

Contract Number: C03169

Contract Name: COLCHESTER NH 028-1(31)

VERMONT
AGENCY OF TRANSPORTATION
2018 Standard Specifications for Construction

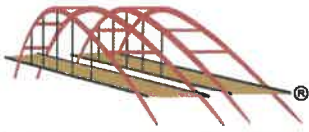
CONTRACT AGREEMENT

**Kubricky-Jointa Lime LLC
269 Ballard Road
Wilton, NY 12831**

VTrans Mission and Vision

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

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KUBRICKY-JOINTA LIME, LLC

CERTIFIED COPY OF RESOLUTION

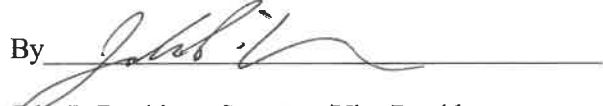
Kubricky-Jointa Lime, LLC
Name of Corporation

RESOLVED that Thomas J. Garrett, Authorized Representative of Kubricky-Jointa Lime, LLC be authorized to sign and submit bids and/or proposals and enter into Contracts for said Corporation.

The foregoing is a true and correct copy of the resolution adopted by Kubricky-Jointa Lime, LLC at a meeting of its Board of Directors held on the 2nd day of May, 2023.

Kubricky-Jointa Lime, LLC

By


John P. Davidson, Secretary/Vice President

Formed in the State of New York

269 Ballard Road, Wilton, NY 12831

(SEAL)

No Seal

SCHEDULE OF INSURANCE RATES ON EXTRA WORK

APPLICABLE TO THE **C03169 COLCHESTER NH 028-1(31)** PROJECT

To the Secretary of Transportation, Barre, Vermont

In connection with the contract for the above project, I/we submit herewith the following classification of work and the rates of insurance applicable to extra work performed and accepted on said project:

WORKER'S COMPENSATION

Classification No. 5222 Rate \$5.12
 Classification No. 5506 Rate \$3.70
 Classification No. 5507 Rate \$3.48
 Classification No. _____ Rate _____

GENERAL LIABILITY

Classification No. All Rate \$12.89
 Classification No. _____ Rate _____
 Classification No. _____ Rate _____
 Classification No. _____ Rate _____

AUTOMOBILE LIABILITY

Classification No. _____ Rate \$2350 per power unit
 Classification No. _____ Rate \$339 per trailer
 Classification No. _____ Rate _____
 Classification No. _____ Rate _____
Federal Social Security Act Rate \$7.65
Federal Unemployment Insurance Rate \$.60 (Net)
Vermont Unemployment Compensation Act Rate \$4.70

All items of insurance as above on extra work performed and accepted shall be allowed on the final estimate as per the Vermont Standard Specifications for Construction.

2/19/24
 Date

Kubricky-Jointa Lime, LLC
 Name of Corporation, Co-Partnership or Individual
Thomas J. Garrett, Authorized Representative
 Name and Title of Individual Signing the Contract
Wilton, New York
 Town or City, State

COMPLETE FORM IN ITS ENTIRETY

Compliance Bond

CA-112

STATE OF VERMONT
CONTRACT BOND

Bond No. SU1197408

KNOW ALL MEN BY THESE PRESENTS, That we

Kubricky-Jointa Lime,
LLC 269 Ballard Road
Wilton NY, 12831

as Principal, and Arch Insurance Company
3 Parkway, Ste 1500, Philadelphia, PA 19102

as Surety, are held and firmly bound unto the State of Vermont, as Obligee, in the penal sum of **Twenty-Six Million, Five Hundred and Sixty Thousand, Four Hundred and Forty-Two Dollars and Fifty Cents (\$26,560,442.50)**, good and lawful money of the United States of America, for the payment of which, well and truly to be made, we bind ourselves, our heirs, administrators, executors, successors and assigns, jointly and severally, firmly by these presents.

WHEREAS, the above bounden Principal has entered into a certain written contract with the above named Obligee, the State of Vermont for the construction of a certain project in the State of Vermont known as **C03169 COLCHESTER NH 028-1(31)** which contract is hereby referred to and made a part hereof as fully and to the same extent as if set forth at length herein:

NOW, THEREFORE, THE CONDITION OF THE ABOVE OBLIGATION IS SUCH that, if the above bounden Principal and his subcontractors and his or their agents and servants shall well and truly keep, do and perform, each and every, all and singular the matters and things in said contract set forth and specified to be by the said Principal kept, done and performed at the time and in the manner in said contract specified and shall pay over, make good and reimburse the State of Vermont all loss or losses and damage or damages which the above named Obligee, the State of Vermont, may sustain by reason of failure or default on the part of the Principal or his subcontractors, or his or their agents and servants, to fully carry out the terms of said contract, then this obligation shall be void; otherwise, to be and remain in full force and effect.

In Witness Whereof we hereunto set our hands and seals this 20th day of February A.D. 2024.

In Presence of **(TWO WITNESSES REQUIRED)**

Suzanne M. Oed
Corner Whitman
as to Principal

Kubricky-Jointa Lime, LLC

Name of Corporation, Co-partnership or Individual

[Signature] L.S.
Authorized Signature

(TWO WITNESSES REQUIRED)

[Signature]
Jesuso L. Ducciullo
as to Surety.

Title

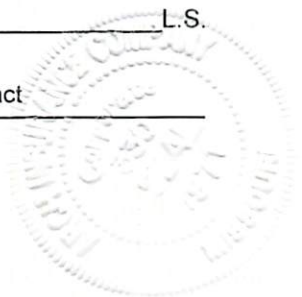
Arch Insurance Company

Bonding Company

[Signature] L.S.
Authorized Signature

Victoria P. Lyons, Attorney-in-Fact

Title



Labor and Materials Bond

CA-113

STATE OF VERMONT
CONTRACT BOND

Bond No. SU1197408

KNOW ALL MEN BY THESE PRESENTS, That we

Kubricky-Jointa Lime, LLC
269 Ballard Road
Wilton NY, 12831

as Principal, and Arch Insurance Company
3 Parkway, Ste 1500, Philadelphia, PA 19102

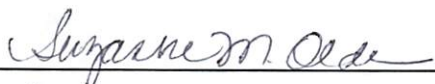
As Surety, are held and firmly bounden, unto the Secretary of Transportation for the State of Vermont, and his successors in office, as Obligees, in the penal sum of **Twenty-Six Million, Five Hundred and Sixty Thousand, Four Hundred and Forty-Two Dollars and Fifty Cents (\$26,560,442.50)**, good and lawful money of the United States of America, for the payment of which, well and truly to be made, we bind ourselves, our heirs, administrators, executors, successors and assigns, jointly and severally, firmly by these presents.

WHEREAS, the above bounden Principal has entered into a certain written contract with the State of Vermont for the construction of a certain project in the State of Vermont known as **C03169 COLCHESTER NH 028-1(31)** which contract is hereby referred to and made a part hereof as fully and to the same extent as if set forth at length herein:

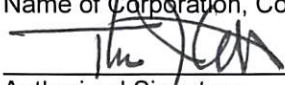
NOW, THEREFORE, THE CONDITION OF THE ABOVE OBLIGATION IS SUCH that, if the above bounden, Principal shall pay, settle, liquidate and discharge the claims of all creditors for material, merchandise, labor, rent, hire of vehicles, power shovels, rollers, concrete mixers, tools and other appliances, professional services, premiums and other services used or employed in carrying out the terms of said contract between said Principal and the State of Vermont, and shall pay all taxes, both State and municipal, and contributions to the Vermont Commissioner of Employment and Training, accruing during the term of performance of said contract, this agreement to make such payment being in compliance with the requirements of 19 Vermont Statutes Annotated, Section 10(9), as amended, to furnish security there under, and being in fact such security, then this obligation shall be void; otherwise, to be and remain in full force and effect.

In Witness Whereof we hereunto set our hands and seals this 20th day of February A.D. 2024.

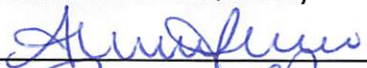
In Presence of **(TWO WITNESSES REQUIRED)**



as to Principal

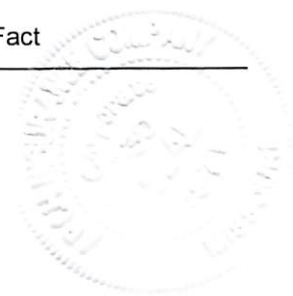
Kubricky-Jointa Lime, LLC
Name of Corporation, Co-partnership or Individual
 L.S.
Authorized Signature

(TWO WITNESSES REQUIRED)



as to Surety.

Title
Arch Insurance Company
Bonding Company
 L.S.
Authorized Signature
Victoria P. Lyons, Attorney-in-Fact
Title



This Power of Attorney limits the acts of those named herein, and they have no authority to bind the Company except in the manner and to the extent herein stated. Not valid for Note, Loan, Letter of Credit, Currency Rate, Interest Rate or Residential Value Guarantees.

POWER OF ATTORNEY

Know All Persons By These Presents:

That the Arch Insurance Company, a corporation organized and existing under the laws of the State of Missouri, having its principal administrative office in Jersey City, New Jersey (hereinafter referred to as the "Company") does hereby appoint:

Anthony Panno, Diane Moraski, Jessica L. Piccirillo, Kathleen M. Flanagan, Richard A. Leveroni, Russell M. Canterbury and Victoria P. Lyons of Farmington, CT (EACH)

its true and lawful Attorney(s)-in-Fact, to make, execute, seal, and deliver from the date of issuance of this power for and on its behalf as surety, and as its act and deed: Any and all bonds, undertakings, recognizances and other surety obligations, in the penal sum not exceeding **One Hundred Fifty Million Dollars (\$150,000,000.00)**.

This authority does not permit the same obligation to be split into two or more bonds In order to bring each such bond within the dollar limit of authority as set forth herein.

The execution of such bonds, undertakings, recognizances and other surety obligations in pursuance of these presents shall be as binding upon the said Company as fully and amply to all intents and purposes, as if the same had been duly executed and acknowledged by its regularly elected officers at its principal administrative office in Jersey City, New Jersey.

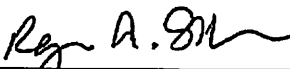
This Power of Attorney is executed by authority of resolutions adopted by unanimous consent of the Board of Directors of the Company on August 31, 2022, true and accurate copies of which are hereinafter set forth and are hereby certified to by the undersigned Secretary as being in full force and effect:

"VOTED, That the Chairman of the Board, the President, or the Executive Vice President, or any Senior Vice President, of the Surety Business Division, or their appointees designated in writing and filed with the Secretary, or the Secretary shall have the power and authority to appoint agents and attorneys-in-fact, and to authorize them subject to the limitations set forth in their respective powers of attorney, to execute on behalf of the Company, and attach the seal of the Company thereto, bonds, undertakings, recognizances and other surety obligations obligatory in the nature thereof, and any such officers of the Company may appoint agents for acceptance of process."

This Power of Attorney is signed, sealed and certified by facsimile under and by authority of the following resolution adopted by the unanimous consent of the Board of Directors of the Company on August 31, 2022:

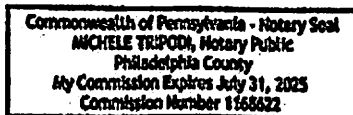
VOTED, That the signature of the Chairman of the Board, the President, or the Executive Vice President, or any Senior Vice President, of the Surety Business Division, or their appointees designated in writing and filed with the Secretary, and the signature of the Secretary, the seal of the Company, and certifications by the Secretary, may be affixed by facsimile on any power of attorney or bond executed pursuant to the resolution adopted by the Board of Directors on August 31, 2022, and any such power so executed, sealed and certified with respect to any bond or undertaking to which it is attached, shall continue to be valid and binding upon the Company. In Testimony Whereof, the Company has caused this instrument to be signed and its corporate seal to be affixed by their authorized officers, this **31st** day of **March, 2023**.

Attested and Certified


Regan A. Shulman, Secretary

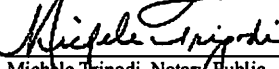
STATE OF PENNSYLVANIA SS
COUNTY OF PHILADELPHIA SS

I, Michele Tripodi, a Notary Public, do hereby certify that Regan A. Shulman and Stephen C. Ruschak personally known to me to be the same persons whose names are respectively as Secretary and Executive Vice President of the Arch Insurance Company, a Corporation organized and existing under the laws of the State of Missouri, subscribed to the foregoing instrument, appeared before me this day in person and severally acknowledged that they being thereunto duly authorized signed, sealed with the corporate seal and delivered the said instrument as the free and voluntary act of said corporation and as their own free and voluntary acts for the uses and purposes therein set forth.



Arch Insurance Company

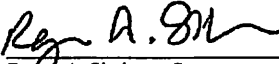

Stephen C. Ruschak, Executive Vice President


Michele Tripodi, Notary Public
My commission expires 07/31/2025

CERTIFICATION

I, Regan A. Shulman, Secretary of the Arch Insurance Company, do hereby certify that the attached Power of Attorney dated **March 31, 2023** on behalf of the person(s) as listed above is a true and correct copy and that the same has been in full force and effect since the date thereof and is in full force and effect on the date of this certificate; and I do further certify that the said Stephen C. Ruschak, who executed the Power of Attorney as Executive Vice President, was on the date of execution of the attached Power of Attorney the duly elected Executive Vice President of the Arch Insurance Company.

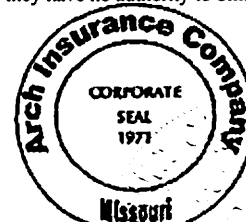
IN TESTIMONY WHEREOF, I have hereunto subscribed my name and affixed the corporate seal of the Arch Insurance Company on this **20th** day of **February**, 20 **24**


Regan A. Shulman, Secretary

This Power of Attorney limits the acts of those named therein to the bonds and undertakings specifically named therein and they have no authority to bind the Company except in the manner and to the extent herein stated.

PLEASE SEND ALL CLAIM INQUIRIES RELATING TO THIS BOND TO THE FOLLOWING ADDRESS:

Arch Insurance - Surety Division
3 Parkway, Suite 1500
Philadelphia, PA 19102



**To verify the authenticity of this Power of Attorney, please contact Arch Insurance Company at SuretyAuthentic@archinsurance.com
Please refer to the above named Attorney-in-Fact and the details of the bond to which the power is attached.**



CERTIFICATE OF LIABILITY INSURANCE

DATE (MM/DD/YYYY)

2/16/2024

THIS CERTIFICATE IS ISSUED AS A MATTER OF INFORMATION ONLY AND CONFERS NO RIGHTS UPON THE CERTIFICATE HOLDER. THIS CERTIFICATE DOES NOT AFFIRMATIVELY OR NEGATIVELY AMEND, EXTEND OR ALTER THE COVERAGE AFFORDED BY THE POLICIES BELOW. THIS CERTIFICATE OF INSURANCE DOES NOT CONSTITUTE A CONTRACT BETWEEN THE ISSUING INSURER(S), AUTHORIZED REPRESENTATIVE OR PRODUCER, AND THE CERTIFICATE HOLDER.

IMPORTANT: If the certificate holder is an **ADDITIONAL INSURED**, the policy(ies) must have **ADDITIONAL INSURED** provisions or be endorsed. If **SUBROGATION** IS **WAIVED**, subject to the terms and conditions of the policy, certain policies may require an endorsement. A statement on this certificate does not confer rights to the certificate holder in lieu of such endorsement(s).

PRODUCER Arthur J. Gallagher Risk Management Services, LLC 30 Century Hill Drive Suite 200 Latham NY 12110	CONTACT NAME: Heather Bearder PHONE (A/C, No, Ext): 518-869-3535 E-MAIL ADDRESS: heather_bearder@ajg.com FAX (A/C, No): 518-869-3580
INSURED Kubricky-Jointa Lime, LLC 269 Ballard Road Wilton, NY 12831	INSURER(S) AFFORDING COVERAGE INSURER A: Travelers Property Casualty Co of America INSURER B: Guardian Life Ins Co of America INSURER C: Liberty Mutual Fire Insurance Company INSURER D: Starr Indemnity & Liability Company INSURER E: Liberty Mutual Insurance Company INSURER F:

COVERAGES**CERTIFICATE NUMBER:** 1635137983**REVISION NUMBER:**

THIS IS TO CERTIFY THAT THE POLICIES OF INSURANCE LISTED BELOW HAVE BEEN ISSUED TO THE INSURED NAMED ABOVE FOR THE POLICY PERIOD INDICATED. NOTWITHSTANDING ANY REQUIREMENT, TERM OR CONDITION OF ANY CONTRACT OR OTHER DOCUMENT WITH RESPECT TO WHICH THIS CERTIFICATE MAY BE ISSUED OR MAY PERTAIN, THE INSURANCE AFFORDED BY THE POLICIES DESCRIBED HEREIN IS SUBJECT TO ALL THE TERMS, EXCLUSIONS AND CONDITIONS OF SUCH POLICIES. LIMITS SHOWN MAY HAVE BEEN REDUCED BY PAID CLAIMS.

INSR LTR	TYPE OF INSURANCE	ADDL INSD	SUBR WVD	POLICY NUMBER	POLICY EFF (MM/DD/YYYY)	POLICY EXP (MM/DD/YYYY)	LIMITS
C	☒ COMMERCIAL GENERAL LIABILITY ☐ CLAIMS-MADE ☒ OCCUR ☒ Contractual Liab GEN'L AGGREGATE LIMIT APPLIES PER: ☐ POLICY ☒ PRO-JECT ☒ LOC ☐ OTHER:	Y	Y	TB2641446071024	1/1/2024	1/1/2025	EACH OCCURRENCE \$2,000,000 DAMAGE TO RENTED PREMISES (Ea occurrence) \$300,000 MED EXP (Any one person) \$10,000 PERSONAL & ADV INJURY \$2,000,000 GENERAL AGGREGATE \$4,000,000 PRODUCTS - COMP/OP AGG \$4,000,000 \$
C	☒ AUTOMOBILE LIABILITY ☒ ANY AUTO ☐ OWNED AUTOS ONLY ☐ SCHEDULED AUTOS ☐ HIRED AUTOS ONLY ☐ NON-OWNED AUTOS ONLY	Y	Y	AS2641446071034	1/1/2024	1/1/2025	COMBINED SINGLE LIMIT (Ea accident) \$2,000,000 BODILY INJURY (Per person) \$ BODILY INJURY (Per accident) \$ PROPERTY DAMAGE (Per accident) \$ \$
D	☒ UMBRELLA LIAB ☒ OCCUR ☐ EXCESS LIAB ☐ CLAIMS-MADE DED RETENTION \$	Y	Y	1000588162241	1/1/2024	1/1/2025	EACH OCCURRENCE \$3,000,000 AGGREGATE \$3,000,000 \$
E	WORKERS COMPENSATION AND EMPLOYERS' LIABILITY ANY PROPRIETOR/PARTNER/EXECUTIVE OFFICER/MEMBER EXCLUDED? (Mandatory in NH) If yes, describe under DESCRIPTION OF OPERATIONS below	Y/N N	Y	WA564D446071014	1/1/2024	1/1/2025	☒ PER STATUTE ☐ OTH-ER E.L. EACH ACCIDENT \$1,000,000 E.L. DISEASE - EA EMPLOYEE \$1,000,000 E.L. DISEASE - POLICY LIMIT \$1,000,000
B A	NY Disability Inland Marine - Blanket BR Inland Marine - Leased & Rented			00923815 QT6308R820653TIL24	1/1/2024 1/1/2024	1/1/2025 1/1/2025	Continuous Blanket Builders Risk Leased & Rented Equip Statutory \$2,000,000 \$1,500,000

DESCRIPTION OF OPERATIONS / LOCATIONS / VEHICLES (ACORD 101, Additional Remarks Schedule, may be attached if more space is required)

Contractor Pollution Liability - Berkley Assurance Company - NAIC Code: 39462 - Effective Date: 1/1/2024 - Expiration Date: 1/1/2025 - Policy

#PCAB50239170124 - \$10,000,000 Each Claim/Aggregate.

Contractor Professional Liability - Berkley Assurance Company - NAIC Code: 39462 - Effective Date: 1/1/2024 - Expiration Date: 1/1/2025 - Policy

#PCAB50239170124 - \$5,000,000 Each Claim/Aggregate.

RE: 2024003-KCC-JLC-C03169-Colchester NH 028-1(3)

The State of Vermont and its agencies, departments, officers and employees, OWNER, and any other entity required by written contract are included as Additional Insureds as required by written contract executed prior to a loss but limited to the operations of the Insured under said contract, for ongoing & completed operations with respect to the General Liability, Automobile Liability, and Umbrella/Excess Liability policies. General Liability, Automobile Liability, See Attached...

CERTIFICATE HOLDER**CANCELLATION**

Vermont Agency of Transportation
219 North Main Street
Barre VT 05641

SHOULD ANY OF THE ABOVE DESCRIBED POLICIES BE CANCELLED BEFORE THE EXPIRATION DATE THEREOF, NOTICE WILL BE DELIVERED IN ACCORDANCE WITH THE POLICY PROVISIONS.

AUTHORIZED REPRESENTATIVE

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**ADDITIONAL REMARKS SCHEDULE**Page 1 of 1

AGENCY Arthur J. Gallagher Risk Management Services, LLC		NAMED INSURED Kubricky-Jointa Lime, LLC 269 Ballard Road Wilton, NY 12831	
POLICY NUMBER		EFFECTIVE DATE:	
CARRIER	NAIC CODE		

ADDITIONAL REMARKS**THIS ADDITIONAL REMARKS FORM IS A SCHEDULE TO ACORD FORM,****FORM NUMBER:** 25 **FORM TITLE:** CERTIFICATE OF LIABILITY INSURANCE

and Umbrella/Excess Liability evidenced herein is primary and noncontributory to other insurance available to an additional insured, but only to the extent required by written contract with the insured and executed prior to a loss. A Waiver of subrogation applies in favor of above-named Additional Insureds with respect to insured operations where required by written contract but limited to the operations of the Insured under said Contract and executed prior to a loss, with respect to the General Liability, Automobile Liability, Umbrella/Excess Liability, and Workers' Compensation policies. 30 days' notice of cancellation or non-renewal will be provided to Certificate Holder, except 10 days' notice for cancellation for non-payment of premium.

**STATE OF VERMONT
AGENCY OF TRANSPORTATION
CERTIFICATE OF COMPLIANCE**

For a bid/proposal to be considered valid, this form must be completed in its entirety, executed by a duly authorized representative of the bidder, and submitted as part of the response to the proposal.

A. NON-COLLUSION: The undersigned certifies under the penalties of perjury under the laws of the State of Vermont and the United States that it has not, either directly or indirectly, entered into any agreement, participated in any collusion, or otherwise taken any action, in restraint of free competitive bidding in connection with the submitted bid/proposal.

B. DEBARMENT: The undersigned certifies under the penalties of perjury under the laws of the State of Vermont and the United States that it:

1. Is not presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from participating in covered transactions by any Federal department or agency; and
2. Has not within a three-year period preceding this bid/proposal been convicted of or had a civil judgment rendered against them for commission of fraud or a criminal offense in connection with obtaining, attempting to obtain, or performing a public (Federal, State, or local) transaction or contract under a public transaction; violation of Federal or State antitrust statutes or commission of embezzlement, theft, forgery, bribery, falsification or destruction of records, making false statements, or receiving stolen property; and
3. Is not presently indicted for, or otherwise criminally or civilly charged by a governmental entity (Federal, State, or local) with commission of any of the offenses enumerated in paragraph 2 above; and
4. Has not within a three-year period preceding this application/proposal had one or more public transactions (Federal, State or local) terminated for cause or default.
5. **Where the prospective participant is unable to certify to any of the statements in this certification, such prospective participant shall attach an explanation to this bid/proposal, including whom it applies and dates of action. Exceptions will not necessarily result in denial of award but will be considered in determining bidder eligibility and/or responsibility. Providing false information may result in criminal prosecution or administration sanctions.**

C. BYRD ANTI-LOBBYING: The undersigned hereby certifies, by signing and submitting this bid/proposal, to the best of his or her knowledge and belief, that:

1. No Federal appropriated funds have been paid or will be paid, by or on behalf of the undersigned, to any person for influencing or attempting to influence an officer or

employee of any Federal agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with the awarding of any Federal contract, the making of any Federal grant, the making of any Federal loan, the entering into of any cooperative agreement, and the extension, continuation, renewal, amendment, or modification of any Federal contract, grant, loan, or cooperative agreement.

2. If any funds other than Federal appropriated funds have been paid or will be paid to any person for influencing or attempting to influence an officer or employee of any Federal agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with this Federal contract, grant, loan, or cooperative agreement, the undersigned shall complete and submit Standard Form-LLL, "Disclosure Form to Report Lobbying," in accordance with its instructions.
3. This certification is a material representation of fact upon which reliance was placed when this transaction was made or entered into. Submission of this certification is a prerequisite for making or entering into this transaction as required by 31 U.S.C. 1352. Any person who fails to file the required certification shall be subject to a civil penalty of not less than \$10,000 and not more than \$100,000 for each such failure.
4. The undersigned also agrees by submitting its bid/proposal that the participant shall require that the language of this certification be included in all lower tier subcontracts, which exceed \$100,000 and that all such recipients shall certify and disclose accordingly.

E. WORKER CLASSIFICATION COMPLIANCE REQUIREMENT: In accordance with Section 32 of The Vermont Recovery and Reinvestment Act of 2009 (Act No. 54), the following provisions and requirements apply to the undersigned when the total project costs exceed \$250,000.00.

