

Special Provisions for: Ludlow BRF 025-1(42)

1. LABOR SUPPLY. Available workers for this Contract may be obtained from Manager, Employment & Training, Springfield, VT. The latest edition of the DBE Registry can be obtained from the Office of Civil Rights and Labor's Webpage at the following address: <http://vtranscivilrights.vermont.gov/>. Contractors that do not have access to the internet may obtain a copy from the Office of Contract Administration upon request.
2. CONTRACT COMPLETION DATE. This Contract shall be completed on or before **September 29, 2017**.
3. NOTICE TO BIDDERS. 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 do not apply to this Contract.
4. 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 Standard Time on **xxx**, 2016. No exceptions will be made to this requirement.*
5. NOTICE TO BIDDERS. The Contractor is hereby notified that in the absence of the Engineer, the Agency's Safety Officer and the Agency's Hazardous Materials and Waste Coordinator shall each have the authority to suspend work when they determine that a serious safety or environmental violation exists on the job site. The period of time work is suspended due to a serious safety or environmental violation will not be justification for an extension of time.
6. STANDARD SPECIFICATIONS. The provisions of the 2011 STANDARD SPECIFICATIONS FOR CONSTRUCTION, as modified herein, shall apply to this Contract.

7. SUPPLEMENTAL SPECIFICATIONS AND CONTRACT REQUIREMENTS. The Contractor's attention is directed to the following specifications and contract requirements included in the Proposal form and effective for this Contract:

Required Contract Provisions for Federal-Aid Construction
Standard Federal EEO Specifications
VT Agency of Transportation Contractor Workforce Reporting Requirements
Workers' Compensation; State Contracts Compliance Requirement
General Special Provisions dated April 7, 2016
Bulletin 3.5 Attachment C: Standard State Provisions for Contracts and Grants
Vermont Minimum Labor & Truck Rates
Disadvantaged Business Enterprise (DBE) Policy Contract Requirements
U.S. Department of Labor Davis-Bacon Wage Rates
Asphalt Price Adjustment Provisions dated April 6, 2010
River Management Consultation #HD-2-0112 (email) dated April 28, 2014
Army Corps of Engineers Permit #NAE-2014-0026 dated June 10, 2014
Certification for Federal-Aid Contracts
Contractor's EEO Certification Form
Debarment & Non-Collusion Affidavit

8. NOTICE TO BIDDERS - CONTRACT INSURANCE REQUIREMENTS. The Contractor is hereby notified that in the event of a discrepancy between the stated insurance requirements of Bulletin 3.5 Attachment C: Standard State Provisions for Contracts and Grants and those of Subsection 103.04 of the Standard Specifications for Construction, the requirements of Subsection 103.04 of the Standard Specifications for Construction shall govern.
9. NOTICE TO BIDDERS - ADDITIONAL CONTRACT REQUIREMENT. For construction and transportation projects over \$250,000.00, a payroll process by which during every pay period the Contractor collects from the subcontractors or independent contractors a list of all workers who were on the jobsite during the pay period, the work performed by those workers on the jobsite, and a daily census of the jobsite. This information, including confirmation that Contractors, subcontractors, and independent contractors have the appropriate workers' compensation coverage for all workers at the jobsite, and similar information for the subcontractors regarding their subcontractors shall also be provided to the Department of Labor and to the Department of Banking, Insurance, Securities, and Health Care Administration, upon request, and shall be available to the public.
10. NOTICE TO BIDDERS-CARGO PREFERENCE REQUIREMENT. The contractor is hereby notified that the Contractor and Subcontractor(s) are required to follow the requirements of 46 CFR 381.7 (a)-(b). For guidance on requirements of Part 381 - Cargo Preference - U.S.Flag Vessels please go to the following web link: <https://www.fhwa.dot.gov/construction/cqit/cargo.cfm>.

11. NOTICE TO BIDDERS - RE-DESIGNATION OF VTRANS OFFICIALS. The Contractor is hereby notified of the following re-designation of VTrans officials as referenced in the Contract Documents:

Where in the Contract Documents it reads:	It shall be read as and shall mean:
Director of Program Development	Chief Engineer
Assistant Director of Program Development	Deputy Chief Engineer
Roadway, Traffic, and Safety Engineer; Roadway Program Manager; Highway Safety & Design Engineer;	Highway Safety and Design Program Manager
Structures Engineer	Structures Program Manager
Chief of Local Transportation Facilities	Director of Municipal Assistance Bureau
Construction Engineer; Materials and Research Engineer	Director of Construction and Materials Bureau
Director of Operations	Director of Maintenance and Operations Bureau

12. NOTICE TO BIDDERS - INCENTIVE/DISINCENTIVE (I/D). The Agency's intent is to have the bridge closure period (BCP) be as short a duration as possible. To encourage the Contractor to provide a maximum effort to complete the Identified Work for I/D within the period as defined below, the Agency is willing to pay an incentive.

(a) Dates. The allowable BCP will be thirty-five (35) consecutive calendar days between June 1, 2017 and August 31, 2017, inclusive. The thirty-five (35) consecutive calendar day BCP is herein defined as the I/D period. The BCP shall begin no earlier than 7:00 am on the first calendar day of the I/D period and shall end no later than 6:59 pm on the 50th calendar day of the I/D period. During the BCP, the Contractor will be allowed to work on the Bridge for 24 hours per day, 7 days per week, including holiday periods.

Night work will be allowed during the BCP. See Special Provision Nos. 13 NOTICE TO BIDDERS - REQUIREMENTS FOR NIGHTTIME WORK and 14 NOTICE TO BIDDERS - NIGHTTIME WORK RESTRICTIONS for additional information and requirements.

The Contractor shall submit to the VAOT Construction Section for review and approval a certified letter indicating the BEGIN CONSTRUCTION DATE for the BCP work. This letter shall be received by the Construction Section a minimum of twenty-one (21) calendar days prior to the BEGIN CONSTRUCTION DATE indicated in the letter. The BEGIN CONSTRUCTION DATE shall be determined by the Contractor.

The I/D period as established above for this Contract is absolutely fixed and will not be changed for any Act of God, omission, improper action, direction of the Engineer, or any other reason unless done so by the Secretary and only under extreme conditions as determined by the Secretary.

There shall be a pre-closure meeting held on site with the Contractor's Superintendent, Contractor's Project Manager, the Engineer, the Project Manager, the Town of Ludlow, Ludlow Fire Department, Ludlow Ambulance Service, Vermont State Police and Central Vermont Regional Planning Commission 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 14 days prior to the BCP.

In addition, weekly meetings between the Contractor, Engineer, and other pertinent parties as determined by the Engineer shall be held to discuss the project progress and future construction activities, and current CPM progress schedules and narratives.

All prefabricated concrete elements shall be authorized for shipment prior to the BCP. The bridge shall remain open to traffic until the prefabricated elements are authorized for shipment.

- (b) Identified Work. All work required to open the new Bridge to two-way traffic including:
- (1) Installation of approach slabs and proper cure of approach slab longitudinal joints and closure pours;
 - (2) Installation of bridge sidewalk;
 - (3) Completion of deck grinding and grooving;
 - (4) Base Course (two - 3" lifts of Type IIS) and Final Course (two - 1 1/2" lifts of Type IVS) of pavement placed on roadway; and
 - (5) Temporary barrier installed.

In the 14 days prior to the BCP, the contractor will be allowed to maintain a minimum of one-lane (11 feet wide) alternating traffic during daytime hours for the installation of temporary traffic control, EPSC, and access and staging areas.

No night work will be allowed outside of the BCP and two-lane, two-way traffic must be maintained on the existing alignment during nighttime hours.

- (c) Pay Schedule. The Contractor will receive a lump sum compensation of **seventy-five thousand dollars (\$75,000)** for completing the Identified Work before the end of the I/D period.

In addition, the Contractor will be compensated at a rate of **seven hundred ninety dollars (\$790.00)** per hour that the Identified Work is completed prior to the end of the I/D period, up to a maximum total payment as specified herein. Only full hours prior to the new bridge opening of 6:00 a.m. will count toward this extra incentive payment.

The maximum amount payable under the incentive clause shall be one hundred seventy-four thousand seven hundred twenty dollars (\$174,720) (including the lump sum 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 seven hundred ninety dollars (\$790.00) per hour. The full hourly disincentive amount will be assessed for each hour that traffic is not allowed on the bridge 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.

- (d) Underruns and Overruns. The proposal indicates an estimated quantity for each Contract 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.

- (e) Payment. Payment will be made as specified in Section 900.

13. NOTICE TO BIDDERS - REQUIREMENTS FOR NIGHTTIME WORK. The Contractor is hereby notified that night work will be allowed during the bridge closure period. For the purposes of this Contract, "night" shall mean from the hours of 9:00 p.m. until 5:59 a.m. of the following day. The Engineer may abbreviate this time period as necessary for safety considerations.

Night work shall be performed in accordance with the National Cooperative Highway Research Program (NCHRP) Report 476 - "Guidelines for Design and Operation of Nighttime Traffic Control for Highway Maintenance and Construction". A copy of this guideline specification may be downloaded from the following website: http://onlinepubs.trb.org/onlinepubs/nchrp/nchrp_rpt_476.pdf.

Prior to beginning night work, the Contractor shall design a lighting system and present it to the Engineer for approval. The Contractor shall not perform any night work or activities within the project limits until the lighting system has been fully approved and is in place on the project.

The designed lighting system shall be mobile, shall be mounted separately from other construction equipment, shall illuminate the entire work area to daylight intensity with minimal glare, and shall be a surrounding design that minimizes shadows in the work area as much as possible.

All costs associated with the lighting system will be considered incidental to Contract item 900.645 Special Provision (Traffic Control, All-Inclusive).

14. NOTICE TO BIDDERS - NIGHTTIME WORK RESTRICTIONS. The Contractor is hereby notified that during the bridge closure period, no work shall be performed between the hours of 9:00 p.m. and 6:00 a.m. that creates a noise level exceeding 75 decibels. The decibel level shall be measured from the point of activity to the nearest occupied residence.

Construction activities expected to reach this noise threshold include pneumatic hammers, hoe-ram, and similar impact type equipment.

The Contractor shall provide the Engineer, for the duration of the nighttime work, with a sound level meter capable of measuring this noise criteria during the bridge closure period.

Sound level meters shall be Rion NL-20, CESVA SC-160, Extech 407780 or an approved equal capable of meeting IEC60651: 1979 Type 2 and IEC60804: 1985 Type 2 Standards.

The cost for providing this equipment and meeting the specified noise level criteria will not be paid for separately, but will be considered incidental to all other Contract items.

15. NOTICE TO BIDDERS. All temporary construction signs shall meet the following requirements:

- A. Where sign installations are not protected by guardrail or other approved traffic barriers, all sign stands and post installations shall meet National Cooperative Highway Research Program (NCHRP) Report 350 or the AASHTO Manual for Assessing Safety Hardware (MASH). The appropriate resource shall be determined as described in the MASH publication. No sign posts shall extend over the top of the sign installed on said post(s). When anchors are installed, stub shall not be greater than 4 inches above existing ground.
- B. As a minimum, roll up sign material shall have ASTM D 4956 Type VI fluorescent orange retroreflective sheeting.
- C. All post-mounted signs and solid substrate portable signs shall have ASTM D 4956 Type VII, Type VIII, or Type IX fluorescent orange retroreflective sheeting.
- D. All retroreflective sheeting on traffic cones, barricades, and drums shall be at a minimum ASTM D 4956 Type III sheeting.
- E. All stationary signs shall be mounted on two 3 lb/ft flanged channel posts or 2 inch square steel inserted in 2 ¼" galvanized square steel anchors. No sign posts shall extend over the top edge of sign installed on said posts.
- F. Prior to placing temporary work zone signs on the project, the Contractor must furnish for the Engineer's approval a detail for temporary work zone signs on steel posts showing stubs projecting a maximum of 4 inches above ground level and bolts for sign post.
- G. Construction signs shall be installed so as to not interfere with nor obstruct the view of existing traffic control devices, stopping sight distance, and corner sight distance from drives and town highways.

