disadvantaged group owner(s) or stockholder(s) must possess control over management, interest in capital, and interest in earnings commensurate with percentage of ownership. Disadvantaged participation in a joint venture must also be based on the sharing of real earnings, as above. If the disadvantaged group ownership interests are real, substantial and continuing and not created solely to meet the requirements of the program, a firm is considered a bona fide DBE.

Certified DBE Directory. The current Vermont Unified Disadvantaged Business Enterprise (DBE) Directory is available online at: <http://vtrans.vermont.gov/civil-rights/doing-business/dbe-center/directory>. This directory contains all currently certified DBEs available for work in Vermont and is updated continuously. Only firms listed in this directory are eligible for DBE credit on Vermont Federal-aid projects. If you have questions about DBE certification, or do not have access to the Internet, please call the [AOT DBE Program Manager](#) for assistance.

Counting DBE Participation Towards Project Goals. For payments made to DBE contractors to be counted toward DBE goals, the DBE contractors must perform a commercially useful function (CUF). The DBE must be responsible for execution of the work of the contract and must carry out its responsibilities by performing, managing, and supervising the work involved, consistent with standard industry practices.

This means that:

- The DBE must also be responsible for ordering its own materials and supplies, determining quantity and quality, negotiating price, installing (where applicable) and paying for the material itself;
- The DBE must perform work commensurate with the amount of its contract;
- The DBE's contribution cannot be that of an extra participant or a conduit through which funds are passed in order to obtain the appearance of DBE participation;
- The DBE must exercise responsibility for at least fifty percent of the total cost of its contract with its own workforce;
- None of the DBE's work can be subcontracted back to the prime contractor, nor can the DBE employ the prime's or other subcontractor's supervisors currently working on the project;
- The DBE's labor force must be separate and apart from that of the prime contractor or other subcontractors on the project. Transferring crews between primes, subcontractors, and DBE contractors is not acceptable;
- The DBE owner must hold necessary professional or craft license(s) or certification(s) for the type of work he/she performs on the project;
- The DBE may rent or lease, at competitive rates, equipment needed on the project from customary leasing sources or from other subcontractors on the project.

Allowable credit for payments made to DBEs for work performed. A contractor may take credit for payments made to a certified DBE that satisfies CUF requirements at the following rate:

- A DBE Prime Contractor: Count 100% of the value of the work performed by own forces, equipment and materials towards the DBE goals.
- An approved DBE subcontractor: Count 100% of the value of work performed by the DBE's own forces, equipment and materials, excluding the following:
 - The cost of materials/supplies purchased from a non-DBE Prime Contractor.
 - The value of work provided by non-DBE lower tier subcontractors, including non-DBE trucking to deliver asphalt to a DBE contractor.
- A DBE owner-operator of construction equipment: Count 100% of expenditures committed.
- A DBE manufacturer: Count 100% of expenditures committed. The manufacturer must be a firm that operates or maintains a factory or establishment that produces on the premises the materials or supplies obtained by the Contractor.

- A regular DBE dealer/supplier: Count 60% of expenditures committed. A regular dealer/supplier is defined as a firm that owns, operates, or maintains a store, warehouse or other establishment, in which the materials or supplies required for the performance of the contract are bought, kept in stock, and regularly sold or leased to the public in the usual course of business. A person may be a dealer in such bulk items as petroleum products, steel, cement, gravel, stone or asphalt without owning, operating or maintaining a place of business, if the person both owns and operates distribution equipment for the products, by the means of a long term agreement, and not by a contract by contract basis.
- A DBE broker: Count for DBE credit only the fees or commissions charged for assistance in the procurement, and, fees and transportation charges for the delivery of materials or supplies required at the job site, but not the cost of materials procured. A broker is defined as any person(s) or firm who arranges or expedites transactions for materials or supplies, and does not take physical possession of the materials or supplies at their place of business for resale.
- A DBE renter of construction equipment to a contractor: Count 20% of expenditures committed, with or without operator.
- A bona fide DBE service provider: Count 100% of reasonable fees or commissions. Eligible services include professional, technical, consultant, or managerial, services and assistance in the procurement of essential personnel, facilities, equipment, materials or supplies required for the performance of the contract. Eligible services also include agencies providing bonding and insurance specifically required for the performance of the contract.
- A trucking, hauling or delivery operation: Count 100% of expenditures committed when trucks are owned, operated, licensed and insured by the DBE and used on the contract and, if applicable, includes the cost of the materials and supplies. 100% of expenditures committed when the DBE leases trucks from another DBE firm including an owner-operator. 100% of reasonable fees, or commissions, the DBE receives as a result of a lease arrangement for trucks from a non-DBE, including an owner-operator.
- Any combination of the above.

Removal of Approved DBE From Transportation Related Project. Contractors may not terminate for convenience, any approved DBE subcontractor and perform the work with their own forces, without prior written consent from the [AOT DBE Program Manager or the AOT Civil Rights Director](#)

Federal-aid projects which specify a DBE contract goal. The provisions of the Vermont Agency of Transportation Supplemental Specification – Disadvantaged Business Enterprise (DBE) Utilization (CR 160) shall apply to all VTrans Federal-aid projects which specify a DBE contract goal.

Compliance With Prompt Payment Statute. In accordance with Vermont's Prompt Payment Act and VTrans Standard Specifications for Construction, Section 107.01(g), the Contractor

shall fully comply with the provisions of 9 V.S.A. Chapter 102, also referred to as Act No. 74 of 1991 or the Prompt Payment Act, as amended.

Subcontractor Payments. In accordance with VTrans Standard Specifications for Construction, Section 107.01(h), on all federal-aid and state funded contracts, the Contractor, during the life of the Contract and on a monthly basis, shall submit electronically, a listing of payments to subcontractors on the form specified by the State and made available at: <http://apps.vtrans.vermont.gov/promptpay/>. Electronic reports shall be filed with the Agency Office of Civil Rights by an authorized representative and received in the Agency Office of Civil Rights on or before the tenth working day after month end. Contractors without access to the internet shall obtain and submit manual reports to the Agency Office of Civil Rights. Manual reports shall be signed by an authorized representative, sent to the Agency Office of Civil Rights, and postmarked on or before the tenth working day after month end. There shall be no direct compensation allowed the Contractor for this work, but the cost thereof shall be included in the general cost of the work. In accordance with 9 V.S.A. Section 4003, notwithstanding any contrary agreement, payments made to subcontractors after seven days from receipt of a corresponding progress payment by the State to the Contractor, or seven days after receipt of a subcontractor's invoice, whichever is later, violate this agreement. Violations shall be reported to the Agency Office of Civil Rights for review. Failure to resolve disputes in a timely manner may result in a complaint made to the Agency Pre-qualification Committee. In this Committee's judgment, appropriate penalties may be involved for failure to comply with this specification. Penalties may include suspension, reduction or revocation of the Contractor's pre-qualification rating. This clause shall be included in the prime Contractor's Contract made with all if its subcontractors.

ATTACHMENT C: STANDARD STATE PROVISIONS FOR CONTRACTS AND GRANTS**REVISED DECEMBER 7, 2023**

1. Definitions: For purposes of this Attachment, “Party” shall mean the Contractor, Grantee, or Subrecipient, with whom the State of Vermont is executing this Agreement and consistent with the form of the Agreement. “Agreement” shall mean the specific contract or grant to which this form is attached.

2. Entire Agreement: This Agreement, whether in the form of a contract, State-funded grant, or Federally-funded grant, represents the entire agreement between the parties on the subject matter. All prior agreements, representations, statements, negotiations, and understandings shall have no effect. Where an authorized individual is either required to click-through or otherwise accept, or made subject to, any electronic terms and conditions to use or access any product or service provided hereunder, such terms and conditions are not binding and shall have no force or effect. Further, any terms and conditions of Party’s invoice, acknowledgment, confirmation, or similar document, shall not apply, and any such terms and conditions on any such document are objected to without need of further notice or objection.

3. Governing Law, Jurisdiction and Venue; No Waiver of Jury Trial: This Agreement will be governed by the laws of the State of Vermont without resort to conflict of laws principles. Any action or proceeding brought by either the State or the Party in connection with this Agreement shall be brought and enforced in the Superior Court of the State of Vermont, Civil Division, Washington Unit. The Party irrevocably submits to the jurisdiction of this court for any action or proceeding regarding this Agreement. The Party agrees that it must first exhaust any applicable administrative remedies with respect to any cause of action that it may have against the State regarding its performance under this Agreement. Party agrees that the State shall not be required to submit to binding arbitration or waive its right to a jury trial.