Bidder is required to self-report the following information relating to past violations, convictions, suspensions, and any other information related to past performance and likely compliance with proper coding and classification of employees. The Agency of Transportation is requiring information on any incidents that occurred in the previous 12 months. Attach additional pages as necessary. **If not applicable, please enter 'Not Applicable' or 'N/A' below.**

Summary of Detailed Information	Date of Notification	Outcome

Bidder hereby certifies that the company/individual is in compliance with the requirements as detailed in Section 32 of Act 54(2009), as amended by Section 17 of Act 142 (2010) and further amended by Section 6 of Act 50 (2011).

Subcontractor Reporting.

A. Contracts for Services. The undersigned hereby acknowledges and agrees that if it is a successful bidder, prior to execution of any contract resulting from this solicitation, the undersigned will provide to the State a list of all proposed subcontractors and subcontractors' subcontractors, together with the identity of those subcontractors' workers compensation insurance providers, and additional required or requested information, as applicable, in accordance with Section 32 of The Vermont Recovery and Reinvestment Act of 2009 (Act No. 54), the undersigned will provide any update of such list to the State as additional subcontractors are hired. The undersigned further acknowledges and agrees that the failure to submit subcontractor reporting in accordance with Section 32 of The Vermont Recovery and Reinvestment Act of 2009 (Act No. 54) will constitute non-compliance and may result in cancellation of contract and/or restriction from bidding on future state contracts.

B. Construction Contracts. The Contractor is required to provide a list of subcontractors on the job along with lists of subcontractor's subcontractors and by whom those subcontractors are insured for workers' compensation purposes. This is not a requirement for subcontractor's providing supplies only and no labor to the overall contract or project.

Additionally, the Contractor shall collect and retain evidence of subcontractors' workers' compensation insurance, such as the ACORD insurance coverage summary sheet. Agency of Transportation will periodically verify the Contractor's compliance.

This information must be updated as necessary and provided to the State as additional subcontractors are hired. If none, please enter 'Not Applicable' or 'N/A' below.

Sub-Contractor	Insured By	Sub-Contractor's Sub	Insured By
N/A			

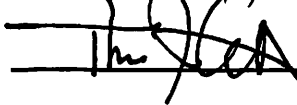
The undersigned further acknowledges and agrees that the failure to submit subcontractor reporting in accordance with Section 32 of The Vermont Recovery and Reinvestment Act of 2009 (Act No. 54), and as amended will constitute non-compliance and may result in cancellation of contract and/or restriction from bidding on future state contracts.

As a duly authorized representative of the bidder, I hereby certify that the information above is true and correct.

Date:

2/20/24

Duly Authorized Signature:



**Name and Title of Person Signing:
(Duly Authorized Signer)**

Thomas J. Garrett, Authorized Representative

Company Name:

Kubricky-Jointa Lime, LLC

Company Address:

269 Ballard Road

Wilton, New York 12831

E-Mail Address:

tgarrett@dacollins.com

Executive Order 02-22 Vendor Certification

Contractor: Kubricky-Jointa Lime, LLC.
Address 1 269 Ballard Road
City, State, Postal Wilton, New York 12831
Contractor's SOV Contract Number: C03169
Contract Subject Matter: EO02-22-Colchester NH 028-1(31)

This communication is sent to your company as you currently hold the State of Vermont (SOV) Contract referenced above. On March 3, 2022, Governor Phil Scott issued Executive Order No. 02-22, which in part requires a review of all contracts for Russian-sourced goods and goods produced by Russian entities. The Executive Order can be found here: <https://governor.vermont.gov/content/executive-order-02-22-solidarity-ukrainian-people>

The State is required to secure your response to this certification request. You should (1) either check Box A below, or check Box B and complete the associated table accordingly, and (2) sign below certifying that the form is accurate on behalf of your organization with respect to whether Russian-sourced goods and goods produced by Russian entities are being provided to the State of Vermont under the Contract.

Response to this letter must be submitted on or before March 21, 2022 by email to the SOV "Return to" contact stated above. If convenient for you, an electronic version of the template used for this letter is available at the web address link [Forms | Buildings and General Services \(vermont.gov\)](#) above.

- A. ☒ Contractor hereby certifies that in connection with the Contract, **none** of the applicable goods or services are Russian-sourced goods and/or produced by Russian entities.
- B. ☐ If the non-use box is not checked in Section A above, Contractor hereby indicates that certain products provided under this contract with the State of Vermont are Russian-sourced goods and/or produced by Russian entities, as described in the table below.

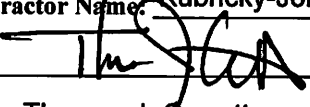
In addition, identify where indicated in the table, which goods are Russian-sourced and/or produced by Russian entities. An additional column is provided for any note or comment that you may have.

SOV Contract #	Provided Equipment, Product or Service	Contractor Note or Comment

Identify the point of contact for your company, along with their email address and phone number who the State can reach out to with follow-up questions or information associated with Executive Order No. 02-22.

Contact Name: Thomas J. Garrett
E-mail: tgarrett@dacollins.com
Phone: 518-792-5864

The person signing this form states that the person is authorized to sign on behalf of the Contractor, and that upon reasonable inquiry and investigation, the certification and information provided above is true and correct for the Contractor and for its vendors whose products and services are being used to support performance of the Contract.

Contractor Name: Kubricky-Jointa Lime, LLC
By: 
Name: Thomas J. Garrett
Title: Authorized Representative
Date: 2/20/24

PROJECT SPECIAL PROVISIONS

PART I – PROJECT NOTICE TO BIDDERS

1. NOTICE TO BIDDERS – CONTRACT COMPLETION DATE. This Contract shall be completed on or before July 1, 2026.
2. NOTICE TO BIDDERS – INTERIM COMPLETION DATE. The Contractor shall complete all work except demolition of the existing bridge, final wearing course paving, final pavement markings, final stabilization, and final site cleanup prior to December 1, 2025.

Liquidated damages in the amount of 90% of the applicable Contract Daily Charge Per Day of Delay in accordance with Subsection 108.12(b) will be assessed for each working day following December 1, 2025 that the specified work is not completed. These liquidated damages are separate from, and will be imposed in addition to, liquidated damages which may be imposed for failure to complete the Contract on time.

Subsection 108.11 shall not apply to the interim completion requirements listed above unless authorized by the Vermont Agency of Transportation.

3. NOTICE TO BIDDERS – PROHIBITION OF RUSSIAN GOODS. The Contractor is hereby notified that, pursuant to Vermont Executive Order No. 02-22, dated March 3rd, 2022, the purchase of Russian-sourced goods and goods produced by Russian entities (defined as institutions or companies that are headquartered in Russia or have their principal place of business in Russia) is prohibited. The awarded Contractor must fill out and sign the Executive Order 02-22 Vendor Certification as part of Contract awarding process.
4. NOTICE TO BIDDERS – SUBSECTION 406.14(b)(3). Subsection 406.14(b)(3) is hereby modified by deleting the eighth paragraph in its entirety and replacing it with the following:

Core samples 6-inches in diameter shall be taken to satisfy the provisions of this subsection. As necessary, the Contractor shall mark the cores for saw-cutting in the presence of the Engineer or designee for verification of cut locations. Agency personnel will process the core samples within 10 working days and will relay the test results to both the Engineer and the Contractor. Bulk specific gravity will be determined in accordance with *AASHTO T 166*, Method A and maximum specific gravity will be determined in accordance with *AASHTO T 209* from Agency acceptance tests conducted at the plant. For material subject to box sampling, the average of Agency results and validated quality control results will be used for maximum specific gravity.

For quality control results to be included in the daily average for maximum specific gravity, F and T testing, with a level of significance of $\alpha = 0.05$, will be used with a moving window including the 5 previous tests to validate the newest test results of the same mix design. The first air void lot of a mix design on a project will be validated once it is complete. If quality control results are successfully validated for both the F and T tests, the acceptance and quality control daily test results will be averaged to determine the G_{mm} for the core lot. If the results are successfully validated for the F test but fail validation on the T test, then only the acceptance results will be used, unless otherwise directed by the Engineer. If the results are successfully validated for the T test but fail validation on the F test, then the Agency will conduct further investigations before the quality control results are included. Quality control results shall be submitted to SiteManager or emailed to AOT.HMAQC@vermont.gov within 24 hours of the conclusion of the paving shift. If quality control results are not provided in time, they may be excluded from the daily average for maximum specific gravity.

5. NOTICE TO BIDDERS – SUBSECTION 631.02(a)(2). Subsection 631.02(a)(2) is hereby modified by being deleted in its entirety and replaced with the following.

- (2) Design. Field Offices shall be a commercial-type Field Office trailer of standard commercial quality, or a building, in good condition as determined by the Engineer with a minimum width of 24 feet and a minimum length of 60 feet. They shall have a minimum of two means of egress equipped with dead bolt locks and a minimum 4 foot × 4 foot deck with steps and railings in accordance with the VOSHA Safety and Health Standards for Construction.

The Contractor shall provide the Engineer with three sets of keys. The Contractor shall not access the Field Office without approval of the Engineer.

For the commercial-type Field Office trailer, Field Offices shall have a minimum of four individual offices and central conference room/meeting area. Commercial-type Field Office trailers shall also have six side windows (three each side), two front windows, and two rear windows. Standard buildings shall have sufficient windows to the satisfaction of the Engineer. All windows shall be glassed and screened with provisions for opening and locking and equipped with adjustable louvered blinds.

Field Offices shall have a lighting system capable of providing a minimum of 50 foot-candles on all work surfaces and shall have a minimum 400 W exterior security light.

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

- (4) Communications Services. Field Offices shall have independent telephone and internet services such that both can be used simultaneously without impacting functionality. The Contractor shall provide the Engineer with a list of all internet services available at the proposed field office location and the Engineer will select the service to be provided. In all cases, internet service shall have a minimum download speed of 4 Mbps and a minimum upload speed of 1 Mbps. The specified internet speeds shall be achieved without using compression algorithms. Jacks for connection to internet and telephone services shall be located at each end of the field office for both services.

The Contractor shall be responsible for establishing all connections for communications services and maintaining communications services throughout the duration the field office is in use.

7. NOTICE TO BIDDERS – SUBSECTION 631.02(a)(5). Subsection 631.02(a)(5) is hereby modified by adding the following as the second paragraph.

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

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

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

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

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

9. NOTICE TO BIDDERS – SUBSECTION 631.02(a)(7). Subsection 631.02(a)(7) is hereby modified by being deleted in its entirety and replaced with the following.

- (7) Office Equipment. All Field Offices shall contain the following standard commercial-quality office equipment, with substitutions allowed upon approval of the Engineer:

6 Standard office desks a minimum of 60 inches wide × 30 inches deep and with drawers, locks, and keys

3 12 foot × 4 foot tables

6 2 foot × 8 foot tables

12 Ergonomic office chairs with adjustable lumbar support, adjustable height, and rolling casters

25 folding chairs

2 Adjustable height drafting stools

2 Secure, four-drawer, legal-size file cabinet, fire-resistant (rated to withstand a one-hour fire) with lock and two keys

4 Telephones with touch tone dial, compatible with the local telephone service available and capable of receiving and storing messages

2 30-gallon trash cans with trash bags

1 Electric clock having a dial face at least 8 inches in diameter

1 First aid kit conforming to the latest revision of ANSI/ISEA Z 308.1

1 Halon fire extinguisher, equal in fire-fighting capacity to a 5-pound carbon dioxide fire extinguisher, or as needed in accordance with OSHA requirements

1 Outdoor thermometer, weatherproof, easy to read, and having a minimum scale range of -40°F to 120°F in graduations of 2°F

Field Offices shall be provided with ventilation and gas connections as required.

The Contractor shall furnish all labor and materials for winterizing Field Offices.

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

- (b) Field Office, Engineers. Field Office, Engineers shall be available for use 7 Calendar Days prior to any work commencing, including erection of construction approach signing, until 30 Calendar Days after final inspection of the Project, unless otherwise directed by the Engineer.

In addition to Subsection 631.02(a), Field Office, Engineers shall meet the following requirements:

- (1) Size. Field Office, Engineers shall have a minimum floor space of 1316 square feet.
- (2) Office Equipment. Field Office, Engineers shall contain the following standard commercial quality office equipment, with substitutions allowed upon approval of the Engineer:

1 Rain gauge

1 Standard drafting table a minimum of 72 inches wide × 37-1/2 inches deep

6 Storage cabinets a minimum of 36 inches wide × 24 inches deep × 24 inches high

6 24" wide screen monitors

55" wall mounted monitor over the conference table

Video conferencing equipment including camera with pan, tilt, and zoom and speakerphone that is connected to the 55" monitor and compatible with Microsoft Teams and Zoom.

1 Storage cabinet a minimum of 36 inches wide × 24 inches deep × 24 inches high

1 Storage locker or closet of sufficient size for secure storage of surveying equipment

1 Printer/scanner/copier combination unit with color, with a minimum tray capacity of 50 sheets and a minimum print speed of 10 sheets per minute. The combination unit shall be capable of handling 11 × 17-inch sheets. The combination unit shall be compatible with Microsoft Windows 10 and later versions and shall have wired and wireless network capabilities.

The printer/scanner/copier combination unit shall have a stand of sufficient size and strength to support the unit. Supplies for the printer/scanner/copier shall include 8-1/2 × 11-inch paper, 11 × 17-inch paper, and ink or toner in black and color.

1 Microwave with a minimum capacity of 2 cubic feet

1 full size refrigerator / freezer with a minimum capacity of 21 cubic feet

All furnished equipment shall be maintained in good working order. Replacement equipment shall be provided within 48 hours for all equipment that is damaged, stolen, or becomes inoperative in any way.

The Contractor shall provide training to the Engineer in the use of the furnished equipment.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

- b. Biosolids. Biosolids shall be Exceptional Quality biosolids in accordance with the Vermont Agency of Natural Resources *Solid Waste Management Rules, Subchapter 13*.
- (3) Per- and Polyfluoroalkyl Substances (PFAS). The composite manufactured topsoil shall have maximum PFAS screening values in accordance with Table 755.02A as determined in accordance with *EPA Method 1633*.

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

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

14. NOTICE TO BIDDERS - INCENTIVE/DISINCENTIVE (I/D). The Agency's intent is to have the contractor maintain the existing traffic signals and their components in as good or better condition, until replaced under the Contract, to minimize the risks of safety and capacity impacts on the traveling public. 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) Timeframe. The Contractor shall assume ownership and maintenance of all three (3) traffic signals within the project limits, listed below, beginning when all construction approach signing is installed and accepted, and ending upon turn on and switch over to all three (3) completed traffic signals.
- US Route 2 & I-89 Interchange 17 Southbound Ramps
 US Route 2 & I-89 Interchange 17 Northbound Ramps
 US Route 2 & US Route 7 (Chimney Corners)
- (b) Identified Work. The contractor shall maintain the existing traffic signals and all their components in as good or better condition until replaced under the Contract.

The Contractor shall assume ownership and maintenance of all three (3) traffic signals within the project limits beginning when all construction approach signing is installed and accepted.

For a dark signal or a signal in flash, the Contractor shall report to the site and begin addressing the issue within 4 hours of receiving notification from the Agency. For any other signal maintenance issue, the Contractor shall report on site and begin addressing the issue within 48 hours of receiving notification from the Agency.

The Contractor shall be responsible for any signal issue that exceeds the allotted timeframe. Every hour past the reporting times described above will be eligible for a disincentive.

Any damage or loss to the traffic signals due to an accident will be considered maintenance.

The contractor is expected to report as required in this section to repair any damage or loss to the traffic signals due to an accident. This work will be considered Extra Work per Subsection 109.06.

Any damage or loss to the traffic signals, including poles and cabinet/controller, caused by the Contractor's operations shall not be considered maintenance of the existing traffic signals.

- (c) Pay Schedule. The Contractor will receive a lump sum compensation of fifty thousand dollars (\$50,000.00) for completing the Identified Work.

For each hour past the reporting times specified in the Identified Work that the Contractor reports to a signal maintenance issue, the Contractor will be assessed a disincentive at a rate of four thousand dollars (\$4000.00) per hour. The full hourly disincentive amount will be assessed for each hour past the reporting times specified in the Identified Work 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 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 contract 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.

15. NOTICE TO BIDDERS – NIGHT WORK. The Contractor is hereby notified that all construction operations that require full closures of a roadway, interstate barrel, or ramp, including but not limited to, bridge erection, bridge demolition, ramp reconstruction and widening, traffic signal construction, intersection reconstruction, drainage construction, final paving, and pavement markings shall be performed between the hours of 8:00 p.m. and 6:00 a.m. of the next calendar day. The Engineer may abbreviate this time period as necessary. All work performed at night shall be completed in accordance with Subsection 105.14.

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

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

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

(b) Recommended Mitigation Measures. Noise reduction mitigation measures as outlined in the FHWA Construction Noise Handbook (http://www.fhwa.dot.gov/environment/noise/construction_noise/handbook/handbook07.cfm) may be utilized by the Contractor and include the following:

- (1) Sequence work such that noisy activities occur concurrently, when possible.
- (2) Shield or insulate stationary equipment such as air compressors and light towers.
- (3) Properly maintain equipment with attention to lubrication, air intake, exhaust, and other aspects that impact noise.
- (4) Employ systems to prevent slamming tailgates on dump trucks.
- (5) Minimize idling of equipment.

- (c) Required Mitigation Measures. The Contractor shall utilize broadband sound (i.e. “white-noise, whooshing sound”) types of backup alarms, or adjustable backup alarms that can be adjusted down for the ambient noise level. Broadband sound is defined as sound where the acoustic energy is distributed over a very wide frequency range. The spectrum is largely smooth and continuous, except at the extremes.

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

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

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

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

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

The deadline for submitting inquiries related to this project to the Office of Contract Administration is 4:30 p.m. Eastern Time on ~~January 3, 2024~~ ~~January 10, 2024~~ January 17, 2024. No exceptions will be made to this requirement.

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

Construction Stormwater Permit
Operational Stormwater Permit
404 Corps of Engineers Permit
State Wetland Permit
Act 250 Land Use Permit
PIF – Aero Aggregates Foamed Glass Aggregate
PIF – Cree Lighting Products
PIF – DSGI Inclinometer System
PIF – Econolite Traffic Signal Products
PIF – GTT Opticom Preemption System
PIF – Wavetronix Vehicle Detection
Required Contract Provisions for Federal-Aid Construction
U.S. Department of Labor Davis-Bacon Wage Rates
Disadvantaged Business Enterprise (DBE) Policy Contract Requirements (Form CR-110)
Bulletin 3.5 Attachment C: Standard State Provisions for Contracts and Grants
USDOT Standard Title VI/Non-Discrimination Assurances, Appendices A and E
Standard Federal EEO Specifications
Contractor's EEO Certification Form
Vermont Certificate of Compliance
Vermont Minimum Labor and Truck Rates
Commodity Index Prices
Schedule of Pay Items

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

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

21. NOTICE TO BIDDERS – GENERAL SPECIAL PROVISIONS. The Contractor is hereby notified that the most recent General Special Provisions in effect on the date of advertisement shall apply to this Contract. The General Special Provisions may be found at the following address:

<https://vtrans.vermont.gov/2018-specifications>

22. NOTICE TO BIDDERS – STANDARD DRAWINGS. The Vermont Agency of Transportation Standard Drawings listed on the Index of Sheets are not included in the plan set, but may be found at the following address:

https://outside.vermont.gov/agency/vtrans/external/CADD/WebFiles/Downloads/Standards/VAOTconSTD_Owner.xml

23. NOTICE TO BIDDERS – INFORMATIONAL DOCUMENTS. The Contractor is hereby notified that the following informational documents for this Contract are available on iCXWeb and the VTrans Bid Opportunities website. These documents are being provided during the bid solicitation period for informational purposes only.
- (a) TMP Checklist
 - (b) TMP – Exit 17 – Colchester NH 028-1(31)
 - (c) TMP – Exit 16 – Colchester HES NH 5600(14)
 - (d) Geotechnical Reports and Memoranda
 - (e) Record Plans for I 89-3(29) C-2, I 89-3(19) C-4, BRF F 028-1(3), & Street Lighting

24. NOTICE TO BIDDERS – STAGING AND WASTE SITES. The Contractor is hereby notified that VTrans is providing an onsite staging area for use by the Contractor during construction of the Project. The staging area is in the northwest quadrant of the interchange bordered by the existing interstate southbound off ramp on the east and Jasper Mine Road on the south. The areas of this parcel which are permitted for use are shown on the EPSC Construction Site Plan Sheets. No additional permitting or offsite activity approvals are required for use of this parcel. The Contractor shall position the Engineer's Field Office on this parcel. Restoration activities including final grading consistent with preconstruction grading and final stabilization measures for this parcel will not be paid for directly but will be considered incidental to all contract items.

The Contractor is hereby notified that the Vermont Natural Resources Board has requested that VTrans contractors planning to use alternate staging and waste sites governed by preexisting Act 250 permits notify District Coordinators prior to using these sites. Complying with preexisting Act 250 permits at these sites is the sole responsibility of the landowner and the Contractor, not the State.

25. NOTICE TO BIDDERS – ACT 250. The Contractor is hereby notified in addition to the Act 250 permit there is a Memorandum of Understanding (MOU) to establish and coordinate procedures for regulating certain transportation-related projects, dated April 7, 2009. As described in the MOU, if the Contractor elects to open any new waste or borrow sites they shall be responsible for coordinating with the DEC District Coordinator prior to the commencement of construction.
26. NOTICE TO BIDDERS – SURFACE WATER WITHDRAWAL. The Contractor is hereby notified that the Vermont state law, Act 135 of 2022, requires any person withdrawing surface water (as defined in 10 V.S.A. § 1002 (20)) to register with and report the water withdrawal and usage to the Vermont Department of Environmental Conservation beginning January 1, 2023. Guidance can be found here: <https://dec.vermont.gov/watershed/rivers/streamflow-protection/act-135-surface-water-withdrawal-registration-and-reporting>

27. NOTICE TO BIDDERS – ENVIRONMENTAL COMMITMENTS.(a) Threatened, Endangered, and Rare Species.

- (1) The Contractor shall ensure all personnel working on the project site are made aware of the potential presence and protected status of the northern long eared bat and Indiana Bat. No suitable bat habitat is present within the project limits and no Time-of-Year (TOY) restrictions are required. The Contractor is hereby made aware of the potential for TOY restrictions related to proposed Waste, Borrow and Staging areas. Cutting trees ≥ 3 inches in diameter outside of the contract project limits shall require review under Section 105.26 Opening Off-Site Activity Areas.

(b) Emerald Ash Borer.

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

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

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

The Contractor is also hereby made aware of the same potential restrictions as they relate to proposed Off-Site Activities (Waste, Borrow and Staging) areas under Section 105.25 Off-Site Activity Areas.

(c) Section 106 Archaeology.

- (1) Stipulations for Protective Fencing to Avoid Site VT-CH-1281: This project will have no effect on site VT-CH-1281 with the following stipulations in place:

- a. The contractor will place fencing around site VT-CH-1281 as shown on the EPSC plans dated 9-25-2023 prior to the placement of any staging material and equipment.
- b. This area will be labeled as "Do not disturb" and will be avoided during construction.

28. NOTICE TO BIDDERS – UTILITIES. Existing underground facilities owned by Vermont Gas Systems will not require adjustment. The Contractor is cautioned to protect these facilities from damage.

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

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

Contacts for the above listed companies are as follows:

Comcast	Marc Descoteaux	(802) 999-7504
Consolidated Communications	Jason Lavery	(802) 338-0793
Firstlight Fiber	William Gray	(802) 922-9506
Green Mountain Power	Bob Kennedy	(802) 524-1646
Champlain Water District	Jay Nadeau	(802) 497-7195
Vermont Gas Systems	Adam Gero	(802) 376-9699

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

Employees or agents of the above listed company(ies) 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 company(ies), 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 Traffic Signal Superintendent, Dan Ertel, to obtain/verify the location of Agency’s underground utility facilities or to confirm the absence of such facilities. Dan can be reached at (802) 343-2188.

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

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.

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

TABLE 1 – CONCURRENT CONSTRUCTION PROJECTS

Project	Contractor	Anticipated Contract Completion Date
Colchester BM23503	TBD	December 2024
Berlin-Highgate IM BPNT(18)	TBD	September 2026
Statewide – Northwest STP CULV(90)	TBD	TBD
Colchester HES NH 5600(14)	TBD	TBD

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

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

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

30. NOTICE TO BIDDERS – SALVAGED MATERIALS. The Contractor is hereby notified that the following reusable equipment, as determined by the Agency, removed and not re-used on the project shall remain the property of the State:

Traffic signal cabinets, controllers and all ancillary traffic signal equipment inside the cabinet, Bluetooth traffic data devices with solar panels, traffic signal heads except those at the US 2/US 7 intersection, Miovision equipment, light poles, luminaires, bracket arms, and the flashing beacon sign assembly with solar panel.

All costs for storing and transferring these salvaged materials will be incidental to the following Contract Items: 678.45, Removal of Existing Traffic Control Signal System for the applicable intersection, item 675.50, Removing Signs, and item 679.24, Remove Street Light Assembly.

The Contractor shall load all the salvaged materials onto suitable transport and deliver them to the VTrans District 5 Colchester garage at 189 Troy Avenue, Colchester, Vermont 05446.

The Contractor shall contact Dan Ertel, VTrans Traffic Signal Superintendent Tel.:(802) 343-2188 a minimum of two (2) weeks prior to beginning delivery to the designated location.