- H. Speed zones, if used, should be a maximum of 10 mph below existing posted speeds. Temporary speed limit certificates must be approved by the Chief Engineer.
16. NOTICE TO BIDDERS. All retroreflective sheeting on permanent signs (signs to remain after the project is completed) shall be at a minimum ASTM D 4956 Type III sheeting, unless otherwise shown on the Plans.
17. NOTICE TO BIDDERS - BUILDING INSPECTION. 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 shall be inspected:
- (a) Black River Associates, Inc.
101 Main Street
 - (b) Black River Good Neighbor Services, Inc.
105 Main Street
 - (c) Black River Amato, L.P.
100 Main Street

The Contractor's insurer shall notify the Engineer when the video is complete and the video shall be available upon request by the Agency.

Upon completion of project construction, the Contractor's insurer shall again completely inspect, inside and out, and make a complete video CD record of all buildings 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 the 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 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.

18. ENVIRONMENTAL.
- (a) Archaeological Resources.
 - (1) The archaeologically sensitive area between Elm Street and the river on the south side of the bridge will be avoided during construction.
 - (2) Any subsequent changes to the Plans will require review and written authorization by the VTrans Archaeology Officer and may result in the need for further archaeological study.

- (b) Threatened and Endangered Species. The northern long-eared bat (NLEB) is federally listed a threatened species under the Endangered Species Act effective April 2015. This project shall be subject to Avoidance and Minimization Measures to protect the habitat and hibernacula of this species. These measures include, but are not limited to, Time Of Year (TOY) restrictions for cutting habitat trees and demolition of bridges.

It is anticipated that the Contractor will be required to remove trees within the identified project limits as part of the work. An assessment of the project limits resulted in a finding of no suitable habitat. Therefore, tree cutting 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 review under Section 105.25 Control of Waste, Borrow, and Staging Areas.

19. UTILITIES. Existing aerial facilities owned by Village of Ludlow Electric Light Department, Vermont Telephone Company (VTel), TDS Telecom, and Comcast will be adjusted, as necessary, by employees or agents of the above companies as shown on the project plans. The Village of Ludlow Electric Light Department shall install a disconnect switch to allow for the line to be de-energized in the area of the bridge, when deemed necessary, for specific construction activities.

Contacts for the above listed companies are:

Village of Ludlow Electric Light Dept.	Howard Barton Jr.	(802)228-3721 howardb@tds.net
Vermont Telephone Company	Judy Paton	(802)885-7757 patonje@vermontel.com
TDS Telecom	Scott Brooks	(802)228-9750 Scott.brooks@tdstelecom.com
Comcast	Steven Marshall	(802)776-1626 Steven_marshall@cable.comcast.com

Existing municipal water facilities owned by the Town of Ludlow will be adjusted by the Contractor as shown on the project plans. Coordination of this work shall be through the Village of Ludlow Water Department, (802)228-8431.

Existing municipal sewer facilities owned by the Town of Ludlow will not require adjustment. The Contractor is cautioned to protect these facilities from damage. Should adjustments to the existing sewer manholes be deemed necessary, they shall be adjusted by the Contractor. The contact for this utility is the Village of Ludlow Wastewater Department, (802)228-8431.

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 will be made under contract Pay Item 204.22.

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.

There will be no extra compensation paid to the Contractor for any inconvenience caused by working around and with the companies, or their facilities.

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 District Transportation Administrator to obtain/verify the location of Agency's underground utility facilities or to confirm the absence of such facilities.

The Contractor is advised that many towns are not members of Dig safe. It is the contractor's responsibility to check with the towns prior to excavation and it shall protect and restore any utilities damaged within the project limits as set forth in subsection 107.13 Protection and Restoration of utilities and services.

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.

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.

20. HIGHWAY PARKING RESTRICTIONS. Only such trucks and equipment as are necessary for the construction of this project will be permitted to stop or park on the shoulders or right-of-way of the highway trucks or equipment so stopped or parked shall be at least 1.2 m (4 feet) from the edge of the thru traffic lanes. Parking or stopping on the traveled portion of the roadway will not be permitted unless authorized by the Engineer to meet field conditions.

Private automobiles of workers will not be permitted to stop or park on the shoulders or right-of-way of the highway.

Each of the Contractor's trucks or equipment used for the construction of this project and permitted to park or stop as provided above shall be equipped with flashing light signals on the front and rear and the signals shall be operating at all times when parked or stopped on the highway unless otherwise authorized by the Engineer.

The flashing light signals shall be visibly distinct from and physically separate from the hazard warning system required by Federal and State motor vehicle laws and regulations. At least one of these flashing light signals shall be visible to traffic approaching from any angle at all times.

Qualified traffic control personnel shall be employed whenever the Contractor's vehicles or equipment (including that which belongs to the individual workers) enter or leave the traffic flow. All movement, in or out of the traffic flow, shall be with the flow of traffic.

21. SPECIAL CONSTRUCTION REQUIREMENTS.

- A. Unless otherwise permitted in writing by the Engineer, and except as otherwise allowed under Special Provision No. 12(a), the Contractor shall not work during the holiday periods for Labor day, Veterans Day, Thanksgiving Day, Memorial Day and July Fourth. The Engineer shall give a written order designating the time of observance of these holidays and of any additional holidays required by the season, anticipated traffic, and local custom. As specified in Subsection 105.14, and except as otherwise allowed under Special Provision No. 12(a), construction operations shall not be performed on any Sunday without the specific authorization of the Engineer.

Designated holiday periods shall begin at 12:00 noon on the day before the weekend or holiday, whichever applies, and shall end at 7:00 a.m. on the day after the holiday or the weekend, as appropriate.

- B. The Contractor shall maintain a safe access to all drives and intersecting side roads at all times during the construction of this project.
- C. Two-way radios shall be provided by the Contractor when requested by the Engineer for use by traffic control personnel. All costs for furnishing and using two-way radios will not be paid for directly, but will be considered incidental to Contract item 641.10.
- D. The Contractor shall have available on the project the current editions of the Manual on Uniform Traffic Control Devices (MUTCD) and the Standard Highway Signs and Markings (SHSM) Book. Information for obtaining these publications may be found at: <http://mutcd.fhwa.dot.gov/index.htm>.

ASPHALT PRICE ADJUSTMENT

22. SUPPLEMENTAL SPECIFICATION - ASPHALT PRICE ADJUSTMENT, dated April 6, 2010, is hereby made a new Subsection of the Specifications, superseding all previous editions and their modifications.
23. SUPPLEMENTAL SPECIFICATION - ASPHALT PRICE ADJUSTMENT, dated April 6, 2010, GENERAL REQUIREMENTS AND CONDITIONS, part (b) text, is hereby modified by being deleted in its entirety and replaced with text "NOT USED".

The index price for asphalt cement is \$xxx.00 per ton.

In addition to materials produced under Contract pay item(s) as allowed in GENERAL REQUIREMENTS AND CONDITIONS, part (a) of the Supplemental Specification, asphalt cement produced under Contract items 900.680 Special Provision (Bituminous Concrete Pavement, Small Quantity), will be included for adjustment.

If an emulsified asphaltic liquid is used in the Contract work under any Contract item subject to the Asphalt Price Adjustment provisions and that liquid is not included in the table under subpart (5) of PRICE ADJUSTMENT PROCEDURES of the Supplemental Specification, the ACEA as defined in subpart (5) for that liquid will be that as determined by averaging Contractor certified test results for the project.

SECTION 501 - HPC STRUCTURAL CONCRETE

24. 501.02 MATERIALS, is hereby modified by adding the following:

Where a shrinkage admixture will be used in placing concrete as allowed by the Contract Documents, the following requirements shall be met:

A shrinkage compensating admixture shall be added during the initial concrete mixing phase or as recommended by the chemical manufacturer product representative. The shrinkage compensating admixture shall be one of the products listed below. The final dosage rate will be determined by the product representative and the concrete producer. The dosage rate volume is computed into the final water/cementitious ratio.

Manufacturer: Sika Construction Product Division

Product name: - Sika Control 40

Tel.: 1-800-933-7452

Website:

<http://usa.sika.com/dms/getredirect.get/us01.webdms.sika.com/39>

Manufacturer: The Euclid Chemical Company

Product name: Eucon SRA

Tel.: 1-800-321-7628

Website:

http://www.euclidchemical.com/fileshare/ProductFiles/techdata/eucon_sra.pdf

Manufacturer: BASF (Master Builders)

Product name: MasterLife SRA 20

Tel.: 1-800-628-9900

Website: [http://assets.master-builders-](http://assets.master-builders-solutions.basf.com/Shared%20Documents/EB%20Construction%20Chemicals%20-%20US/Admixture%20Systems/Data%20Sheets/MasterLife/BASF-masterlife-sra-20-tds.pdf)

[solutions.basf.com/Shared%20Documents/EB%20Construction%20Chemicals%20-%20US/Admixture%20Systems/Data%20Sheets/MasterLife/BASF-masterlife-sra-20-tds.pdf](http://assets.master-builders-solutions.basf.com/Shared%20Documents/EB%20Construction%20Chemicals%20-%20US/Admixture%20Systems/Data%20Sheets/MasterLife/BASF-masterlife-sra-20-tds.pdf)

Manufacturer: Grace Construction Products

Product name: Eclipse 4500

Tel.: 1-877-423-6491

Website:

www.buildsite.com/pdf/wrgrace/Eclipse-4500-Product-Data-578947.pdf

SECTION 652 - EROSION PREVENTION & SEDIMENT CONTROL PLAN

25. SECTION 652 - EROSION PREVENTION & SEDIMENT CONTROL PLAN, is hereby made a new Section of the Specifications as follows:

26. 652.01 DESCRIPTION. This work shall consist of designing, furnishing, and submitting for acceptance modifications to the Contract Erosion Prevention & Sediment Control Plan (hereinto known as the EPSC Plan), becoming a co-permittee with the Agency of Transportation, State of Vermont on associated permits, monitoring the EPSC Plan using an On-Site Plan Coordinator, and maintaining the erosion prevention and sediment control measures to ensure the effectiveness of the EPSC Plan.

27. 652.02 MATERIALS. Materials required for the field work maintenance of the EPSC Plan shall meet all requirements of the appropriate Section of the VAOT Standard Specifications for Construction.

Materials including manuals, checklists, forms, and other supporting documentation necessary to meet the requirements of these provisions and maintain compliance with associated permits shall be made available to the Engineer by the Contractor and maintained on site by the Contractor. Supporting documents associated with the requirements of General Permit 3-9020 are available upon request to ANR or from the ANR Stormwater web page. The VTrans Erosion Prevention and Sediment Control Plan Contractor Checklist and Low Risk Site Inspection Form are available from the VTrans Construction Environmental Engineer.

28. 652.03 QUALIFICATIONS. Modifications to the EPSC Plan shall be prepared and signed by a Licensed Professional Civil Engineer registered in the State of Vermont or a qualified professional in erosion prevention and sediment control, certified by CPESC, Inc. or equivalent, hereinafter called the "Preparer."

29. 652.04 EROSION PREVENTION & SEDIMENT CONTROL PLAN. The EPSC Plan, developed using a combination of structural, non-structural, and vegetative practices to adequately prevent erosion and control sedimentation, and meeting the requirements of the VTrans Erosion Prevention & Sediment Control Plan Designer Checklist (Non-Jurisdictional and Low Risk) or the Vermont Standards & Specifications for Erosion Prevention & Sediment Control based on area of disturbance and risk, has been included in the Contract Documents.

The Contractor shall use the EPSC Plan included in the Contract and, at the onset of construction as well as throughout the duration of the project, modify it to describe changing conditions and illustrate how the criteria of the determined risk will be upheld. For Non-Jurisdictional and Low Risk projects, the Contractor shall use the VTrans Erosion Prevention and Sediment Control Plan Contractor Checklist. For Moderate Risk projects, the Contractor shall modify the Contract EPSC Plan in accordance with the General Permit 3-9020 Parts 4 through 6. If a modification to the EPSC Plan at a Low or Moderate Risk project alters any criteria of the determined risk, an updated Risk Evaluation shall be prepared.

The Contractor may use the Agency's EPSC Plan sheet(s) as a basis for necessary modifications; however, if necessary to convey the sequential nature and phases of construction activities and associated erosion prevention and sediment control measures, several plan sheets showing successive site conditions are recommended.

All work shown in the EPSC Plan shall be included in the Contractor's CPM Progress Schedule, as required by Subsection 108.03.