4. Sovereign Immunity: The State reserves all immunities, defenses, rights, or actions arising out of the State’s sovereign status or under the Eleventh Amendment to the United States Constitution. No waiver of the State’s immunities, defenses, rights, or actions shall be implied or otherwise deemed to exist by reason of the State’s entry into this Agreement.

5. No Employee Benefits For Party: The Party understands that the State will not provide any individual retirement benefits, group life insurance, group health and dental insurance, vacation or sick leave, workers compensation or other benefits or services available to State employees, nor will the State withhold any state or Federal taxes except as required under applicable tax laws, which shall be determined in advance of execution of the Agreement. The Party understands that all tax returns required by the Internal Revenue Code and the State of Vermont, including but not limited to income, withholding, sales and use, and rooms and meals, must be filed by the Party, and information as to Agreement income will be provided by the State of Vermont to the Internal Revenue Service and the Vermont Department of Taxes.

6. Independence: The Party will act in an independent capacity and not as officers or employees of the State.

7. Defense and Indemnity:

- A.** The Party shall defend the State and its officers and employees against all third-party claims or suits arising in whole or in part from any act or omission of the Party or of any agent of the Party in connection with the performance of this Agreement. The State shall notify the Party in the event of any such claim or suit, and the Party shall immediately retain counsel and otherwise provide a complete defense against the entire claim or suit. The State retains the right to participate at its own expense in the defense of any claim. The State shall have the right to approve all proposed settlements of such claims or suits.
- B.** After a final judgment or settlement, the Party may request recoupment of specific defense costs and may file suit in Washington Superior Court requesting recoupment. The Party shall be entitled to recoup costs only upon a showing that such costs were entirely unrelated to the defense of any claim arising from an act or omission of the Party in connection with the performance of this Agreement.
- C.** The Party shall indemnify the State and its officers and employees if the State, its officers, or employees become legally obligated to pay any damages or losses arising from any act or omission of the Party or an agent of the Party in connection with the performance of this Agreement.
- D.** Notwithstanding any contrary language anywhere, in no event shall the terms of this Agreement or any document furnished by the Party in connection with its performance under this Agreement obligate the State to (1) defend or indemnify the Party or any third party, or (2) otherwise be liable for the expenses or reimbursement, including attorneys’ fees, collection

costs or other costs of the Party or any third party.

8. Insurance: During the term of this Agreement, Party, at its expense, shall maintain in full force and effect the insurance coverages set forth in the Vermont State Insurance Specification in effect at the time of incorporation of this Attachment C into this Agreement. The terms of the Vermont State Insurance Specification are hereby incorporated by reference into this Attachment C as if fully set forth herein. A copy of the Vermont State Insurance Specification is available at: <https://aoa.vermont.gov/Risk-Claims-COI>.

9. Reliance by the State on Representations: All payments by the State under this Agreement will be made in reliance upon the accuracy of all representations made by the Party in accordance with this Agreement, including but not limited to bills, invoices, progress reports, and other proofs of work.

10. False Claims Act: Any liability to the State under the Vermont False Claims Act (32 V.S.A. § 630 et seq.) shall not be limited notwithstanding any agreement of the State to otherwise limit Party's liability.

11. Whistleblower Protections: The Party shall not discriminate or retaliate against one of its employees or agents for disclosing information concerning a violation of law, fraud, waste, abuse of authority, or acts threatening health or safety, including but not limited to allegations concerning the False Claims Act. Further, the Party shall not require such employees or agents to forego monetary awards as a result of such disclosures, nor should they be required to report misconduct to the Party or its agents prior to reporting to any governmental entity and/or the public.

12. Use and Protection of State Information:

- A. As between the State and Party, "State Data" includes all data received, obtained, or generated by the Party in connection with performance under this Agreement. Party acknowledges that certain State Data to which the Party may have access may contain information that is deemed confidential by the State, or which is otherwise confidential by law, rule, or practice, or otherwise exempt from disclosure under the State of Vermont Access to Public Records Act, 1 V.S.A. § 315 et seq. ("Confidential State Data").
- B. With respect to State Data, Party shall:
 - i. take reasonable precautions for its protection;
 - ii. not rent, sell, publish, share, or otherwise appropriate it; and
 - iii. upon termination of this Agreement for any reason, Party shall dispose of or retain State Data if and to the extent required by this Agreement, law, or regulation, or otherwise requested in writing by the State.
- C. With respect to Confidential State Data, Party shall:
 - i. strictly maintain its confidentiality;
 - ii. not collect, access, use, or disclose it except as necessary to provide services to the State under this Agreement;
 - iii. provide at a minimum the same care to avoid disclosure or unauthorized use as it provides to protect its own similar confidential and proprietary information;
 - iv. implement and maintain administrative, technical, and physical safeguards and controls to protect against any anticipated threats or hazards or unauthorized access or use;
 - v. promptly notify the State of any request or demand by any court, governmental agency or other person asserting a demand or request for Confidential State Data so that the State may seek an appropriate protective order; and
 - vi. upon termination of this Agreement for any reason, and except as necessary to comply with subsection B.iii above in this section, return or destroy all Confidential State Data remaining in its possession or control.
- D. If Party is provided or accesses, creates, collects, processes, receives, stores, or transmits Confidential State Data in any electronic form or media, Party shall utilize:
 - i. industry-standard firewall protection;
 - ii. multi-factor authentication controls;
 - iii. encryption of electronic Confidential State Data while in transit and at rest;
 - iv. measures to ensure that the State Data shall not be altered without the prior written consent of the State;
 - v. measures to protect against destruction, loss, or damage of State Data due to potential environmental hazards, such as fire and water damage;

- vi. training to implement the information security measures; and
 - vii. monitoring of the security of any portions of the Party's systems that are used in the provision of the services against intrusion.
- E. No Confidential State Data received, obtained, or generated by the Party in connection with performance under this Agreement shall be processed, transmitted, stored, or transferred by any means outside the United States, except with the express written permission of the State.
- F. Party shall notify the State within twenty-four hours after becoming aware of any unauthorized destruction, loss, alteration, disclosure of, or access to, any State Data.
- G. State of Vermont Cybersecurity Standard Update: Party confirms that all products and services provided to or for the use of the State under this Agreement shall be in compliance with State of Vermont Cybersecurity Standard Update in effect at the time of incorporation of this Attachment C into this Agreement. The State of Vermont Cybersecurity Standard Update prohibits the use of certain branded products in State information systems or any vendor system, and a copy is available at: <https://digitalservices.vermont.gov/cybersecurity/cybersecurity-standards-and-directives>
- H. In addition to the requirements of this Section 12, Party shall comply with any additional requirements regarding the protection of data that may be included in this Agreement or required by law or regulation.

13. Records Available for Audit: The Party shall maintain all records pertaining to performance under this Agreement. "Records" means any written or recorded information, regardless of physical form or characteristics, which is produced or acquired by the Party in the performance of this Agreement. Records produced or acquired in a machine-readable electronic format shall be maintained in that format. The records described shall be made available at reasonable times during the period of this Agreement and for three years thereafter or for any period required by law for inspection by any authorized representatives of the State or Federal Government. If any litigation, claim, or audit is started before the expiration of the three-year period, the records shall be retained until all litigation, claims, or audit findings involving the records have been resolved.

14. Fair Employment Practices and Americans with Disabilities Act: Party agrees to comply with the requirement of 21 V.S.A. Chapter 5, Subchapter 6, relating to fair employment practices, to the full extent applicable, and shall include this provision in all subcontracts for work performed in Vermont. Party shall also ensure, to the full extent required by the Americans with Disabilities Act of 1990, as amended, that qualified individuals with disabilities receive equitable access to the services, programs, and activities provided by the Party under this Agreement.

15. Offset: The State may offset any sums which the Party owes the State against any sums due the Party under this Agreement; provided, however, that any offset of amounts due the State of Vermont as taxes shall be in accordance with the procedures more specifically provided in 32 V.S.A. § 3113.

16. Taxes Due to the State: Party certifies under the pains and penalties of perjury that, as of the date this Agreement is signed, the Party is in good standing with respect to, or in full compliance with, a plan to pay any and all taxes due the State of Vermont.

17. Taxation of Purchases: All State purchases must be invoiced tax free. An exemption certificate will be furnished upon request with respect to otherwise taxable items.

18. Child Support: (Only applicable if the Party is a natural person, not a corporation or partnership.) Party states that, as of the date this Agreement is signed, Party is not under an obligation to pay child support or is in good standing with respect to or in full compliance with a plan to pay any and all child support payable under a support order. Party makes this statement with regard to support owed to any and all children residing in Vermont. In addition, if the Party is a resident of Vermont, Party makes this statement with regard to support owed to any and all children residing in any other state or territory of the United States.