31. NOTICE TO BIDDERS – SPECIAL CONSTRUCTION REQUIREMENTS.

- (a) The Contractor shall maintain a safe access to all ramps and U-turns at all times during the construction of this project.
- (b) During construction it will be necessary for the Contractor to maintain one-lane traffic for extended periods of time. In no case shall the paved width for one-lane traffic, including shoulders, be reduced to less than 16 feet and for non-interstate two-lane traffic, including shoulders, be reduced to less than 28 feet. The paved width shall remain free of obstructions and obstacles at all times.
- (c) The Contractor shall position Portable Changeable Message Signs at locations determined by the Engineer properly warning motorists of the roadway conditions ahead. As directed by the Engineer, these locations may change during construction as needs arise based on daily work activities. The message to be displayed shall be submitted to the Engineer in advance for approval. The displayed message should accurately reflect what motorists can expect to encounter through the project area. The Contractor shall also install and maintain appropriate construction signing warning the traveling public of the expected roadway surface conditions.

- (d) Prior to final acceptance of the project, all drop inlets and bridge joints within the project limits shall be cleaned and all material within the drop inlets and bridge joints shall be removed. All paved areas adjacent to curbs shall be swept and cleaned of all extraneous material. Costs for this work will not be paid for directly, but will be considered incidental to all Contract items.
- (e) There are special events throughout the year that may require close communication and coordination between the Contractor and the municipality to reduce conflicts. The municipality will advise the Engineer and Contractor of the specifics of each event and the Engineer will direct the Contractor as to what actions, if any, will be necessary on the Contractor's part to minimize impacts to the event. Special events that may conflict with Contractor operations are not limited to those which may be listed in this Notice to Bidders. There will be no extra compensation paid to the Contractor for any inconvenience caused by working around any listed or unlisted special events.

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

Town of Colchester: Amanda Clayton, PE
Town Engineer
Public Works Department
Town of Colchester
781 Blakely Road, Colchester VT, 05446
aclayton@colchestervt.gov
802-264-5639

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

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

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

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

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

33. NOTICE TO BIDDERS – REINFORCING STEEL.

Level II reinforcing steel shall be continuously galvanized or hot-dipped galvanized and meet the requirements of Section 507 and Section 713, as modified in Notice to Bidders Nos. 34, 35, 36, and 37.

34. NOTICE TO BIDDERS – SUBSECTION 507.01(b).

Subsection 507.01(b) is hereby modified by being deleted in its entirety and replaced with the following:

- (b) Level II (Improved Corrosion Resistance). Level II reinforcing includes stainless-clad, dual-coated, and continuously-galvanized (CGR), and hot-dipped galvanized (HDG) reinforcing steel.

35. NOTICE TO BIDDERS – SUBSECTION 507.03.

Subsection 507.03 is hereby modified by adding the following as a new second paragraph:

When HDG reinforcing steel is used, it shall be bent to the required shapes and lengths prior to galvanizing.

36. NOTICE TO BIDDERS – SUBSECTION 507.04(c).

Subsection 507.04(c) is hereby modified by being deleted in its entirety and replaced with the following:

(c) Cut ends of continuously-galvanized or hot-dipped galvanized reinforcing steel shall be coated with a zinc-rich paint. The paint used in the repair shall be organic-rich and contain at least 92% zinc by weight in the dry film. The paint shall be applied per the manufacturer's recommendations to a thickness equivalent to the surrounding galvanizing.

37. NOTICE TO BIDDERS – SUBSECTION 713.01.

Subsection 713.01 is hereby modified by adding the following new subpart:

(h) Hot-Dipped Galvanized Reinforcement. Hot-dipped galvanized reinforcing steel shall meet the requirements of ASTM A 767 to a Class 1 Coating. Chromate treatment will not be required.

38. NOTICE TO BIDDERS – PERFORMANCE GRADED ASPHALT BINDER. All permanent pavement on mainline including shoulders, side roads and ramps is required to use the PG binder grade specified in the Plans and Specifications. All other adjacent pavement used on the project, regardless of the method of placement, will be allowed to use either the binder grade as specified in the Plans and Specifications or PG 58-28 binder. There will be no additional compensation allowed for using either binder grade.

39. NOTICE TO BIDDERS – THREE-DIMENSIONAL MODEL. The Contractor is notified that a digital three-dimensional model was created as part of the preliminary engineering phase for the project. The digital three-dimensional model was developed using Bentley MicroStation, OpenRoads, and OpenBridge software. The three-dimensional model files will be made available to the Contractor who is awarded the project. The three-dimensional model files are not considered part of the contract documents. Contract documents govern and override any conflicting details in the three-dimensional model files.

As part of this contract, the Contractor agrees to meet with VTrans during monthly partnering meetings to discuss how the Contractor is using the model, obstacles to using the model, and opportunities to make the model more useable.

Costs for using the model and participating in partnering meetings will be incidental to all other Contract items.

40. NOTICE TO BIDDERS – POST-CONSTRUCTION SOIL DEPTH AND QUALITY STANDARD. The Operational Stormwater Permit authorization requires areas identified in the plans to meet the Post-Construction Soil Depth and Quality Standard, as defined in the 2017 Vermont Stormwater Management Manual. In accordance with this standard, the Contractor shall follow Section 651 with the following additions and modifications:

- (a) Equipment shall be restricted from driving outside of established project demarcation fence or barrier fence.

- (b) Native topsoil, if present, shall be stockpiled and then reused within the project limits.
- (c) Both native and imported topsoil shall be tested in accordance with Subsection 755.02. If results show that the topsoil has less than 4% organic matter, then the topsoil shall be amended with compost at a rate of 1:3 compost to topsoil. The compost shall be a humus-rich material having 40% to 65% organic matter, a carbon to nitrogen ration below 25:1, and meet the definition of compost in the Vermont DEC Solid Waste Management Rules.
- (d) Subsoils shall be scarified or loosened to a depth of 4 inches.
- (e) Topsoil shall be placed in accordance with Subsection 651.05(a) with a minimum depth of 4 inches.

Required depth verification testing will be conducted by the Engineer and will include shovel tests to a minimum depth of 8 inches, driven solely by the individual's weight. A total of nine tests per acre of area subject to the Post-Construction Soil Depth and Quality Standard, spaced a minimum of 50 feet apart, shall be performed. Test locations will be as selected by the Engineer.

Costs for complying with the Post-Construction Soil Depth and Quality Standard will be incidental to all other Contract items.

41. NOTICE TO BIDDERS – ELECTRONIC TICKETING VTRANS PORTAL. The Contractor is hereby notified that the Contractor, their subcontractors, and suppliers shall connect to the VTrans Portal and use the application for distribution and management of electronic tickets (e-Tickets). VTrans Portal is a State Cloud Based e-Ticket Database, including a web-based user interface and a jobsite mobile e-Ticket application. VTrans Portal will interface with the Contractor's supplier existing point of sales or e-Ticketing platform and will allow VTrans to manage bituminous material e-Tickets.

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

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

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

42. NOTICE TO BIDDERS – FUEL PRICE ADJUSTMENT. In addition to the items specified in Section 690, the Special Provision items listed in Table 1 will also be eligible for Fuel Price Adjustment under Section 690.

TABLE 1 – SPECIAL PROVISION ITEMS SUBJECT TO FUEL PRICE ADJUSTMENT

Special Provision Pay Items Subject to Adjustment:		Using the Tabulated Fuel Usage Factor and Threshold Quantity for:
Item No.	Item Name	Work Category
N/A	N/A	N/A

PART II – SECTION 900 SPECIAL PROVISION ITEMSFOAMED GLASS AGGREGATE

1. DESCRIPTION. This work shall consist of furnishing and installing foamed glass aggregate (FGA) fill for backfilling behind structures and construction of embankments in designated locations or as directed by the Engineer. The Contractor shall furnish all labor, materials, equipment, tools, and appurtenances required to complete the work of placing and compacting the FGA materials in accordance with these provisions and as shown on the Plans, including:
 - (a) Preparation of subgrade.
 - (b) Storage and handling of FGA.
 - (c) Protection and preservation of all existing utilities and structures.
 - (d) Placement and compaction of FGA fill at locations indicated on the Drawings.
 - (e) Placement of geotextile wrap at locations indicated on the Drawings.
2. MATERIALS.
 - (a) Foamed Glass Aggregate (FGA). FGA manufactured by Aero Aggregates of North America, LLC shall be used for this project.
 - (1) FGA shall be made from of a minimum of 98% recycled glass and shall meet the gradation specifications in table below:

Sieve Size	Total Percent Passing
4 inch	100
2 ½ inch	85-100
3/8 inch	0-15

The as-delivered FGA shall have a maximum dry bulk density of no more than 15 pcf. The loose bulk density of delivered FGA shall be determined per ASTM C29/C29M Method C. If necessary, this value shall be adjusted by the moisture content of the FGA to determine the dry, loose bulk density. Moisture content shall be determined using ASTM D2216, ASTM D4959 or ASTM D4643.

The FGA shall be made using a dry foaming process to produce a closed cell structure and shall be non-leaching.

The in-place compacted dry density shall not exceed 20 lbs/ft³ when determined in accordance with the method by the Engineer.

- (b) Geotextile. Geotextile shall meet the requirements of Subsection 720.02.

3. SUBMITTALS

- (a) Quality Control Data. Two weeks prior to material delivery to the project site, the Contractor shall provide the Engineer with a written certification or manufacturer's quality control data which displays that the products meet or exceed the values specified herein.
- (b) Product Volume Availability. Two weeks prior to material delivery to the project site, the Contractor shall provide the Engineer with documentation that the Manufacturer has a minimum of 12,000 cubic yards of product meeting the requirements of this specification on hand and available for the Contractor's use (installation or stockpiling) at the project site.
- (c) Product Sample. The Contractor shall provide a sample of the products described herein at the request of the Engineer.
- (d) Proposed Installation Equipment. Two weeks prior to FGA installation, the Contractor shall provide to the Engineer the equipment cut sheets for the equipment the Contractor will be using for FGA placement and compaction.

4. GENERAL

- (a) Storage and Handling. Deliver, store, and handle materials in accordance with manufacturer's recommendations.

During all stages of manufacture, shipment, storage, and construction, minimize the amount of material moves to prevent physical damage. Minimize the amount of trafficking on foamed glass aggregate until geotextile for roadbed separator and a thickness of 12 inches of Subbase material is placed over the FGA.

- (b) Placement and Compaction. Place geotextile and FGA at locations indicated on the drawings. During placement of the FGA, divert storm water from the FGA installation area.

FGA shall be placed in maximum uncompacted lift thicknesses of 24 inches and compaction shall be performed with a tracked excavator or dozer with ground pressures of 625 - 1,025 psf. Placement and compaction with wheeled equipment, such as rubber tires or steel rollers, is not permitted. Compaction using tracked equipment shall be completed by placing the initial lift thickness, and then raising the blade or bucket and tracking over the layer. The placement of the first and second lift of FGA shall be utilized to establish a project-specific installation methodology that will be used to achieve 20% compaction of a given lift. The project-specific installation methodology shall reflect the lift thickness and identify the piece(s) of construction equipment and the corresponding number of passes required. Alternatively, compaction shall be complete after making the number of passes shown in table below. Excessive compaction shall be avoided to minimize crushing of the aggregate.

Equipment Ground Pressure	Number Of Passes
625-825 psf	4
825-1025 psf	3

Construction equipment, other than for placement and compaction, shall not operate over the foamed glass aggregate until 12 inches of cover material has been placed. The area to be filled shall not have any standing water (including ice) in it prior to placement of the foamed glass aggregate.

- (c) Compaction around structures. For areas not accessible by tracked equipment (e.g., around structures and utilities), FGA shall be placed in maximum uncompacted lifts of 12 inches and compacted with a plate compactor weighing 110-220 lbs. Compaction shall be complete after verifying that 20% compaction of the original lift thickness has been achieved.

The geotextile shall be placed as a separator between the FGA and the surrounding soils, including between the subgrade and the initial lift of foamed glass aggregate, the sides of the foamed glass aggregate fill area, and above the final lift as a separator between the foamed glass aggregate and capping layer as shown on the plans. Care should be taken during placement of capping layer to prevent damage to geotextile. Adjacent panels of geotextile may be sewn together or overlapped a minimum of 12 inches. The geotextile shall not be left exposed for longer than 14 days.

- (d) Quality Assurance Testing. The contractor shall provide safe access for the Agency or its representative to conduct quality assurance testing during FGA placement and compaction operations. Testing may include verification of lift thickness before and after compaction and density and moisture content determination using non-nuclear gage methods on each lift of FGA.

5. METHOD OF MEASUREMENT. The quantity of Special Provision (Foamed Glass Aggregate) to be measured for payment will be the number of cubic yards for use in the complete and accepted work, in accordance with these provisions and the Plans.
6. BASIS OF PAYMENT. The accepted quantity of Special Provision (Foamed Glass Aggregate) will be paid for at the Contract unit price per cubic yard which shall be full compensation for furnishing all qualifications, on-site supervision from supplier, shop drawings, labor, materials, 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 (Foamed Glass Aggregate)	Cubic Yard

PERFORMANCE-BASED STRUCTURAL CONCRETE

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

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

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

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

Water.....745.01

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

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

~~TABLE 1 — PERFORMANCE BASED CONCRETE CLASSES AND PROPERTIES~~

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

¹ PCD = Performance Concrete, Deck

— PCS = Performance Concrete, Substructure

— SCC = Self Consolidating Concrete

² The concrete may be accepted if the design compressive strength from standard cured cylinders has been obtained at 28 calendar days. Any 56 calendar day acceptance cylinders shall be tested regardless of the results of earlier tests.

³ The maximum W/CM ratio shall be determined by the Contractor as established by mix qualification testing. During production, the W/CM ratio shall be less than or equal to the W/CM ratio from the approved qualification mix. See Subsection 3(b)(1).

⁴ Visual Stability Index (VSI) as determined in accordance with *ASTM C 1611*.

⁵ The freeze/thaw durability of the proposed mix design may be established by providing mix qualification testing demonstrating conformance with either of the two requirements. Testing shall meet the requirements of either *AASHTO T 161*, Procedure A, or *ASTM C 457*, as applicable. See Subsection 3(b)(2).

⁶ The minimum air content shall be determined by the Contractor as established by mix qualification testing. During production, the air content shall be greater than or equal to the air content from the approved qualification mix, see note 10. See Subsection 3(b)(2).

⁷ The Contractor shall determine the surface resistivity in accordance with Subsection 3(b)(4).

⁸ The mix shall not exhibit segregation. If the mix does exhibit segregation, the load shall be rejected. If the spread is equal to or exceeds 18 inches, the mix shall be classified as SCC.

⁹ The Contractor shall determine the spread target and limits in accordance with Subsection 3(b)(5). The spread shall be maintained within the determined spread limits for the placement. The mix shall not exhibit segregation. If the mix does exhibit segregation or exceeds the upper spread limit, the load shall be rejected, and subsequent loads shall be tested by the Contractor until the mix meets the allowable limits. The Engineer may perform a J ring test at the time of placement if blocking is a concern.

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

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

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

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

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

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

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

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

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

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

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

~~(a) — The mix design must contain the following information:~~

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

~~Concrete test mix or mixes shall be used to obtain the test results where applicable. All wet testing shall be done by personnel with current ACI Concrete Field Testing Technician Grade I certifications. All other tests shall be performed by a laboratory that is accredited by AASHTO resource or the Concrete and Cement Reference Laboratory (CCRL) in the particular test method, or as allowed by the Engineer.~~

- ~~(b) — The following mix qualification tests shall be performed. The minimum air content value and the maximum water/cementitious materials ratio of the material used to pass the mix qualification tests shall become the minimum air content value and the maximum water/cementitious materials ratio allowed during production.~~
- ~~(1) — The Contractor shall provide test results that establish the shrinkage tendency of the concrete. The free shrinkage rate of the concrete shall be tested per the requirements of *AASHTO T 160*. The test specimen shall be a prism of 4 inch square cross section. Procedure 11.1.2 of *AASHTO T 160* shall be followed for storage and measurements, and all specified test age results shall be submitted. Specimen testing may be terminated after 28 calendar days of drying. Testing shall be performed by a laboratory accredited in the specific test method.~~
- ~~(2) — The Contractor shall provide test results that establish the freeze/thaw durability of the concrete. At the contractor's choice, either *AASHTO T 161* or *ASTM C 457* may be used to demonstrate freeze/thaw durability meeting the specification requirements.~~

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

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

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

- (3) ~~The compressive strength of the concrete shall be measured based on the requirements of AASHTO T 22 for 7, 14, 28, and 56 calendar day standard cured cylinders.~~
- (4) ~~The surface resistivity of the test mix shall be measured at 56 calendar days based on the requirements of AASHTO T 358. Results shall be categorized as Low, Very Low, or Negligible in accordance with AASHTO T 358, Table 1. The surface resistivity may be accepted prior to 56 calendar days if the results meet these requirements. 56 calendar day test results shall be completed and submitted regardless of the results of earlier tests.~~
- (5) ~~The Contractor shall determine the lower and upper spread limit for SCC concrete. The J-Ring Test and the Spread Test will be conducted at both the lower and upper spread limits. The J-Ring Test will be conducted per the requirements of ASTM C 1621/C 1621 M, and the Spread Test will be conducted per the requirements of ASTM C 1611/C 1611 M.~~
- ~~The J-Ring test results shall be compared to the Spread Test results at both the upper and lower limits. The difference between the two tests at both the upper and lower limit shall not be greater than 2 inches. At both the upper and lower limits, the Visual Stability Index (VSI) shall not be greater than 1.~~
- (e) ~~The Alkali-Silica Reactivity (ASR) of each type of aggregate shall be measured separately based on the requirements of AASHTO T 303. If one or more of the aggregates exceeds 0.10% expansion, then the aggregate shall be tested again according to the requirements of ASTM C 1567.~~
- ~~The Contractor may elect to go directly to ASTM C 1567 testing if they suspect that the aggregate may exceed the 0.10% expansion if tested by AASHTO T 303. Testing shall be performed by a laboratory accredited in the specific test method.~~
- (d) ~~After the mix design furnished by the Contractor has been reviewed and approved by the Structural Concrete Engineer, no changes to the mix design shall be allowed except as defined in Table 2. Following an approved change in accordance with Table 2, a contractor may still revert back to original approved mix design formulation. If a source change is requested due to a change in product or material name that does not include any significant change in product formulation or material characteristic, and this is substantiated by the product or material supplier in writing, re-testing is not required.~~

TABLE 2—ALLOWABLE MIX DESIGN CHANGES FOR ALL MIX TYPES

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

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

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

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

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

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

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

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

~~Proper facilities shall be provided for the Engineer to inspect ingredients and processes used in the batching and delivery of the concrete. The Contractor shall, without charge, afford the Engineer all reasonable facilities for securing samples to determine whether the concrete is being furnished in accordance with these specifications. In the batch room area, the producer shall provide the Inspector with a 24-inch × 18-inch horizontal working surface, at a sufficient working height, with a seat and an adequate view of the batching controls, display, and power supply.~~

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

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

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

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

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

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

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

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

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

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

- ~~1— Standard office desk, with lockable drawers or a separate lockable two-drawer file cabinet and chair~~
- ~~1— VTrans Qualified Laboratory Binder with producer equipment calibration data~~
- ~~1— Set of bench sections at least 2 feet wide providing a minimum of 28 square feet of working area with under-counter shelving~~
- ~~1— Standard laboratory stool~~
- ~~1— Fully automatic electronic calculator with eight digit capacity~~
- ~~1— Standard laboratory sink and faucet provided with an adequate supply of water meeting the requirements of Subsection 745.01. The sink shall drain to the outside of the laboratory~~
- ~~1— Bench brush~~
- ~~1— Floor brush~~
- ~~1— Motorized 8-inch sieve shaker with an adjustable timer. The shaker's operation shall be conducted by means of lateral and vertical motion of the sieve accompanied by jarring action with the following 8-inch diameter sieves: 3/8 inch (9.50 mm), No. 4 (4.75 mm), No. 8 (2.36 mm), No. 16 (1.18 mm), No. 30 (0.600 mm), No. 50 (0.300 mm), No. 100 (0.150 mm), plus pan and cover.~~

~~1—Mechanical aggregate shaker with an adjustable timer, a 1 cubic foot capacity, together with the following screens: 1 3/4 inch (43.0 mm), 1 1/2 inch (37.5 mm), 1 inch (25.0 mm), 3/4 inch (19.0 mm), 1/2 inch (12.5 mm), 3/8 inch (9.50 mm), 1/4 inch (6.30 mm), No. 4 (4.75 mm), No. 8 (2.36 mm), No. 16 (1.18 mm), and pan. The aggregate shaker may be placed in a separate enclosed area, or be shielded for dust and sound control. When the aggregate shaker is placed in a separate enclosed area, there shall be a minimum of 5 feet of clear space measured from the front frame of the aggregate shaker outward, as well as a bench section measuring approximately 36 inches high, 24 inches deep, and 50 inches long located adjacent to the aggregate shaker. The area shall be well lit and ventilated.~~

~~1—Square pointed shovel~~

~~5—Five gallon plastic buckets, with handles~~

~~1—Electronic balance with a minimum capacity of 50 pounds and accurate to 0.0002 pounds. If separate fine and coarse aggregate scales are to be used, the fine aggregate scale shall meet the requirements of AASHTO M 231 Table 2, Class G2 with a minimum capacity of 1.75 pounds and readable to 0.0002 pounds. The coarse aggregate scale shall meet the requirements of AASHTO M 231 Table 2, Class G5 with a minimum capacity of 50 pounds and readable to 0.002 pounds.~~

~~1—Set of standard masses (weights) to use for verifying the accuracy of the electronic balance~~

~~2—Double burner hot plates with variable temperature controls~~

~~3—Metal pans with a nominal size of 9 inches × 9 inches × 2 inches~~

~~5—Metal pans with a nominal size of 9 inches × 13 inches × 2 inches~~

~~1—Sample splitter with a 2 1/2 inch chute~~

~~1—10 inch blunted trowel~~

~~1—4 foot × 4 foot minimum heavy canvas for quartering samples~~

~~1—Brass wire bristle brush~~

~~1—Pair of heat resistant gloves (500°F, short contact)~~

~~2—1 1/2 inch soft bristle paint brushes~~

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

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

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

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

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

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

~~Adequate means for checking the accuracy of the scales shall be provided by the Contractor either using 50 pound weights or by other methods approved by the Structural Concrete Engineer. Weights shall be certified annually by the Division of Weights and Measures of the Vermont Agency of Agriculture, Food, and Markets. All exposed fulcrums, clevises, and similar working parts of scales shall be kept clean.~~

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

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

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

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

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

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

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

TABLE 3—CONCRETE PRODUCTION TOLERANCES FOR BATCHING

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

(f) ~~Storage and Proportioning of Materials.~~

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

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

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

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

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

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

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

~~Stockpiles shall be constructed as follows:~~

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

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

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

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

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

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

~~d. — Lightweight coarse aggregate stockpiles shall be presoaked for a minimum period of time to ensure that the aggregate is completely saturated surface dry or greater immediately prior to use as indicated by moisture testing. Soaking shall be accomplished by continuous sprinkling or other suitable means that will provide a uniform moisture content throughout the stockpile. The stockpile shall be allowed to drain for 12 to 15 hours immediately prior to use.~~

~~(4) — Admixtures. The Contractor shall follow an approved procedure for adding the necessary amounts of admixtures to each batch. Admixtures shall be dispensed in such a manner that will ensure uniform distribution of the material throughout the batch within the required mixing period. Except as specified herein, all admixtures shall be added to the batch at the plant, unless otherwise authorized by the Structural Concrete Engineer.~~

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

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

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

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

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

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

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

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

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

5. ~~MIXING AND DELIVERY.~~

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

(1) ~~All concrete shall reach its final position in the forms no more than 1.5 hours after the cement has been added to the water.~~

~~Concrete shall not have water added once discharging has begun. Admixtures may be adjusted as required by QC.~~

~~If, in the opinion of the Engineer, the concrete visual characteristics appear to be noticeably different from the last acceptance test or previous concrete for that pour, the Engineer may direct the Contractor to perform QC tests to confirm the concrete conforms with the specifications.~~

(2) ~~Addition of water or admixtures at the project site must be communicated to field inspection personnel. If additional mixing water, admixtures, or other additions are required, a minimum of 30 revolutions of the mixer drum at mixing speed shall be required before discharge of any concrete. If water is added in excess of the specified maximum W/CM ratio, the concrete shall not be used.~~

(3) ~~The Engineer may require the Contractor to perform uniformity tests on a transit mixer or agitator, in accordance with *AASHTO M 157* and reported except as modified. Two samples shall be taken. The first sample shall be taken after 15% of the load volume has been discharged, and the second prior to 85% of the load volume being discharged.~~

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

(4) ~~Each load of concrete delivered at the job site shall be accompanied by a batch weight ticket meeting the requirements of Subsection 4.~~

~~(5) — The Contractor shall provide direct communication service from the site of the work to the batch plant that shall always be available to the Engineer during concrete operations. The cost of this service will be considered incidental to the work.~~

~~(6) — When use of a Water Reducing, High Range Admixture or Water Reducing, High Range, and Retarding Admixture is specified for deck concrete, the Contractor shall submit, for the Engineer's approval, information about the admixture manufacturer, the admixture addition rate, and when the admixture is to be added to the mixture (i.e., at the plant, on project, or a combination thereof).~~

~~To obtain the required concrete characteristics, a representative from the concrete producer is required on the project to determine the final admixture dosage and water addition for each load of concrete. The dosage shall be applied by means of a dispenser, or by other means of accurately measuring volume as approved by the Engineer. The Contractor shall provide QC concrete testing personnel, with current ACI Concrete Field Testing Technician Grade I Certification, to confirm the concrete is within specifications for the required work.~~

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

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

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

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

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

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

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

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

~~All mechanical details of the mixer or agitator such as water measuring and discharge apparatus, condition of the blades, speed of rotation of the drum, general mechanical condition of the unit and clearance of the drum shall be checked before a further attempt to use the unit will be permitted.~~

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

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

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

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

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

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

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

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

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

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

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

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

- ~~(b) Sampling. Sampling for tests shall be taken in accordance with the requirements of *AASHTO R 60* or other procedures approved by the Agency. Sampling will be done at point of placement or as close to it as practical.~~
- ~~(1) Changes. Any time that there is a change in admixture dosage outside of the allowable tolerances, whether modified at the batch plant or at the site, additional QC sampling and testing shall be performed on the modified load prior to incorporating the concrete into the work.~~
- ~~(2) Beginning of Load Sampling. Beginning of Load Sampling is sampling for QC testing purposes that is taken before 15% of the load has been discharged. Beginning of Load Sampling shall be performed as required by the Engineer, or as needed to ensure that the Concrete meets the Contract requirements at the point of placement. The QC personnel shall monitor the placement operation and adjust the mix accordingly to ensure that the material being incorporated into the work meets Contract requirements.~~
- ~~(c) Slump Tests. Slump tests shall be made in accordance with *AASHTO T 119 M/T 119*.~~

- (d) — ~~Spread Tests.~~ Spread tests for SCC shall be made in accordance with the requirements of *ASTM C 1611/C 1611 M*, Procedure B. The concrete inside the cone shall not be tamped.
- (e) — ~~Visual Stability Index (VSI) Tests.~~ VSI tests for SCC shall be made in accordance with the requirements of *ASTM C 1611/C 1611 M*, Appendix X.1 and shall be performed on each completed spread test.
- (f) — ~~Air Content Tests.~~ Air content tests shall be made in accordance with the pressure method specified in *AASHTO T 152*.