30. 652.05 SUBMITTALS. Three sets of the modified EPSC Plan as well as the updated Risk Evaluation, stamped and signed by the Preparer, shall be submitted to the Construction Engineer as Construction Drawings in accordance with Section 105. Submittals shall occur after award of the Contract but not later than the Pre-Construction Conference to allow time for review by the Agency. An Acceptance Memo or comments will be provided to the Contractor within 10 working days.

The Contractor shall respond to comments as soon as possible, but not more than 10 days after the date of VTrans initial correspondence. Agency review time for response to comments will be completed within an additional 10 working days. Modifications or additions to the EPSC Plan will not be considered as an acceptable delay of the work under Subsection 108.11.

All subsequent modifications to the EPSC Plan and updates to the Risk Evaluation will be reviewed and forwarded to the ANR by the Agency as appropriate.

Construction activities for EPSC Plan modifications that do not require authorization from the ANR shall commence only after the EPSC Plan has been accepted by the Agency. Construction activities for EPSC Plan modifications that do require authorization from the ANR shall commence only after that authorization has been granted.

31. 652.06 MONITORING EROSION PREVENTION & SEDIMENT CONTROL PLAN. The Contractor shall designate a person (On-Site Plan Coordinator) who is directly responsible for the on-site implementation of the EPSC Plan. This person shall generally be on-site on a daily basis during active construction and have the authority to halt construction activities if necessary. The On-Site Plan Coordinator shall have demonstrated experience in construction practices as they relate to erosion prevention and sediment control as well as a general understanding of State and Federal environmental regulations and permits pertaining to the National Pollutant Discharge Elimination System Construction Program. The On-Site Plan Coordinator shall be proficient at reading and interpreting engineering and EPSC plans. Preference will be given to a Licensed Professional Civil Engineer registered in the State of Vermont or a qualified professional in erosion prevention and sediment control, certified by CPESC, Inc. or equivalent. The qualifications of the On-Site Plan Coordinator shall be included in the EPSC Plan. The Engineer, if not satisfied with the performance of this individual, may at any time request a replacement.

During active construction and periods of inactivity, the On-Site Plan Coordinator shall be responsible for inspections and reporting.

- (a) Active Construction. Inspections shall occur once every seven calendar days and within 24 hours of the end of a storm event that results in a discharge of stormwater from the site. During the winter construction season (October 15th to April 15th, inclusive), inspections at all sites shall occur daily.

For Non-Jurisdictional and Low Risk projects, inspections shall be conducted using the Agency's EPSC Plan Inspection Report (Non-Jurisdictional and Low Risk Projects).

For Moderate Risk projects, inspections shall be conducted using the General Permit 3-9020 Inspection Report for Moderate Risk Projects referenced in the Permit and available upon award of the Contract.

Immediate action shall be taken to correct the discharges of sediment, including halting or reducing construction activities as necessary, until the discharge and/or the condition is fully corrected. Corrective actions shall be recorded on the monitoring reports and shown on the EPSC Plan. Each report shall be signed by the On-Site Plan Coordinator.

- (b) Inactive Construction. Periods such as shutdown during the winter season shall require inspection and reporting of erosion prevention and sediment control measures. The Contractor shall contact the Engineer prior to conducting any inspections. The inspections shall be conducted at least once every 30 days and within 24 hours of any storm or significant snow melt event that may cause stormwater runoff to leave the construction site. The Contractor shall provide, within 24 hours, the necessary personnel, equipment, and materials to repair or correct any deficiencies identified during inspection. All deficiencies and corrective measures taken shall be documented on the reports.

Copies of all reports shall be submitted to the Engineer within 24 hours of inspection or when corrective measures were taken. Copies of all reports shall be kept on site in the Contractor's project files.

32. 652.07 MAINTENANCE OF EROSION PREVENTION & SEDIMENT CONTROL PLAN. This work shall consist of providing all labor and equipment necessary for field maintenance of erosion prevention and sediment control items in the Contract, and providing materials and labor necessary for installing, monitoring, maintaining and, where necessary, removing additional measures needed to correct deficiencies that develop during construction that lessen the performance of the EPSC Plan. Erosion prevention and sediment control measures shall be maintained by the Contractor and removed when authorized by the Engineer. The Contractor shall establish vegetation in all areas disturbed during removal of the erosion prevention and sediment control measures.

Any maintenance required due to the failure of the Contractor to follow the EPSC Plan in its accepted form shall be performed at no additional cost to the Agency.

33. 652.08 METHOD OF MEASUREMENT. The quantity of EPSC Plan to be measured for payment will be on a lump sum basis in the complete and accepted work.

The quantity of Monitoring EPSC Plan will be measured to the nearest 1/4 hour for the actual number of authorized hours spent monitoring, reviewing, and reporting on the construction site(s), including waste, borrow and staging areas or other support activities, as it relates to the EPSC Plan. Travel time and other time not spent at the construction site(s) or time not authorized will not be measured for payment (i.e. travel expenses, clerical staff time, copying, miscellaneous expenses, overhead, etc.).

The quantity of Maintenance of EPSC Plan will be on a lump unit basis for all such field maintenance provided for in the Contract, excluding waste, borrow and staging areas or other support activities.

34. 652.09 BASIS OF PAYMENT. The accepted quantity of EPSC Plan will be paid for at the Contract lump sum price. Payment will be full compensation for the initial preparation of modifications, submittals, and all incidentals necessary to complete the work. Subsequent modifications to the EPSC Plan during Construction will be considered incidental to Contract item 652.10.

Partial payments will be made as follows:

- (a) The first payment of 50 percent of the lump sum price for the EPSC Plan will be paid for upon acceptance of the EPSC Plan for the entire project.
- (b) The second payment of 35 percent of the lump sum price for the EPSC Plan will be made on the first estimate following the completion of 50 percent of the project.
- (c) The third payment of 15 percent of the lump sum price for the EPSC Plan will be made when the project is substantially complete.

The accepted quantity of Monitoring EPSC Plan will be paid for at the Contract unit price per hour. Payment will be full compensation for performing the work specified. Payment will not be made unless a report for the monitoring is submitted to and accepted by the Engineer.

The accepted quantity of Maintenance of EPSC Plan will be paid for as specified for force account work in Subsection 109.06. Payments will be drawn against the Contract Lump Unit amount. To provide a common proposal for all bidders, the Agency has entered an amount in the proposal to become part of the Contractor's total bid. Maintenance related to material supply and disposal areas shall be performed in accordance with Subsection 105.29.

Payment will be made under:

<u>Pay Item</u>	<u>Pay Unit</u>
652.10 EPSC Plan	Lump Sum
652.20 Monitoring EPSC Plan	Hour
652.30 Maintenance of EPSC Plan (N.A.B.I.)	Lump Unit

SECTION 690 - FUEL PRICE ADJUSTMENT

35. SECTION 690 - FUEL PRICE ADJUSTMENT, is hereby made a new Section of the Specifications as follows:

36. 690.01 GENERAL REQUIREMENTS AND CONDITIONS

- (a) This specification contains price adjustment provisions for fuel used on Vermont Agency of Transportation (Agency) construction projects. This price adjustment clause is being inserted in this Contract to provide for either additional compensation to the Contractor or a payment to the Agency, depending upon an increase or decrease in the average price of diesel fuel or gasoline during the construction of this project.
- (b) These provisions apply to this Contract only as specified herein through the fuel usage factors set forth in Table 1. No further fuel price adjustments will be allowed under this Contract.

- (c) It is understood by the Contractor that a price adjustment increase may cause the Agency to decrease the quantities of the Contract pay items subject to adjustment under these provisions. Provisions providing for decreased quantities and item cancellation in this paragraph are separate and take precedence, notwithstanding any other provisions of this Contract.
- (d) No price adjustment will be paid for work performed after the Contract Completion Date, as modified by Change Order, if applicable.
- (e) Price Adjustment, Fuel will be determined for a pay item if each of the following criteria is met:
 - (1) the pay item is included in the original awarded Contract;
 - (2) the original awarded Contract bid quantity for the pay item equals or exceeds the quantity threshold indicated in Table 1.
- (f) Any increase in the total Contract amount due to fuel price adjustment will not be justification for an extension of time under Subsection 108.11.

In such cases that estimated quantities are used to determine estimated fuel price adjustments throughout the duration of the Contract, reconciliation of those estimated adjustments will be made upon the determination of actual final quantities and final adjustments to the total final quantity made by prorating those estimated adjustments over the applicable fuel price adjustment periods previously paid. Reconciliation of any fuel price adjustment will only be performed in those instances where the actual final quantity differs by more than five percent from the total estimated quantity. Payments owed to either the Contractor or VTrans will not be subject to any applicable interest claims.

37. 690.02 PRICE ADJUSTMENT PROCEDURES

- (a) Prior to advertising for bids, Index Prices for both a gallon of diesel fuel and a gallon of gasoline will be established by the Agency using retail prices reported by the Energy Information Administration (EIA) for the New England Region. The Index Prices will be set monthly using the first EIA posting falling either on or after the 1st calendar day of that month. The Contract Index Prices will be the most recent Index Prices set by the Agency at the time of advertising for bids. These prices are included below and will be the base from which price adjustments are computed.

The index price (retail) for gasoline is \$2.32 per gallon. The index price (retail) for diesel fuel is \$2.48 per gallon.

- (b) For the duration of the Contract, Posted Prices for both a gallon of diesel fuel and a gallon of gasoline will be established monthly by the Agency. The Posted Prices will be established in the same manner as the Index Prices.
- (c) A Price Adjustment will be paid or credited for diesel fuel and/or gasoline only when the Posted Price of diesel fuel and/or gasoline increases or decreases 5 percent or more over its respective Index Price.

(d) Payment for Price Adjustment, Fuel will be based upon the quantity of fuel incorporated in the work as determined by the fuel usage factors in Table 1 of this specification for both diesel fuel and gasoline, multiplied by the algebraic difference between the Posted Price and the Index Price for either diesel fuel or gasoline, respectively.

(e) Payment for Price Adjustment, Fuel shall be computed as follows:

PA = Price Adjustment (LU in \$)
 IPD = Index Price, Diesel Fuel (\$/gallon)
 IPG = Index Price, Gasoline (\$/gallon)
 PPD = Posted Price, Diesel Fuel (\$/gallon)
 PPG = Posted Price, Gasoline (\$/gallon)

FUFD = Fuel Usage Factor, Diesel Fuel (gallon/unit)
 FUFG = Fuel Usage Factor, Gasoline (gallon/unit)

For $PPD/IPD \leq 0.95$ or ≥ 1.05 and $PPG/IPG > 0.95$ and < 1.05 :
 $PA = FUFD \times \text{Pay Item Quantity} \times (PPD - IPD)$

For $PPD/IPD > 0.95$ and < 1.05 and $PPG/IPG \leq 0.95$ or ≥ 1.05 :
 $PA = FUFG \times \text{Pay Item Quantity} \times (PPG - IPG)$

For PPD/IPD and $PPG/IPG \leq 0.95$ or ≥ 1.05 :

$PA = [FUFD \times (PPD - IPD) + FUFG \times (PPG - IPG)] \times \text{Pay Item Quantity}$

(f) The Contract bid prices for the applicable pay items will be paid under the Contract. The price adjustment, when such adjustment is required as specified in part (c) of this Subsection, will be made subsequent to the month in which the applicable Contract work was performed and will be entered on the next bi-weekly estimate.

(g) Payment for Price Adjustment, Fuel shall be debited or credited against the Contract price (Lump Unit) bid for Price Adjustment, Fuel.