19. Sub-Agreements: Party shall not assign, subcontract, or subgrant the performance of this Agreement or any portion thereof to any other Party without the prior written approval of the State. Party shall be responsible and liable to the State for all acts or omissions of subcontractors and any other person performing work under this Agreement pursuant to an agreement with Party or any subcontractor.

In the case this Agreement is a contract with a total cost in excess of \$250,000, the Party shall provide to the State a list of all proposed subcontractors and subcontractors' subcontractors, together with the identity of those subcontractors' workers compensation insurance providers, and additional required or requested information, as applicable, in accordance with Section 32 of The Vermont Recovery and Reinvestment Act of 2009 (Act No. 54), as amended by Section 17 of Act No. 142 (2010) and by

Section 6 of Act No. 50 (2011).

Party shall include the following provisions of this Attachment C in all subcontracts for work performed solely for the State of Vermont and subcontracts for work performed in the State of Vermont: Section 10 (“False Claims Act”); Section 11 (“Whistleblower Protections”); Section 12 (“Confidentiality and Protection of State Information”); Section 14 (“Fair Employment Practices and Americans with Disabilities Act”); Section 16 (“Taxes Due the State”); Section 18 (“Child Support”); Section 20 (“No Gifts or Gratuities”); Section 22 (“Certification Regarding Debarment”); Section 30 (“State Facilities”); and Section 32.A (“Certification Regarding Use of State Funds”).

20. No Gifts or Gratuities: Party shall not give title or possession of anything of substantial value (including property, currency, travel, and/or education programs) to any officer or employee of the State during the term of this Agreement.

21. Regulation of Hydrofluorocarbons: Party confirms that all products provided to or for the use of the State under this Agreement shall not contain hydrofluorocarbons, as prohibited under 10 V.S.A. § 586.

22. Certification Regarding Debarment: Party certifies under pains and penalties of perjury that, as of the date that this Agreement is signed, neither Party nor Party’s principals (officers, directors, owners, or partners) are presently debarred, suspended, proposed for debarment, declared ineligible, or excluded from participation in Federal programs, or programs supported in whole or in part by Federal funds. Party further certifies under pains and penalties of perjury that, as of the date that this Agreement is signed, Party is not presently debarred, suspended, nor named on the State’s debarment list at: <https://bgs.vermont.gov/purchasing-contracting/debarment>.

23. Conflict of Interest: Party shall fully disclose, in writing, any conflicts of interest or potential conflicts of interest.

24. Vermont Public Records Act: Party acknowledges and agrees that this Agreement, any and all information obtained by the State from the Party in connection with this Agreement, and any obligations of the State to maintain the confidentiality of information are subject to the State of Vermont Access to Public Records Act, 1 V.S.A. § 315 *et seq.*

25. Force Majeure: Neither the State nor the Party shall be liable to the other for any failure or delay of performance of any obligations under this Agreement to the extent such failure or delay shall have been wholly or principally caused by acts or events beyond its reasonable control rendering performance illegal or impossible (excluding strikes or lockouts) (“Force Majeure”). Where Force Majeure is asserted, the nonperforming party must prove that it made all reasonable efforts to remove, eliminate or minimize such cause of delay or damages, diligently pursued performance of its obligations under this Agreement, substantially fulfilled all non-excused obligations, and timely notified the other party of the likelihood or actual occurrence of an event described in this paragraph.

26. Marketing: Party shall not use the State’s logo or otherwise refer to the State in any publicity materials, information pamphlets, press releases, research reports, advertising, sales promotions, trade shows, or marketing materials or similar communications to third parties except with the prior written consent of the State.

27. Termination:

- A. Non-Appropriation:** If this Agreement extends into more than one fiscal year of the State (July 1 to June 30), and if appropriations are insufficient to support this Agreement, the State may cancel this Agreement at the end of the fiscal year, or otherwise upon the expiration of existing appropriation authority. In the case that this Agreement is funded in whole or in part by Federal funds, and in the event Federal funds become unavailable or reduced, the State may suspend or cancel this Agreement immediately, and the State shall have no obligation to pay Party from State revenues.
- B. Termination for Cause:** Either party may terminate this Agreement if a party materially breaches its obligations under this Agreement, and such breach is not cured within thirty (30) days after delivery of the non-breaching party’s notice or such longer time as the non-breaching party may specify in the notice.
- C. Termination Assistance:** Upon nearing the end of the final term or termination of this Agreement, without respect to cause, the Party shall take all reasonable and prudent measures to facilitate any transition required by the State. All State property, tangible and intangible, shall be returned to the State upon demand at no additional cost to the State in a format acceptable to the State.

28. Continuity of Performance: In the event of a dispute between the Party and the State, each party will continue to perform its obligations under this Agreement during the resolution of the dispute until this Agreement is terminated in accordance with its terms.

29. No Implied Waiver of Remedies: Either party's delay or failure to exercise any right, power, or remedy under this Agreement shall not impair any such right, power, or remedy, or be construed as a waiver of any such right, power, or remedy. All waivers must be in writing.

30. State Facilities: If the State makes space available to the Party in any State facility during the term of this Agreement for purposes of the Party's performance under this Agreement, the Party shall only use the space in accordance with all policies and procedures governing access to, and use of, State facilities, which shall be made available upon request. State facilities will be made available to Party on an "AS IS, WHERE IS" basis, with no warranties whatsoever.

31. Requirements Pertaining Only to Federal Grants and Subrecipient Agreements: If this Agreement is a grant that is funded in whole or in part by Federal funds:

- A. Requirement to Have a Single Audit:** The Subrecipient will complete the Subrecipient Annual Report annually within 45 days after its fiscal year end, informing the State of Vermont whether or not a Single Audit is required for the prior fiscal year. If a Single Audit is required, the Subrecipient will submit a copy of the audit report to the Federal Audit Clearinghouse within nine months. If a single audit is not required, only the Subrecipient Annual Report is required. A Single Audit is required if the subrecipient expends \$750,000 or more in Federal assistance during its fiscal year and must be conducted in accordance with 2 CFR Chapter I, Chapter II, Part 200, Subpart F. The Subrecipient Annual Report is required to be submitted within 45 days, whether or not a Single Audit is required.
- B. Internal Controls:** In accordance with 2 CFR Part II, §200.303, the Party must establish and maintain effective internal control over the Federal award to provide reasonable assurance that the Party is managing the Federal award in compliance with Federal statutes, regulations, and the terms and conditions of the award. These internal controls should be in compliance with guidance in "Standards for Internal Control in the Federal Government" issued by the Comptroller General of the United States and the "Internal Control Integrated Framework" issued by the Committee of Sponsoring Organizations of the Treadway Commission.
- C. Mandatory Disclosures:** In accordance with 2 CFR Part II, §200.113, Party must disclose, in a timely manner, in writing to the State, all violations of Federal criminal law involving fraud, bribery, or gratuity violations potentially affecting the Federal award. Failure to make required disclosures may result in the imposition of sanctions which may include disallowance of costs incurred, withholding of payments, termination of the Agreement, suspension/debarment, etc.

32. Requirements Pertaining Only to State-Funded Grants:

- A. Certification Regarding Use of State Funds:** If Party is an employer and this Agreement is a State-funded grant in excess of \$1,000, Party certifies that none of these State funds will be used to interfere with or restrain the exercise of Party's employee's rights with respect to unionization.
- B. Good Standing Certification (Act 154 of 2016):** If this Agreement is a State-funded grant, Party hereby represents: (i) that it has signed and provided to the State the form prescribed by the Secretary of Administration for purposes of certifying that it is in good standing (as provided in Section 13(a)(2) of Act 154) with the Agency of Natural Resources and the Agency of Agriculture, Food and Markets, or otherwise explaining the circumstances surrounding the inability to so certify; and (ii) that it will comply with the requirements stated therein.