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

(g) — Compressive Strength Tests.

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

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

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

(2) — Categories of Testing.

- a. — Acceptance Testing. Acceptance testing utilizes specimens to determine the compliance with requirements for the project. All test cylinders used for quality acceptance testing shall be stored in an approved curing box until they are shipped to the Agency's Materials Section Central Laboratory.
- b. — Job Control Testing. Job control testing utilizes specimens to determine whether adequate curing procedures are being followed and for early form removal or early loading of structure.
 - 1. — All job control specimens shall be stored on the structure and shall receive the same curing and protection from the elements as the concrete that they represent up until 24 hours before anticipated testing of specimens.

- ~~2. The maturity method may be used as an alternative for estimating the concrete strength. The procedures of *ASTM C 1074* shall be followed except as noted below:~~
- ~~i. For Section 8.1 there shall be a minimum of 17 cylinders cast. Two of the 17 shall have temperature sensors embedded in them to be used for monitoring.~~
 - ~~ii. For Section 8.4 there shall be 3 cylinders tested for each test age.~~
 - ~~iii. For Section 8.4 for rapid set concrete mixes the test ages shall be 12 hours, 1 day, 2 days, 7 days, and 28 days.~~

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

~~All temperature measuring devices shall be verified/calibrated on a 12 month basis or sooner if there are questions about the accuracy. The device shall have an accuracy of $\pm 2^{\circ}\text{F}$.~~

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

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

~~TABLE 4 — CONCRETE SPECIMEN CURING REQUIREMENTS~~

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

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

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

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

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

- (b) ~~Cold Weather Concrete.~~

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

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

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

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

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

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

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

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

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

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

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

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

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

~~When dry heat is used, a means of maintaining atmospheric moisture shall be supplied. The Contractor shall also maintain adequate fire protection and shall provide personnel to keep the heating units in continuous operation. When concrete placement operations are in locations where water levels may fluctuate, the supports for heating equipment shall be built so that the heating equipment can be raised and steam lines shall be placed above the probable high water level.~~

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

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

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

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

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

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

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

~~When the Contractor places concrete at more than one location within the specified curing period or if the Engineer determines that monitoring of a single pour is necessary in multiple locations, additional monitoring and recording equipment shall be furnished to provide temperature records at each location.~~

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

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

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

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

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

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

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

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

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

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

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

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

- ~~(e) — Surface Treatment. All forms shall be treated with commercial form oil prior to placing reinforcement, and wood forms shall be saturated with water immediately before placing the concrete. Any material that will adhere to or discolor the concrete shall not be used.~~

- (f) — ~~Metal Forms.~~ The specifications for wood forms regarding design, mortar tightness, filleted and chamfered corners, beveled projections, bracing, alignment, removal, reuse, and oiling also apply to metal forms. The metal used for forms shall be of such thickness that the forms will remain true to shape throughout the concrete placement operations.

~~All bolt and rivet heads shall be countersunk. Clamps, pins, or other connecting devices shall be designed to hold the forms rigidly together and to allow removal without injury to the concrete. Metal forms that do not present a smooth surface or do not line up properly shall not be used. Care shall be exercised to keep metal forms free from rust, grease, or other foreign matter.~~

- (g) — ~~Removal of Forms.~~

- (1) — ~~Deck Superstructure.~~ The forms, or their supports, for any portion of a structure shall not be removed before the end of the 10-day cure period for the deck. Forms under beams or floor slabs may be removed upon approval of the Engineer after the concrete attains 85% of the minimum compressive strength as specified in Table 1, but not prior to the end of the 10-day cure period.

- (2) — ~~Substructure.~~ The forms, or their supports, for any portion of a substructure shall not be removed without the approval of the Engineer. Forms under arches, pier caps, or other special design conditions may be removed upon approval of the Engineer after the concrete attains 85% of the minimum compressive strength as specified in Table 1.

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

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

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

- (1) — General. Use of SIPCMF for superstructure deck slab construction shall be subject to the following requirements:

- a. — ~~Fascia overhangs shall be formed with removable forms that leave the resulting concrete with a flat surfaced finish.~~

- b. ~~Days that are constructed in stages such that a longitudinal joint is required shall be made with removable forms.~~

(2) ~~Design Requirements. The following requirements shall govern the design of SIPCMF:~~

- a. ~~The design span shall be the clear span of the form plus 2 inches, measured parallel to the form flute (also referred to as the form valley).~~
- b. ~~The design load shall be the sum of the weight of forms, bar reinforcement, plastic concrete, and 55 pounds per square foot for construction loads.~~
- c. ~~The unit working stress shall not exceed 75% of the specified minimum yield strength of the material.~~
- d. ~~The dead load deflection shall not exceed 1/180 times the form span length or 1/2 inch, whichever is less.~~
- e. ~~Physical design properties shall be computed with the requirements of the latest edition of the *American Iron and Steel Institute Specifications for the Design of Cold-Formed Steel Structural Members*.~~

(3) ~~Construction Requirements. The following construction requirements shall apply to the use of SIPCMF:~~

- a. ~~Construction Drawings. The Contractor shall submit construction drawings for SIPCMF in accordance with the requirements of Subsection 105.03. These drawings shall contain the following information as a minimum:~~
 - 1. ~~The name of the SIPCMF supplier.~~
 - 2. ~~A layout showing the compression and tension region of each beam/girder.~~
 - 3. ~~The method of SIPCMF attachment for the compression and tension regions.~~
 - 4. ~~The geometric properties of each type of panel being used.~~
 - 5. ~~The number, location, and type of panels being used within each girder bay.~~
 - 6. ~~Panel laps, considering the direction of concrete pours.~~

~~7. The specifications for the material used to fill the flutes.~~

~~8. Any other material data, erection information, or miscellaneous notes that may be required.~~

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

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

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

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

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

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

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

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

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

- b. ~~Step 2. After the concrete has attained 85% of the specified design strength, the Engineer will spot check the underside areas of the steel forms by sounding with a suitable weight hammer. If honeycomb or voided areas are detected, the SIPCMF at that location shall be removed for a visual inspection.~~

- c. ~~Step 3. A minimum of 2% of the total SIPCMF area shall be removed for visual inspection of the concrete surface. The amount of sounding and form removal may be moderated, at the Engineer's discretion, after a substantial amount of the slab has been constructed and inspected, if the Contractor's methods of construction and results of the inspections as outlined above indicate that sound concrete is being obtained throughout the slab.~~

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

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

~~The form sections shall be removed by a metal saw or air-carbon arc gouging with minimum damage to the concrete. Cuts shall only be sufficiently deep to sever the form. Any other method of removal shall be submitted to the Structures Engineer for approval. Cuts parallel to the corrugations in the forms shall be located on the sloping surface midway between a crest and valley. Cuts parallel to the supporting beams/girders shall be made through the supporting angles taking care not to damage the structural steel beams/girders.~~

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

9. ~~PLACING CONCRETE.~~

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

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

- ~~(1) Time of concrete placement and amount~~
- ~~(2) Batch plant testing~~
- ~~(3) Delivery of concrete~~
- ~~(4) Method of concrete placement on the deck~~
- ~~(5) Consolidation and finishing of concrete~~
- ~~(6) QC testing of the plastic concrete~~
- ~~(7) Protection of the concrete from evaporation~~
- ~~(8) Curing of the concrete~~
- ~~(9) How to avoid long delays for balance loads~~
- ~~(10) Screed, work bridge, and rail set-up~~
- ~~(11) Dry run schedule~~
- ~~(12) Contingency plans for long delays, break downs, weather events and other potential problems~~

- ~~(13) — Crew size and responsibilities~~
- ~~(14) — Available equipment~~
- ~~(15) — Project layout including locations for all pumps, cranes, testing, cleanouts, staging, etc.~~
- ~~(c) — Placement Limitations. All concrete shall be placed in daylight, unless otherwise authorized in writing by the Engineer. Authorization to place concrete at any other time shall not be given unless an adequate lighting system is provided prior to beginning the concrete placement operations.~~

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

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

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

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

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

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

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

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

~~Concrete shall not be deposited in running water.~~

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

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

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

~~(d) — Placement of Overlays. For a period of at least 24 hours before the placement of overlay material, the prepared surface shall be flooded with water. After removal of all free water, the overlay material shall be deposited on the damp surface and manipulated to coat the horizontal and vertical surfaces to be covered. The rate of progress shall be controlled to prevent the drying of previously deposited materials.~~

~~(e) — Use of Chutes. Chutes, troughs, and pipes used in placing concrete shall be arranged to avoid segregation of the materials and the displacement of the reinforcement and shall be approved by the Engineer. Aluminum chutes, troughs, or pipes will not be permitted.~~

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

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

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

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

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

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

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

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

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

10. — ~~DEPOSITING CONCRETE UNDER WATER.~~

- (a) — ~~General. Concrete shall not be deposited under water except as specified by the Contract or upon approval of the Engineer and shall be subject to the following specifications.~~
- (b) — ~~Placement. When placing concrete underwater, the Contractor shall use a tremie or an alternate method of conveyance, approved by the Engineer, which minimizes the mixing of fresh concrete and water. A tremie shall have a hopper at the top that empties into a watertight tube at least 10 inches in diameter.~~

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

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

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

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

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

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

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

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

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

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

12. — CONSTRUCTION JOINTS.

- (a) — ~~Construction Joint Locations.~~ Joints shall be formed at the location shown on the Plans. Any variation or new location of joints shall require written permission of the Engineer. Feather edges at construction joints will not be permitted. Joints shall be formed with inset formwork so that each layer of concrete will have a thickness of not less than 6 inches.
 - (b) — ~~Joining Fresh Concrete to Previously Set Concrete.~~ When joining fresh concrete to concrete that has hardened, the surface of the set concrete shall be roughened in such a manner that will not leave loosened particles or damaged concrete at the surface and shall be thoroughly cleaned of all laitance, loose, and foreign material. Immediately prior to the placing of the new concrete, the surface shall be saturated with water.
 - When shown on the Plans or ordered by the Engineer, the surface shall be thoroughly coated with a very thin coating of mortar, neat cement grout, or epoxy bonding system and all forms drawn tight against the face of the concrete. This coating shall not be allowed to dry out before being covered with fresh concrete.
 - (c) — ~~Filled Construction Joints.~~ Filled construction joints shall contain a pre-formed cork joint filler or other pre-formed joint filler that may be shown in the Contract. Joint filler shall be cut to fit exactly and shall completely fill the space that is shown on the Plans. Where a pour grade or caulking grade filler is indicated to be used in the joints, that portion of the joint to be filled shall be formed with a separate material (other than the pre-formed joint filler) that can easily be removed prior to placement of the above indicated filler.
 - (d) — ~~Water Stops.~~ Approved water stops shall be placed at locations shown on the Plans. They shall form continuous watertight joints.
 - (e) — ~~Bond Breakers.~~ Bond breakers shall be asphalt treated felt or pipe insulation, as shown on the Plans.
13. — ~~EXPANSION JOINTS.~~ All expansion joints shall be constructed according to details shown on the Plans.
- (a) — ~~Filled Compression and Expansion Joints.~~ Filled compression and expansion joints shall be made with a pre-formed self-expanding cork joint filler or other pre-formed joint filler that may be shown in the Contract. Joint filler shall be cut to fit exactly and shall completely fill the space that is shown on the Plans. Where a pour grade or caulking grade filler is indicated to be used in the joint, that portion of the joint to be filled shall be formed with a separate material (other than the expansion joint filler) that can easily be removed prior to placement of the above indicated filler.
 - (b) — ~~Special Types of Expansion Joints.~~ Special types of expansion joints may be used when shown on the Plans or ordered by the Engineer.

14. CONCRETE FINISHING.

- (a) Formed Concrete. Unless otherwise specified, all concrete surfaces shall be given a dressed finish. Other finish classes may be shown on the Plans for designated surfaces.

- (1) Dressed Finish. All fins and irregular projections shall be removed from all surfaces except from those that are not to be exposed. On all surfaces, the cavities produced by form ties and all other holes, honeycomb spots, broken corners or edges, and other minor defects shall be thoroughly cleaned, saturated with water, and carefully pointed and trued with a product that meets the requirements of [Subsection 780](#). The manufacturer's recommendations shall be followed for surface preparation, mixing, application, and curing.

All construction and expansion joints in the completed work shall be left carefully tooled and free of all mortar and concrete. The joint shall be left exposed to its full length with clean and true edges.

Areas that contain minor defects shall be repaired to the satisfaction of the Engineer. Minor defects are defined as the intermittent presence of holes, honeycombing, chips, or spalls, which are 6 inches or less in the longest dimension, and that 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.

Major defects are anything beyond the scope of minor as described above. The Contractor shall submit a corrective action proposal to the Engineer for all major defects.

- (2) Aesthetic Finish. In addition to the requirements for a dressed finish, the following work shall be performed when an aesthetic finish is specified.

On all exposed surfaces, the cavities produced by form ties and all other holes, honeycomb spots, broken corners or edges, and other minor defects shall be thoroughly cleaned, saturated with water, and carefully pointed and trued with a mortar composed of the same cement and fine aggregate and mixed in the same proportions used in the concrete being finished, unless otherwise directed by the Engineer. Mortar used in pointing shall be not more than 1 hour old. The mortar patches shall be cured for a minimum of 72 hours in accordance with [Section 15](#).

- (b) Float Finish. This finish for horizontal surfaces shall be achieved by placing an excess of material in the form and removing or striking off the excess with a template, forcing the coarse aggregate below the mortar surface. Creation of concave surfaces shall be avoided.

~~After the concrete has been struck off, the surface shall be smoothed with a magnesium float.~~

~~Immediately after float finishing, the surface shall be given a broom finish, burlap drag finish, or left smooth as determined by the Engineer.~~

~~(c) — Bridge Seats. Surfaces of bridge seats under bearing devices shall be level. The entire bridge seat surface shall be smoothed with a magnesium float.~~

~~(d) — Finishing Bridge Decks and Overlays.~~

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

15. — CURING CONCRETE.

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

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

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

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

TABLE 5 — CURING TIMES FOR CONCRETE COMPONENTS

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

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

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

- (1) ~~Water Curing.~~ Curing with water shall be by continuously sprinkling or flooding of all exposed surfaces for the entire required curing period.

- (2) ~~Burlap Curing.~~ The entire exposed surface of the concrete shall be covered with two layers of approved burlap that has been pre-soaked with water. The burlap shall then be covered with a lapped layer of white polyethylene sheeting. Once the concrete superstructure has hardened sufficiently, a stream of water, applied with a soaker hose or similar device, shall be run continuously under the polyethylene sheeting until the cure period is complete.
- (3) ~~Sand Cover.~~ The entire exposed surface of the concrete shall be covered with at least 3 inches of approved sand that shall be kept wet for the entire curing period.
- (4) ~~White Polyethylene Sheeting.~~ The entire exposed surface of the concrete shall be covered with a blanket of white polyethylene sheeting, maintained and fastened to provide a nearly airtight condition in contact with the surface where possible. If, in the opinion of the Engineer, this cover is not adequately provided or maintained to ensure the proper conditions for the concrete cure, then the white polyethylene sheeting cure shall be terminated and another method substituted.
- (5) ~~White Burlap Polyethylene Sheeting.~~ The entire exposed surface of the concrete shall be covered with a blanket of white burlap polyethylene sheeting. The burlap shall be thoroughly dampened prior to placing and shall be placed next to the concrete. All joints shall be lapped a minimum of 18 inches. The burlap shall be kept damp throughout the curing period.
- (6) ~~Membrane Forming Curing Compounds.~~ White pigmented or fugitive dye membrane forming curing compounds may be used for curing concrete in minor drainage structures. All other uses of curing compounds shall be approved in writing by the Engineer. Only membrane forming curing compounds approved by the Agency's Materials Section may be used.

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

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

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

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

~~(7) — White Polyethylene Sheeting with Sand Cover. This method may be used only when approved by the Engineer and shall conform to the requirements of Subsection 15(b)(4). The airtight condition shall be obtained by the addition of a uniform sand cover with a minimum depth of 2 inches.~~

~~(8) — Pre Dampened Cotton Mats. The entire exposed surface of the concrete shall be covered with a blanket of cotton mats that has been pre-dampened with water. The mats shall be maintained in a damp condition until the curing period is complete.~~

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

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

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

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

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

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

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

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

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

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

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

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

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

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

Payment will be made under:

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

INCENTIVE/DISINCENTIVE (I/D)

1. INCENTIVE/DISINCENTIVE (I/D). To provide a common proposal for all bidders and expedite the incentive payment process, the Agency has entered an amount of \$50,000.00 in the proposal to become part of the Contractor's total bid. The dollar amount entered by the Agency is the maximum amount payable under the incentive clause, but the actual payment/deduction will be computed and paid/deducted per this Special Provision and the stipulations of Notice to Bidders No. 14.

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

- (a) The quantity of incentive to be paid will be the accepted quantity of incentive computed per the provisions of Notice to Bidders No. 14.
- (b) The quantity of disincentive to be deducted will be the quantity of disincentive computed per the provisions of Notice to Bidders No. 14. For the assessed disincentive as described in part (c) of Notice to Bidders No. 14, the Engineer will deduct the amount due the Agency from the monies due the Contractor on the next biweekly estimate.

Payment will be made under:

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

JUNCTION BOX, HEAVY DUTY

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

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

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

PRECAST CONTROL STRUCTURE

1. DESCRIPTION. This work shall consist of furnishing and installing a precast concrete outlet structure with a solid cast iron grate, as shown on 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 604 of the Standard Specifications.

2. MATERIALS. Materials shall be furnished at the sizes and configuration shown in the Plans.
3. SUBMITTALS. Fabrication Drawings for each structure shall be submitted for approval in accordance with Subsection 540.04.
4. METHOD OF MEASUREMENT. The quantity of Special Provision (Precast Control Structure, Gravel Wetland) and Special Provision (Precast Control Structure with Weir Wall) to be measured for payment will be for each structure installed in the complete and accepted work.
5. BASIS OF PAYMENT. The accepted quantity of Special Provision (Precast Control Structure, Gravel Wetland) and Special Provision (Precast Control Structure with Weir Wall) will be paid for at the Contract unit price per Each. Payment will be full compensation for furnishing, transporting, handling, assembling, and placing the materials specified, including concrete, top sections, reinforcing steel, grates, underdrain connections, and for furnishing all labor, tools, equipment, and incidentals necessary to complete the work.

Partial payments will be made as follows:

- (a) An initial payment of 15% of the Contract each price will be made when Fabrication Drawings have been submitted and marked conforming in accordance with Section 105.
- (b) The next ~~25%~~ 35% of the Contract each price will be paid on the delivery to the site and the structure is installed.
- (c) The remaining 50% of the Contract each price will be paid when the structure is tested to demonstrate it is working properly to the satisfaction of the Engineer.

Payment will be made under:

<u>Pay Item</u>	<u>Pay Unit</u>
900.620 Special Provision (Precast Control Structure, Gravel Wetland)	Each
900.620 Special Provision (Precast Control Structure with Weir Wall)	Each

GNSS CONSTRUCTION INSPECTION EQUIPMENT

1. DESCRIPTION. This work shall consist of furnishing, configuring, installing, maintaining, and removing Global Navigation Satellite System (GNSS) units as needed for use by the Engineer and their inspection staff, including building the required surface models and downloading them into the Contractor provided data collectors, and the training of the Engineer and their representatives on the use of the GNSS units provided.
2. EQUIPMENT. Each GNSS Construction Inspection Unit shall include all necessary components, communication devices, integrated antennae and receiver and cables, data collectors, operating manuals, attachments, and fastening hardware to meet the minimum requirements described below.
 - (a) GNSS units provided for a single Contract shall be the same model and manufacturer; and shall include, and be licensed to operate, the same version of GNSS planning software, and data collection software to be utilized by the Engineer and their representatives for data collection. All software provided (including firmware) shall be the most current available from the manufacturer at the time of delivery of the GNSS units. GNSS units shall not be more than two (2) years old from the date of manufacturing to the time of delivery. To verify the age of the GNSS units, the Contractor shall provide a dated copy of the manufacturer's receipt(s) for the purchase, lease, or rental of the units.
 - (b) GNSS units shall include both standard USB cable and Bluetooth wireless technology for data transfer between the GNSS units and the data collectors.
 - (c) GNSS units shall be equipped, at a minimum, to receive Global Positioning System (GPS) and GLONASS data.
 - (d) GNSS units shall be equipped to receive, and be capable of utilizing, Real Time Kinematics (RTK) correctional data (current version of RTCM format) through internet protocol provided from the VT Continuously Operating Reference System (VT CORS) Network. This shall include all necessary communication devices, repeaters, and systems, data service plans, and communications to meet the minimum required accuracy and not exceed two (2) second latency at the rover. Whichever communication method is utilized by the Contractor to broadcast the VT CORS RTK correctional data, the Contractor shall ensure that the RTK data shall be available at all locations across the entire Contract site during all hours of construction and inspection operations.
 - (e) GNSS units shall include either an integrated or modular communication device capable of receiving RTK correctional data to satisfy the requirement of using VT CORS RTK corrections.

- (f) GNSS Units shall be capable of collecting dual frequency GPS data.
 - (g) Minimum Required Kinematic Accuracy relative to primary project control (CORS):
 - (1) Horizontal: 0.033 ft + 1.0 ppm
 - (2) Vertical: 0.065 ft + 1.0 ppm
 - (h) Necessary hardware and software shall be included (including communication drivers) to connect the GNSS units to an Agency-provided PC and communicate/exchange positional data with that Agency PC.
 - (i) GNSS units shall have an internal, or modular, rechargeable battery system capable of operating through all active working hours (may include interchangeable batteries), including the battery charger.
 - (j) GNSS Units shall include a hard or soft shell carry case, and all appropriate operation manuals.
 - (k) GNSS data collectors shall have a touchscreen with a minimum size of 7 inches.
 - (l) GNSS rover units shall include one (1) fixed height rover rod of 6.56 feet in length, one attachable bipod which is compatible with the rover rod, one bracket connecting the data collector to the rover rod, and one Topo shoe.
 - (m) A GNSS unit set up to operate as a base station shall include all necessary additional cables, hardware, fasteners, or accessories necessary to install it in a fixed semi-permanent location. This setup will not be considered as a rover unit and therefore will not require a rover rod, a bi-pod, a data collector bracket, or a Topo shoe.
3. CONSTRUCTION REQUIREMENTS. The Contractor shall furnish, configure, install, maintain, and remove the GNSS units, and provide the Engineer and/or their representatives with the training on the operation of the GNSS units. The Contractor shall ensure all GNSS units are fully operational and training has been provided before construction begins.

All projects shall utilize the VT CORS as the spatial reference network from which RTK corrections are derived. The Contractor shall choose which communication technique and devices will be used which will insure the consistent and reliable delivery of RTK correctional data from VT CORS to the GNSS units. When geographic locations or lack of reliable communications network prohibits the use of the VT CORS directly, the Engineer may approve the use of a Survey Grade GNSS Inspection unit as a base station in place of the VT CORS, which will be paid for separately.

The Contractor shall semi-permanently mount the base station in a stable and secure location where it shall not be disturbed by construction activities nor be easily damaged by vandalism, and where it shall be capable of providing radio signal coverage over the entire Contract area. If the base station cannot broadcast a signal that covers the entire site, the Contractor shall provide adequate repeater radios or other communications at such frequency and locations such that a minimum 90% signal strength is maintained throughout the length of the project site. A GNSS unit installed as a base station for inspection operations shall only be moved with the approval of the Engineer.

The GNSS units shall be maintained and remain in service until either:

- (a) a maximum of one week after the Engineer requests its removal in writing, or
- (b) the State relinquishes the Engineer's Field Office.

The Contractor shall maintain all GNSS units and software in good working condition and shall provide replacement due to breakdown, damage, or theft within two (2) working days. The Contractor shall retain ownership of all supplied GNSS units at the end of the Contract.

4. SURFACE MODELS. The Contractor shall build the required GNSS Construction Inspection Surface Models and download them into the provided data collectors to facilitate construction inspection by the Engineer.

- (a) At a minimum, the following GNSS Construction Inspection Surface Models shall be provided by the Contractor.