Payment will be made under:

<u>Pay Item</u>	<u>Pay Unit</u>
690.50 Price Adjustment, Fuel (N.A.B.I.)	Lump Unit

Table 1
Pay Item Fuel Usage Factors and Quantity Thresholds

Work Category	Pay Item No.	Usage Factor Units	Diesel Fuel (FUFD)	Gasoline (FUGG)	Quantity Threshold
		English	English	English	English
Excavation	203.15	GAL/CY	0.29	0.15	3,000
	203.16	GAL/CY	0.39	0.18	2,500
	204.25	GAL/CY	0.35	0.16	2,500
	208.3	GAL/CY	0.35	0.16	2,000
	208.35	GAL/CY	0.39	0.18	2,000
Borrow	203.3	GAL/CY	0.29	0.15	3,000
	203.31	GAL/CY	0.29	0.15	3,000
	203.32	GAL/CY	0.29	0.15	3,000
Granular Backfill For Structures	204.3	GAL/CY	1	0.16	1,500
Cold Planing, Bituminous Pavement	210.1	GAL/SY	0.12	0	15,000
Subbase	301.25	GAL/CY	0.85	0.56	1,000
	301.35	GAL/CY	0.85	0.56	1,000
Reclaimed Stabilized Base	310.2	GAL/SY	0.04	0	35,000
Pavement	406.25	GAL/TON	3.06	0.86	500
	406.27	GAL/TON	3.06	0.86	500
	490.3	GAL/TON	3.06	0.86	500
Cold Mixed Recycled Bituminous Pavement, Portland Cement	900.675	GAL/SY	0.96	0.75	1
Hand-Placed Bituminous Concrete Material, Drives	900.675	GAL/SY	3.06	0.86	500
Bituminous Concrete Pavement, Small Quantity	900.680	GAL/TON	3.06	0.86	500
Material Transfer Vehicle	900.680	GAL/TON	0.1	0	1
Concrete	501.32	GAL/CY	0.75	0.25	1,000
	501.33	GAL/CY	0.75	0.25	1,000
	501.34	GAL/CY	0.75	0.25	1,000
Stone Fill	613.1	GAL/CY	0.39	0.18	2,000
	613.11	GAL/CY	0.39	0.18	2,000
	613.12	GAL/CY	0.39	0.18	2,000
	613.13	GAL/CY	0.39	0.18	2,000
Guardrail	621.2	GAL/LF	0.18	0.05	5,000
	621.205	GAL/LF	0.18	0.05	5,000
	621.21	GAL/LF	0.18	0.05	5,000
	621.215	GAL/LF	0.18	0.05	5,000

SECTION 900 - SPECIAL PROVISION ITEMS

HIGH PERFORMANCE CONCRETE, RAPID SET

38. To be developed.

STONE FILL, STREAM BED MATERIAL

39. DESCRIPTION. This work shall consist of furnishing and placing stone fill material in the location of the pier removal to facilitate aquatic organism passage and mimic the native channel.

40. MATERIAL. Stone Fill shall be approved, hard, blasted, angular rock other than serpentine rock containing the fibrous variety chrysotile (asbestos) supplemented with material excavated from the channel and/or the tailings of a topsoil screening operation, with gradation adjusted to conform to the following:

Type III. The longest dimension of the stone shall be at least 36 inches, and at least 50 percent of the volume of the stone in place shall have a least dimension of 24 inches, and at least 25 percent of the particles shall have a maximum dimension of 2 inches and be well graded material.

Bed material shall be approved by the Engineer and the Agency of Natural Resources prior to use.

41. PLACING. Stone fill shall be placed as shown in the Plans.

Fill in voids in the stone with a mixture of fines from the existing stream bed material. Fill voids by hand tamping with metal tamping rods, plate compactors, and water pressure with a metal wand to reach between stones.

Once all material has been placed in the stream channel, the Contractor shall slowly wet the stream to minimize the effects of the initial sediment pulse. Every attempt shall be made to minimize the movement of sediment downstream of the site.

There shall be no subsurface flow upon final inspection.

42. METHOD OF MEASUREMENT. The quantity of Special Provision (Stone Fill, Stream Bed Material) to be measured for payment will be the number of cubic yards installed in the complete and accepted work, measured within the limits shown on the Plans or as directed by the Engineer.

43. BASIS OF PAYMENT. The accepted quantity of Special Provision (Stone Fill, Stream Bed Material) will be paid for at the Contract unit price per cubic meter (cubic yard). Payment will be full compensation for furnishing, transporting, and placing the material specified and for furnishing all labor, tools, equipment, and incidentals necessary to complete the work.

Payment will be made under:

<u>Pay Item</u>	<u>Pay Unit</u>
900.608 Special Provision (Stone Fill, Stream Bed Material) (TYPE III)	Cubic Yard

ULTRA-HIGH PERFORMANCE CONCRETE

44. DESCRIPTION. The Contractor shall furnish all materials, tools and labor necessary for the performance of all work to form, cast, cure & finish Ultra High Performance Concrete (UHPC) where required per plan. Before casting UHPC for actual construction, the Contractor will cast mockups per the requirements of 900.645 Special Provision (Precast Mockup) for a trial batch to understand the properties and placement of UHPC prior to the bridge closure.

All UHPC shall be produced using "DUCTAL" concrete materials manufactured by Lafarge North America.

The work under this section shall be performed in accordance with these provisions, the Plans, and the following sections of Section 501 of the Standard Specifications:

- Forms.....501.09
- Finishing Concrete.....501.16

45. MATERIALS. Use the UHPC mixture JS1000 produced by Lafarge Corp supplied by Lafarge North America. Material supplier for DUCTAL concrete:

Paul White, P.E., Bridge Engineering Manager, UHPC/Ductal
 8700 W. Bryn Mawr Avenue
 Suite 300
 Chicago, IL 60631
 Phone (Office) (773) 355-4464
 Phone (Mobile) (773) 329-6569

UHPC components shall meet the following Ductal component recommendations:

- (a) Premix: Silica fume, ground quartz, sand, & cement
- (b) High Tensile Steel Fibers: 0.2mm (0.008 in) diameter x 14mm (0.5 in) long (>2000MPa/290 psi)
- (c) Admixture: High range water reducer/3rd generation
- (d) Water: Conforming to Section 745.01 of the Standard Specifications. Lafarge North America may require potable ice to be used in the batching process in lieu of liquid water.

46. SUBMITTALS. A minimum of fourteen (14) calendar days prior to placement of the trial batch the Contractor shall submit the mix design for approval. The mix design shall be submitted to the Agency's Materials and Research Laboratory, attention Structural Concrete Engineer. Concrete under this provision shall not be placed until the mix design has been approved. The mixing sequence shall include the order and time of introduction of the materials, mixing time and QA/QC procedure for verification of the mix uniformity.

The Contractor shall submit for review and approval a UHPC placement plan, including methodology for batching and casting, equipment used for final placement, starting location of UHPC pours, and anticipated cold joints in UHPC joints to the Engineer.

47. PRE-POUR MEETING. Prior to the trial batch placement of the UHPC for the mockup, the Contractor shall arrange for an onsite meeting with the Lafarge Representative, Engineer and VTrans Structural Concrete Engineer.

The Contractor shall attend the site meeting. The objective of the meeting will be to clearly outline the procedures for mixing, transporting, finishing, curing and final grinding of the UHPC material. The Contractor shall arrange for a representative of Lafarge to be in site during placement of the UHPC. The Lafarge representative shall be knowledgeable in the supply, mixing, delivery, placement, curing and final grinding of the Ductal Material. The Engineer may request a second Pre-pour meeting after the placement of the trial batch.

48. TRIAL BATCH. The Contractor shall produce and place a trial batch in a precast mockup at a location agreed upon by the Contractor and the Engineer. The Engineer shall be given a minimum of seven (7) days notice prior to the trial batch pour. The trial batch shall be produced, poured, and cured in the same manner that will occur during construction. The trial batch is intended to test the handling and flowability during UHPC placement. Cylinders shall be cast to determine whether the concrete meets the strength requirement of 14.5 ksi required for the project.
49. STORAGE. The Contractor shall assure the proper storage of DUCTAL premix including powder, fibers and other additives, obtained by Lafarge North America, as required by the Lafarge specifications in order to protect materials against loss of physical and mechanical properties.
50. FORMING, BATCHING, PLACEMENT, CURING AND GRINDING. Forming, batching placing, curing and grinding shall be in accordance with the procedures by Lafarge and as submitted and accepted by the Structural Concrete Engineer.

Placement of the UHPC shall be in accordance with the procedures recommended by Lafarge to ensure the elimination of air pockets in the closure pours. A minimum 1/8" overpour above final elevation is required for all UHPC joints.

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.

The design and fabrication of forms shall follow approved installation drawings and shall follow the recommendations of Lafarge.

Two portable batching units will be supplied by Lafarge to the Contractor for mixing of the UHPC. The contractor shall follow the batching sequence as specified by Lafarge and approved by the Structural Concrete Engineer.

The Contractor shall supply insulated containers for ice used in the batching operations.

The bridge can be opened to traffic when a strength of 14.5 ksi has been achieved.

The concrete in the form shall be cured according to Lafarge's recommendations to attain design strength.

51. TESTING. The following tests shall be performed following casting of the mockup and for each day of UHPC placement:

(a) Compressive Strength: Concrete compressive strength tests shall be performed according to ASTM C39. AASHTO T22/ASTM 39 shall be modified to allow a specimen loading rate of 150 psi/sec for each UHPC casting day. A minimum of 12 specimens 3 inch diameter by 6 inches shall be provided for each UHPC casting day. Prior to grinding UHPC, three specimens from each casting day shall be tested to validate achievement of 10 ksi compressive strength two (2) days after casting. Three specimens from each casting day shall be tested four (4) days after casting to validate the achievement of 14.5 ksi compressive strength and final acceptance of each UHPC casting prior to opening the bridge to traffic. Three specimens from each casting day shall be tested to verify final 20 ksi strength for informational purposes only. The Contractor shall coordinate with representatives of Lafarge to determine the day of final testing. The remaining three specimens from each casting day shall be treated as reserves.

All specimens shall be tested at the VTrans Material and Research (M&R) Central Laboratory in Berlin, VT, or a VTrans approved alternate location.

52. METHOD OF MEASUREMENT. The quantity of Special Provision (Ultra High Performance Concrete) to be measured for payment will be the number of cubic meters (cubic yards) of concrete placed with the complete and accepted work, as determined by the prismatic method using dimensions shown on the Plans or as directed by the Engineer. No deductions will be made for the volume of concrete displaced by steel reinforcement, structural steel and expansion joint material.

53. BASIS OF PAYMENT. The accepted quantity of Special Provision (Ultra High Performance Concrete) will be paid for at the Contract unit price per cubic meter (cubic yard). Payment will be full compensation for performing the work specified, including constructing forms and mockups for the trial batch, designing the mix, satisfactory finishing and curing, and for furnishing all forms, materials, including joint filler and bond breaker, labor, tools, admixtures, equipment, including automatic temperature recording units, trial batches, and incidentals necessary to complete the work.

Payment will be made under:

<u>Pay Item</u>	<u>Pay Unit</u>
900.608 Special Provision (Ultra High Performance Concrete) (FPQ)	Cubic Yard

INCENTIVE/DISINCENTIVE (I/D)

54. INCENTIVE/DISINCENTIVE (I/D), is hereby made a new Section of the Specifications as follows:

To provide a common proposal for all bidders and expedite the incentive payment process, the Agency has entered an amount of **one hundred seventy-four thousand nine hundred twenty (\$174,720)** dollars in the proposal to become part of the Contractor's total bid. **One hundred seventy-four thousand seven hundred twenty (\$174,720)** dollars amount 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 Special Provision No **12**.

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 the special provision No 12. For the incentive payment as described in part (c) of Special Provision No. 12, the Contractor will be paid in the next bi-weekly estimate in which the Contractor has satisfactorily met the requirements of I/D.
- (b) The quantity of incentive to be deducted will be the quantity of disincentive computed per the provisions of the special provision No 12. For the assessed disincentive as described in part (c) of Special Provision No. 12, the Engineer will deduct the amount due the Agency from the monies due the Contractor on the next bi-weekly 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

CPM SCHEDULE

55. DESCRIPTION. This work shall consist of developing and furnishing a CPM Schedule, including narratives, updates, and revisions for the duration of the Contract. These provisions shall supersede Subsection 108.03(a) of the Standard Specifications.
56. SUBMISSIONS.
- (a) The Contractor is responsible for the scheduling of all Contract work, which shall include, but is not limited to subcontracted work, complete and acceptable submissions, work component fabrications, and delivery of materials. The schedule shall include allowance for time for all aspects of the work including sufficient time for VTrans to perform its functions as indicated in the Contract, including but not limited to acceptance inspection and/or testing, and review and acceptance/approval of any required Working Drawings as defined in Section 105 or otherwise in the Contract Documents.
- (b) Provide the following items with each schedule submission. The schedule shall be prepared with MS Project.
- (1) An electronic copy in MS Project format with run date and version of the schedule;
 - (2) A PDF illustrated in color, depicting no more than 50 activities on each 280 by 430 mm (11 by 17 in.) sheet, and with each sheet including title, project name and number, match data for diagram correlation, and a key;
 - (3) A four-week look-ahead narrative to provide a more detailed plan of upcoming work highlighting the near term priorities. Indicate the anticipated workdays per week, number of shifts per day, number of hours per shift, crew sizes, and assumed resources. If the project requires a road closure, identify any changes in anticipated resources, or work schedule during the closure period.