(End of Standard Provisions)

USDOT Standard Title VI Nondiscrimination Assurances Appendix A, E

Assurance Appendix A

During the performance of this contract, the contractor, for itself, its assignees, and successors in interest (hereinafter referred to as the “contractor”) agrees as follows:

1. **Compliance with Regulations:** The contractor (hereinafter includes consultants) will comply with the Acts and the Regulations relative to Nondiscrimination in Federally-assisted programs of the U.S. Department of Transportation, Federal Highway Administration (FHWA), as they may be amended from time to time, which are herein incorporated by reference and made a part of this contract.
2. **Nondiscrimination:** The contractor, with regard to the work performed by it during the contract, will not discriminate on the grounds of race, color, national origin, sex, age, disability, income-level, or LEP in the selection and retention of subcontractors, including procurements of materials and leases of equipment. The contractor will not participate directly or indirectly in the discrimination prohibited by the Acts and the Regulations as set forth in Appendix E, including employment practices when the contract covers any activity, project, or program set forth in Appendix B of 49 CFR Part 21.
3. **Solicitations for Subcontracts, Including Procurements of Materials and Equipment:** In all solicitations, either by competitive bidding, or negotiation made by the contractor for work to be performed under a subcontract, including procurements of materials, or leases of equipment, each potential subcontractor or supplier will be notified by the contractor of the contractor’s obligations under this contract and the Acts and the Regulations relative to Non-discrimination on the grounds of race, color, national origin, sex, age, disability, income-level, or LEP.
4. **Information and Reports:** The contractor will provide all information and reports required by the Acts, the Regulations and directives issued pursuant thereto and will permit access to its books, records, accounts, other sources of information, and its facilities as may be determined by the Recipient or the FHWA to be pertinent to ascertain compliance with such Acts, Regulations, and instructions. Where any information required of a contractor is in the exclusive possession of another who fails or refuses to furnish the information, the contractor will so certify to the Recipient or the FHWA, as appropriate, and will set forth what efforts it has made to obtain the information.
5. **Sanctions for Noncompliance:** In the event of a contractor’s noncompliance with the Non-discrimination provisions of this contract, the Recipient will impose such contract sanctions as it or the FHWA may determine to be appropriate, including, but not limited to:
 - a. withholding payments to the contractor under the contract until the contractor complies; and/or
 - b. cancelling, terminating, or suspending a contract, in whole or in part.
6. **Incorporation of Provisions:** The contractor will include the provisions of paragraphs one through six in every subcontract, including procurements of materials and leases of equipment, unless exempt by the Acts, the Regulations and directives issued pursuant thereto. The contractor will take action with respect to any subcontract or procurement

as the Recipient or the FHWA may direct as a means of enforcing such provisions including sanctions for noncompliance. Provided, that if the contractor becomes involved in, or is threatened with litigation by a subcontractor, or supplier because of such direction, the contractor may request the Recipient to enter into any litigation to protect the interests of the Recipient. In addition, the contractor may request the United States to enter into the litigation to protect the interests of the United States.

Assurance Appendix E

During the performance of this contract, the contractor, for itself, its assignees, and successors in interest (hereinafter referred to as the “contractor”) agrees to comply with the following non-discrimination statutes and authorities; including but not limited to:

- Title VI of the Civil Rights Act of 1964 (42 U.S.C. § 2000d *et seq.*, 78 stat. 252), (prohibits discrimination on the basis of race, color, national origin), as implemented by 49 C.F.R. § 21.1 *et seq.* and 49 C.F.R. § 303;
- The Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, (42 U.S.C. § 4601), (prohibits unfair treatment of persons displaced or whose property has been acquired because of Federal or Federal-aid programs and projects);
- Federal-Aid Highway Act of 1973, (23 U.S.C. § 324 *et seq.*), (prohibits discrimination on the basis of sex);
- Section 504 of the Rehabilitation Act of 1973, (29 U.S.C. § 794 *et seq.*), as amended, (prohibits discrimination on the basis of disability); and 49 CFR Part 27;
- The Age Discrimination Act of 1975, as amended, (42 U.S.C. § 6101 *et seq.*), (prohibits discrimination on the basis of age);
- Airport and Airway Improvement Act of 1982, (49 USC § 471, Section 47123), as amended, (prohibits discrimination based on race, creed, color, national origin, or sex);
- The Civil Rights Restoration Act of 1987, (102 Stat. 28.), (“...*which restore[d] the broad scope of coverage and to clarify the application of title IX of the Education Amendments of 1972, section 504 of the Rehabilitation Act of 1973, the Age Discrimination Act of 1975, and title VI of the Civil Rights Act of 1964.*”);
- Titles II and III of the Americans with Disabilities Act, which prohibit discrimination on the basis of disability in the operation of public entities, public and private transportation systems, places of public accommodation, and certain testing entities (42 U.S.C. §§ 12131 – 12189) as implemented by Department of Justice regulations at 28 C.F.R. parts 35 and 36, and Department of Transportation regulations at 49 C.F.R. parts 37 and 38;
- The Federal Aviation Administration’s Non-discrimination statute (49 U.S.C. § 47123) (prohibits discrimination on the basis of race, color, national origin, and sex);
- Executive Order 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations, which ensures non-discrimination against minority populations by discouraging programs, policies, and activities with disproportionately high and adverse human health or environmental effects on minority and low-income populations;
- Executive Order 13166, Improving Access to Services for Persons with Limited English Proficiency, and resulting agency guidance, national origin discrimination includes discrimination because of limited English proficiency (LEP). To ensure compliance with Title VI, you must take reasonable steps to ensure that LEP persons have meaningful access to your programs (70 Fed. Reg. at 74087 to 74100);
- Title IX of the Education Amendments of 1972, as amended, which prohibits you from discriminating because of sex in education programs or activities (20 U.S.C. 1681 *et seq.*), as implemented by 49 C.F.R. § 25.1 *et seq.*

STANDARD FEDERAL EQUAL EMPLOYMENT OPPORTUNITY
CONSTRUCTION CONTRACT SPECIFICATIONS
(EXECUTIVE ORDER 11246)

1. As used in these specifications:

- a. "Covered Area" means the geographical area described in the solicitation from which this contract resulted.
- b. "Director" means Director, Office of Federal Contract Compliance Programs, United States Department of Labor, or any person to whom the Director delegates authority.
- c. "Employer Identification Number" means the Federal Social Security Number used on the Employer's Quarterly Federal Tax Return, U.S. Treasury Department Form 941.

A Minority Group Member is:

...American Indian or Alaskan Native

consisting of all persons having origins in any of the original people of North American and who maintain cultural identification through tribal affiliations or community recognition.

...Black

consisting of all persons having origins in any of the Black racial groups of Africa.

...Asian or Pacific Islander

consisting of all persons having origins in any of the original people of the Far East, Southeast Asia, the Indian Sub-Continent or the Pacific Islands. This area includes China, India, Japan, Korea, the Philippines and Samoa.

...Hispanic

consisting of all persons of Mexican, Puerto Rican, Cuban, Central or South American or other Spanish culture or origin.

...Cape Verde an

consisting of all persons having origins in the Cape Verde Islands.

...Portuguese

consisting of all persons of Portuguese, Brazilian or other Portuguese culture or origin.

2. Whenever the Contractor, or any Subcontractor at any tier, subcontracts a portion of the work involving any construction trade, it shall physically include in each subcontract in excess of \$10,000.00 the provisions of these specifications and the notice which contains the applicable goals for minority and female participation and which is set forth in the solicitations from which this contract resulted.

3. If the Contractor is participating (pursuant to 41 CFR 60-4.5) in the Hometown Plan approved by the U.S. Department of Labor in the covered area either individually or through an association, its affirmative action obligations on all work in the Plan area (including goals and timetables) shall be in accordance with that Plan for those trades which have unions participating in the Plan. Contractors must be able to demonstrate their participation in and compliance with the provisions of any such Hometown Plan. Each Contractor or subcontract participating in an approved Plan is individually required to comply with its obligations under the EEO clause, and to make a good faith effort to achieve each goal under the Plan in each trade in which it has employees. the overall good faith performance by other Contractors or subcontractors toward a goal in an approved Plan does not excuse any covered Contractor's or subcontractor's failure to make good faith efforts to achieve the Plan goals and timetables.
4. The Contractor shall implement the specific affirmative action standards provided in Paragraphs 7a through p of these specifications. The goals set for the Contractor in the solicitation from which this contract resulted are expressed as percentages in the total hours of employment and training of minority and female utilization the Contractor should reasonably be able to achieve in each construction trade in which it has employees in the covered area. The Contractor is expected to make substantially uniform progress toward its goals in each craft during the period specified.
5. Neither the provisions of any collective bargaining agreement nor the failure by a union with whom the Contractor has a collective bargaining agreement to refer either minority or women shall excuse the Contractor's obligations under these specifications, Executive Order 11246, or the regulations promulgated pursuant thereto.
6. In order for the non-working training hours of apprentices and trainees to be counted in meeting the goals, such apprentices and trainees must be employed by the Contractor during the training period, and the Contractor must have made a commitment to employ the apprentices and trainees at the completion of their training, subject to the availability of employment opportunities. Trainees must be trained pursuant to training programs approved by the U.S. Department of Labor.
7. The Contractor shall take specific affirmative actions to ensure equal employment opportunity . The evaluation of the Contractor's compliance with these specifications shall be based upon its effort to achieve maximum results from its actions. The Contractor shall document these efforts fully and shall implement affirmative action steps at least as extensive as the following:
 - a. Ensure and maintain a working environment free of harassment, intimidation and coercion at all sites, and in all facilities at which the Contractor's employees are assigned to work. The Contractor, where possible, will assign two or more women to each construction project. The Contractor shall specifically ensure that all foremen, superintendents, and other on-site supervisory personnel are aware of and carry out the Contractor's obligation to maintain such a working environment with specific attention to minority or female individuals working at such sites or in such facilities.
 - b. Establish and maintain a current list of minority and female recruitment sources, provide written notification to minority and female recruitment sources and to community organizations when the Contractor or its unions have employment opportunities available and maintain a record of the organizations' responses.