- (1) Proposed Finish Grade
 - (2) Existing Ground

- (b) Following the award of the Contract, the Agency will make available the following electronic data files. The files that will be made available were originally created with the computer software applications MicroStation® (CADD software) and InRoads® (civil engineering software). The data files will be in the native formats and other software formats as described below. The Contractor will perform any and all necessary conversion of the files for the selected grade control equipment.

- (1) CAD Files.

- a. InRoads® DTM files representing the existing ground and design surfaces.
 - b. InRoads® ALG files containing horizontal and vertical geometry.
 - c. MicroStation® alignment design file.

- d. MicroStation® cross section design files.
 - e. MicroStation® ROW design file.
 - f. MicroStation® Existing Ground topography design file.
- (2) Machine Control Surface Model Files.
- a. LandXML (ASCII format).
- (3) Alignment Data Files.
- a. Alignment Geometry Report (ASCII Report format).
 - b. LandXML (ASCII format).

The Contractor is notified that VTrans utilizes the US Survey Foot as a basis for all engineering work. Particular care shall be taken to ensure that the US Survey Foot is utilized in any and all conversion/evaluation of the files provided. This includes any required conversion from MicroStation® DGN to AutoCAD® DWG; as well as from Bentley InRoads® to other engineering formats. The XML files shall also be checked to ensure that the US Survey Foot is utilized.

Information shown on the Plans governs over the provided electronic data. The electronic information is not to be considered a representation of actual conditions to be encountered during construction. The electronic data provided may be incomplete and may contain errors. The Contractor is responsible for verifying that the electronic data is consistent with the information shown on the plans, and making any necessary corrections, before using the electronic data to build the required surface models. The Contractor shall notify the Engineer upon discovery of any ambiguity or error before proceeding. Providing the Contractor this information does not relieve the Contractor from the responsibility of making an investigation of conditions to be encountered, including but not limited to site visits, and basing any bid on information obtained from these investigations and their professional interpretations and judgment.

The Contractor assumes all risk of error if the information is used for any purposes for which the information was not intended.

Any assumptions the Contractor makes from this electronic information is at their risk.

5. TRAINING REQUIREMENTS.

- (a) For all Construction Grade GNSS units, the Engineer and/or their representatives shall be provided with a minimum of 16 hours of training on the use and operation of the GNSS equipment and software. Initial training shall occur within one week of delivery of GNSS units to the site unless otherwise directed by the Engineer. The remainder of the training hours shall occur at the request of the Engineer. If a Contract has multiple years of work, an additional 8 hours of training shall be provided at the request of the Engineer.
- (b) All training shall be performed by a manufacturer-verified trainer who is approved by the Engineer. The training shall occur at the Engineer's Field Office or at a location agreed to by the Engineer.

6. METHOD OF MEASUREMENT. The quantity of Special Provision (GNSS Construction Inspection Equipment) to be measured for payment will be the number of each GNSS Construction Inspection Unit provided and operational in the complete and accepted work.

The quantity of Special Provision (GNSS Construction Inspection Surface Models) to be measured for payment will be for all required GNSS Construction Inspection Surface Models on a lump sum basis in the complete and accepted work.

7. BASIS OF PAYMENT. The accepted quantity of Special Provision (GNSS Construction Inspection Equipment) will be paid for at the Contract unit price per each. Payment will be full compensation for furnishing all equipment, support, training, and maintenance as specified and required, and for furnishing all materials, labor, tools, equipment, and incidentals necessary to complete the work.

The accepted quantity of Special Provision (GNSS Construction Inspection Surface Models) will be paid for at the Contract lump sum price. Payment will be full compensation for furnishing the required surface models, performing corrections and updates to the models if issues are discovered, and for furnishing all materials, labor, tools, equipment, and incidentals necessary to complete the work.

- (a) Partial payments for Special Provision (GNSS Construction Inspection Equipment) will be made as follows:
 - (1) The first payment of 50 percent of the Contract unit price for Special Provision (GNSS Construction Inspection Equipment) or 5 percent of the adjusted Contract price, whichever is less, will be made once the equipment has been delivered to the Engineer and is fully operational.

- (2) The second payment of 40 percent of the Contract unit price for Special Provision (GNSS Construction Inspection Equipment) or 5 percent of the adjusted Contract price, whichever is less, will be made on the first estimate following the completion of 50 percent of the Contract.
 - (3) Payment of any remaining amount of the Contract unit price bid for Special Provision (GNSS Construction Inspection Equipment) will be made after the Contract Substantial Completion Date as determined by the Engineer.
- (b) Partial payments for Special Provision (GNSS Construction Inspection Surface Models) will be made as follows:
 - (1) The first payment of 75 percent of the Contract unit price for Special Provision (GNSS Construction Inspection Surface Models) will be made once the model has been delivered to the Engineer and installed on the equipment.
 - (2) The second payment of 25 percent of the Contract unit price for Special Provision (GNSS Construction Inspection Surface Models) will be made on the first estimate following the completion of 50 percent of the Contract.

Payment will be made under:

<u>Pay Item</u>	<u>Pay Unit</u>
900.620 Special Provision (GNSS Construction Inspection Equipment)	Each
900.645 Special Provision (GNSS Construction Inspection Surface Models)	Lump Sum

GEOTECHNICAL INSTRUMENTATION

1. DESCRIPTION. This work shall consist of furnishing, installing, and maintaining vibrating wire piezometers, Type IV Settlement platforms and inclinometers in conformance with the design shown in the Plans, at the locations indicated in the Plans and as directed by the Engineer.
2. GENERAL REQUIREMENTS. Data obtained from ~~the Contractor's~~ observations of the response of these instruments, in concert with the other data, will give the Engineer a measure of how much settlement and lateral movement has occurred and how much more can be anticipated. Settlement data, interpreted by the Engineer will provide information for analysis as to whether or not the embankments and retaining walls are performing as anticipated. The Contractor's attention must be directed at proper installation, protection of installed equipment, and coordination of this sensitive work with other construction activities. The Engineer is responsible for monitoring the geotechnical instrumentation a minimum of once per day during filling activities and weekly thereafter.
3. MATERIALS. Materials shall meet the requirements of the following Subsections:

Portland Cement.....	701.02
Sand Borrow and Cushion	703.03
Misc. Hardware, Shapes, and Fabricated Materials.....	709.01(h)
Nonstructural Lumber	709.02
Plastic Pipe, Rigid (PVC)	740.02
Water.....	745.01

Bentonite-cement grout shall consist of a mixture of 94 pounds (1 bag) of Portland cement, 75 gallons of water, and 39 pounds, or as required, of high yield sodium Bentonite clay (dry). Mix the Portland cement with water first then mix the bentonites. Adjust the amount of bentonite to produce a grout with the consistency of heavy cream.

Bentonite seal shall consist of a mixture of 20 pounds of high yield sodium Bentonite clay (dry) and 14 gallons of water. The bentonite seal shall be mixed in such a manner and at such a time that the swelling of the bentonite mixture shall occur with the material in place within the hole.

- (a) Vibrating Wire Piezometer. The following materials will be required for Piezometer, Vibrating Wire:

- (1) Transducer. A vibrating wire piezometer consists of a transducer capable of transforming a piezometric pressure into resonant frequencies which can be transmitted and displayed. The piezometers shall have an average accuracy of 0.50 percent over its entire range of 0 to 350 kPa (50 psi) with a resolution to 0.1 percent of full scale. The size of the transducer shall not exceed 0.75 inch in diameter. Calibration data shall be provided with each instrument. The transducer shall be capable of operation in temperatures from -20 to 140°F and have thermal constant of 2 minutes per degree of Celsius.

The transducer shall have an overpressurization capability of 200 percent. Each piezometer shall be provided with a 50-micron sintered stainless steel filter. All materials shall be stainless steel except as otherwise specified or recommended by the manufacturer.

The interior shall be hermetically sealed to provide a stable, inert atmosphere around the wire to ensure long life of the gauge. Each piezometer shall be equipped with a thermistor with a range of -60 to 140°F with an accuracy of $\pm 1^\circ\text{F}$ and a thermal shift corrected to 0.002 percent full scale per degree Fahrenheit.

- (2) Readout Device. The vibrating wire readout device shall be supplied by the same manufacturer as the vibrating wire piezometer. It shall be capable of reading pore pressures to 100 psi with a resolution of 0.1 HZ and provide digital display. A battery charger that is capable of recharging the unit's battery from a 110-volt, alternating current source shall be provided if the device features an internal rechargeable battery. Leads capable of attaching to the connectors on the piezometer electrical cable shall be provided by the Contractor for connecting the readout to the leads on the vibrating wire piezometers.

The Contractor shall supply the Engineer a vibrating wire readout system with a minimum resolution of 0.01 microseconds and a minimum 5 digit display.

- (3) Conductor. Each vibrating wire piezometer shall be furnished with a thick vinyl jacketed 4-conductor (2 pair), color coded, 22 gauge cable of sufficient length in order that there will be no splices or connections except at the cell and Remote Readout Location, or as ordered by the Engineer. The color coding of each cable shall be the same. The length of each cable shall have a minimum allowance of 10% slack plus an additional 10 feet. The conductors shall be solid wire of commercially annealed copper. The conductor shall meet the requirements of ASTM Designation B3-69. Each cable shall be attached to the appropriate piezometer cell and permanently marked with the number of the instrument to which it is attached. The markings shall be every 10 feet over the length of the cable and shall be applied by the manufacturer prior to shipment to the construction site. Each cable shall be mounted on a reel and protected to prevent damage during shipping. Each reel shall be stenciled or labeled with the name of the instrument. Only new, unused cable will be accepted. Signal cables shall be terminated at the Remote Readout Location in a waterproof lockable enclosure as shown on the plans.

The vibrating wire piezometer and readout device shall be supplied by one of the following manufacturers:

Geokon
VW Piezometer Model 4500S
Readout Box model GK-404

Geokon, Inc.
48 Spencer St.
Lebanon, NH 03766
Tel.: (603)448-1562
www.geokon.com

DGSI
VW Piezometer order # 52611020
VW Data Recorder # 52613500

Durham Geo Slope
Indicator Co.
4561 Greer Circle, Suite 100
Tucker, GA 30083
Tel.: (770)-465-7557
www.durhamgeo.com

RST Instruments Ltd.
VW Piezometer VW2100
VW Readout Model VW2106

RST Instruments Ltd.
11545 Kingston St
Maple Ridge, BC V2X 0Z5 Canada
Tel.: (800)665-5599
www.rstinstruments.com

or approved equal.

The Contractor shall repair or replace, if necessary, and otherwise maintain the readout system for the duration of the Contract.

(b) Settlement Platform, Type IV.

(1) Vibrating Wire (VW) Settlement Systems.

The vibrating wire settlement systems shall be supplied by the same manufacturer selected for the Vibrating Wire Piezometers, so as to utilize the same readout device:

Geokon

VW Settlement System Model 4660

DGSI

VW Settlement Cell order # 52612420

RST Instruments

VW Liquid Settlement System SSVW105

or approved equal.

The vibrating wire transducers shall measure over a range of 0-172 kPa (0-25 psi) and shall have the capability to measure temperature. Gas tube discharge electrical surge protection units shall be incorporated inside the body of each transducer. Vibrating wire transducers shall have factory-attached vented electrical cables of sufficient length to route to the terminal box without splicing.

Vibrating wire transducers shall have factory-attached connecting tubes, 2 x 1/4" Type II nylon filled with de-aired antifreeze solution, of sufficient length to route to the reservoir without splicing.

(c) Inclinerometers. The following materials and equipment are required for the Inclinerometers:

- (1) **Inclinometer Casing.** An ABS plastic inclinometer casing fabricated with four internal, longitudinal grooves, precisely manufactured to fit the wheel dimensions of the inclinometer sensor. Two sizes are available, 3.34 inch O.D. (2.87 inch I.D.) and 2.75 inch O.D. (2.32 inch I.D.); either size is acceptable and can be based on availability by the supplier. The inclinometer casing shall consist of self-aligning casing quick-connect or coupling sections, couplings compatible with casing, pop rivets as needed, and end caps.

The inclinometer casing material shall be supplied by one of the following manufacturers. Some manufacturers may have more than one type of acceptable casing; the acceptable casings are listed below:

Geokon
Model 6400 Casing
Model 6600 Casing

Geokon, Inc.
48 Spencer St.
Lebanon, NH 03766
Tel.: (603)448-1562
www.geokon.com

DGSI
Standard Casing
QC Casing
Shear Wire Casing

Durham Geo Slope Indicator
4561 Greer Circle, Suite 100
Tucker, GA 30083
Tel.: (770)-465-7557
www.slopeindicator.com

RST Instruments, Ltd.
Standard Casing
Snap Seal Casing

RST Instruments, Ltd.
11545 Kingston St
Maple Ridge, BC
Canada V2X 0Z5
Tel.: (800)665-5599
www.rstinstruments.com

Or approved equal.

- (2) **Inclinometer System.** An inclinometer system shall be provided that is compatible with the inclinometer casing. The inclinometer system shall include an inclinometer probe, control cable and storage reel, inclinometer readout, and a software license key. The inclinometer system shall be as supplied by the following supplier:

DGSi

Durham Geo Slope Indicator
4561 Greer Circle, Suite 100
Tucker, GA 30083
Tel.:(770)-465-7557
www.slopeindicator.com

The inclinometer system shall consist of the following items:

- i. Inclinometer probe: Digitilt AT Probe – English, #50332500. The inclinometer probe shall be digital, using MEMS-based tilt sensors with a range of +/- 30 degrees and capable of a resolution of 0.0002". The guide wheels shall be 24" apart. The probe shall come in a protective case and include a cable gate which will align the control cable to the top of the inclinometer casing.
- ii. Inclinometer control cable and storage reel: Reel with 100 ft cable, #50334100. The inclinometer control cable shall be 100 feet long. The inclinometer control cable shall be a continuous length with no splices or other defects. The cable shall be marked at 2-foot increments with depth labels every 4 feet. The cable storage reel shall be a hand crank-operated cable reel assembly capable of holding the inclinometer control cable. The reel shall be of such design as to allow operation of the inclinometer system while the drum is rotating. The cable storage reel shall include a protective case.
- iii. Inclinometer Readout: 7" Panasonic Toughpad Reader, #50330945. The Contractor shall supply the Engineer a computerized readout device capable of obtaining inclinometer data, processing checksum statistical routines, and storing data for each inclinometer installation.
- iv. Software: DigiPro2 License Key, #50310101. The Contractor shall supply a software license key which will allow for the use by the Engineer of the DigiPro2 software package. The software itself is available for free to be downloaded from the DGSi website, however the software key needs to be purchased to allow for the use of advanced features in the software.

4. SUBMITTALS.

- (a) Vibrating Wire Piezometer. The Contractor shall submit to the Engineer for approval an installation schedule, instrumentation installation procedures, and a complete listing of

materials a minimum of two (2) weeks prior to installation.

- (b) **Inclinometers.** The Contractor shall submit to the Engineer for approval an installation schedule, instrumentation installation procedures, and a complete listing of materials a minimum of two (2) weeks prior to installation.
- (c) **Settlement Platforms, Type IV.** The following information shall be submitted to the Engineer for approval a minimum of two (2) weeks prior to beginning settlement platform installation:
 - (1) A complete installation schedule of indicated instrumentation, with detailed installation procedures and a complete listing of all materials.
 - (2) A list of all settlement systems with the cable and tubing lengths and the proposed procedures and methods for installing the cable and tubing. The method for marking and identifying cables from individual settlement systems shall be clearly identified.
 - (3) The manufacturer calibration sheets for all VW transducers. Calibration sheets shall include the zero correction value, the gauge factor, barometric pressure and temperature, and calibration data at the time of manufacture.

5. INSTALLATION.

- (a) **General.** The Contractor shall survey all geotechnical instrumentation for both location and elevation prior to and immediately after installation. For instrumentation installed into boreholes, such as vibrating wire piezometers, the ground surface or other temporary benchmark shall be surveyed and a depth offset applied to determine the elevation of the sensor. All instrumentation shall be in place and accepted by the Engineer prior to proceeding with Mechanically Stabilized Earth (MSE) retaining wall and embankment construction.
- (b) **Drilling Requirements.** The following are the basic drilling requirements for installation of the geotechnical instrumentation:
 - (1) Drilling personnel shall have three years of experience in installing geotechnical instrumentation.
 - (2) The Contractor shall utilize a grout pump and tremie pipe capable of delivering both grout types to a depth of 85 feet.

- (3) Approximate vibrating wire piezometer sensor elevations are provided on the Plans for estimating purposes only. Actual installation elevations will be determined by the Engineer based upon actual soil conditions.
- (4) Only Hollow-stemmed augers or flush-jointed casing shall be used for installation of the geotechnical instruments.
- (5) Boreholes shall be cased continuously. "Open-holed" or "mudded" borings will not be permitted.
- (6) The Contractor shall select a casing inside diameter of sufficient size to ensure that the proposed instrumentation can be installed without damage and without pulling up instrumentation while withdrawing casing.
- (7) The maximum borehole deviance from vertical shall be 2 degrees.
- (8) Standard penetration testing (SPT) shall be performed in accordance with ASTM D 1586. Intervals will be every 5 feet or as determined by the Engineer.
- (9) No additional compensation will be provided if more SPT's or split spoon samples are required.
- (10) The Contractor shall place the split spoon samples recovered from each hole in new, large-mouth, round, clear glass jars.
- (11) The hole number and sample recovery depth shall be clearly marked on each jar and the cap. The recovered samples shall then be given to the Engineer for storage.
- (12) When withdrawing the drill casing or augers during instrument installation, care shall be taken to minimize the increments and rate of casing withdrawal so that collapse of the borehole does not occur, and to ensure that material does not build up inside the casing as the casing is withdrawn. The casing shall be withdrawn without rotation.
- (13) The Engineer will log each soil test boring and record the configuration and elevations of the installed instrumentation.

- (c) Vibrating Wire Piezometer. Piezometers shall be installed at the locations and depths indicated in the Plans or as directed by the Engineer in accordance with the manufacturer's instructions. Piezometers shall be installed and fully functioning with recorded data a minimum of one week before commencing the excavation of the temporary construction slope below the toe of the wall to obtain baseline readings.

The Contractor shall use personnel experienced with the installation of piezometers.

The bore hole should extend a minimum of 300 mm (12 inches) below the proposed piezometer tip elevation and should be washed clean of drill cuttings. The piezometer should be attached to a sacrificial grout tremie pipe or other method such that the piezometer can be held without moving at the proposed piezometer tip elevation. The hole will then be backfilled with bentonite-cement grout in a continuous process by slowly pumping the bentonite grout through the sacrificial grout tremie pipe or drill rods so that any water in the drill hole is expelled completely.

The casing shall be removed after the grout has been placed to within 5 feet of the ground surface. As the casing is being withdrawn from the hole, additional grout shall be placed to ensure that the grout remains within 5 feet of the ground surface.

Protection of the signal cable shall be provided as required to prevent the cable from being damaged during subsequent construction activities until the riprap slope is completed. Where the signal cable will extend out horizontally from the borehole location, the signal cable shall be positioned so that the cable will exit the borehole in a broad sweep away from the borehole and in the direction of the wire run. The cable shall be placed in a 1 foot x 1 foot trench and shall be backfilled with sand borrow and compacted to protect the cable. The signal cable shall extend to a location that will allow the piezometer to be safely read.

Each cable shall be clearly marked by means of a stamped metal tag.

Piezometers shall be maintained by the Contractor throughout the duration of the project. When a piezometer becomes damaged or inoperable, all construction operations within 100 feet of the installation shall cease unless otherwise ordered by the Engineer. The Engineer shall determine if replacement is required or if sufficient information has been obtained and the installation may be abandoned. Construction may resume upon written authorization by the Engineer.

- (d) Inclinometers. Inclinometers shall be installed at the locations indicated on the Plans or as directed by the Engineer and installed in accordance with the manufacturer's instructions. One set of grooves, defined as the A-axis, shall be oriented perpendicular to the completed face of the wall or slope. Casing groove orientation shall be maintained through installation.

For inclinometer casing that is installed into a borehole, the casing shall be assembled as it is installed into the borehole. The casing should be weighted with water or other suitable method to counteract buoyancy effects; the drill rig shall not be used to hold down empty casing as it will cause the casing to bend in the borehole. The annular space outside of the inclinometer casing shall be backfilled in a continuous process using bentonite-cement grout.

Inclinometer casing shall be terminated into 5 feet of bedrock or 10 feet of glacial till as shown on the plans or determined by the Engineer.

The exposed portion of the inclinometer casing shall be painted fluorescent orange and the inclinometer number stenciled in black on the casing.

After completion of installation, a post-installation acceptance test will be performed by the Engineer to verify that there is no concrete in the inclinometer casing, that groove orientation and verticality are correct, that the inclinometer probe tracks correctly in all four orientations, and to establish a baseline reading.

After completion of installation, the as-built survey coordinates for horizontal position shall be determined to an accuracy of ± 0.01 foot and the elevation of the top of the riser pipe to an accuracy of ± 0.01 foot.

The inclinometer shall be protected against damage from construction equipment by indicators as directed by the Engineer. Inclinometers shall be maintained by the Contractor for the duration of the project.

When an inclinometer becomes damaged or inoperable, all wall construction operations shall cease unless otherwise ordered by the Engineer. The Engineer shall determine if replacement is required or if sufficient information has been obtained and the installation may be abandoned. Wall construction may resume upon written authorization by the Engineer.

6. MAINTENANCE. The Contractor shall maintain all geotechnical instrumentation equipment in an acceptable working order for the duration of the project and shall repair or replace any such equipment which fails to function properly, as directed by the Engineer.

Any instrumentation that becomes damaged or inoperable through no fault of the Contractor and requires replacement shall be replaced and paid for at the unit price bid for the respective instrumentation.

Any instrumentation that becomes damaged or inoperable as a result of the Contractor's operations shall be replaced by the Contractor at no cost to the State.

The liability of the Contractor under this Contract is absolute and is not dependent upon question of negligence on the part of the Contractor or the Contractor's agents, servants, or employees.

Any oversight by the Engineer in ordering specific precautionary measures will not relieve the Contractor of responsibility in case of any alteration, movement, or disturbance of the geotechnical instrumentation other than due to settlement of the embankments.

The Contractor shall monitor and record elevation data at the completion of installation as indicated on the Plans or as directed by the Engineer. The Engineer will be responsible for monitoring the instrumentation and interpreting the instrumentation data. The Contractor shall provide clear access to inclinometers and readout boxes until the completion of the project.

7. METHOD OF MEASUREMENT. The quantity of Special Provision (Piezometer, Vibrating Wire) to be measured for payment will be the number of each installed and maintained in the complete and accepted work.

The quantities of Special Provision (Settlement Platform, Type IV) to be measured for payment will be the number of settlement platforms furnished, installed, and maintained in the complete and accepted work.

The quantity of Special Provision (Inclinometer Casing) to be measured for payment will be of the linear feet of specified inclinometer casing satisfactorily installed and maintained in accordance with this specification.

The quantity of Special Provision (Inclinometer System) to be measured for payment will be the number of each complete system installed and maintained in the complete and accepted work. Each system includes the inclinometer probe, the control cable and reel, the readout, and the software license.

8. BASIS OF PAYMENT. The accepted quantity of Special Provision (Piezometer, Vibrating Wire), Special Provision (Inclinometer System) and Special Provision (Settlement Platform, Type IV) will be paid for at the Contract unit price per each. Payment will be full compensation for furnishing, transporting, handling, installing, and placing the materials specified, including cables, readout devices, remote readout locations, backfill, and appurtenances; trenching and backfilling; maintaining the piezometers, inclinometers and settlement platforms as necessary; and for furnishing all labor, tools, equipment, and incidentals necessary to complete the work.

The accepted quantity of Special Provision (Inclinometer Casing) will be paid for at the Contract unit price per linear foot, which price shall be full compensation for furnishing, transporting, handling, installing all appurtenances, and the furnishing of all tools, equipment, measuring devices and incidentals necessary to complete and maintain the inclinometer casing.

Partial payments for Special Provision (Piezometer, Vibrating Wire), Special Provision (Inclinometer System), and Special Provision (Settlement Platform, Type IV) will be made as follows:

- (a) When instrumentation has been delivered on-site, a payment of 25 percent of the Contract unit price will be allowed.
- (b) When instrumentation has been installed and is properly functioning, a further payment of 50 percent of the Contract unit price will be allowed.
- (c) The remaining 25 percent of the Contract unit price will be paid upon completion of the project or removal/abandonment of the equipment as determined by the Engineer.

At the completion of the project, the geotechnical instrumentation and appurtenances, including all readout devices, will become the property of the State.

Payment will be made under:

<u>Pay Item</u>	<u>Pay Unit</u>
900.620 Special Provision (Piezometer, Vibrating Wire)	Each
900.620 Special Provision (Inclinometer System)	Each
900.620 Special Provision (Settlement Platform, Type IV)	Each
900.640 Special Provision (Inclinometer Casing)	Linear Foot

WET AREA SEED

1. DESCRIPTION. This work shall consist of the preparation of the area and furnishing and installing a wet area seed mix.

The work under this Section shall be performed in accordance with these provisions, the Plans, and Section 651 of the Standard Specifications.

2. MATERIALS. Wet area seed shall meet the requirements of the following Subsection and as shown on the Plans:

Seed.....755.04

3. CERTIFICATIONS. A Type A Certification shall be furnished.
4. CONSTRUCTION REQUIREMENTS. Preparation of the area and placement of the wet area seed shall be in accordance with Section 651. The seeding application rate shall be as shown on the Plans.
5. METHOD OF MEASUREMENT. The quantity of Special Provision (Wet Area Seed) to be measured for payment will be by the ~~square-foot~~ pound installed in the complete and accepted work.
6. BASIS OF PAYMENT. The accepted quantity of Special Provision (Wet Area Seed) will be paid for at the Contract unit price per ~~square-foot~~ pound. Payment shall be full compensation for furnishing, transporting, handling, and placing the Wet Area Seed, and for furnishing all labor, tools, equipment, maintenance, water necessary to promote growth, and incidentals necessary to complete the work. All work required for preparation of the area will not be paid for separately but will be considered incidental to Special Provision (Wet Area Seed).