- (a) The CPM schedule shall include the following:
- (1) Activities that describe the essential features of the work, activities that might delay Contract completion, and which activities are on the critical path;
 - (2) The planned start and completion dates for each activity and the duration of each activity stated in work days (field activities of more than 15 work days in duration shall be broken into two or more activities distinguished by location or some other logical feature); this estimated figure shall include considerations for permit limitations, seasonal limitations, and any other anticipated delays.
 - (3) When the project contains a defined Road or Bridge Closure Period of a minimum of 24 hours and up to a maximum of 28 days, the duration for work within the closure period shall be shown in hours instead of days. The maximum duration of each activity within the closure period shall be limited to twelve (12) hours;
 - (4) Finish-to-Start relationships among activities, without leads or lags unless justified in the narrative, and approved by the Engineer;
 - (5) Distinct columns showing Predecessors, Successors, Duration, Actual Start, and Actual Finish for each Activity;
 - (6) Project suspension or work inactivity that is three (3) days or longer;
 - (7) Dates related to the procurement of materials, equipment, and articles of special manufacture;
 - (8) Dates related to the submission of Working Drawings, plans, and other data specified for review or approval by the Agency;
 - (9) Key milestone dates specified in the Contract including but not limited to; Notice to Proceed, Interim Completion, Permit Restriction Dates, and Contract Completion Date. These shall be the only constraints in the schedule logic;
 - (10) Activities related to Agency or Third Party reviews and inspections.
- (b) For contracts with an original Contract amount in excess of \$8,000,000.00 the following additional information shall be shown on the CPM schedule:
- (1) Each Contract bid item identified with at least one activity, except:

Lump Sum items, Lump Unit items, Contract items paid by the "Hour", Contract items paid by the "Dollar", Section 641 pay items, and Section 653 pay items.
 - (2) Each compensable activity shall identify the applicable Contract item(s), along with the total quantity intended to be placed during that activity.

57. BASELINE SCHEDULE. The CPM Schedule submittal shall be received by the Engineer a minimum of seven (7) calendar days prior to the preconstruction meeting. The Engineer and Contractor may review the schedule at the preconstruction meeting. Any requested information and a revised schedule shall be submitted within seven (7) calendar days after receiving the Engineer's request. The Engineer shall be allowed twenty-one (21) calendar days to review the schedule and provide a response. The Engineer will review the schedule by assessing the schedule's compliance with these provisions and conformance with the Contract requirements. By accepting the schedule, the Engineer does not modify the Contract in any way. The Baseline Schedule shall be accepted before any field work begins. The accepted schedule will be used as the Baseline Schedule for the remainder of the project.

The schedule shall define and sequence activities so as to accurately describe the project and to meet Contract requirements for scope of work, phasing, accommodations for traffic, and interim, and project completion dates. Create the schedule, beginning with the date of the Notice to Proceed.

58. SCHEDULE UPDATES. The schedule shall be updated during active construction at the end of every other bi-weekly estimate period (update period) and when directed by the Engineer. Projects with short duration road closures are of particular importance as the project float will be limited. The Contractor shall promptly inform the Engineer of any schedule delays or changes that occur during these periods. The Engineer shall be allowed ten (10) calendar days to review the update for compliance with these provisions and provide a response. Include the following with each update:

- (1) Actual start dates of each activity started;
- (2) Actual finish dates of each activity finished, or remaining durations of activities started but not yet completed;
- (3) Narrative report describing progress during the update period, shifts in the critical activities from the previous update, sources of delay, potential problem areas, work planned for the next update period, and changes made to the schedule. Changes include additions, deletions, or revisions to activities due to the issuance of a Contract revision, changes to an activity duration, changes to relationships between activities, or changes to the planned sequence of work or the method and manner of its performance.
- (4) The Original schedule shall be shown as a Baseline.

59. REVISIONS. Schedule revisions shall be submitted within ten (10) calendar days after any of the following:

- (1) A written request to revise the schedule from the Engineer;
- (2) A delay (actual or projected) to scheduled milestones or project completion dates;
- (3) When actual progress falls behind the most recent schedule accepted by the Engineer, either by falling more than two (2) weeks behind schedule or by 5% of the total Contract time, the Contractor shall immediately inform the Engineer in writing. The Engineer may require the Contractor to submit a revised schedule. Neither the Engineer's acceptance of such revised schedule nor any Agency

feedback regarding the revised schedule shall be construed as an approval of the revised schedule, nor should it be construed as the Agency's dictation of the Contractor's means and methods;

- (4) Issuance of a Change Order/Supplemental Agreement(s) that by adding, deleting, or revising activities, changes the planned sequence of work or the method and manner of its performance;
- (5) Issuance of a Change Order/Supplemental Agreement(s) that adds time to the Contract;
- (6) The Contractor shall participate in progress meetings at the request of the Engineer to review and discuss the updated schedule information including any activity delay, coordination requirements, change orders, potential delays, and other relevant issues.

The Engineer shall review the revised schedule for compliance with these provisions, and provide a response within ten (10) calendar days.

- 60. FLOAT. Any float in the schedule is to be credited to the project only.
- 61. FAILURE TO SUBMIT SCHEDULE. Failure to submit a schedule (i.e. original baseline schedule, required updates, revisions, and when requested by the Engineer) in accordance with these provisions may be grounds for suspension of partial payments, as identified in Subsection 109.08, until a satisfactory schedule meeting the requirements of these provisions is received by the Engineer.
- 62. METHOD OF MEASUREMENT. The quantity of Special Provision (CPM Schedule) to be measured for payment will be the number of each CPM Schedule (i.e. original baseline schedule, required updates, revisions, and when requested by the Engineer), accepted by the Engineer through the duration of the Contract.
- 63. BASIS OF PAYMENT. The accepted quantity of Special Provision (CPM Schedule) will be paid for at the Contract unit price for each. Payment will be full compensation for preparing and submitting a schedule as specified, and for furnishing all labor, tools, equipment, and incidentals necessary to complete the work.

Payment will be made under:

<u>Pay Item</u>	<u>Pay Unit</u>
900.620 Special Provision (CPM Schedule)	Each
<u>GUARDRAIL APPROACH SECTION, GALVANIZED 2 RAIL BOX BEAM</u>	

- 64. DESCRIPTION. This work shall consist of furnishing and erecting galvanized 2-rail box beam guardrail approach sections as shown in the Plans and as directed by the Engineer.

The work under this Section shall be performed in accordance with these provisions, the Plans, and Section 621 of the Standard Specifications.

- 65. MATERIALS. Materials shall meet the requirements specified in the Contract Documents.
 - (a) Coating. Steel components of approach railing shall be powder coated black in accordance with ASTM D7803 following galvanizing.

66. CONSTRUCTION REQUIREMENTS. Guardrail approach sections shall be provided and erected to the configuration shown in the Contract Documents.
67. METHOD OF MEASUREMENT. The quantity of Special Provision (Guardrail Approach Section, Galvanized 2 Rail Box Beam) to be measured for payment will be the number of units installed in the complete and accepted work.
68. BASIS OF PAYMENT. The accepted quantity of Special Provision (Guardrail Approach Section, Galvanized 2 Rail Box Beam) will be paid for at the Contract unit price for each. Payment will be full compensation for furnishing, transporting, handling, and placing the material specified, and for furnishing all labor, tools, equipment, and incidentals necessary to complete the work.

Payment will be made under:

<u>Pay Item</u>	<u>Pay Unit</u>
900.620 Special Provision (Guardrail Approach Section, Galvanized 2 Rail Box Beam) (Coated Black)	Each

BRIDGE RAILING, GALVANIZED STEEL TUBING/CONCRETE COMBINATION

69. DESCRIPTION. This work shall consist of furnishing and erecting cast-in-place concrete bridge railing with galvanized steel tube rail in accordance with the Plans and as directed by the Engineer.

The work under this Section shall be performed in accordance with these provisions, the Plans, and Sections 501 and 525 of the Standard Specifications.

70. MATERIALS. Materials shall meet the following requirements:
- (a) Concrete. Concrete shall meet the requirements of CONCRETE, HIGH PERFORMANCE CLASS A of Section 501.
- Coarse aggregate for concrete shall meet the requirements of Subsection 704.02, Table 704.02A.
- (b) Reinforcing Steel. Reinforcing steel shall meet the requirements of Section 507 for Reinforcing Steel, Level II.
- (c) Steel Tubing. Steel tubing shall meet the requirements of Subsection 732.03.
- (d) Anchor Plate. Anchor plate for anchoring approach railing shall meet the requirements of Subsection 714.02.
- (e) Coating. Steel components of bridge railing shall be powder coated black in accordance with ASTM D7803 following galvanizing.
71. FABRICATION. Fabrication tolerances for all cast-in-place concrete barrier, regardless of the method of construction, shall conform to the following finished tolerances:

Bar Reinforcement Cover	-0, + $\frac{1}{2}$ inch
Width (Top)	-0, + $\frac{1}{4}$ inch
Width (Bottom)	-0, + $\frac{1}{2}$ inch

Surface Straightness	½	inch	in	20	feet
(Deviation from theoretical centerline)					
Vertical Alignment	½	inch	in	20	feet
(Deviation from a line parallel to the theoretical grade line)					

72. CONSTRUCTION REQUIREMENTS. The parapet shape detailed on the Plans shall not be altered. Slip forming of parapet is not allowed.
73. FORMS. Forms shall conform to the railing design shown on the Plans and the forming requirements of Section 501. Forms shall be constructed to allow for checking and correcting the railing alignment and grade after the concrete has been placed and prior to initial set. The forms shall be reinforced in such a manner that finishing of the railing tops will not disturb the final adjusted alignment.
74. CONCRETE FINISHING. Concrete bridge railing shall have a rubbed finish in accordance with Section 501. In addition, the following work shall be performed:
- (a) Repairs/Patching. Areas that contain minor defects shall be repaired. Minor defects are defined as holes, honeycombing, or spalls which are 6 inches or less in diameter and do not penetrate deeper than 1 inch into the concrete. Surface voids, or "bugholes", that are less than 1/4 inch in diameter and less than 1/8 inch deep need not be repaired. Repairs shall be made using an overhead and vertical concrete repair material satisfactory to the Engineer. The repair material shall be cured as specified by the manufacturer. Repairs shall be approved by the Engineer.
 - (b) Cracking. Cracks less than 0.01 inch in width shall be sealed by a method approved by the Engineer. Cracks in excess of 0.01 inch may be cause for rejection. At the Engineer's discretion, cracks shall be repaired or the bridge railing replaced at the Contractor's expense.
75. CURING CONCRETE. Curing compound shall not be used in curing railing concrete.

The Contractor and all other project personnel shall take particular care when performing any construction or other operations during the railing curing period in order that the bridge deck is not struck, shaken, or vibrated. After the curing period is completed, all parties shall take care to avoid damaging the railing during the remainder of project construction.

76. METHOD OF MEASUREMENT. The quantity of Special Provision (Bridge Railing, Galvanized Steel Tubing/Concrete Combination) to be measured for payment will be the number of meters (linear feet) of railing constructed in the complete and accepted work. Measurement will be made along the face of the railing between the pay limits specified.
77. BASIS OF PAYMENT. The accepted quantity of Special Provision (Bridge Railing, Galvanized Steel Tubing/Concrete Combination) will be paid for at the Contract unit price per meter (linear foot). Payment shall be full compensation for detailing, furnishing, handling, and placing the materials specified and for furnishing all labor, tools, equipment, and incidentals necessary to complete the work, including the furnishing of all forms, joint filler, admixtures, trial batches, anchor plates for approach railing connections, and satisfactory completion of any necessary repairs, surface finishing, and curing.

Reinforcing Steel and Water Repellent, Silane used within the limits of Special Provision (Bridge Railing, Galvanized Steel Tubing/Concrete Combination) will be paid for separately under Contract items 507.12 and 514.10, respectively.