- c. Maintain a current file of the names, addresses and telephone numbers of each minority and female off-the-street applicant and minority or female referral from a union, a recruitment source or community organization and of what action was taken with respect to each such individual. If such individual was sent to the union hiring hall for referral and was not referred back to the Contractor by the union or, if referred, not employed by the Contractor, this shall be documented in the file with the reason therefor, along with whatever additional actions the Contractor may have taken.
- d. Provide immediate written notifications to the Regional Director when the union or unions, with which the Contractor has a collective bargaining agreement, have not referred to the Contractor a minority person or woman sent by the Contractor or when the Contractor has other information that the union referral process has impeded the Contractor's efforts to meet its obligations.
- e. Develop on-the-job training opportunities and/or participate in training programs for the area which expressly include minorities and women, including upgrading programs and apprenticeship and trainee programs relevant to the Contractor's employment needs, especially those programs funded or approved by the Department of Labor. The Contractor shall provide notice of these programs to the sources compiled under Paragraph 7b above.
- f. Disseminate the Contractor's EEO policy by providing notice of the policy to unions and training programs and requesting their cooperation in assisting the Contractor in meeting its EEO obligations; by including it in any policy manual and collective bargaining agreement; by publicizing it in the company newspaper, annual report, etc.; by specific review of the policy with all management personnel and with all minority and female employees at least once a year; and by posting the company EEO policy on bulletin boards accessible to all employees at each location where construction is performed.
- g. Review, at least annually, the company's EEO policy and affirmative action obligations under these specifications with all employees having any responsibility for hiring, assignment, layoff, termination or other employment decisions including specific review of these items with on-site supervisory personnel such as Superintendents, Supervisors etc., prior to the initiation of construction work at any job site. A written record shall be made and maintained identifying the time and place of these meetings, persons attending, subject matter discussed, and disposition of the subject matter.
- h. Disseminate the Contractor's EEO policy externally by including it in any advertising in the news media, and providing written notification to, and discussing the Contractor's EEO policy with, other Contractors and subcontractors with whom the Contractor anticipates doing business.
- i. Direct its recruitment efforts, both oral and written, to minority, female and community organizations, to schools with minority and female students and to minority and female recruitment and training organizations serving the Contractor's recruitment area and employment needs. Not later than one month prior to the date for the acceptance of applications for apprenticeship or other training by any recruitment source, the Contractor shall send written notifications to organizations such as the above, describing the openings, screening procedures, and tests to be used in the selection process.

- j. Encourage present minority and female employees to recruit other minority persons and women and, where reasonable, provide after school, summer and vacation employment to minority and female youth both on the site and in other areas of a Contractor's workforce.
 - k. Validate all tests and other selection requirements where there is an obligation to do so under 41 CFR Part 60-3.
 - l. Conduct, at least annually, an inventory and evaluation of all minority and female personnel for promotional opportunities and encourage these employees to seek or to prepare for, through appropriate training, etc., such opportunities.
 - m. Ensure that seniority practices, job classifications, work assignments and other personnel practices, do not have a discriminatory effect by continually monitoring all personnel and employment-related activities to ensure that the EEO policy and Contractor's obligations under these specifications are being carried out.
 - n. Ensure that all facilities and company activities are non-segregated except that separate or single-user toilet and necessary changing facilities shall be provided to assure privacy between the sexes.
 - o. Document and maintain a record of all solicitations of offers for subcontracts from minority and female construction contractors and suppliers, including circulation of solicitations to minority and female contractor associations and other business associations.
 - p. Conduct a review, at least annually, of all supervisors' adherence to and performance under the Contractor's EEO policies and affirmative action obligations.
8. Contractors are encouraged to participate in voluntary associations which assist in fulfilling one or more of their affirmative action obligations (Paragraph 7a through p). The efforts of a contractor association, joint contractor-union, contractor-community, or other similar group of which the Contractor is a member and participant, may be asserted as fulfilling any one or more of its obligations under Paragraph 7a through p of these Specifications provided that the Contractor actively participates in the group, makes every effort to assure that the group has a positive impact on the employment of minorities and women in the industry, reflected in the Contractor's minority and female workforce participation , makes a good faith effort to meet its individual goals and timetables, and can provide access to documentation which demonstrates the effectiveness of actions taken on behalf of the Contractor. The obligation to comply, however, is the Contractor's, and failure of such a group to fulfill an obligation shall not be a defense for the Contractor's non-compliance.
9. A single goal for minorities and a separate single goal for women have been established. The Contractor, however, is required to provide equal employment opportunity and to take affirmative action for all minority groups, both male and female, and all women, both minority and non-minority. Consequently, the Contractor may be in violation of the Executive Order if a particular group is employed in a substantially disparate manner (for example, even though the Contractor has achieved its goals for women generally, the Contractor may be in violation of the Executive Order if a specific minority group of women is under-utilized).

10. The Contractor shall not use the goals and timetables or affirmative action standards to discriminate against any person because of race, color, religion, sex or national origin.
11. The Contractor shall not enter into any subcontract with any person for firm debarred from Government contracts pursuant to Executive Order 11246.
12. The Contractor shall carry out such sanctions and penalties for violation of these specifications and of the Equal Opportunity Clause, including suspension, terminations and cancellation of existing subcontracts as may be imposed or ordered pursuant to Executive Order 11246, as amended, and its implementing regulations, by the Office of Federal Contract Compliance Programs. Any Contractor who fails to carry out such sanctions and penalties shall be in violation of these specifications and Executive Order 11246, as amended.
13. The Contractor, in fulfilling its obligations under these specifications, shall implement specific affirmative action steps, at least as extensive as those standards prescribed in Paragraph 7 of these specifications, so as to achieve maximum results from its efforts to ensure equal employment opportunity. If the Contractor fails to comply with the requirements of the Executive Order, the implementing regulations or these specifications, the Director shall proceed in accordance with 41 CFR 60-4.8.
14. The Contractor shall designate a responsible official to monitor all employment-related activity to ensure that the company EEO policy is being carried out, to submit reports relating to the provisions hereof as may be required by the Government and to keep records. Records shall at least include for each employee the name, address, telephone numbers, construction trade union affiliation if any, employee identification number when assigned, social security number, race, sex, status (e.g., mechanic, apprentice, trainee, helper or laborer), dates of changes in status, hours worked per week in the indicated trade, rate of pay, and locations at which the work was performed. Records shall be maintained in an easily understandable and retrievable form; however, to the degree that existing records satisfy this requirement, contractors shall not be required to maintain separate records.
15. Nothing herein provided shall be construed as a limitation upon the application of other laws which establish different standards of compliance or upon the application or requirements for the hiring of local or other area residents (e.g., those under the Public Works Employment Act of 1977 and the Community Development Block Grant Program).

**NOTICE OF REQUIREMENTS FOR AFFIRMATIVE ACTION TO ENSURE EQUAL
EMPLOYMENT OPPORTUNITY (EXECUTIVE ORDER 11246)**

1. The Offeror's or Bidder's attention is called to the "Equal Opportunity Clause" and the "Standard Federal Equal Employment Specifications" set forth herein.
2. The goals and timetables for minority and female participation, expressed in percentage terms for the Contractor's aggregate workforce in each trade on all construction work in the covered area, are as follows:

Economic Areas	Timetables	Goals for Minority participation for each trade (%)	Goals for Female Participation in each trade (%)
Entire State of Vermont:			
<u>Vermont</u> 003 Burlington, VT Non-SMSA Counties NH Coos; NH Grafton; NH Sullivan; VT Addison; VT Caledonia; VT Chittenden; VT Essex; VT Franklin; VT Grand Isle; VT Lamoille; VT Orange; VT Orleans; VT Rutland; VT Washington; VT Windsor	Indefinite	0.8	6.9
<u>Connecticut (Mass)</u> 006 Hartford - New Haven Springfield, CT-MA Non-SMSA Counties CT Litchfield; CT Windham; MA Franklin; NH Cheshire; VT Windham	Indefinite	5.9	
<u>New York</u> 007 Albany - Schenectady - Troy, NY Non-SMSA Counties NY Clinton; NY Columbia; NY Essex; NY Fulton; NY Greene; NY Hamilton; NY Schoharie; NY Warren; NY Washington; VT Bennington	Indefinite	2.6	

These goals are applicable to all the Contractor's construction work (whether or not it is Federal or federally assisted) performed in the covered area. If the Contractor performs construction work in a geographical area located outside of the covered area, it shall apply the goals established for such geographical area where the work is actually performed. With regard to this second area, the Contractor also is subject to the goals for both its federally involved and non-federally involved construction.