Payment will be made under:

<u>Pay Item</u>	<u>Pay Unit</u>
900.635 Special Provision (Wet Area Seed)	Pound

BRIDGE RAILING

1. DESCRIPTION. This work shall consist of furnishing and erecting bridge railing ~~and performing repairs to existing bridge railing.~~
2. MATERIALS. Materials shall meet the following requirements:
 - (a) Concrete. Concrete shall meet the requirements of Section 900.608 Special Provision (Performance-Based Concrete, Class PCD) unless otherwise specified in the Contract. For any class of concrete that is not included in Special Provision (Performance-Based Structural Concrete), a shrinkage-compensating admixture shall be added during the initial concrete mixing phase or as recommended by the chemical manufacturer's product representative. The Contractor shall provide a written recommendation from the chemical manufacturer's product representative for the appropriate shrinkage-compensating dosage.
 - (b) Reinforcing Steel. Reinforcing steel shall meet the requirements of Section 507 for Reinforcing Steel, Level II (Hot Dipped Galvanized).
3. FABRICATION DRAWINGS. The fabricator of steel components furnished under this section shall submit detailed fabrication drawings in accordance with the requirements of Subsection 105.03.

The Contractor shall submit a bending schedule for concrete bridge railing reinforcement in accordance with the requirements of Subsection 105.03.

4. FABRICATION.
 - (a) Concrete Forms. Forms shall conform to the railing design shown in the Plans and forming requirements of Special Provision (Performance-Based Structural Concrete). 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.
5. CONSTRUCTION TOLERANCES. Tolerances for railing components shall meet the requirements of the *AASHTO LRFD Bridge Construction Specifications*.
6. INSTALLATION.

- (a) General Requirements. Railings shall be installed in conformance with the applicable provisions of Special Provision (Performance-Based Structural Concrete), Section 507, and these specifications. Alignment, grade, and clearances at joints shall be adjusted to the satisfaction of the Engineer.

Unless otherwise specified, removed railing shall become the property of the Contractor and shall be removed from the project.

Concrete railing shall receive an aesthetic finish in accordance with Special Provision (Performance-Based Structural Concrete) Subsection 14(a)(2). Cracks in concrete railing shall be repaired by a method approved by the Engineer. Cracks in concrete greater than 0.01 inch may be cause for rejection.

- (b) Delineation. Delineation devices shall be of the design shown on the Plans and shall be securely fastened to the bridge railing posts as shown on the Plans or as directed by the Engineer.

7. METHOD OF MEASUREMENT. The quantity of Special Provision (Bridge Railing, Single Slope, 42 Inch) to be measured for payment will be the number of linear feet of bridge railing used in the complete and accepted work. Measurement will be made along the face of the rail from end to end or between the pay limits specified. No deductions or additions will be made for joints.
8. BASIS OF PAYMENT. The accepted quantity of Special Provision (Bridge Railing, Single Slope, 42 Inch) will be paid for at the Contract unit price per linear foot. Payment will be full compensation for detailing, furnishing, handling, placing, and delineating the railing components, 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, and satisfactory completion of any necessary repairs, surface finishing, and curing. Reinforcing Steel used in the railing will not be paid for separately but will be included in the unit price for Special Provision (Bridge Railing, Single-Slope Concrete, 42 Inch).

Payment will be made under:

<u>Pay Item</u>	<u>Pay Unit</u>
900.640 Special Provision (Bridge Railing, Single-Slope Concrete, 42 Inch)	Linear Foot

GRANITE CURBS

1. DESCRIPTION. This work shall consist of furnishing and installing concrete backed sloped granite curb in accordance with the Plans and as directed by the Engineer.

The work under this Section shall be performed in accordance with Section 616 of the Standard Specifications.

2. MATERIALS. Materials shall be in accordance with Section 616.02 of the Standard Specification.
3. CONSTRUCTION REQUIREMENTS. Concrete backed granite slope edging shall be furnished and constructed in accordance with the Contract Plans.
4. METHOD OF MEASUREMENT. The quantity of Special Provision (Concrete Backed Granite Slope Edging) to be measured for payment will be the number of linear feet constructed in the complete and accepted work.
5. BASIS OF PAYMENT. The accepted quantity of Special Provision (Concrete Backed Granite Slope Edging) will be paid for at the Contract unit price per linear foot placed. Payment will be full compensation for detailing, furnishing, transporting, handling, and placing the specified materials, including all excavation, providing, placing, and compacting backfill material when not otherwise specified, concrete for curb bed and backing, mortar for the bed and joints of curbs, joint material for curbs, cleaning, cutting, fitting, dressing, or stockpiling of curb 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 (Concrete Backed Granite Slope Edging)	Linear Foot

CURED IN-PLACE PIPE (CIPP) LINER, ULTRAVIOLET

1. DESCRIPTION. This work shall consist of lining an existing pipe culvert at the location indicated in the Plans and as directed by the Engineer.
 - (a) The Contractor shall provide all materials, equipment, labor, and incidentals for the installation and testing of cured in-place pipe (CIPP) lining within an existing host pipe culvert.
 - (b) The CIPP liner installation shall consist of inserting a resin-impregnated flexible tube into an existing sewer main or pipe culvert, expanding the tube out against the inner walls of the existing sewer pipe or pipe culvert, and curing the tube to form a pipe liner. Curing shall be accomplished by applying ultraviolet light to obtain the desired cure throughout the tube extending the full length from manhole to manhole or from pipe invert to pipe invert.
 - (c) The CIPP liner shall cure into a hard, impermeable liner less than or equal to 0.75-inches thick and form a structurally sound liner pipe with a uniformly smooth interior.
2. REFERENCE STANDARDS. This work shall comply with applicable provisions and recommendations of the following:
 - (a) ASTM D 790 – Standard Test Methods for Flexural Properties of Unreinforced and Reinforced Plastics and Electrical Insulating Materials
 - (b) ISO 178 – Determination of Flexural Properties
 - (c) ASTM D 2990 – Standard Test Methods for Tensile, Compressive, and Flexural Creep and Creep-Rupture of Plastics
 - (d) DIN 761 – Glass Reinforced thermosetting plastics (GRP) pipes
 - (e) ASTM D 3567 – Standard Practice for Determining Dimensions of “Fiberglass” (Glass-Fiber-Reinforced Thermosetting Resin) Pipe and Fittings
 - (f) DIN EN 13566-4 – Plastics piping systems for renovation of underground non-pressure drainage and sewerage networks
 - (g) ASTM F 1216 – Standard Practice for Rehabilitation of Existing Pipelines and Conduits by the Inversion and Curing of a Resin-Impregnated Tube
 - (h) ASTM F 2019 – Standard Practice for Rehabilitation of Existing Pipelines and Conduits by the Pulled in Place Installation of Glass Reinforced Plastic (GRP) Cured in-Place Thermosetting Resin Pipe (CIPP)

- (i) ASTM D 543 – Standard Practices for Evaluating the Resistance of Plastics to Chemical Reagents
- (j) WRC Sewerage Rehabilitation Manual, Type II Design

3. PRODUCT, MANUFACTURER/INSTALLER QUALIFICATION REQUIREMENTS. In order to minimize the risk to the Agency, only proven products with substantial successful long-term track records will be approved.

Products and installers seeking approval must meet all of the following criteria to be deemed commercially acceptable.

- (a) For each method of installation and curing used on this project, the manufacturer of the CIPP liner system shall have a history of at least 350,000 linear feet of CIPP liner installations using a similar resin and flexible tube and using the specific method of installation and curing being used.
- (b) For each method of installation and curing used on this project, the CIPP liner work shall be supervised by a foreman having previously supervised a minimum of 50,000 linear feet of CIPP liner using a similar resin and flexible tube and using the specific method of installation and curing method proposed.
- (c) The entity performing the wet-out of the CIPP liner shall have been performing this type of work for a minimum of three years and previously wet-out at least 350,000 linear feet of CIPP liner. If the Contractor does not have 350,000 linear feet of CIPP liner experience with the UV curing system being used, then the manufacturer's onsite representative shall be present during all installations of the CIPP liner system. The Contractor shall provide the Engineer with the manufacturer representative's work experience for approval. Work shall not begin prior to the Engineer's approval of the manufacturer's onsite representative.
- (d) The Contractor shall provide five references of completed projects with similar installations.

4. DELIVERY, STORAGE, AND HANDLING. Care shall be taken in shipping, handling and storage to avoid damaging the liner. Any part of the liner damaged in shipment shall be replaced as directed by the Engineer at no additional cost to the State. While stored, the CIPP shall be adequately supported and protected. The CIPP shall be stored in a manner as recommended by the manufacturer and as approved by the Engineer.

5. MATERIALS. Materials for the Cured In-Place Pipe (CIPP) liner system shall be certified under a Type D Certification, furnished to the Agency, and shall meet the following requirements:

- (a) The CIPP lining shall be a resin-impregnated flexible tube which is inserted into a host pipe to be rehabilitated and cured in-place by ultraviolet (UV) light. The tube may have a suitable polyurethane membrane coating for protection of the interior surface and to provide a uniform, smooth flow surface and may be removed after installation and curing is completed. The resin shall be an ultraviolet initiated resin and shall be suitable for the design conditions as well as a curing process. The resin shall be encapsulated with an inner and outer impervious film to envelop the resin within the membrane of the liner.
- (b) Short Term Flexural Modulus: 1,500,000 psi
- (c) 50-Year Flexural Modulus (ASTM D2990 or DIN 761): 1,125,000 psi minimum
- (d) Meet IIM-LD-244.1 Table A Flexible Liner Type Selection Guidelines for Category A.
- (e) Follow ASTM F1216 Appendix X1.2.2 Fully Deteriorated Gravity Pipe Conditions.
- (f) Be in accordance with ASTM F2019, Appendix X1, Design Considerations for a fully deteriorated or partially deteriorated host pipe for a circular host pipe with 10% ovality or less.
- (g) Have a minimum service life of 50 years under continuous service.
- (h) Provide groundwater table elevation at crown of pipe.
- (i) Be designed for a traffic loading of HL-93. Traffic load shall be ignored after 8 feet of cover except for multiple barrel rehabs, in which case it shall continue indefinitely.
- (j) Total wet unit weight of soil is 120 pcf, 135 pcf saturated.
- (k) A Poisson's ratio of 0.3
- (l) An enhancement factor of 7
- (m) Modulus of soil reaction
 - (1) 0-5 ft of cover = 1.8 ksi
 - (2) >5-10 ft of cover = 2 ksi
 - (3) >10-30 ft of cover = 2.2 ksi
 - (4) >30-60 ft of cover = 2.6 ksi
 - (5) >60 ft of cover = 2.8 ksi

- (n) Factor of safety $N = 2.0$.
- (o) Construction:
 - (1) Any voids around exterior of host pipe must be filled for design assumptions to be valid.
- (p) Shall specify the following:
 - (1) Method for installation and curing.
 - (2) Individual components.
 - (3) Tube type (whether reinforced or non-reinforced).
 - (4) Manufacturer name and type of resin including catalyst.
 - (5) Volume of resin required to achieve proper impregnation and curing.
- (q) Shall include lot numbers and expiration dates of all supplied components.
- (r) Shall have an impermeable inner and outer plastic film to envelop the resin liner system to promote complete polymerization, prevent resin migration and loss, and prevent contamination of the interior of the finished product.
- (s) Shall conform to the requirements of Table 1:

TABLE 1 – REQUIRED LINER PROPERTIES

Property	Test Procedure	Physical Requirement
Tensile strength at yield	ASTM D 638	3,000 psi
Modulus of elasticity	ASTM D 790	200,000 psi
Flexural strength	ASTM D 790	4,000 psi

- (t) The tube shall consist of one or more layers of fiberglass laminate that meets the requirements of ASTM F2019.

The tube shall be homogeneous across the entire wall thickness containing no intermediate or encapsulated elastomeric layers. No material shall be included in the tube that may cause de-lamination in the CIPP. No dry or unsaturated layers shall be present.

After installation of the CIPP, the wall color of the interior pipe surface shall be a light reflective color so that a clear detailed examination can be made by using closed circuit television inspection equipment.

- (u) Ultraviolet (UV) initiated resin shall saturate the tube and produce a properly cured liner which is resistant to abrasion due to solids, grit, and sand.

Polyester, vinyl ester and catalyst system shall comply with the following requirements and that when properly cured meets the requirements of ASTM F 1216. Resins created from recycled materials are not allowed.

- 6. SUBMITTALS. The submittal shall be made to the Agency in accordance with Section 105 and VTrans shall be allowed 14 calendar days to review. The submittal shall include, at a minimum, the following:

- (a) Summary table of CIPP material properties, including short-term flexural modulus of elasticity, 50-year flexural strength (bending stress), and chemical resistance. Certified test reports shall be submitted verifying each value as described below.
- (b) Independent third party certified laboratory test reports demonstrating that the exact resin/liner combination to be used for this project meets the requirements for initial structural properties (ISO 178 with wall thickness measured per DIN EN 13566-4) and chemical resistance (performed in accordance with ASTM F 1216 Appendix X2)
- (c) Independent third party certified laboratory test reports demonstrating that the exact resin and liner to be used for this project has been tested for long-term flexural modulus of elasticity and long-term flexural strength (i.e. 10,000 hour creep testing performed in accordance with ASTM D 2990 or DIN 761 for design conditions applicable to this project).
- (d) Installation quality control plan, cleanliness requirements, liner sequence, liner installation standard procedures (including but not limited to, minimum/maximum allowable installation pressures and speeds certified by the liner manufacturer), light train sizing, temperature monitoring plan, and odor control procedure.
- (e) The name of the liner and resin manufacturer, the location of the facility where each was manufactured, and a list of appurtenant materials and accessories to be furnished.
- (f) Structural design calculations and specification data sheets listing all parameters used in the liner design and thickness calculations based on Appendix X1 of ASTM F 2019 for each pipe segment with less than 10% ovality. All calculations shall be prepared under and stamped by a Professional Engineer. Submit P.E. Certification Form for all CIPP liner design data.

- (g) Available standard written warranty from the manufacturer of wet-out liner.
 - (h) Contingency plan, including methods and equipment to be used to repair unacceptable liner defects and for removing failed liners. Plan for availability and accessibility of backup equipment such as two lateral reinstatement cutters per truck.
7. HYDRAULIC CAPACITY. The CIPP shall have a minimum diameter as shown on the Plans. The hydraulic cross-section shall be maintained as large as possible.
8. PREPARATION.
- (a) The Contractor shall ~~review the Agency's television inspection logs and/or~~ conduct additional inspection of the pipe(s) as deemed necessary by the Contractor to plan rehabilitation work.
 - (b) Pipes shall be cleaned to pre-construction inspection, such that the pipes are free of roots, grease, sand, rocks, sludge, tuberculation (to a tolerance of 0.25 inches projection) and other debris.
 - (c) The Contractor shall submit and obtain the Engineer's approval for a pre-construction inspection. The Contractor shall inspect and confirm the inside diameter, alignment and condition of each segment to be lined. The data and information collected from this inspection shall be used to verify the size of the liner and refine the installation techniques. If unknown physical conditions in the work area are uncovered during the investigation that materially differ from those ordinarily encountered, the Engineer shall be notified.
 - (d) The line of obstruction shall be cleared of debris such as solids or broken pipe that will prevent the insertion of the liner. If inspection reveals an obstruction that cannot be removed by the conventional cleaning equipment, the Engineer shall be alerted immediately.
 - (e) In presence of the Engineer, the Contractor shall perform a pre-lining CCTV inspection immediately prior to CIPP lining to demonstrate that the pipe is clean and free of roots, grease, sand, rocks, sludge, pockets of water, or structural impediments that would affect long-term viability of the pipe liner. The Contractor shall obtain the Engineer's written approval of the acceptability of the existing pipe condition prior to installation of the CIPP.
 - (f) Ultraviolet cured in-place installations shall be performed in the dry.

- (g) The Contractor shall place an impermeable sheet immediately upstream and downstream of the host pipe prior to liner insertion to capture any possible raw resin spillage during installation and shall remove and properly dispose of any waste materials. Where the pulled-in-place method of installation is used, the Contractor shall install a semi-rigid plastic slip sheet over any interior portions of the host pipe that could tear the outer film or over any significant voids in the host pipe. The Contractor shall ensure there is no loss of impermeability of the inner and outer plastic films or pre-liner during installation. The Contractor shall promptly repair any pinholes or tears in the plastic films or pre-liner before proceeding with the installation. Where such damaged areas cannot be repaired, the Contractor shall promptly replace the impermeable plastic films or pre-liner before proceeding with the installation.
- (h) The Contractor shall obtain and comply with all discharge-related permits, including air, water, and wastewater treatment (i.e. Publicly Owned Treatment Works or "POTW"). For any discharge to a POTW, the Contractor shall obtain advanced written approval from the receiving facility for acceptance of effluent waste before repair work can start and shall provide such documentation of the POTW discharge approval to the Engineer prior to the start of the installation.
- (i) The Contractor shall capture and properly dispose of and be responsible for the proper transportation and off-site disposal of process residuals. The Contractor shall provide disposal documentation from the receiving facility to the Engineer. For any discharge to a POTW, the Contractor shall comply with all the requirements of the POTW receiving the discharge.

9. ULTRAVIOLET CIPP INSTALLATION PROCEDURES.

- (a) General. Installation and curing requirements of pipe sections for the ultraviolet cured in-place pipe liner shall be according to the manufacturer's recommendations for the specific product as applicable.

The Contractor shall furnish curing requirements for ultraviolet cured in-place pipe liner to include as applicable individual components of the system, tube type (whether reinforced or non-reinforced), manufacturer name and type of resin included catalyst, volume of resin required to achieve proper impregnation and curing. All components of the systems shall be as recommended by the manufacturer for the specific system used, and all components shall include lot numbers and expiration dates.

- (b) Material Saturation. The wet-out of the liner will not be permitted to be done onsite. Liners shall be wet-out in an environmentally controlled indoor manufacturing setting and shall be registered in accordance with ISO 9001:2008 for its Quality Management System.

- (c) Insertion. The flexible tube shall be inserted through an existing access way. The liner material shall be inserted by means and method required by the manufacturer and shall be fully extended from invert to invert. Where applicable, insert the tube such that the seam of the liner is positioned at the six o'clock position. Only lubricants approved by the tube manufacturer will be allowed. Allowances shall be made for circumferential stretching during insertion and for longitudinal stretching during pull-in. No inversion of the tube will be allowed. Overlapped layers of material in longitudinal seams that cause lumps in the final product will not be allowed.
- (d) Pressure. The Contractor shall maintain pressure requirements as defined by the manufacturer. The pressure used during the installation process shall be sufficient to hold the liner tight to the pipe wall and prevent wrinkles in the cured liner. The same pressure shall be great enough to prevent infiltration from entering the pipeline during the curing process. The pressure shall be maintained sufficiently long enough to allow pockets of water to exfiltrate through the host pipe and prevent lifts in the liner.
- (e) Curing.
 - (1) The submitted cure schedule shall be followed when curing the liner.
 - (2) The liner temperature shall be continuously monitored.
 - (3) Curing shall continue uninterrupted until the desired product is achieved.
- (f) Finished Pipe. The finished CIPP shall be continuous and as free as commercially practicable from visual defects such as foreign inclusions, dry spots, pinholes, delamination, and wrinkles at any location totaling more than 5% of host pipe inside diameter.
- (g) Cure Video. The Contractor shall provide a video of the uncured liner in place, the lining curing in progress, and an automated tamper proof log of all critical data immediately after completion of line curing. Irregularities from visual defects such as foreign inclusions, dry spots, pinholes, delamination, and wrinkles at any location shall be noted.

10. TRIMMING AT MANHOLES OR PIPE INVERTS.

- (a) The finished ends of the liner shall be neatly and smoothly trimmed to within two inches of host pipe end. No rough edges that may catch debris shall remain. If applicable, the CIPP shall not extend into the manhole channel.
- (b) A smooth transition between the existing manhole channel invert and the effluent liner shall be created using cement grout or other approved material to prevent settling of sediments or debris from catching on the liner.

11. POST-INSTALLATION INSPECTION OF COMPLETED WORK.

- (a) The Contractor shall provide post-construction inspection video documentation showing the completed work on the same day as liner curing and a minimum of 30 days after the completed liner has been in service.
- (b) The Contractor shall correct all defects discovered during the television inspection before Conditional Acceptance. After the defects are corrected, the post-construction inspection shall be repeated.
- (c) The allowable contact tolerance between the liner and host pipe is 0.4 inches. In cases where any space or gap between the outside surface of the liner and the inside surface of the host pipe exceeds 0.4 inches, the liner will be deemed deficient and corrective action will be required as determined by the Engineer.
- (d) The Contractor shall thoroughly rinse the cured lined pipe with clean water and capture and properly dispose of rinse water prior to re-introducing flow.

12. FINAL CLEANUP. Upon completion of rehabilitation work and testing, the project area affected by the work shall be cleaned and restored.

13. WATER SAMPLING COLLECTION. For styrene-based CIPP and vinyl ester-based CIPP, the Contractor shall employ the services of a qualified independent environmental services laboratory or environmental consultant to collect the following samples:

(a) Pre-Installation Sampling.

- (1) Pre-rehabilitation soil and water samples shall be taken within 3 feet of the pipe ends (or otherwise as close as possible) upstream and downstream of the pipe location.
- (2) Prior to the installation of the CIPP, a sample of the naturally occurring water flow shall be collected at the outlet. The sample shall be retained for analysis and be analyzed for the same constituents as the flowing water testing. The test results from this sample will be used as evidence of existing conditions at the site.

(b) Post-Installation Sampling.

- (1) Soil and water samples shall be taken within 3 feet of the pipe ends (or otherwise as close as possible) upstream and downstream of the pipe location.

- (2) A flowing water test shall be performed upon completion of the installation of the liner, removal of the inner liner and cutting of both ends of the finished product pipe. The amount of water/water flow available at the time of the installation will determine the process by which samples are taken for analysis.
 - (3) If current conditions provide for a low flow of surface water through the newly rehabilitated culvert, water will be allowed to run through the culvert and a sample of water shall be collected at the outlet of the culvert. If current conditions do not provide for the natural flow of water through the culvert, a rain event shall be simulated by introducing water at the inlet of the culvert.
- (c) Water Sampling Frequency. Samples shall be collected the same day as the installation and daily thereafter (unless suspended by the governing authority) until two successive daily samples show no leakage from the liner is occurring.

These samples shall be collected in accordance with applicable ASTM standard procedures. For styrene-based liners, samples shall be analyzed for styrene using USEPA SW 846 Method 8260. Styrene concentrations in water samples shall not exceed 1.0 mg/L. For vinyl ester-based liners, samples shall be analyzed for diallyl phthalate. Diallyl phthalate concentrations in water samples shall not exceed 0.4 mg/L. The Contractor shall report the results of all sampling to the Engineer within 4 weeks after completion of the rehabilitation. The following information shall also be supplied in the water or soil sampling reports:

- (1) Location of Pipe.
 - a. Town
 - b. County
 - c. Route number and distance to nearest intersection
 - d. Name of stream if applicable or known
- (2) Description of Pipe.
 - a. Length, diameter, type (e.g. concrete, corrugated steel)
 - b. Conveyance conditions (e.g. wet weather only, perennial, current conditions)
 - c. General flow description (e.g. high, medium, low)

- d. Site description (e.g. stream bed, earthen ditch, concrete ditch, subsurface stormwater drainage)

It shall be the Contractor's responsibility to report and take appropriate corrective actions to contain and remediate any release of contaminants from cured in-place process materials, effluent or condensate into the environment in accordance with applicable local, state or federal regulations and the Specifications. The cost for such remediation shall be at the Contractor's expense.

The Contractor shall capture and properly dispose of and be responsible for the proper transportation and off-site disposal of process residuals. The Contractor shall provide disposal documentation from the receiving facility to the Engineer. For any discharge to a POTW, the Contractor shall comply with all the requirements of the POTW receiving the discharge.

14. ACCEPTANCE.

- (a) At the time of delivery, the liner shall be homogeneous throughout, uniform in color, free of cracks, holes, foreign materials, blisters or deleterious faults.
- (b) The liner manufacturer shall have a Quality Management System registered with ISO 9001:2008.
- (c) Acceptance of the CIPP shall be based on the Engineer's evaluation of the resin impregnation quality control reports, curing logs, post-construction inspection video, and laboratory test results for the installed pipe samples, which shall demonstrate:
 - (1) Compliance with the required CIPP physical properties and thickness.
 - (2) No observed groundwater infiltration of the liner.
 - (3) There is no evidence of excessive wrinkles, splits, cracks, breaks, lifts, kinks, scalds, blisters, de-laminations, crazing or other defects in the liner. It is understood that the condition of the host pipe can cause these defects. Large offsets, voids and the like are understood, and notice provided to VTrans before pipe lining starts.
- (d) If any defective liner is discovered after it has been installed, it shall be removed and replaced with either a sound liner or a new pipe at no additional cost to VTrans. The Contractor shall be responsible for costs of additional testing required to confirm compliance with these requirements. Approval of the Engineer shall be obtained for the method of repair, which may require field or workshop demonstration.