Payment will be made under:

<u>Pay Item</u>	<u>Pay Unit</u>
900.640 Special Provision (Bridge Railing, Galvanized Steel Tubing/Concrete Combination)	Linear Foot

DURABLE CROSSWALK MARKING, IMPRINTED/COLORIZED

78. DESCRIPTION. This work shall consist of furnishing and installing imprinted and colorized durable crosswalk markings at the locations shown in the Plans and as directed by the Engineer.

The work under this Section shall be performed in accordance with these provisions and Section 646 of the Standard Specifications.

79. MATERIALS. Materials for crosswalk markings shall meet the requirements specified in the Plans and as recommended by the manufacturer.

Edge line pavement markings will meet the requirements of Section 646 for Durable White Line, Thermoplastic at the width specified in the Plans.

All materials shall be approved by the Engineer prior to use.

80. CONSTRUCTION REQUIREMENTS. The crosswalk shall be constructed to the depths and widths shown in the Plans, as recommended by the manufacturer and as directed by the Engineer.

Traffic shall only be allowed on the newly constructed crosswalk as recommended by the manufacturer and as directed by the Engineer.

81. METHOD OF MEASUREMENT. The quantity of Special Provision (Durable Crosswalk marking, Imprinted/Colorized) to be measured for payment will be the number of meters (feet) of marking applied in the complete and accepted work, as measured along the centerline of the crosswalk.

82. BASIS OF PAYMENT. The accepted quantity of Special Provision (Durable Crosswalk Marking, Imprinted/Colorized) will be paid for at the Contract unit price per meter (linear foot). Payment will be full compensation for furnishing, handling, and placing the materials specified, including edge line pavement markings, and for furnishing all labor, tools, equipment, and incidentals necessary to complete the work.

Payment will be made under:

<u>Pay Item</u>	<u>Pay Unit</u>
900.640 Special Provision (Durable Crosswalk Marking, Imprinted/Colorized)	Linear Foot

CONTRACTOR-FABRICATED PRECAST CONCRETE STRUCTURE

83. DESCRIPTION. This work shall consist of manufacturing, transporting, handling, and erecting precast concrete structure components fabricated by the Contractor at a location other than a Precast Concrete Institute (PCI) or National Precast Concrete Association (NPCA) certified precast concrete facility.
84. MATERIALS. Materials shall meet the requirements of Subsections 501.02, 507.02, and 540.02.
- (a) Concrete. Concrete shall meet the requirements of Subsection 540.05, with the exception that the requirements of part (a) do not apply. In lieu of a mix meeting the requirements of Subsection 540.05, the Contractor may provide a mix meeting the requirements of Section 501 for Concrete, High Performance Class A or Concrete, High Performance Class B, provided that the design strength as shown in the Plans as well as that required for lifting and handling is met.
85. GENERAL FABRICATION REQUIREMENTS. Unless noted otherwise herein, Contractor-fabricated Precast Concrete (CFPC) produced and paid under this Special Provision shall meet the requirements of Sections 501, 507, and 540.
86. SUBMITTALS. As soon as practical after award of the Contract, all required information shall be prepared and submitted. Fabrication drawings, mix designs, and erection plans shall be submitted as separate submittals.

If the contractor proposes a different configuration than what is provided in the contract plans then a complete copy of the structural design calculations for the CFPC shall be submitted accompanying / with Construction Drawings in accordance with Section 105. The design calculations shall substantiate that the proposed precast concrete satisfies the design parameters of the Contract. The applicable design code will be the latest edition of the AASHTO LRFD Bridge Design Specifications unless indicated otherwise in the Contract Documents.

Fabrication Drawings for the precast concrete shall be submitted in accordance with Section 105, with an additional copy to the Composite Materials Engineer. In addition to the requirements for Fabrication Drawings in Section 105, the following shall be included:

- (a) Dimensions and tolerances of the precast concrete to be fabricated.
- (b) The concrete mix design, including but not limited to the following:
- (1) Batch weights specifying dry or saturated surface dry.
 - (2) Material names and sources.
 - (3) Aggregate properties and date tested.
 - (4) Chemical and physical properties of cementitious material.
 - (5) Admixture names and sources.
 - (6) Lab data that shall include, but not be limited to:

- a. Slump.
 - b. Air Content.
 - c. Temperature.
 - d. Ratio of Water/Cementitious Material.
 - e. Cylinder breaks for 28 days standard cured.
 - f. 56-day Rapid Chloride Ion Permeability - AASHTO T 277 test data. The results shall be the average from testing 3 specimens, but the individual specimen results shall also be included. Testing shall be performed by an independent laboratory accredited by AMRL in this test method.
 - g. Alkali-Silica Reactivity (ASR) - AASHTO T 303 data from testing of both the fine and coarse aggregates. Testing shall be performed by an independent laboratory accredited by AMRL in this test method.
- (7) Alkali-Silica Reactivity (ASR). If potentially reactive aggregates are to be used in a mix design, then proposed mitigation method(s) and test results must be provided. The AASHTO T 303 test must be run again with the proposed mitigation method(s) and using the proposed job cementitious material proportioning. The proposed mitigation method(s) shall reduce expansion to below 0.10%.

If a mix design, including the testing results, has been submitted and approved within a 12 month period, it may be used in lieu of submitting an additional mix design. However, if any change in the material sources, properties, or proportions has occurred, then a new mix design with lab test data will be required regardless of previous approval. The requirements for testing in Subsections 540.04(b)(6)f, 540.04(b)(6)g, and 540.04(b)(7) above shall be waived if the submitted mix design has a minimum proportion of the cementitious material content of that allowed for use in High Performance Concrete in Section 501.

The mix design shall be approved by the Composite Materials Engineer prior to fabrication.

- (c) The sources and properties of the materials proposed for use.
- (d) The reinforcement schedule, placement of reinforcing steel, welded wire fabric, mechanical bar connectors, and inserts.
- (e) The type of surface finish and how the finish will be obtained. Include details of potential repair procedures.
- (f) The curing method, detailing sequence, and duration.
- (g) The minimum required concrete strength for design strength and form removal.
- (h) The design of the lifting attachments.

- (i) Transportation, handling, and storage details along with calculations to substantiate the proposed CFPC units will not be cracked/damaged by handling and/or transport.
 - (j) The installation procedures, including a detailed grouting procedure.
 - (k) A Quality Control Plan that identifies a Quality Control Manager and provides previous experience for work of this nature. A Description of Quality Control Processes addressing but not limited to:
 - (1) Concrete production including batching, delivery, and placement.
 - (2) Formwork.
 - (3) Reinforcing.
 - (4) Concrete finishing.
 - (5) Concrete cure.
 - (6) Shipping/Installation procedures.
87. INSPECTION. Materials furnished and the work performed herein shall be inspected by the Agency. The Agency will test all concrete incorporated into the work in accordance with Section 501. The inspector shall have the authority to reject any material or work that does not meet the requirements of the Specifications. Advance notification of at least two (2) weeks shall be provided by the Contractor to the Agency's Engineer and the Composite Materials Engineer concerning the proposed intention to commence work. A minimum of five (5) working days notification shall be provided by the Contractor to the Agency's Engineer and the Composite Materials Engineer to confirm the fabrication start date.
- Prior to placing any precast concrete elements produced under these Specifications, all materials shall have all applicable certifications approved in accordance with Subsection 700.02.
88. FABRICATION.
- (a) Pre-Production Meeting. Unless the Engineer deems, in writing, that a pre-production meeting is unnecessary, then a pre-production meeting shall be held a minimum of seven (7) calendar days prior to beginning concrete placement. The pre-production meeting shall be attended by, as a minimum but not limited to, the Crew Supervisor, Contractor Project Manager, Concrete Producer, Resident Engineer, Project Manager, and Composite Materials Engineer.
 - (b) Placing Concrete. Concrete placement shall be in accordance with Subsection 501.10 and as specified herein. Concrete shall not be deposited in the forms until the appropriate Agency representative has approved placement of the reinforcement, conduits, and anchorages.
 - (c) Repairs/Patching. CFPC structure components that contain minor defects caused by manufacture or handling may be repaired at the manufacturing site. Minor defects are defined as holes, honeycombing, or spalls which are 150 mm (6 inches) or less in diameter and that do not penetrate deeper than 25 mm (1 inch) into

the concrete. Surface voids or "bugholes" that are less than 16 mm (5/8 inch) in diameter and less than 6 mm (1/4 inch) deep need not be repaired. Repairs shall be made using a material from the Agency's Approved Products List for overhead and vertical concrete repair. The repair material shall be cured as specified by the manufacturer. Repairs shall be approved by the Engineer.

- (d) Cracking. Cracks less than 0.25 mm (0.01 inch) in width shall be sealed by a method approved by the Engineer. Cracks in excess of 0.25 mm (0.01 inch) may be cause for rejection. At the Engineer's discretion, cracked CFPC structure components shall be repaired or replaced at the Contractor's expense.
- (e) Dimensional Tolerances. All tolerances shall be in accordance with the latest editions of both PCI MNL 116 *Manual for Quality Control for Plants and Production of Precast and Prestressed Concrete Products* and PCI MNL 135 *Tolerance Manual for Precast and Prestressed Concrete Construction*, or with the National Precast Concrete Association (NPCA) *Quality Control Manual for Precast Concrete*, unless otherwise noted in the Contract Documents or as approved by the Engineer.
- (f) Marking. The date of manufacture, the production lot number, and the piece mark shall be clearly marked on each individual piece of precast concrete. The mark shall be in a location that will not be visible in the finished product.
89. HANDLING, STORAGE, AND SHIPPING. Each CFPC structure shall be handled, stored, and shipped in such a manner as to minimize chipping, cracks, fractures, discoloration, and excessive bending stresses. A unit damaged by handling, storage, or shipping shall be replaced at the Contractor's expense.
- A CFPC structure shall not be installed until the respective unit has been inspected. This inspection shall verify that the pieces are free from defects, and that all specification requirements, including but not limited to those for compressive strength and tolerance requirements, have been achieved. In addition, a CFPC structure will not be considered for shipment until the completion of the cure period and the required strength has been attained as demonstrated by field-cured cylinder breaks.
90. INSTALLATION METHODS, EQUIPMENT, AND ERECTION. Cranes, lifting devices, and other equipment for CFPC structure erection shall be of adequate design and capacity to safely erect, align, and secure all members and components in their final positions without damage. The Contractor is solely responsible for the methods and equipment employed for the erection of the CFPC structure components.

Construction Drawings for CFPC structure component erection shall be submitted in accordance with Section 105. The erection plan shall include the necessary computations to indicate the magnitude of stress in the units during erection and to demonstrate that all of the erection equipment has adequate capacity for the work to be performed, and provisions for all stages of construction, including temporary stoppages.

Post tensioning shall comply with Subsection 540.12.

Submittal of the erection plan is for the Agency's documentation only and shall in no way be construed as approval of the proposed method of erection. The Contractor shall follow the erection plan as submitted.

91. GROUT.

- (a) Unless otherwise noted grout shall be used to fill shear keys, leveling screw voids, transverse tie anchor recesses, dowel holes, and for fairing joints as detailed in the Contract Documents or as ordered by the Engineer.

Grout shall be Mortar, Type IV. Acceptable grout materials shall be those included on the Approved Products List on file with the Agency's Materials and Research Section. Additional aggregates shall not be added to the material during field mixing.

The Contractor, with written permission from the Engineer, has the option to use ready-mixed mortar for the grouting process. The Contractor shall prepare and submit for approval the mix design for the grout. The maximum quantity that may be delivered in a single load is one cubic meter (1.25 cubic yards), which shall be delivered and placed within the time limits specified by the manufacturer.

For testing, 6 neat 50 mm (2 inch) cubes shall be molded and cured in accordance with AASHTO T 106 (ASTM C 109). The average compressive strength of 3 cubes shall be a minimum of 7 MPa (1000 psi) at 3 days and a minimum of 35 MPa (5000 psi) at 28 days.

- (b) The surface to be grouted shall be thoroughly cleaned, wetted, and free of all standing water. The grout shall be mixed using a mechanical mixer according to the manufacturer's recommendations and shall be readily pourable so that it completely fills the shape of the shear keys or holes, depending on the product being installed. The placement of grout shall be continuous so as to produce a monolithic key absent of any voids or cold joints.
- (c) All exposed grout shall be cured for a period of no less than three days by the wetted burlap method in accordance with Section 501. Curing shall commence as soon as practical after grout placement.