The Contractor's compliance with the Executive Order and the regulation in CFR Part 60-4 shall be based on its implementation of the Equal Opportunity Clause, specific affirmative action obligations required by the specifications set forth in 41 CFR 60-4.3 (a), and its efforts to meet the goals. The hours of minority and female employment and training must be substantially uniform throughout the length of the contract and in each trade, and the Contractor shall make a good faith effort to employ minorities and women evenly on each of its projects. The transfer of minority or female employees or trainees from Contractor to Contractor or from project to project for the sole purpose of meeting the Contractor's goals shall be a violation of the contract, the Executive Order and the regulations in 41 CFR Part 60-4. Compliance with the goals will be measured against the total work hours performed.

3. The Contractor shall provide written notification to the Director of the Office of Federal Contract Compliance Programs within ten working days of award of any construction subcontract in excess of \$10,000.00 at any tier for construction work under the contract resulting from this solicitation. The notifications shall list the name, address and telephone number of the subcontractor; employer identification number of the subcontractor; estimated dollar amount of the subcontract; and the geographical area in which the subcontract is to be performed.
4. As used in this Notice, and in the contract resulting from this solicitation, the "covered area" is (insert description of the geographical areas where the contract is to be performed giving the state, county and city, if any)

CONTRACTOR'S EEO CERTIFICATION FORM

Certification with regard to the Performance of Previous Contracts of Subcontracts subject to the Equal Opportunity Clause and the filing of Required Reports.

The bidder _____, proposed subcontractor _____, hereby certifies that he/she has _____, has not _____, participated in a previous contract or subcontract subject to the equal opportunity clause, as required by Executive Orders 10925, 11114, or 11246 as amended, and that he/she has _____, has not _____, filed with the Joint Reporting Committee, the Director of the Office of Federal Contract Compliance, a Federal Government contracting or administering agency, or the President's Committee on Equal Employment Opportunity, all reports due under the applicable filing requirements.

Company	By	Title
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NOTE: The above certification is required by the Equal Employment Opportunity regulations of the Secretary of Labor (41 CFR 60-1.7(b) (1)), and must be submitted by bidders and proposed subcontractors only in connection with contracts and subcontracts which are subject to the equal opportunity clause. Contracts and subcontracts which are exempt from the equal opportunity clause are set forth in 41 CFR 60-1.5 (Generally only contracts or subcontracts of \$10,000 or under are exempt.) Currently, Standard Form 100 (EEO-1) is the only report required by the Executive Orders or their implementing regulations.

Proposed prime contractors and subcontractors who have participated in a previous contract or subcontract subject to the Executive Orders and have not filed the required reports should note that 41 CFR 60-1.7 (b) (1) prevents the award of contracts and subcontracts unless such contractor submits a report covering the delinquent period or such other period specified by the Federal Highway Administration, or by the Director, Office of Federal Contract Compliance, U.S. Department of Labor.

**STATE OF VERMONT
AGENCY OF TRANSPORTATION
CERTIFICATE OF COMPLIANCE**

For a bid/proposal to be considered valid, this form must be completed in its entirety, executed by a duly authorized representative of the bidder, and submitted as part of the response to the proposal.

A. NON-COLLUSION: The undersigned certifies under the penalties of perjury under the laws of the State of Vermont and the United States that it has not, either directly or indirectly, entered into any agreement, participated in any collusion, or otherwise taken any action, in restraint of free competitive bidding in connection with the submitted bid/proposal.

B. DEBARMENT: The undersigned certifies under the penalties of perjury under the laws of the State of Vermont and the United States that it:

1. Is not presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from participating in covered transactions by any Federal department or agency; and
2. Has not within a three-year period preceding this bid/proposal been convicted of or had a civil judgment rendered against them for commission of fraud or a criminal offense in connection with obtaining, attempting to obtain, or performing a public (Federal, State, or local) transaction or contract under a public transaction; violation of Federal or State antitrust statutes or commission of embezzlement, theft, forgery, bribery, falsification or destruction of records, making false statements, or receiving stolen property; and
3. Is not presently indicted for, or otherwise criminally or civilly charged by a governmental entity (Federal, State, or local) with commission of any of the offenses enumerated in paragraph 2 above; and
4. Has not within a three-year period preceding this application/proposal had one or more public transactions (Federal, State or local) terminated for cause or default.
5. **Where the prospective participant is unable to certify to any of the statements in this certification, such prospective participant shall attach an explanation to this bid/proposal, including whom it applies and dates of action. Exceptions will not necessarily result in denial of award but will be considered in determining bidder eligibility and/or responsibility. Providing false information may result in criminal prosecution or administration sanctions.**

C. BYRD ANTI-LOBBYING: The undersigned hereby certifies, by signing and submitting this bid/proposal, to the best of his or her knowledge and belief, that:

1. No Federal appropriated funds have been paid or will be paid, by or on behalf of the undersigned, to any person for influencing or attempting to influence an officer or

employee of any Federal agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with the awarding of any Federal contract, the making of any Federal grant, the making of any Federal loan, the entering into of any cooperative agreement, and the extension, continuation, renewal, amendment, or modification of any Federal contract, grant, loan, or cooperative agreement.

2. If any funds other than Federal appropriated funds have been paid or will be paid to any person for influencing or attempting to influence an officer or employee of any Federal agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with this Federal contract, grant, loan, or cooperative agreement, the undersigned shall complete and submit Standard Form-LLL, "Disclosure Form to Report Lobbying," in accordance with its instructions.
3. This certification is a material representation of fact upon which reliance was placed when this transaction was made or entered into. Submission of this certification is a prerequisite for making or entering into this transaction as required by 31 U.S.C. 1352. Any person who fails to file the required certification shall be subject to a civil penalty of not less than \$10,000 and not more than \$100,000 for each such failure.
4. The undersigned also agrees by submitting its bid/proposal that the participant shall require that the language of this certification be included in all lower tier subcontracts, which exceed \$100,000 and that all such recipients shall certify and disclose accordingly.

E. WORKER CLASSIFICATION COMPLIANCE REQUIREMENT: In accordance with Section 32 of The Vermont Recovery and Reinvestment Act of 2009 (Act No. 54), the following provisions and requirements apply to the undersigned when the total project costs exceed \$250,000.00.

Bidder is required to self-report the following information relating to past violations, convictions, suspensions, and any other information related to past performance and likely compliance with proper coding and classification of employees. The Agency of Transportation is requiring information on any incidents that occurred in the previous 12 months. Attach additional pages as necessary. **If not applicable, please enter 'Not Applicable' or 'N/A' below.**

Summary of Detailed Information	Date of Notification	Outcome

Bidder hereby certifies that the company/individual is in compliance with the requirements as detailed in Section 32 of Act 54(2009), as amended by Section 17 of Act 142 (2010) and further amended by Section 6 of Act 50 (2011).

Subcontractor Reporting.

A. **Contracts for Services.** The undersigned hereby acknowledges and agrees that if it is a successful bidder, prior to execution of any contract resulting from this solicitation, the undersigned will provide to the State a list of all proposed subcontractors and subcontractors’ subcontractors, together with the identity of those subcontractors’ workers compensation insurance providers, and additional required or requested information, as applicable, in accordance with Section 32 of The Vermont Recovery and Reinvestment Act of 2009 (Act No. 54), the undersigned will provide any update of such list to the State as additional subcontractors are hired. The undersigned further acknowledges and agrees that the failure to submit subcontractor reporting in accordance with Section 32 of The Vermont Recovery and Reinvestment Act of 2009 (Act No. 54) will constitute non-compliance and may result in cancellation of contract and/or restriction from bidding on future state contracts.

B. **Construction Contracts.** The Contractor is required to provide a list of subcontractors on the job along with lists of subcontractor’s subcontractors and by whom those subcontractors are insured for workers’ compensation purposes. This is not a requirement for subcontractor’s providing supplies only and no labor to the overall contract or project.