- (e) If the Contractor elects to repair defects in the liner using trenchless methods, the defective sections of the liner shall be removed for the full circumference to a minimum of six inches beyond each end of the defective liner or as approved by the Engineer. A cured in-place point repair that matches or exceeds the short and long-term material properties of the existing liner shall be installed and must have the appropriate thickness to withstand the criteria for that particular liner. A minimum of twelve inches of overlap is required on either end of the repair. Should the proposed cured in-place point repair reduce the inside diameter of pipe to an unacceptable diameter, VTrans retains the right to require alternative materials for the repair or to have the Contractor perform an excavated repair, at no additional cost to VTrans.
 - (f) The Contractor shall conduct a CCTV inspection following a minimum 30-day period after installation of the liner, showing condition of the liner in service. Ideally the inspection should be completed during high groundwater conditions. The Contractor shall provide the Engineer a minimum of 5 calendar days' notice prior to conducting the post-construction CCTV inspection for Final Acceptance, and all inspections shall be conducted in the presence of the Engineer.
 - (g) The Contractor shall provide a curing log, including CIPP lining temperatures, pressures, and times during the curing process to document that a proper cure has been achieved. The curing log shall list at a minimum the light train speed, liner pressures, and temperature of the internal liner surface.
15. METHOD OF MEASUREMENT. The quantity of Special Provision (Cured In- Place Pipe Liner, Ultraviolet) of the size specified in the plans to be measured for payment will be the number of linear feet installed in the complete and accepted work.
16. BASIS OF PAYMENT. The accepted quantity of Special Provision (Cured In-Place Pipe Liner, Ultraviolet) of the size specified in the plans will be paid for at the Contract unit price per linear foot. Payment will be full compensation for furnishing, transporting, handling, and placing the materials specified; for providing access and staging; for submitting the required Work Plan; for cleaning and repairing the existing pipe prior to CIPP installation; for performing required materials sampling and testing; for performing video inspection of the completed lining; for cleanup of the project area; 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 (Cured In-Place Pipe Liner, Ultraviolet)	Linear Foot

STORMWATER TREATMENT PRACTICES

1. DESCRIPTION. This work shall consist of constructing stormwater treatment practices as shown on the Plans.
2. MATERIALS. Materials shall meet the requirements of the following subsections:

Granular Borrow	703.04
Fine Aggregate for Concrete.....	704.01
Coarse Aggregate for Concrete.....	704.02
Gravel Filter for Slope Stabilization	704.07
Drainage Aggregate	704.16
Stone for Stone Fill	706.04
Corrugated Polyethylene Pipe.....	710.03
Acrylonitrile-Butadiene-Styrene (ABS) Plastic Pipe.....	710.05
Polyvinyl Chloride (PVC) Plastic Pipe.....	710.06
Bar Reinforcement	713.01
Iron Castings	715.01
Geotextile for Roadbed Separator.....	720.02
Geotextile for Underdrain Trench Lining	720.05

Clay soil shall meet the requirements of [Table 703.01A](#), Group Classification A-7-6.

Precast concrete shall meet the requirements of [Section 540](#). Cast-in-place concrete shall meet the requirements of [Section 541](#) for Concrete, Class B.

Bedding for gravel wetland shall conform to the requirements of [Subsection 704.02](#). The layer of 1-1/2 inch bedding shall be in accordance with [Table 704.02C](#). The layer of 3/8 inch bedding shall be in accordance with [Table 704.02A](#).

Media filter drain soil shall consist of mineral aggregate, perlite, dolomite lime, and gypsum in quantities shown in Table 6-1 of the *Vermont Stormwater Management Manual Rule and Design Guidance*. The composition of perlite, dolomite lime, and gypsum shall meet the amendment requirements of Table 6-1. The mineral aggregate component shall meet the requirements in Table 704.02A.

3. GENERAL The stormwater treatment practices, and the areas draining to them, shall be fully stabilized prior to allowing water to drain to them.
4. DRY SWALE WITH UNDERDRAIN. This work shall consist of constructing dry swales at the locations shown on the Plans. Geotextile fabric shall meet the material requirements of [Subsection 720.05](#) and placement shall be performed in accordance with [Section 649](#). Underdrain shall be installed in accordance with [Section 605](#).

Dry swale soils shall consist of natural or manufactured sand meeting the requirements of [Subsection 704.01](#).

The Contractor shall not place dry swale soil directly from haul vehicles or by pushing material by bulldozers, graders, or other equipment.

5. GRAVEL WETLAND. This work shall consist of constructing gravel wetlands in locations shown on the Plans. Gravel wetlands shall be comprised of a network of underdrain pipes placed in a bedding of crushed stone and connected to an outlet structure, as shown on the Plans.

Bedding for gravel wetland shall consist of a layer of 3/8 inch bedding on top of a layer of 1-1/2 inch bedding installed to the depths shown on the Plans.

Unless otherwise specified, the bottom and sides of the gravel wetlands shall be lined with a clay soil at a depth specified in the Plans. Geotextile for roadbed separator shall then be placed over the impermeable liner before placing the stone bedding.

Placement of geotextile fabric shall be performed in accordance with [Section 649](#) and underdrain shall be installed in accordance [Section 605](#), except as modified herein.

6. MEDIA FILTER DRAIN. This work shall consist of constructing media filter drains at the locations shown on the Plans.

Placement of geotextile fabric shall be performed in accordance with [Section 649](#). Underdrain shall be installed in accordance [Section 605](#).

The Contractor shall not place media filter drain soil directly from haul vehicles or by pushing material by bulldozers, graders, or other equipment.

7. STONE DIAPHRAGM. This work shall consist of furnishing and installing a stone trench for the purpose of providing initial stormwater treatment and distributing flows at the locations indicated in the Plans and as directed by the Engineer.

The stone diaphragm shall be comprised of a trench lined with geotextile meeting the requirements of [Subsection 720.05](#) and filled with stone meeting the requirements of [Subsection 704.16](#).

Trenches for stone diaphragms shall be excavated to the dimensions and grade shown in the Plans or as directed by the Engineer. The surface of the trench shall be prepared to a smooth condition free of debris, depressions, or obstructions which may damage the geotextile.

The geotextile fabric lining the trench shall be placed loosely with no wrinkles or folds. The upstream geotextile shall be overlapped over the downstream. Care shall be taken to ensure direct contact with the soil such that there are no voids between the geotextile and the trench. The geotextile lining shall be anchored by extending 12 inches beyond each side of the trench at a depth of 4 inches below finished grade.

Drainage aggregate shall be placed in layers of not more than 6 inches in thickness and compacted by use of air or mechanical tampers.

8. METHOD OF MEASUREMENT. The quantity of Dry Swale with Underdrain, Media Filter Drain, and Stone Diaphragm to be measured for payment will be the number of linear feet installed in the complete and accepted work.

The quantity of Gravel Wetland to be measured for payment will be the square yards installed in the complete and accepted work, measured based on the neat lines showing the finished surface area on the Plans.

9. BASIS OF PAYMENT. The accepted quantity of Stone Diaphragm will be paid for at the Contract unit price per linear foot. Payment will be full compensation for furnishing, transporting, handling, and installing the materials specified, and for furnishing all labor, tools, equipment, and incidentals necessary to complete the work.

The accepted quantity of Dry Swale with Underdrain and Media Filter Drain will be paid for at the Contract unit price per linear foot. Payment will be full compensation for furnishing, transporting, handling, and installing the materials specified including underdrain, geotextile, and for furnishing all labor, tools, equipment, and incidentals necessary to complete the work.

The accepted quantity of Gravel Wetland will be paid for at the Contract unit price per square yard. Payment will be full compensation for furnishing, transporting, handling, and installing the materials specified including underdrain, impermeable liner, geotextile, and crushed stone bedding, and for furnishing all labor, tools, equipment, and incidentals necessary to complete the work. The outlet structure, inlet and outlet pipes will be paid for separately under their respective Contract items.

For all stormwater treatment practices, excavation will be paid for under the appropriate excavation item included in the Contract. Topsoil, seed, and mulch will be paid under their respective Contract items.

Payment will be made under:

<u>Pay Item</u>	<u>Pay Unit</u>
900.640 Special Provision (Dry Swale with Underdrain)	Linear Foot
900.640 Special Provision (Media Filter Drain)	Linear Foot
900.640 Special Provision (Stone Diaphragm)	Linear Foot
900.675 Special Provision (Gravel Wetland)	Square Yard

INTERCONNECTING FIBER OPTIC CABLE

1. DESCRIPTION. This work shall consist of furnishing and installing interconnecting fiber optic cable inside of a conduit to connect the traffic signal controller cabinets with telecommunications as shown on the Plans and as directed by the Engineer. The conduit shall also contain a tracer wire.
2. MATERIALS.

(a) Fiber Optic Cable. The interconnecting fiber optic cable shall be an indoor/outdoor general purpose tight-buffered 6-fiber optic cable. The fiber optic cable shall have the following characteristics:

- (1) Functional Requirements. Provide cable that is suitable for installation in an underground conduit environment including constant immersion in water. Provide only non-metallic cable.

Provide all fiber optic glass manufactured by the same manufacturer.

- (2) Environmental Requirements. Provide cable that functions within specifications over its full life time at a temperature range of -40°F to +185°F, and when totally immersed in water for indefinite periods of time.

- (3) Optical Requirements. Provide a multimode fiber with nominal attenuation of 2.8 dB/.62 mile maximum at a wavelength of 850 nm and a nominal attenuation of 1dB/.62 mile maximum at a wavelength of 1300 nm.

- (4) Mechanical Requirements.

a. Diameter. Provide cable with an outer diameter of 0.21 inches containing 6 fibers with a nominal fiber core of 50 µm.

b. Color Coding. Each fiber shall have a color coating applied to it by the manufacturer. The coating shall not affect the optical characteristics of the fiber. The basic color configuration shall be as follows, in accordance with EIA/TIA-598:

1. Blue
2. Orange
3. Green
4. Brown
5. Slate
6. White

- c. Tensile Strength. Provide cable that is capable of withstanding a pulling tension of 150 pounds without changing the characteristics of the optical fibers.
 - d. Bend Radius. Provide cable that is capable of withstanding a minimum bending radius of 3.1 inches during installation and 1.0 inches during operation.
 - (b) Conduit. Conduit shall be schedule 80 2" minimum diameter meeting the requirements of subsection 752.08.
 - (c) Tracer Wire. Tracer wire shall be a minimum of 14-gauge wire with orange insulation sheathing.
3. CONSTRUCTION REQUIREMENTS. Conduit shall be installed in accordance with Section 678

- (a) Fiber Optic Cable. Fiber optic cable shall be installed inside of the electrical conduit and in accordance with the requirements for wiring under Section 678.

Perform the cable pulling operations in a way that ensures that the minimum bend radius of the cable is not exceeded during the unreeling and pulling operations. Use entry guide chutes to guide the cable into the pull-box conduit ports. Use lubricating compound to minimize cable-to-conduit friction.

Use corner rollers (wheels) with radii not less than the minimum installation bending radius of the cable. Use a series array of smaller wheels for accomplishing the bend if the array is specifically approved by the cable manufacturer. Continuously measure the pulling tension and do not allow it to exceed the maximum tension specified by the manufacturer of the cable. Use fuse links and breaks to insure that cable tension does not exceed 150 lb.

Seal conduits with a 2 part urethane after cable installation.

- (b) Electrical Conduit. Electrical conduit shall be installed in accordance with the requirements of Section 678.
- (c) Tracer Wire. Tracer wire shall be installed inside of the electrical conduit and shall terminate inside of each signal controller cabinet. The tracer wire shall be clearly identified and labeled within each signal controller cabinet.

4. METHOD OF MEASUREMENT. The quantity of Special Provision (Interconnecting Fiber Optic Cable) to be measured for payment will be the number of linear feet placed in the complete and accepted work.
5. BASIS OF PAYMENT. The accepted quantity of Special Provision (Interconnecting Fiber Optic Cable) will be paid for at the Contract unit price per linear foot. Payment will be full compensation for furnishing, transporting, handling, testing, and placing the materials specified including excavation and backfill, 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 (Interconnecting Fiber Optic Cable)	Linear Foot

MECHANICALLY STABILIZED EARTH RETAINING WALL

1. DESCRIPTION. This work shall consist of designing, detailing, fabricating, furnishing, and erecting mechanically stabilized earth (MSE) retaining walls constructed in accordance with these specifications and in conformance with the lines, grades, details, and dimensions shown on the Plans or as directed by the Engineer.

The mechanically stabilized earth (MSE) retaining wall system shall consist of placement and compaction of select granular backfill or foamed glass aggregate, a non-structural leveling pad, drainage aggregate, geotextile fabric, precast concrete face panels, and membrane and soil reinforcement elements mechanically connected to each facing panel. The soil reinforcement shall have sufficient strength, length, and frictional resistance as required by the design as specified herein.

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

Drainage Aggregate	704.16
Select Backfill for Mechanically Stabilized Earth (MSE) Structures.....	704.18
Polyvinyl Chloride (PVC) Plastic Pipe.....	710.06
Bar Reinforcement	713.01
Mechanical Splices for Bar Reinforcement	713.02
Geotextile for Roadbed Separator.....	720.02
Mechanically Stabilized Earth Retaining Wall Systems	760.05(b)
MSE Wall Components	760.06
Geomembrane Liner	760.07

Precast concrete shall meet the requirements of Section 540.

Reinforcing steel shall meet the requirements for Level II corrosion resistance unless otherwise specified in the Plans.

Foamed Glass Aggregate shall meet the requirements of Special Provision - Foamed Glass Aggregate.

Retaining wall systems utilizing soil reinforcements mechanically connected to concrete facing panels. MSE wall systems shall be one of the systems on the Agency's *Approved Products List* as approved by the Geotechnical Engineering Manager and meet the following requirements:

- (a) Reinforcing Mesh Elements. Reinforcing mesh elements shall be shop fabricated from cold drawn steel rod conforming to the requirements of *ASTM A1064*, Grade 65 minimum, and shall be welded at the junctions between longitudinal and transverse wires in accordance with *AASHTO M 336*. Galvanizing shall be applied after mesh fabrication and shall conform to the minimum requirements of *AASHTO M 111*. The galvanizing thickness shall be determined and specified based on the design life requirements of the structure.

- (b) Loop Embeds. Loop embeds shall be fabricated from cold drawn steel rod conforming to *ASTM A1064*. Loop embeds shall be welded in accordance with *AASHTO M 336* and galvanized in accordance with *AASHTO M 111*.
- (c) Reinforcing Strips. Reinforcing strips shall be hot rolled from bars to the required shape and dimensions. Their physical and mechanical properties shall conform to *ASTM A572*, Grade 65 minimum. Galvanizing shall conform to the minimum requirements of *AASHTO M 111* with a minimum application rate of 0.125 pounds per square foot. The actual galvanizing thickness shall be determined and specified based on the design life requirements of the structure.
- (d) Tie Strips. Tie strips shall be shop fabricated from hot rolled steel conforming to the minimum requirements of *ASTM A570*, Grade 50 (*ASTM A1101*, Grade 50 min) or equivalent. Galvanizing shall conform to *AASHTO M 111*. The minimum galvanizing application rate shall be 0.125 pounds per square foot.
- (e) Fasteners. Fasteners shall consist of galvanized hexagonal cap screw bolts and nuts conforming to the requirements of *ASTM F3125*, *ASTM A449*, or equivalent. Fasteners shall be galvanized in accordance with *AASHTO M 232* with a minimum application rate of 0.125 pounds per square foot and achieves 3.4 mils of galvanization to all surfaces of the fasteners.
- (f) Bearing Pads. Bearing pads shall be preformed Ethylene Propylene Diene Monomer rubber pads conforming to *ASTM D2000* Grade 2, Type A, Class A with a durometer hardness equal to 60±5.
- (g) Geomembrane Liner. An impervious liner, consisting of virgin PVC resins, plasticizer, and stabilizers, that prevents or minimizes the infiltration of water and deicing salts into the substrate below the liner. Geomembrane liners shall have a minimum thickness of 0.03 inches and shall meet the requirements of Table 227.02A.

Individual widths of geomembrane liners shall be fabricated into larger sections by dielectric seaming into a single piece, or into a minimum number of panels, as required to fit the application, unless otherwise specified in the Contract. Lap joints with a minimum joint width of 6 inches shall be used.

TABLE 227.02A – PHYSICAL REQUIREMENTS FOR GEOMEMBRANE

Property	Test Method	Requirement
Thickness	<i>ASTM D1593</i>	0.03 in. $\pm$ 5%
Specific gravity	<i>ASTM D792</i>	1.23 min.
Tensile strength (breaking factor)	<i>ASTM D882</i>	2,300 psi min. (835.3 lbs/ft width min.)
Elongation at break	<i>ASTM D882</i>	350% min.
Modulus at 100% elongation	<i>ASTM D882</i>	1,000 psi min. (363.2 lbs/ft width min.)
Tear resistance	<i>ASTM D1004</i>	3630.28 lbs/ft min. (9.07 lbs min.)
Low temperature brittle failure point	<i>ASTM D1790</i>	-28°C max.
Dimensional stability (100°C, 15 min.)	<i>ASTM D1204</i>	3.5% change max.
Water extraction loss change	<i>ASTM D3083</i>	0.35% max.
Volatility loss	<i>ASTM D1203</i>	0.70% max.
Resistance to soil burial loss	<i>ASTM D3083</i>	-5% max.
Tensile strength change, elongation at break, modulus at 100% elongation	<i>ASTM D3083</i>	20% max.
Hydrostatic resistance, psi, min.	<i>ASTM D751</i>	85 psi min.
Bonded seam strength (factory seam, breaking factor) ¹	<i>ASTM D3082 (Modified)</i>	668 lbs/ft width
Puncture Resistance	<i>ASTM D4833</i>	32 lbs min.

¹ Factory bonded seam strength is the responsibility of the fabricator.

3. **DESIGN REQUIREMENTS.** The MSE retaining wall system shall be designed and constructed in accordance with the *AASHTO LRFD Bridge Design Specifications*, the Plans, the design criteria, and the geotechnical information specified in the Contract.

The system shall be designed for a design life of 100 years, and any wall reinforcing located above the geomembrane shall have a design life of 125 years, both using the corrosion rates given in the *AASHTO LRFD Bridge Design Specifications* for non-aggressive soil.

- (a) Select Granular Backfill. The friction angle of the select granular backfill used in the reinforced fill zone for the internal stability of the wall shall be assumed to be 34° , unless determined otherwise by tests. When a friction angle greater than 34° is proposed, the friction angle shall be determined by the standard direct shear test, AASHTO T 236, utilizing a sample of the material compacted to 95 percent of AASHTO T 99, Methods C or D (with oversize correction per AASHTO T 224), at the optimum moisture content. Before construction begins, the select granular backfill material selected shall be subject to approval by the Engineer. Compliance with the test requirements shall be the responsibility of the Contractor. The wall supplier shall be furnished a copy of the test results for the backfill prior to construction.
- (b) Foamed Glass Aggregate Backfill. The friction angle of the foamed glass aggregate backfill used in the reinforced zone for the internal stability of the wall shall be assumed to be 38° . Before construction begins, the foamed glass aggregate material shall be subject to approval by the Engineer. Compliance with the test requirements shall be the responsibility of the Contractor and material supplier. The wall supplier shall be furnished a copy of the test results for the backfill prior to construction.

All appurtenances behind, in front of, under, mounted upon, or passing through the wall such as drainage structures, utilities, or other appurtenances shown on the Plans shall be accounted for in the stability design of the wall.

MSE wall panels shall have a minimum structural thickness of 5 inches and a minimum cover for steel reinforcement of 1-1/2 inches.

The design shall follow the dimensions of the wall envelope and minimum embedment shown on the Plans. Where a wall coping is utilized, the wall face panel shall extend up into the coping the minimum distance specified on the Plans. The top of the face panels may be level or sloped to meet the top of the wall. Cast-in-place concrete will not be an acceptable replacement for panel areas, except for minor grouting of pipe penetrations and leveling required for coping.

Where walls or wall sections intersect with an angle of 130° or less, a special vertical corner element panel shall cover the joint of the panels that abut the corner and allow for independent movement along the abutting panels.

The face panels shall be designed to accommodate differential settlement of 12 inches in 100 feet between the substructure and wall system. The design of the wall system shall include a provision to accommodate settlement of this magnitude. The spacing between adjacent panels shall be designed to be 0.75 inches. Where shown on the Plans, slip joints to accommodate excessive differential settlement shall be included.

4. SUBMITTALS. As soon as practical after award of the Contract, the following information shall be prepared and submitted:
- (a) Working drawings and design calculations shall be submitted to the Engineer for review and approval in accordance with Section 105 and shall include the following:
 - (1) Complete design drawings and calculations substantiating that the proposed design satisfies the design parameters specified in the Contract. Wall design drawings and calculations shall be signed and sealed by a professional engineer employed by the wall system supplier.
 - (2) Details of revisions or additions to drainage systems or other facilities required to accommodate the wall system.
 - (3) An elevation view of the wall, which shall include the elevations at the top of the wall, at all horizontal and vertical break points and at least every 50 feet along the face of the wall, and at all steps in the leveling pads, the designation as to the type of panel, the length of soil reinforcing elements. The elevation view shall also include the distance along the face of the wall to where changes in length of the soil reinforcing elements occur, and an indication of the final ground line.
 - (4) A typical section or cross-sections showing the existing ground conditions and proposed grades, including existing ground elevations that have been verified by the Contractor for each location involving construction wholly or partially in original ground.
 - (5) General notes pertaining to design criteria and wall construction.
 - (6) All other necessary details including reinforcement overlap detail.
 - (7) A listing of the summary of quantities on the elevation sheet for each wall.
 - (8) The details for diverting soil reinforcements around obstructions such as piles, catch basins, and other utilities.
 - (9) The details for connection between the concrete panel and the soil reinforcements.
 - (10) Other information required in the Contract or requested by the Engineer.
 - (11) Working drawings showing all dimensions necessary to construct the element, all reinforcing steel in the element, the location of soil reinforcing connection devices embedded in the panels, and an indication of the architectural treatment.
 - (b) All applicable information required in Subsection 540.04.

5. MSE WALL PANEL FABRICATION REQUIREMENTS.

- (a) Test Panel. A full-size test panel shall be produced and approved by the Agency prior to production of the MSE wall panels. The panel shall be available for review a minimum of 5 working days prior to the start of production. The approved test panel shall be used as a benchmark for the correct color and form liner finish.
- (b) Concrete Finish. No surface voids or bug holes greater than 5/8 inch in diameter and more than 1/4 inch deep will be allowed in the finished exposed surface. Surface voids or bug holes that are smaller than the size described shall not exceed 1% of the finished exposed surface with no 6 inch by 6 inch area containing more than 3 surface voids or bug holes. The concrete surface for the front face shall meet requirements as noted in the plans. Any repairs to the front face shall match the color and finish of the surface and be approved by the Engineer.

The concrete surface for the front face shall have a form liner finish as required on the approved fabrication drawings. The concrete surface on the rear face shall be an unformed flat finish. The concrete panels shall be constructed using colored concrete as specified in the Plans.

- (c) Panel Tolerances. All MSE wall panels shall be manufactured within the following tolerances with respect to the dimensions shown on the approved fabrication drawings:
- (1) Attachment Device Locations and Alignment. The lateral position of reinforcing element attachment devices shall be within 1 inch. The embedment measured from the back face of the panel shall be 4 inches (+1/4 inch, -1/2 inch).
- (2) Panel Dimensions. All panel dimensions shall be within $\pm 1/4$ inch. All hardware embedded in the panel except for attachment devices shall be within $\pm 1/4$ inch.
- (3) Panel Squareness. The panel's squareness, as determined by the difference between the two diagonals, shall not exceed 1/2 inch.
- (4) Panel Surface Finish. Surface defects on smooth-formed surfaces, measured on a length of 5 feet, shall not exceed 1/4 inch. Surface defects on textured-finished surfaces, measured on a length of 5 feet, shall not exceed 5/16 inch.
- (d) Curing. MSE wall panels shall have an approved curing compound applied to the back face of the panel immediately following finishing.

- (e) Handling, Storage, and Shipping. MSE wall panels shall be stored and shipped in stacks, front face down. Firm blocking of sufficient thickness to prevent the reinforcement attachments from contacting the adjacent panels shall be used. Lifting inserts shall be installed on the top edge of the MSE wall panels to permit lifting at the project site. Reinforcement connection inserts (tie strips) shall not be used for lifting or handling the panel at the project site.
- (f) Panel Acceptance Criteria. MSE wall panels will be accepted for use in wall construction provided the concrete strength meets or exceeds the design compressive strength, the soil reinforcement connection devices and the panel dimensions are within tolerances, and any chipping, cracks, honeycombing, or other defects are repaired to the satisfaction of the Structural Concrete Engineer using methods submitted and approved as specified in Subsection 540.07(g).

The MSE wall panels will be subject to inspection by the Engineer at the time of unloading and once placed in their final position. MSE wall panels that do not meet the requirements of this subsection may be subject to rejection.

6. CONSTRUCTION REQUIREMENTS.

- (a) Manufacturer's Representative. The Contractor shall make the necessary arrangements with the wall supplier to have a technical representative on the project to supervise the first level of panel placement of the mechanically stabilized earth retaining wall system. The technical representative shall also be required to be on-site or available for consultation any time during wall installation as requested by the Engineer.
- (b) Wall Excavation. Excavation shall be performed in accordance with Section 203 or Section 204 as applicable and shall conform with the limits shown on the Plans.
- (c) Foundation Preparation. The foundation for the structure shall be graded level for a width equal to or exceeding the length of the soil reinforcements, or as shown on the Plans. The Contractor shall proof roll the foundation using a minimum 5-ton, self-propelled vibratory roller to compact soils disturbed by excavation. Areas exhibiting excess weaving or soft, unsuitable soils should be excavated and replaced with compacted granular fill. Wet foundation soils should be proof rolled without vibration. Any foundation soils found to be unsuitable shall be removed and replaced as directed by the Engineer.