92. METHOD OF MEASUREMENT. The quantity of Special Provision (Contractor-Fabricated Precast Concrete Structure) of the type and size specified to be measured for payment shall be on a lump sum basis. The lump sum shall include all of the CFPC structure components in the complete and accepted work for each location specified in the Contract.

93. BASIS OF PAYMENT. The accepted quantity of Special Provision (Contractor-Fabricated Precast Concrete Structure) of the type and size specified will be paid for at the Contract lump sum price. Payment shall be full compensation for designing, detailing, fabricating, repairing, transporting, handling, and erecting the materials specified, for furnishing and implementing the erection plan, and for furnishing all labor, tools, equipment, and incidentals necessary to complete the work.

Any grouting work, such as fairing out unevenness between adjacent precast concrete structure components and filling leveling screw holes, shear keys, transverse anchor recesses, and dowel holes, is considered incidental to the work for Special Provision (Contractor-Fabricated Precast Concrete Structure).

Payment will be made under:

Pay Item

Pay Unit

900.645	Special Provision (Contractor-Fabricated Precast Concrete Structure) (Abutment #1)	Lump Sum
900.645	Special Provision (Contractor-Fabricated Precast Concrete Structure) (Abutment #2)	Lump Sum
900.645	Special Provision (Contractor-Fabricated Precast Concrete Structure) (Approach Slab #1)	Lump Sum
900.645	Special Provision (Contractor-Fabricated Precast Concrete Structure) (Approach Slab #2)	Lump Sum

METALLIZING STRUCTURAL STEEL

94. DESCRIPTION. This work shall consist of furnishing all materials and equipment necessary and to metalize the structural steel in accordance with the contract documents and as directed by the Engineer.

The work under this section shall be performed in accordance with these provisions, the plans, and Section 506 of the Standard Specifications.

95. MATERIALS. Surfaces to be metallized shall be coated in accordance with Subsection 726.09.

96. SUBMITTALS. As soon as practical after award of the contract, all required information shall be prepared and submitted to the Structures Engineer for approval in accordance with Subsection 105 of the Standard Specifications.

97. METHOD OF MEASUREMENT.

The quantity of Special Provision (Metallizing Structural Steel) to be measured for payment will be on a lump sum basis for all the structural steel installed in the complete and accepted work.

98. BASIS OF PAYMENT. The accepted quantity of Special Provision (Metallizing Structural Steel) will be paid for at the Contract unit price for Lump Sum (LS). Partial payments will be made as follows:

- A. The first payment of 75% of the lump sum price will be made upon the original delivery to the project, provided the materials are acceptable and certified.
- B. The remaining 25% will be paid when the installation is complete and the work accepted.

Payment for Special Provision (Metallizing Structural Steel) will be full compensation for surface preparation, furnishing, transporting, handling, and placing the materials specified, and for furnishing all labor, tools, equipment, and incidentals necessary to complete the work.

Payment will be made under:

<u>Pay Item</u>	<u>Pay Unit</u>
900.645 Special Provision (Metallizing Structural Steel)	Lump sum

PREFABRICATED BRIDGE UNIT SUPERSTRUCTURE

99. **To be developed**

TRAFFIC CONTROL

100. DESCRIPTION. This work shall consist of establishing and maintaining traffic control measures to protect the traveling public and construction operations as indicated in the Plans and as directed by the Engineer.

The work under this Section shall be performed in accordance with these provisions, the Plans, and Section 641 of the Standard Specifications.

101. SUBMITTALS. The Contractor shall submit to the Engineer for approval a site-specific traffic control plan in accordance with Subsection 105.03. The traffic control plan shall conform to the requirements of the MUTCD and all applicable Agency Standard Drawings. Where conflicts exist, the MUTCD will govern. Each phase of construction shall be included in the submitted traffic control plan. The Contractor shall allow the Agency 14 calendar days to review and respond to the proposed traffic control plan.

102. TRAFFIC CONTROL DEVICES. Temporary traffic barrier shall meet the requirements of Section 621. Traffic control devices shall meet the requirements of Section 641.

103. METHOD OF MEASUREMENT. The quantity of Special Provision (Traffic Control, All-Inclusive) to be measured for payment will be on a lump sum basis for providing traffic control in the complete and accepted work.

The quantities for Uniformed Traffic Officers, Flaggers, and Portable Changeable Message Signs will be measured separately in accordance with Sections 630 and 641 respectively.

104. BASIS OF PAYMENT. The accepted quantity of Special Provision Traffic Control, All-Inclusive) will be paid for at the Contract lump sum price.

Partial payments will be made as follows:

- (a) The first 15% of the Contract lump sum price will be paid upon approval of the Contractor's traffic control plan.
- (b) The remaining 85% of the Contract lump sum price will be paid on a prorated basis for the estimated duration of the Contract work remaining.

Payment will be full compensation for preparing, implementing, inspecting, maintaining, and removing the applicable traffic control plan and required traffic control devices, including but not limited to temporary traffic barrier, Barricades, Drums/Cones, temporary pavement markings, signing, sign posts, temporary curb ramps; and for furnishing all labor, tools, materials, equipment, and incidentals necessary to complete the work.

Uniformed Traffic Officers and Flaggers will be paid for separately under Contract items 630.10 and 630.15, respectively.

Payment will be made under:

<u>Pay Item</u>	<u>Pay Unit</u>
900.645 Special Provision (Traffic Control, All-Inclusive)	Lump Sum

WATER MAIN ON BRIDGE

105. DESCRIPTION. This work shall consist of the fabrication, delivery, installation, and testing of a water main within the limits indicated on the Plans.

The work under this Section shall be performed in accordance with these provisions, the Plans, State of Vermont Water Supply Division Standards, and Section 629 of the Standard Specifications.

106. MATERIALS. Materials shall meet the requirements indicated in the Plans and the following Subsections:

Crushed Stone Bedding.....	Table 704.02A
Granular Backfill for Structures.....	704.08
Copper Water Tube, Seamless.....	740.04
Ductile Iron Pipe, Cement Lined.....	740.07
Chlorine Solution.....	742.01

The type and details of all water main components shall be approved by the Engineer prior to purchase.

Push-on pipe and fittings shall be Atlantic States Tyton Joint Pipe and Fittings or approved equal.

Restraint joint pipe and fittings shall be Atlantic States TR Flex Pipe and Fittings or approved equal. Restraint of field cut pipe shall be provided with Atlantic States TR FLEX GRIPPER® Ring, TR FLEX Pipe field weldments, or approved equal.

Pipe insulation, curb boxes, sleeves, and hanger supports shall conform to the details specified in the Plans. Insulation shall include all accessories complete with proper jackets or facings as required by the Plans and field conditions.

Valve boxes shall be Mueller valve box, two piece, slip type; item number 30666. Top piece shall be top with bottom flange. Lid shall be marked "Water" and shall be non-lockable. Box length shall be adequate to allow a minimum 4" overlap of sections with top extended to final grade.

Gate valves shall conform to AWWA C-515 Reduced-Wall, Resilient-Seated Gate Valves for Water Supply Service, be open right with a minimum working pressure of 250 psi. Ends shall be mechanical joint and shall be restrained with "Megalug" retainer glands. Gate valves shall have stainless steel nuts and bolts. Each valve shall have markers name, pressure rating, and year of manufacture cast in the body. Prior to shipment from the factory, each valve shall be tested by hydrostatic pressure equal to twice the specified working pressure. Manufacturers shall be Kennedy Valve, McWane, Inc. Clow Valve, or approved equal.

Corporation stops shall be ball valve type, no-lead in compliance with NSF-61 and shall conform to the details specified in the Plans.

107. GENERAL. The Contractor shall provide Fabrication Drawings indicating all pipe joints, hanger locations, pipe materials, and associated appurtenances prior to purchase and installation.

The Contractor shall notify the Engineer and the Town a minimum of 48 hours in advance of any service disruption.

The Contractor shall adjust the portion of the water main pipe on bridge so that a pipe joint does not occur within 2 feet of any pipe hanger assembly.

108. BEDDING FOR PIPE. Ductile iron pipe shall be bedded as detailed in the Plans.
109. JOINING PIPE. The electrical conductivity of the pipeline and attached services shall be maintained at all joints, couplings, valves, and fittings through the use of four brass wedges at each joint.
110. PRESSURE AND LEAKAGE TESTS. For the pressure test, the Contractor shall develop and maintain for two hours, 150 percent of the working pressure measured in psi (pounds per square inch) or 200 psi, whichever is greater.
111. BACKFILLING. Bedding material shall conform to the details specified in the Plans.
112. PIPE INSULATION. 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 waterproof seal.
113. METHOD OF MEASUREMENT. The quantity of Special Provision (Water Main on Bridge) of the size and type specified to be measured for payment will be on a lump sum basis in the complete and accepted work.
114. BASIS OF PAYMENT. The accepted quantity of Special Provision (Water Main on Bridge) of the type and size specified will be paid for at the Contract lump sum price. Payment will be full compensation for furnishing, transporting, handling, and installing the materials specified; all appurtenant work and materials necessary for a complete installation, including but not limited to excavation, bedding, backfill, pipe, fittings, joint restraints, insulation, jacket, pipe supports, threaded rods, and sleeves; for making all necessary connections; for making the required submittals; and for furnishing all labor, tools, equipment, and incidentals necessary to complete the work.

Payment will be made as follows:

A payment of 10% of the Contract lump sum price will be made when all submittals have been made and all required permits have been obtained.

A payment of 80% of the Contract lump sum price will be made when the new water main has been installed on the 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.

Payment will be made under:

Pay Item

900.645 Special provision (Water Main on Bridge)
(8")

Pay Unit
Lump Sum

BITUMINOUS CONCRETE PAVEMENT, SMALL QUANTITY

115. 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 or Section 490 of the Standard Specifications.

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

- Performance-Graded Asphalt Binder.....702.02
- Emulsified Asphalt, RS-1H or CRS-1H.....702.04
- Aggregate for Marshall Bituminous Concrete Pavement...704.10(a)
- Aggregate for Superpave Bituminous Concrete Pavement..704.10(b)

Aggregate shall meet requirements relating to Section 406 or 490, where so specified.

The grade of PG asphalt binder used to produce bituminous concrete pavement shall be 58-28. Substitutions will be accepted based on availability where the upper end temperature value is greater than 58°C (136°F) and/or the lower end temperature value is less than -28°C (-18°F).

117. DESIGN MIX TYPES. Design mix types may be substituted based on mix availability. Allowable mix type substitutions will be accepted on a one to one thickness relationship, except as listed in Tables A and B below.

TABLE A - ALLOWABLE 1½" MIX TYPE IVS SUBSTITUTIONS

Design ESALs (millions)	Design	Allowable Substitution	
		490.30 Superpave Bituminous Concrete Pavement	406.25 Bituminous Concrete Pavement*
< 0.3	TYPE IVS	TYPE III	TYPE III
0.3 to < 10	TYPE IVS	TYPE III	-

*Per Section 406.

TABLE B - ALLOWABLE 3½" MIX TYPE IIS SUBSTITUTIONS

Design ESALs (millions)	Design	Allowable Substitution	
	490.30 Superpave Bituminous Concrete Pavement	406.25 Bituminous Concrete Pavement*	406.27 Med. Duty Bituminous Concrete Pavement*
< 0.3	TYPE IIS	TYPE I	TYPE I
0.3 to < 10	TYPE IIS	TYPE I	-

*Per Section 406

118. COMPOSITION OF MIXTURE.

- (a) Gradation. Gradation shall meet the requirements of Section 406 or 490, as appropriate.
- (b) Design Criteria. Design Criteria shall meet the requirements of Section 406 or 490, as appropriate.
- (c) Mix Design. Standard mix design will be in accordance with Subsection 490.03 with an n value of 65 gyrations. Allowable substitutions based on pre-existing approved mix designs and/or n values for intended Contract suppliers are listed in Table C below. A request for substitutions must be submitted in writing to the Engineer a minimum of 10 working days prior to production. Any substitutions from the standard mix design or mix types as detailed in the Plans shall not result in any increase in cost to the Agency.

TABLE C - ALLOWABLE SPECIFICATION SUBSTITUTIONS

Design ESALs (millions)	Acceptable Specification Substitution		
	Superpave Bituminous Concrete Pavement (Gyrations)	Bituminous Concrete Pavement* (75 Blow)	Med. Duty Bituminous Concrete Pavement* (50 Blow)
< 0.3	50	✓	✓
0.3 to < 10	65 ¹	✓	-

¹Standard mix design specification.