Additionally, the Contractor shall collect and retain evidence of subcontractors’ workers’ compensation insurance, such as the ACORD insurance coverage summary sheet. Agency of Transportation will periodically verify the Contractor’s compliance.

This information must be updated as necessary and provided to the State as additional subcontractors are hired. If none, please enter ‘Not Applicable’ or ‘N/A’ below.

Sub-Contractor	Insured By	Sub-Contractor’s Sub	Insured By

The undersigned further acknowledges and agrees that the failure to submit subcontractor reporting in accordance with Section 32 of The Vermont Recovery and Reinvestment Act of 2009 (Act No. 54), and as amended will constitute non-compliance and may result in cancellation of contract and/or restriction from bidding on future state contracts.

As a duly authorized representative of the bidder, I hereby certify that the information above is true and correct.

Date: _____

Duly Authorized Signature: _____

Name and Title of Person Signing: _____
(Duly Authorized Signer)

Company Name: _____

Company Address: _____

E-Mail Address: _____

Minimum Labor and Truck Rates
Under Title 19, Vermont Statutes
Annotated Section 18, as amended

April 3, 1997
Sheet 1 of 1

**STATE OF VERMONT
AGENCY OF TRANSPORTATION
MONTPELIER**

FOR OTHER THAN FEDERAL-AID. In accordance with the provisions of Title 19, VSA, Section 18, the following minimum rate for labor shall apply to this project:

The minimum wage for common labor will not be less than the State or Federal minimum wage, whichever is higher.

ON FEDERAL-AID PROJECTS ONLY.

The minimum rates for labor for Federal-Aid Projects shall be those set in the Wage Determination Decision of the U.S. Secretary of Labor for each project in accordance with the Federal-Aid Highway Act of 1956. When such wage rates are required they shall be included in the proposal. In the event these rates are lower than the Vermont rates, the Vermont rates shall prevail.

TRUCK RATES. In accordance with the provisions of Title 19, VSA, Section 18, the following minimum rates for trucks shall apply to this project:

<u>Trucks, not Including Driver Water Level Body Capacity</u>	<u>Minimum Rates Per YD per Hr.</u>
Trucks, Equipment Loaded	\$1.65

**STATE OF VERMONT
AGENCY OF TRANSPORTATION
MONTPELIER**

COMMODITY INDEX PRICES.

- (a) Price Adjustment, Asphalt Cement. When Item 406.50 is included in the Contract, asphalt cement price adjustment will be performed according to the requirements of Section 406 for all asphalt cement and emulsified asphalt incorporated into the work, including that incorporated under Project Special Provision pay items.
- (b) Price Adjustment, Fuel. When Item 690.50 is included in the Contract, fuel price adjustment will be performed according to the requirements of Section 690 for the pay items specified therein, and for any pay items identified in the Project Special Provisions as being eligible for fuel price adjustment.
- (c) Commodity Index Prices. The Index Prices for asphalt and fuel for this Contract are specified in Table 1.

TABLE 1 – COMMODITY INDEX PRICES FOR THIS CONTRACT

	Asphalt (dollars/ton)	Fuel (dollars/gallon)
Index Price	\$623.00	\$4.28

VERMONT AGENCY OF TRANSPORTATION
PROPOSAL SCHEDULE OF PAY ITEMS

LETTING DATE: 06/07/2024 11:00 AM

CONTRACT ID:C03186

PROJECT(S):BENNINGTON BF 1000(20)

ITEM NO.	DESCRIPTION	QUANTITY	UNITS
ITEMS COMMON TO ALL ALTERNATES			
201.10	CLEARING AND GRUBBING, INCLUDING INDIVIDUAL TREES AND STUMPS	1.000	LS
203.15	COMMON EXCAVATION	1,500.000	CY
203.16	SOLID ROCK EXCAVATION	120.000	CY
204.20	TRENCH EXCAVATION OF EARTH	90.000	CY
204.22	TRENCH EXCAVATION OF EARTH, EXPLORATORY (N.A.B.I.)	1.000	CY
204.25	STRUCTURE EXCAVATION	360.000	CY
204.30	GRANULAR BACKFILL FOR STRUCTURES	160.000	CY
210.10	COARSE-MILLING, BITUMINOUS PAVEMENT	725.000	SY
301.35	SUBBASE OF DENSE GRADED CRUSHED STONE	1,360.000	CY
404.65	EMULSIFIED ASPHALT	8.000	CWT
406.38	HAND-PLACED BITUMINOUS CONCRETE MATERIAL, DRIVES	70.000	SY
406.50	PRICE ADJUSTMENT, ASPHALT CEMENT (N.A.B.I.)	1.000	LU
506.50	STRUCTURAL STEEL, ROLLED BEAM	2,300.000	LB
507.11	REINFORCING STEEL, LEVEL I	24,450.000	LB
507.12	REINFORCING STEEL, LEVEL II	11,950.000	LB
507.16	DRILLING AND GROUTING DOWELS	160.000	LF
507.19	MECHANICAL BAR CONNECTOR	130.000	EACH
510.21	PRESTRESSED CONCRETE BOX BEAMS (24" X 36")	122.000	LF
510.22	PRESTRESSED CONCRETE VOIDED SLABS (18" X 48")	730.000	LF
510.24	GROUTING SHEAR KEYS	670.000	LF
514.10	WATER REPELLENT, SILANE	35.000	GAL
516.10	BRIDGE EXPANSION JOINT, ASPHALTIC PLUG	46.000	LF
524.11	JOINT SEALER, HOT POURED	46.000	LF
525.45	BRIDGE RAILING, GALVANIZED STEEL TUBING/CONCRETE COMBINATION (COATED BLACK) (FPQ)	116.000	LF
529.15	REMOVAL OF STRUCTURE (2950 SF - EST) (REMOVAL OF BRIDGE NO. 6)	1.000	EACH
531.17	BEARING DEVICE ASSEMBLY, STEEL REINFORCED ELASTOMERIC PAD	56.000	EACH
541.30	CONCRETE, CLASS C	2.000	CY
580.13	REPAIR OF CONCRETE SUBSTRUCTURE SURFACE, CLASS I	5.000	SY
580.14	REPAIR OF CONCRETE SUBSTRUCTURE SURFACE, CLASS II	5.000	SY
580.15	REPAIR OF CONCRETE SUBSTRUCTURE SURFACE, CLASS III	2.000	CY
601.2615	18" CPEP(SL)	110.000	LF
601.7015	18" CPEPES	1.000	EACH
604.20	PRECAST REINFORCED CONCRETE CATCH BASIN WITH CAST IRON GRATE	2.000	EACH
604.20	PRECAST REINFORCED CONCRETE CATCH BASIN WITH CAST IRON GRATE (DEEP SUMP)	1.000	EACH
604.42	CHANGING ELEVATION OF SEWER MANHOLES	1.000	EACH
613.12	STONE FILL, TYPE III	35.000	CY
616.28	CAST-IN-PLACE CONCRETE CURB, TYPE B	600.000	LF
616.41	REMOVAL OF EXISTING CURB	410.000	LF
618.10	PORTLAND CEMENT CONCRETE SIDEWALK, 5 INCH	410.000	SY
618.30	DETECTABLE WARNING SURFACE	54.000	SF
620.55	REMOVAL OF EXISTING FENCE	26.000	LF
621.21	HD STEEL BEAM GUARDRAIL, GALVANIZED	15.000	LF
621.60	ANCHOR FOR STEEL BEAM RAIL	1.000	EACH
621.746	GUARDRAIL APPROACH SECTION TO CONCRETE BRIDGE RAILING, TL-2	1.000	EACH

VERMONT AGENCY OF TRANSPORTATION
PROPOSAL SCHEDULE OF PAY ITEMS

LETTING DATE: 06/07/2024 11:00 AM

CONTRACT ID:C03186

PROJECT(S):BENNINGTON BF 1000(20)