*Per Section 406

(d) Quality Acceptance.

- (1) General. Acceptance sampling and testing will be conducted in accordance with the Agency's Quality Assurance Program as approved by FHWA. Bituminous concrete mixtures designated under these specifications will be sampled a minimum of once per day of production or 500 metric tons (sublot), or other sublot size deemed appropriate, and evaluated by the Agency for each mix type (each mix design) in accordance with the following acceptance guidelines.

- (2) Acceptance Guidelines. Temperature of the bituminous mixture shall be tested using the Verified Thermometer test method and PG Asphalt Binder content determined from the batch slip. Gradation shall be tested in accordance with AASHTO T 30. Mixture volumetric properties (air voids and VMA) shall be calculated in accordance with Subsections 406.03(b) or 490.03(b), as appropriate.
- (3) Non-Compliant Material.
 - a. Rejection by Contractor. The Contractor may, prior to sampling, elect to remove any defective material and replace it with new material at no expense to the Agency. Any such new material will be sampled, tested, and evaluated for acceptance.
 - b. For any non-compliant material outside the production testing tolerances contained in the applicable Table 406.03C or 490.03C, the representative material (sublot) shall be assessed a mixture pay adjustment according to Table D Mixture Pay Adjustment.

TABLE D - MIXTURE PAY ADJUSTMENT

Criteria	Deductions to be applied to materials outside production testing tolerance.		
	< 1.5X testing tolerance	=1.5-2.0X testing tolerance	>2.0X testing tolerance
AIR Voids	-5%	-25%	Remove
VMA	-5%	-25%	Remove
Aggregate passing 200 sieve	-5%	-25%	Remove
Aggregate larger than the 200 sieve.	-5% applied to each sieve out of toll.	-10% applied to each sieve out of toll.	Remove if any sieve out of toll.
Filler/AC Ratio	See note 2	See note 2	See note 2

- (1) Deductions will be applied per the table above in conjunction with the testing tolerances as contained in the applicable table 406.03C or 490.03C - PRODUCTION TESTING TOLERANCES.
- (2) A 5% deduction will be applied and coupled with any other applicable deduction in any case that the filler/asphalt ratio is outside the criteria as contained in the applicable table 406.03B or 490.03B - DESIGN CRITERIA.
- (3) The total deduction to be applied to any mix will be the sum total of all applicable deductions as contained in the table above.
- (e) Boxed Samples. If Agency plant inspectors are not available for daily testing and inspection functions, then box samples will be taken by the Engineer at the project site to afford verification of mixture volumetrics /properties. Boxed samples will be processed and results reported to the Engineer within ten working days of being received at the Agency Central Laboratory in Berlin, Vermont.

Gradation shall be tested in accordance with AASHTO T 30. Maximum Specific Gravity shall be tested in accordance with AASHTO T 209. Boxed samples will be assessed a mixture pay adjustment factor of 0.000.

119. COMPACTION. Special Provision (Bituminous Concrete Pavement, Small Quantity) will be analyzed for density according to the procedure specified below.

The density of the compacted pavement shall be at least 92.0%, but not more than 97.0%, of the corresponding daily average maximum specific gravity for each mix type (each mix design) of bituminous mix placed during each day, or placed per bridge for any bridge project. For material that falls outside of this range, payment will be made by adjusting the daily production totals in accordance with Table E:

TABLE E - DENSITY PAY FACTORS

AVERAGE DENSITY	DENSITY PAY FACTOR, PF(d)
89.0% - 90.4%	- 0.150
90.5% - 91.9%	- 0.100
92.0% - 93.4%	0.000
93.5% - 95.4%	0.150
95.5% - 97.0%	0.000
97.1% - 98.5%	- 0.100

When the Contract allows for a pay adjustment for mat density and the Agency elects to not take cores of any pavement course, the Density Pay Factor (PF(d)) will be considered equal to 0.000.

Bridges with a length equal to, or greater than, 20 feet will be cored for analyzing density of the bridge deck pavement. The minimum number of cores (taken from the center of the travel lane) shall be two, or as directed by the Engineer. Bridges with a length less than 20 feet will not be cored. Bridge decks or approaches will not be cored within 10 feet of a bridge or construction joint.

Bridge deck core areas shall be repaired with hot bituminous mix to the satisfaction of the Engineer at no additional cost to the Agency.

The cores taken for acceptance testing will be the final cores taken for determination of densities.

When the Contract does not allow for a pay adjustment for mat density the Contractor shall, prior to performing any construction operations, submit to the Engineer for approval the proposed rolling pattern and compaction equipment to be used on the project. Random investigative cores will be taken by Agency personnel on the first day's production of any pavement course, with the exception of the leveling course, to verify effectiveness of the proposed rolling pattern and equipment.

Pending results of the investigative cores, necessary adjustments to the proposed rolling pattern and/or equipment shall be made by the Contractor to achieve densities as directed by the Engineer.

120. 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, and when the mixture pay factor, PF(mix), for a lot of Special Provision (Bituminous Concrete Pavement, Small Quantity) is less than 0.000, the measured quantity of Special Provision (Bituminous Concrete Pavement, Small Quantity) placed will be multiplied by such pay factor to determine a Mixture Pay Adjustment, (PA(mix)), to the accepted tonnage placed (Q) for that lot based on the Contract bid price (B), as follows:

$$PA(mix) = PF(mix) \times Q \times B$$

When applicable, and when the density pay factor, PF(d), for a lot of Special Provision (Bituminous Concrete Pavement, Small Quantity) is less than 0.000, the measured quantity of Special Provision (Bituminous Concrete Pavement, Small Quantity) placed that day, or placed per bridge for any bridge project, will be multiplied by such pay factor to determine a Mat Density Pay Adjustment, (PA(d)), to the accepted tonnage placed (Q) for that lot based on the Contract bid price (B), as follows:

$$PA(d) = PF(d) \times Q \times B$$

121. 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 bridge deck 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 of obtaining, furnishing, transporting, and providing the straightedges required by Subsection 406.16 or Subsection 490.16, as appropriate, will be paid for under the appropriate Section 631 pay item included in the Contract.

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 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 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

CONCRETE BRIDGE DECK SURFACE PREPARATION

122. DESCRIPTION. This work shall consist of protecting and preparing the deck surface for methyl methacrylate, furnishing and installing methyl methacrylate, and 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.

123. GENERAL. This work will include protecting the deck during construction, preparing the deck surface by using pressurized air or similar, applying an approved Methyl Methacrylate (MMA) product, and blanket grinding the entire deck surface.

124. MATERIALS. Methyl Methacrylate (MMA) shall be submitted to the Composite Materials Engineer for approval prior to use.

125. CONSTRUCTION REQUIREMENTS. The construction shall be performed in accordance with these specifications, the Contract Plans, and recommendations of the materials provider.

(a) Deck Protection. The Contractor shall take special care to protect the concrete bridge deck from debris, dust, and spills throughout the project. Deck protection may include providing mats or boards to protect the surface from construction activities.

(b) Application of Methyl Methacrylate (MMA). Prior to application of MMA, the Contractor shall completely clean the bridge deck surface with compressed air. Water shall not be used. All debris, dust, and trash shall be completely removed from the bridge deck surface.

Following the cleaning of the bridge deck, the Contractor shall apply MMA to the entire bridge deck surface. MMA shall be applied in accordance with material provider recommendations. MMA shall be allowed to cure prior to starting any grinding activities.

- (c) Concrete Bridge Deck Grinding. For grinding the deck, provide grinding equipment that is power driven, self-propelled machines 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 4 feet wide. The effective wheel base of the machine shall be no less than 12 feet. The equipment shall have a positive means of vacuuming the grinding residue from the pavement surface, leaving the surface in a clean, near-dry condition.

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 pavement profile and providing proper cross slope on the concrete pavement.

Provide equipment with an effective wheelbase of at least 12.0 feet; 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.

For all bridge decks, furnish and maintain properly calibrated, documented, inertial based non-contact road profiling equipment during the grinding operations. The equipment may be lightweight, low-speed, high-speed, full-size, motor vehicle mounted, non-motor vehicle (trailer) mounted, and/or portable profiling equipment. The profiling equipment shall export raw profile data in an unfiltered ERD file format.

- (1) Initial Smoothness Measurement. The initial smoothness measurement shall be collected prior to any grinding or corrective action. Collect initial surface smoothness measurements for both wheelpaths in each proposed travel lane during one continuous pass. The wheelpaths are located parallel to the centerline or baseline of the roadway or ramp and approximately 3.0 feet inside all lane edges, measured transversely. Start the profile measurement approximately 250 feet before the approach slab/pavement interface at the entry end and continue to approximately 250 feet after the approach slab/pavement interface at the exit end.

Notify the VTrans Resident Engineer a minimum of 24 hours prior to surface smoothness measurements. Do not perform any measurements until all final wearing courses are in place within the bridge encounter lanes being measured and all concrete surfaces have reached specified curing and loading requirements. Remove all dirt and debris from the surface of the travel lanes prior to performing the surface smoothness measurements. Provide temporary pavement markings for all travel lanes that are of sufficient size to be visible during surface smoothness measurements. Ensure the path of the profiler is parallel to the lane edges at all times during data collection.

- (2) Grinding Simulation. For exposed concrete bridge decks, prior to commencing grinding operations, the FHWA's Profile Viewing and Analysis (ProVAL) Grinding Simulation shall be used to develop a grinding strategy and to simulate the grinding head depths across the bridge. The grinding head depths and locations shall be incorporated into the Blanket Grinding Work Plan to obtain the desired predicted outcome through the bridge encounter.
- (3) Blanket Grinding Work Plan. For exposed concrete bridge decks, the Contractor shall submit a written Blanket Grinding Work Plan to the VTrans Resident Engineer. The plans shall indicate the equipment, personnel, grinding patterns, and grinding depths that will be used to achieve the bridge encounter smoothness requirements. The Engineer shall approve of the Contractor's plan prior to the Contractor starting grinding work. Blanket diamond grinding of the exposed concrete bridge deck shall be completed in accordance with the approved Blanket Diamond Grinding Plan. Do not exceed 0.5 inches of material removed by diamond grinding without approval from the VTrans Resident Engineer.

At a minimum the plan must meet the following requirements:

- a. Grind concrete bridge deck until the surface meets the smoothness required.
 1. Meet the straight-edge requirements after grinding for all locations.
 2. Maximum depth of grinding is $\frac{1}{2}$ inch.
 3. Concrete thickness and reinforcement cover requirements are met.
- b. Provide a uniform finished texture.
- c. Perform grinding in a longitudinal direction.
- d. Begin and end grinding at lines normal to the bridge centerline.
- e. Do not damage the deck.
- f. Create a surface in a parallel, corduroy-type texture consisting of grooves between $\frac{1}{16}$ and $\frac{1}{8}$ inches wide.
 1. The peaks of the ridges need to be approximately $\frac{1}{16}$ inch higher than the bottom of the grooves.
- g. Maintain cross slope drainage.
- h. Remove grooving and grinding residue with a vacuum attached to the grooving or grinding machine. Prevent residue from flowing across the roadway surface or remaining on the surface. Dispose of grooving and grinding residue at an appropriate disposal facility.

- i. 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.
- j. Perform longitudinal diamond grooving in accordance with the special provisions.

(4) Bridge Encounter Smoothness Requirements. Following grinding or paving operations, each travel lane of each bridge encounter shall meet the following smoothness requirements:

- Maximum IRI value of 250 inches/mile for any 25-foot segment of a bridge encounter.

(5) Final Smoothness Measurements. Upon completion of the blanket diamond grinding activities or pavement operations, the Contractor shall re-measure surface smoothness in accordance with the above procedure. Corrective action shall be taken if the final smoothness measurements exceed the allowable smoothness requirements.

126. METHOD OF MEASUREMENT. The quantity of Special Provision (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 curbs as shown on the Plans and the longitudinal length of the bridge deck.

127. BASIS OF PAYMENT. The accepted quantity of Special Provision (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.

Providing, placing, and removing protection boards or mats, where required, will not be paid for separately but will be considered incidental to Special Provision (Concrete Bridge Deck Surface Preparation).

Payment will be made under:

<u>Pay Item</u>	<u>Pay Unit</u>
900.670 Special Provision (Concrete Bridge Deck Surface Preparation)	Square Foot