ITEM NO.	DESCRIPTION	QUANTITY	UNITS
629.20	ADJUST ELEVATION OF VALVE BOX	1.000	EACH
630.10	UNIFORMED TRAFFIC OFFICERS	800.000	HR
630.15	FLAGGERS	5,000.000	HR
631.10	FIELD OFFICE, ENGINEERS	1.000	LS
631.16	TESTING EQUIPMENT, CONCRETE	1.000	LS
631.17	TESTING EQUIPMENT, BITUMINOUS	1.000	LS
631.19	TESTING EQUIPMENT, GROUT	1.000	LS
631.26	FIELD OFFICE COMMUNICATIONS (N.A.B.I.)	3,000.000	DL
633.10	CPM SCHEDULE	11.000	EACH
635.11	MOBILIZATION/DEMOBILIZATION	1.000	LS
641.11	TRAFFIC CONTROL, ALL-INCLUSIVE	1.000	LS
641.15	PORTABLE CHANGEABLE MESSAGE SIGN	5.000	EACH
646.403	DURABLE 4 INCH WHITE LINE, EPOXY PAINT	970.000	LF
646.413	DURABLE 4 INCH YELLOW LINE, EPOXY PAINT	925.000	LF
646.443	DURABLE 8 INCH WHITE LINE, EPOXY PAINT	245.000	LF
646.483	DURABLE 24 INCH STOP BAR, EPOXY PAINT	50.000	LF
646.493	DURABLE LETTER OR SYMBOL, EPOXY PAINT	8.000	EACH
646.503	DURABLE CROSSWALK MARKING, EPOXY PAINT	110.000	LF
646.602	TEMPORARY 4 INCH WHITE LINE, PAINT	1,950.000	LF
646.612	TEMPORARY 4 INCH YELLOW LINE, PAINT	1,825.000	LF
646.642	TEMPORARY 8 INCH WHITE LINE, PAINT	225.000	LF
646.682	TEMPORARY 24 INCH STOP BAR, PAINT	100.000	LF
646.692	TEMPORARY LETTER OR SYMBOL, PAINT	16.000	EACH
646.702	TEMPORARY CROSSWALK MARKING, PAINT	220.000	LF
646.76	LINE STRIPING TARGETS	570.000	EACH
649.31	GEOTEXTILE UNDER STONE FILL	10.000	SY
651.15	SEED	5.000	LB
651.18	FERTILIZER	35.000	LB
651.20	AGRICULTURAL LIMESTONE	1.000	TON
651.35	TOPSOIL	40.000	CY
653.01	EPSC PLAN	1.000	LS
653.02	MONITORING EPSC PLAN	90.000	HR
653.03	MAINTENANCE OF EPSC PLAN (N.A.B.I.)	1.000	LU
653.10	HAY MULCH	1.000	TON
653.35	STABILIZED CONSTRUCTION ENTRANCE	70.000	CY
653.41	INLET PROTECTION DEVICE, TYPE II	7.000	EACH
653.45	FILTER BAG	4.000	EACH
653.50	BARRIER FENCE	680.000	LF
656.85	TREE PROTECTION	1.000	LS
675.20	TRAFFIC SIGN, TYPE A	13.000	SF
675.341	SQUARE TUBE SIGN POST AND ANCHOR	70.000	LF
675.50	REMOVING SIGNS	8.000	EACH
675.60	RESETTING SIGNS	8.000	EACH
678.15	TRAFFIC CONTROL SIGNAL SYSTEM, INTERSECTION (VT ROUTE 9 @ BEECH STREET)	1.000	EACH
678.23	WIRED CONDUIT (2")(SCH 80 PVC)	50.000	LF

**VERMONT AGENCY OF TRANSPORTATION
PROPOSAL SCHEDULE OF PAY ITEMS**

LETTING DATE: 06/07/2024 11:00 AM

CONTRACT ID:C03186

PROJECT(S):BENNINGTON BF 1000(20)

ITEM NO.	DESCRIPTION	QUANTITY	UNITS
678.40	TEMPORARY TRAFFIC SIGNAL SYSTEM	1.000	EACH
900.608	SPECIAL PROVISION (GROUT BAGS)	3.000	CY
900.608	SPECIAL PROVISION (PERFORMANCE-BASED CONCRETE, CLAS PCD)(FPQ)	95.000	CY
900.608	SPECIAL PROVISION (PERFORMANCE-BASED CONCRETE, CLASS PCS)(FPQ)	230.000	CY
900.615	SPECIAL PROVISION (INCENTIVE/DISINCENTIVE)(N.A.B.I.)	150,000.000	DL
900.620	SPECIAL PROVISION ((POST FLUSHING HYDRANT, ALL-INCLUSIVE))	1.000	EACH
900.620	SPECIAL PROVISION (CORPORATION STOP, ALL-INCLUSIVE)(1")	2.000	EACH
900.620	SPECIAL PROVISION (EXTENSION SERVICE BOX AND CURB STOP, ALL-INCLUSIVE) (1")	2.000	EACH
900.620	SPECIAL PROVISION (GATE VALVE WITH VALVE BOX, ALL-INCLUSIVE) (10")	2.000	EACH
900.620	SPECIAL PROVISION (GATE VALVE WITH VALVE BOX, ALL-INCLUSIVE) (4")	1.000	EACH
900.620	SPECIAL PROVISION (GATE VALVE WITH VALVE BOX, ALL-INCLUSIVE) (6")	2.000	EACH
900.620	SPECIAL PROVISION (GATE VALVE WITH VALVE BOX, ALL-INCLUSIVE) (8")	1.000	EACH
900.620	SPECIAL PROVISION (JUNCTION BOX, HEAVY DUTY)	2.000	EACH
900.620	SPECIAL PROVISION (MICROPILE VERIFICATION LOAD TEST)	2.000	EACH
900.620	SPECIAL PROVISION (PERMANENT MANUAL AIR RELEASE, ALL-INCLUSIVE)	2.000	EACH
900.620	SPECIAL PROVISION (REMOVAL OF EXISTING SANITARY SEWER MANHOLE, ALL-INCLUSIVE)	1.000	EACH
900.620	SPECIAL PROVISION (SANITARY SEWER MANHOLE WITH INSIDE DROP, ALL INCLUSIVE) (6' I.D.)	1.000	EACH
900.630	SPECIAL PROVISION (UNEXPECTED OBSTRUCTION DRILLING)	40.000	HR
900.640	SPECIAL PROVISION (CRACK SEALING, HIGH MOLECULAR WEIGHT METHACRYLATE)	250.000	LF
900.640	SPECIAL PROVISION (CURED-IN-PLACE-PIPE LINING-SEWER MAIN) (8")	115.000	LF
900.640	SPECIAL PROVISION (DUCTILE IRON PIPE, CEMENT-LINED, ALL-INCLUSIVE) (10")	180.000	LF
900.640	SPECIAL PROVISION (DUCTILE IRON PIPE, CEMENT-LINED, ALL-INCLUSIVE) (4")	15.000	LF
900.640	SPECIAL PROVISION (DUCTILE IRON PIPE, CEMENT-LINED, ALL-INCLUSIVE) (6")	75.000	LF
900.640	SPECIAL PROVISION (DUCTILE IRON PIPE, CEMENT-LINED, ALL-INCLUSIVE) (8")	95.000	LF
900.640	SPECIAL PROVISION (MICROPILE, CASED)(9.625 IN)	450.000	LF
900.640	SPECIAL PROVISION (MICROPILE, UNCASED)(8.535 IN)	400.000	LF
900.640	SPECIAL PROVISION (SDR 35 PVC SEWER PIPE, ALL-INCLUSIVE)(6")	30.000	LF
900.640	SPECIAL PROVISION (SDR 35 PVC SEWER PIPE, ALL-INCLUSIVE)(8")	26.000	LF
900.640	SPECIAL PROVISION (SEAMLESS COPPER WATER TUBE)(1")	180.000	LF
900.640	SPECIAL PROVISION (SEAMLESS COPPER WATER TUBE)(3/4")	10.000	LF
900.645	SPECIAL PROVISION (FURNISHING EQUIPMENT FOR INSTALLING MICROPILES)	1.000	LS
900.645	SPECIAL PROVISION (IN-WATER SEDIMENT ISOLATION DEVICE)	1.000	LS
900.645	SPECIAL PROVISION (TRANSFER TO NEW SYSTEM, SEWER)	1.000	LS
900.645	SPECIAL PROVISION (TRANSFER TO NEW SYSTEM, WATER)	1.000	LS
900.645	SPECIAL PROVISION (WATER MAIN ON BRIDGE)(10")	1.000	LS
900.650	SPECIAL PROVISION (MAT DENSITY PAY ADJUSTMENT, SMALL QUANTITY)(N.A.B.I.)	1.000	LU
900.650	SPECIAL PROVISION (MIXTURE PAY ADJUSTMENT, SMALL QUANTITY)(N.A.B.I.)	1.000	LU
900.670	SPECIAL PROVISION (CONCRETE BRIDGE DECK SURFACE PREPARATION)	3,360.000	SF
900.680	SPECIAL PROVISION (BITUMINOUS CONCRETE PAVEMENT, SMALL QUANTITY)	600.000	TON