At each panel foundation level, an unreinforced concrete leveling pad shall be provided as shown on the Plans. Allowable elevation tolerances are +0.01 feet and -0.02 feet from the design elevation. Prior to placement of the leveling pad, the Agency's Geotechnical Engineer or designated representative shall inspect the foundation soils to evaluate the suitability of the bearing soils.

Leveling pads shall be required to cure a minimum of 24 hours before wall panels are erected on them.

- (d) Wall Erection. Precast concrete panels shall be placed vertically with the aid of a crane or other construction equipment capable of handling the anticipated loads. For erection, panels shall be handled by means of lifting devices set into the upper edge of the panels. Panels shall be placed in successive horizontal lifts in the sequence shown on the working drawings as select granular backfill placement proceeds.

The maximum allowable offset in any panel joint shall be 0.75 inches. The overall vertical tolerance of the wall (plumbness from top to bottom) shall not exceed 0.50 inches per 10 feet of wall height.

- (e) Placement of Reinforcements. Prior to the first layer of reinforcements, select granular backfill shall be placed and compacted in accordance with Subsection 6(f).

Soil reinforcements shall be placed normal to the face of the wall, unless otherwise shown on the working drawings or directed by the Engineer.

If skewing of the soil reinforcements is required due to obstructions in the reinforced fill, or in other cases justified by calculation, the maximum skew angle shall not exceed 15 degrees from the normal position, except in case of acute corners where redundant reinforcements are used, or in other cases justified by calculation.

- (f) Backfill Placement. Backfill placement shall closely follow erection of each course of panels. Backfill shall be placed in such a manner as to avoid any damage or disturbance to the wall materials or misalignment of the facing panels. Any wall materials which become damaged or disturbed during backfill placement shall be corrected or removed and replaced at the Contractor's expense, as directed by the Engineer.

Horizontal and vertical joints between panels shall be covered by a geotextile. The geotextile may be either a non-woven needle punched polyester geotextile or a woven monofilament polypropylene geotextile meeting the requirements of Section 720 for Geotextile Under Stone Fill. The wall supplier shall approve adhesive used to hold the geotextile filter fiber material to the rear of the facing panels prior to backfill placement.

- (1) Select Granular Backfill. Backfill shall be compacted to 95% of the maximum density as determined in accordance with *AASHTO T 99*, Method C or Method D (with oversize correction). The optimum moisture content shall be determined in accordance with *AASHTO T 99*, Method C or Method D (with oversize correction). The moisture content of the select backfill material prior to and during compaction shall be uniform throughout each layer. Backfill material shall have a placement moisture content less than or equal to the optimum moisture content. Backfill material with a placement moisture content in excess of the optimum moisture content shall be removed and reworked until the moisture content is uniform and acceptable throughout the entire lift. Field density and moisture content quality control shall be conducted by the contractor in accordance with *AASHTO T 310* at a frequency of no less than once per 500 cubic yards.

The maximum lift thickness after compaction shall not exceed 10 inches, regardless of the vertical spacing between the reinforced soil layers. The Contractor shall decrease this lift thickness, if necessary, to obtain the specified density.

- (2) Foamed Glass Aggregate Backfill. Select Granular Backfill shall be compacted in accordance with Special Provision (Foamed Glass Aggregate).

The maximum lift thickness after compaction shall not exceed 24 in, regardless of the vertical spacing between the reinforced soil layers. The Contractor shall decrease this lift thickness, if necessary, to obtain equal lifts of Foamed Glass Aggregate (for example, if there are 36 inches vertically between reinforcing, lifts should be 18 inches).

Prior to placement of the soil reinforcement elements, the backfill elevation, after compaction, shall be level with or slightly above the attachment device elevation. A maximum difference between the attachment device elevation and compacted backfill lift should be level or up to 0.6 inches above when measured approximately 12 inches behind the back face of the panels to the free end of the soil reinforcements, unless otherwise shown on the Plans.

Compaction within 3 feet of the back face of the panels shall be achieved by a minimum of three passes of a lightweight mechanical tamper, roller, or vibratory system. The specified lift thickness shall be adjusted as warranted by the type of compaction equipment actually used, but no soil density tests need be taken within this area. Care shall be exercised in the compaction process to avoid misalignment of the panels or damage to the attachment devices. Heavy compaction equipment shall not be used to compact backfill within 3 feet of the wall face.

At the end of each day's operation, the Contractor shall slope the last level of backfill away from the wall facing to direct runoff of rainwater away from the wall face. In addition, the Contractor shall not allow surface runoff from adjacent areas to enter the wall construction site.

- (g) Drainage Aggregate. A nominal 12 in (10 in minimum) of Drainage Aggregate conforming to Subsection 704.16 shall be placed over the PVC lining as shown on the Plans. The Drainage Aggregate shall be approved by the Engineer prior to placement. The Contractor may choose the equipment and manner with which to place the Drainage Aggregate over the liner, provided the Contractor satisfactorily demonstrates to the Engineer that both the equipment and manner used to place the chosen cover material over the lining will not have any detrimental effects on the liner.
- (h) Geomembrane Liner. Field seams shall be made to seal factory fabricated panels of PVC together in the field. Seams shall be formed by lapping the edges of panels a minimum of 6 inches. The contact surfaces of the panels shall be wiped clean to remove all dirt, dust, or other substance. A vinyl to vinyl solvent shall be applied to the contact surface in the seam area as recommended by the manufacturer, and the two surfaces pressed together immediately. Any wrinkles shall be smoothed out. Field seams shall have a strength of at least 85% of the specified sheet strength.

All curing compounds and coatings shall be completely removed from the joint area. Joining of the PVC to the back of panel shall be done with an adhesive. Unless otherwise shown on the Plans, the minimum width of concrete to PVC joint shall be 6 inches. In addition, mechanical attachments may be necessary.

Any necessary repairs to the PVC shall be made with the lining material itself and cold applied vinyl to vinyl splicing adhesives. Patches shall be cut so as to cover the area to be repaired by a minimum of 4 inches in all directions. Patches shall be cut with rounded corners. The splicing adhesive shall be applied to the contact surface between the patch and the lining, and the two surfaces pressed together immediately.

- (i) Horizontal and Vertical Control. Immediately following the erection of the mechanically stabilized earth retaining wall system, the Contractor shall establish horizontal and vertical survey points at a minimum of three locations across the top and at mid-elevation on the wall with an additional set of points for each 100 feet of wall required to monitor future movements. These points shall be tied into a minimum of two control markers that are sufficiently removed from the wall so as not to be influenced by wall movement. The control shall be located to allow the Agency to gather additional measurements to be made after all construction is complete. A plan with the northings and eastings of all survey points and ties, along with distances and elevations recorded to the nearest 0.001 feet, shall be provided to the Engineer within 48 hours of the completion of the mechanically stabilized earth retaining wall system.
7. METHOD OF MEASUREMENT. The quantity of Special Provision (Mechanically Stabilized Earth Retaining Wall) and Special Provision (Mechanically Stabilized Earth Retaining Wall, FGA) to be measured for payment will be on a lump sum basis in the complete and accepted work.
8. BASIS OF PAYMENT. The accepted quantity of Special Provision (Mechanically Stabilized Earth Retaining Wall) and Special Provision (Mechanically Stabilized Earth Retaining Wall, FGA) will be paid for at the Contract lump sum price. Payment shall include full compensation for designing, detailing, fabricating, furnishing, transporting, erecting, and baseline monitoring the mechanically stabilized earth retaining wall system; for preparing all required submittals; for supervision by the manufacturer's representative; for materials required, including but not limited to, select granular backfill, foamed glass aggregate backfill, PVC pipe, drainage aggregate, filter fabric, adhesive, underdrain pipe, concrete facing panels, reinforcing steel, concrete coping, soil reinforcements, attachment devices, fasteners, bearing blocks, shims, joint materials, geomembrane, and geotextiles; for preparing the wall foundation, proof rolling foundation soils, and constructing the concrete leveling pad; all required excavation; 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 (Mechanically Stabilized Earth Retaining Wall)	Lump Sum
900.645 Special Provision (Mechanically Stabilized Earth Retaining Wall, FGA)	Lump Sum

SMART WORK ZONE

1. **DESCRIPTION.** This work shall consist of submitting for approval a Smart Work Zone (SWZ) System Plan; furnishing, installing, operation and acceptance testing, relocating, operating, maintaining, monitoring, and removing automated, portable, real-time work zone systems, meeting the requirements specified herein, and providing a System Manager to maintain the system during the duration of the project. **In accordance with subsection 6, the SWZ shall be operational for a minimum of two (2) weeks prior to the start of field construction operations. The SWZ shall remain in place until the scope of work for the interim completion date identified in Notice to Bidders 2 is complete. ~~The SMZ shall be designed for implementation individually for the Colchester NH 028-1(31) Exit 17 project, individually for the Colchester HES NH 5600(14) project, or for both projects simultaneously.~~**

It is anticipated that traffic conditions will deteriorate due to queuing caused by high traffic volumes, work zone interference, weather conditions and travel surface conditions. This project will require the Contractor to supply, maintain and operate necessary equipment to monitor and report on traffic information so that the Contractor can appropriately react to minimize mobility impediments.

The system will provide work zone traffic monitoring to gather work zone traffic delay, travel speed, travel time and queue length information due to construction activity and/or as directed by the Engineer.

The SWZ System shall aggregate, monitor, record, and report the data retrieved from the field-deployed **detectors/sensors** ~~video cameras, Bluetooth, radar detectors~~. The SWZ System shall include software that will provide an intuitive graphical interface and **access shall be granted to VTrans for accessing the system. ~~shall be fully capable of integrating with existing Agency hardware and software.~~**

For the purposes of this specification, the SWZ System shall include the following major items:

- (a) Queue monitoring and advanced congestion warning systems
- (b) Travel time and speed monitoring equipment
- (b) Portable Changeable Message Signs (PCMS) with travel time estimation algorithms, specific and dedicated to the Smart Work Zone
- (c) Pan Tilt Zoom Video Camera in each work zone to detect and verify incidents (PTZ)
- (d) System Software and Hardware
- (e) Communication equipment for all above elements
- (f) SWZ System Plan
- (g) System Manager

2. SUBMITTALS.

- (a) General. The Contractor shall submit to the Engineer for approval a written and illustrated SWZ System Plan a minimum of three (3) weeks prior to mobilization of any component for the SWZ System. The SWZ System Plan shall include the items specified herein **and be broken out between the Exit 16 Project and the Exit 17 Project.** The Contractor will not be allowed to start any construction activities that will affect traffic on the project until the SWZ System Plan is approved by the Engineer.
- (b) Plan. The SWZ System Plan shall include the following as a minimum:
- (1) Detailed description of proposed locations of all system devices **including all devices to be used specifically for the Exit 16 Project and all devices to be used specifically for the Exit 17 Project.**
 - (2) Detailed equipment descriptions, including make and model.
 - (3) Name and contact information of the SWZ System Manager.
 - (4) Detailed description of the proposed methods of communication between the system devices and the Engineer.
 - (5) Proposed correction, including response times, and notification process for when the system malfunctions.
- (c) Approval of Plan. Approval of the SWZ System Plan by the Engineer is required prior to the placement of any system devices. Approval is conditional and will be predicated on satisfactory performance during construction. The Engineer reserves the right to require the Contractor to make changes to the System Plan and operations, at no additional cost to VTrans, including removal of personnel, as necessary, to obtain the quality specified. The Contractor shall notify the Engineer in writing a minimum of seven (7) calendar days prior to any proposed changes in the System Plan. Proposed changes are subject to approval by the Engineer.

3. CONSTRUCTION REQUIREMENTS.

- (a) General Requirements. The SWZ System shall be a portable, real-time, automated, solar-powered system that utilizes various detectors to collect data for travel time reporting purposes that is non-intrusive, does not present a safety hazard and is relatively easy to set up and maintain. The travel time system shall incorporate use of the PQTs, System Software and Hardware and communication equipment; the radar queue detection system shall incorporate use of the PQTs, PCMSs, System Software and Hardware and communication equipment; the video monitoring system shall utilize the PTZs, System Software and Hardware and communication equipment.

The travel time detectors shall collectively report anonymous Bluetooth device data in the form of Media Access Control Addresses (MAC addresses) to a central server at a centralized location where the data will be processed using filters and algorithms calibrated specifically for the subject corridor. For the Bluetooth devices, the central system shall match time stamped MAC addresses that pass two consecutive data collection points of a known distance to calculate the time it takes for a vehicle to travel from one point to the next. Travel times shall be processed through a series of checks to verify that they are reasonable and accurate given the current conditions. The central system shall archive all collected data. All data shall be accessible through a web-based interface for reporting purposes.

Radar queue detection shall be used to automatically trigger a pre-determined worded message in real-time for display on appropriate PCMSs to warn upstream traffic of approaching queue spillbacks.

Video monitoring shall be used **by the Contractor and be available to VTrans** to remotely monitor traffic and construction-related events to validate Bluetooth and radar sensor data collection and to monitor in the event of sensor failure or damage.

The Contractor shall assume responsibility for any damaged equipment due to crashes, vandalism, adverse weather, etc. that may occur anytime during the project's duration.

The Contractor shall furnish and maintain this system for measuring and delivering real-time messages. This system shall be in operation 24 hours per day, seven (7) days per week, during the determined monitoring period for the project.

The Contractor is responsible for coordinating any work adjacent to the monitoring equipment so as not to interfere with the construction project itself.

The Contractor will be responsible for relocating the devices as directed by the Engineer. When the devices are no longer required for the project, the Contractor shall remove them and retain ownership.

(b) Device Components.

(1) The Bluetooth travel time system shall include the following:

- a. Bluetooth Antennas. Antennas shall include all hardware, testing, setup, integration, mounting hardware, adapters, power supplies, and integration of antenna within cabinet electronics.
- b. Bluetooth Detectors. Detectors shall include all detector hardware, testing, setup, integration, mounting hardware, adapters, power supplies, and integration of detector with the software.
- c. Solar Panels. Solar panels shall include all hardware, testing, setup, integration, mounting hardware, adapters, power supplies, and integration of solar panel electronics.
- d. Bluetooth Lead-in Cable. Lead-in cable shall include all terminations at the Bluetooth antenna, Bluetooth Detector, wireless modem, and the in-cabinet electronics including device power and communications.
- e. Housing Unit. Bluetooth specific housing unit to install all the prescribed equipment.
- f. Bluetooth Detector Software. Detector software shall include installation on the server, testing, labor, and all incidental or third-party software required to make the Bluetooth Travel Time Reporting System fully operational.
- g. Bluetooth Detector Travel Time System. Detector travel time system shall consist of Bluetooth Software to operate and manage the deployed system. This system is to provide **automated notification alerts to VTrans Traffic Operation Center (TOC) personnel.** ~~communication with the Agency's Traffic Operation Center (TOC) software.~~

(2) The radar queue detection system shall include the following:

- a. Vehicle detecting radar detector. Detectors shall include all detector hardware, testing, setup, integration, mounting hardware, adapters, power supplies, and integration of detector with the software.
- b. Solar Panels. Solar panels shall include all hardware, testing, setup, integration, mounting hardware, adapters, power supplies, and integration of solar panel electronics.

- c. Radar Lead-in Cable. Lead-in cable shall include all terminations at the radar detector, wireless modem, device power and communications.
 - d. Radar Detector Software. Detector software shall include installation the server, testing, labor, and all incidental or third-party software required to make the radar queue detection system fully operational.
- (3) The video monitoring system shall include the following:
- a. PTZ Closed Circuit Television Camera (CCTV). CCTVs shall include all camera hardware, testing, setup, integration, mounting hardware, adapters, power supplies and integration of camera with monitors.
 - b. Solar Panels. Solar panels shall include all hardware, testing, setup, integration, mounting hardware, adapters, power supplies, and integration of solar panel electronics.
 - c. Camera Lead-In Cable. Lead-In cable shall include all terminations at the camera, wireless modem, device power and communications.
- (4) The software and hardware package shall include the following:
- a. A laptop computer with travel case, a wireless card for mobile internet access for project use.
 - b. Vendor's software and/or Central System capable of communicating with the Agency's TOC **personnel**.
- (5) Communication equipment shall include the following:
- a. Wireless data networks as required.
 - b. Base stations as required.
 - c. Cell phone data interfaces as required.
 - e. Ethernet network interfaces as required.
- (6) In addition to above reference equipment, the following shall be provided for each PQT, PCMS, and PTZ as determined by the approved SWZ plan:
- a. Each shall be individually mounted on trailer units with solar power.

- b. Each shall be equipped with digital modems or wireless data interfaces as required.
- c. Each shall be linked back to the SWZ provider's central software server.

(c) Device Requirements/Configurations.

(1) PQT devices shall meet the following minimum requirements:

- a. The Bluetooth detectors, antenna and radar detections shall be configured to acquiring speed, volume, occupancy and a minimum of three vehicle classifications data from up to two lanes of traffic in multiple directions, e.g. northbound, southbound.
- b. The Bluetooth detectors, antenna and radar detectors shall be such that the device accuracy is not degraded by inclement weather and visibility conditions, including precipitation, fog, darkness, excessive dust, foliage, and/or road debris.
- c. The portable origin-destination survey equipment will anonymously detect media access control (MAC) addresses and wireless identifications used to connect Bluetooth technologies on mobile devices in vehicles such as phones, headsets, and music players, to uniquely identify vehicles entering a construction work zone.

(2) PCMS devices, specific to the Smart Work Zone, shall meet the following minimum requirements:

- a. PCMSs shall be trailer mounted.
- b. The bottom of the panel shall be at least seven (7) feet above the pavement, present a level appearance and be capable of displaying up to eight (8) characters in each of three lines at a time.
- c. The panel shall be visible from ¼ mile under both night and day conditions. The letters shall be legible from 800 feet.
- d. Batteries powering the signs shall be capable of providing enough power for the sign to display a three-line message with eight (8) characters for 30 consecutive calendar days without any charge from solar panels.
- e. All SWZ PCMSs shall provide for remote sign operation via central computer base station.

- (3) PTZ devices shall meet the following minimum requirements:
 - a. The CCTV device shall have pan, tilt and zoom (PTZ) capabilities.
 - b. The CCTC device shall be digital and IP addressable.
 - c. The PTZ features shall have a latency of no greater than one (1) second.
 - d. The CCTV device shall have the following security features: password protection, IP address filtering, HTTPS encryption, IEEE 802.1X network access control, digest authentication, and user access log.
 - e. The CCTV device shall have a rating of IEC IP66.
- (4) System communications shall meet the following minimum requirements:
 - a. The Contractor performs the required configuration of the communications system during system initialization.
 - b. The wireless communication system(s) used for this project must be reliable, dependable, and capable of functioning 24 hours a day, 7 days a week, 365 days a year regardless of weather, locations, and cell phone usage. The Contractor shall be responsible for all communications cost, utilities, and satellite or cellular phone services needed to provide the dependable functioning SWZ System.
- (d) Operational Requirements.
 - (1) SWZ devices shall be installed on all approaches to the work zone on designated sections of the project as called for per the submitted and accepted SWZ System Plan.
 - (2) The System shall be maintained and operated during summer and winter months or as directed by the Engineer.
 - (3) The Contractor shall prepare the locations to receive the equipment in accordance with the equipment manufacturer's requirements.
 - (4) The Contractor shall install each component of the System in accordance with the manufacturer's recommendations in compliance with all industry standards and codes such that each device is fully operational and can be operated and controlled at the device or remotely.

- (5) The approved field locations of the equipment must meet the clear zone requirements established in the most recent AASHTO Roadside Design Guide unless specified or approved by the Engineer.
- (6) Where equipment is ordered to be relocated, the Contractor shall remove the mobile trailer from one location and reset the mobile trailer at another location as directed by the Engineer. The Contractor shall be responsible for reconfiguring and reprogramming the equipment as needed for each relocation. The labor and equipment to execute such a relocation shall be incidental to the Smart Work Zone Plan contract pay item.
- (7) Training and Support. Training and support for the Bluetooth Monitoring System is subject to the following requirements:
 - a. The SWZ System specified under the Contract shall be furnished, installed, and maintained by personnel who are experienced in this type of work. Deploying firm/personnel shall have a minimum of five (5) similar deployments.
 - b. A technician skilled in the operation of all required SWZ equipment and software shall be available 24 hours per day, seven (7) days per week to maintain the system components, move Contractor-provided portable devices as necessary, and to respond to emergency situations within four (4) hours. The technician shall be equipped with enough resources to make needed corrections of deficiencies within eight (8) hours of notification.
 - c. Training shall be provided to Agency project staff on the use and operation of both the hardware and software components of the SWZ System. Training shall consist of both hands-on training and written manual(s) for the operation of the system.
- (e) Reporting Requirements. Daily reports shall consist of hourly and daily summaries of the following data:
 - (1) Total vehicular traffic passing through the work zone.
 - (2) Vehicular average and standard deviation for delay, travel speed, and travel time through the work zone, and, if possible, the daily average and standard deviation for queue lengths for the time period a queue exists.
 - (3) A spreadsheet file of daily recorded data.

(4) Monthly report submissions in electronic format shall be provided to the Contractor's Project Superintendent, the Resident Engineer, and the Agency's Traffic Research and Quality Assurance Sections.

- a. The system shall calculate travel time through analysis of subsequent detections at the exit of the work zone using a second monitoring device. The subsequent data will then be compared to the baseline data in order to estimate travel time delay due to construction activities.
- b. The system shall summarize the number, the time of day and duration of events that traffic queuing triggers a response to the PCMS and the VTrans-owned permanent message boards.

4. ACCEPTANCE TESTING. The Bluetooth work zone travel time data shall have the following minimum accuracy during testing:

- (a) Travel Time. 95% accurate for probe vehicle traveling time between two test sites.
- (b) Travel Speeds. 95% accurate for probe vehicle speeds between two test sites.
- (c) Origin/Destination. 95% accurate for probe vehicle traveling through multiple corridors.
- (d) Transit Filtering. 95% accurate in filtering out transit data at test site.

The Contractor shall provide a recommended test procedure to the Agency. The Agency will determine the adequacy of the recommended test procedure and whether modifications are necessary. Once concurrence has been achieved between the Contractor and Agency, the ability to accept or reject procured SWZ devices will be achieved.

Any devices not meeting the above-mentioned accuracies may be rejected by the Agency. Should rejection occur, the Contractor shall provide a replacement device at no additional cost to the Agency.

5. DOCUMENTATION. The Contractor shall provide the Agency with electronic report documentation presenting graphic and tabular real-time data records, and hourly and daily summaries of the following:

- (a) travel time and delays;
- (b) queue length, including daily average and standard deviation, if possible;
- (c) travel speeds; and
- (d) traffic volumes through the work zones.

6. MONITORING TIMEFRAME. Non-work zone traffic flow shall be monitored to determine traffic delay, travel speed, and travel time conditions for a minimum of two (2) weeks prior to work zone operation. Therefore, all systems devices will be installed prior to any field work to be done by the project. Additional monitoring of non-work zone conditions for a minimum of one (1) week after project work is complete when the work zone is no longer in operation is required.

Monitor work zone operation during project activity to determine traffic delay, travel speed, travel time and, queue length conditions during the active work zone.

7. WORK ZONE PERFORMANCE MEASURES. Four performance measures have been identified for monitoring throughout the construction process. These measures include the following:

- (1) Average travel time
- (2) Queue lengths
- (3) Crashes
- (4) Roadway surface condition

- (a) Average Travel Time. The average travel time through the corridor will be monitored in real time throughout construction. The target performance measure is **travel times during construction shall be no greater than** a 10 percent increase ~~in travel time~~ above existing travel times.

Performance Measure Target

- (1) Increases in travel times 10% greater than baseline travel times to be defined in advance of construction for the following roadway segments:

a. **~~Exit 16~~**

~~1. NB US 2/7 to I-89 NB on-ramp~~

~~2. NB US 2/7 Thru~~

~~3. SB US 2/7 to I-89 SB on-ramp~~

~~4. SB US 2/7 Thru~~

~~5. NB I-89 to Exit NB on US 2/7~~

~~6. SB I-89 to Exit SB on US 2/7~~

b. Exit 17

1. US-2 EB west of I-89 to I-89 SB south of Exit 17
2. I-89 SB north of Exit 17 to I-89 SB south of Exit 17
3. US-7 SB north of US-2 to I-89 SB south of Exit 17
4. US-7 SB north of US-2 to US-7/2 SB south of US-2
5. I-89 NB south of Exit 17 to US-2 WB west of Exit 17
6. I-89 NB south of Exit 17 to I-89 NB north of Exit 17
7. I-89 NB south of Exit 17 to US-7 NB north of US-2
8. US-2/7 NB south of US-2 to US-7 NB north of US-2

- (b) Queue Length. Monitoring the queue lengths on the I-89 NB and SB off-ramps is also required in real time during construction.

~~Currently at Exit 16, the NB off-ramp queue length does occasionally exceed this threshold in the existing PM peak hour. The efforts to eliminate queuing on the ramps may negatively impact the travel time for some approaches during these peak hours outside of active construction periods. This impact should be addressed as it is identified and quantified in the field.~~

~~If queue spillback at Exit 16 continually impacts I-89, end-of-queue protection should be provided in advance of the off-ramp entrance on I-89. Temporary end-of-queue protection may include a UTO in the peak periods or installation of a “RAMP TRAFFIC STOPPED AHEAD” sign with “WHEN FLASHING” supplementary plaque and beacons connected to the queue detection system to flash whenever the queue exceeds the identified target.~~

Currently at Exit 17, queuing on the NB I-89 off-ramp occasionally extends onto the interstate forcing vehicles to queue on the I-89 shoulder during the existing PM peak hour. The efforts to reduce queuing on the ramps may negatively impact the travel time for some approaches during these peak hours outside of active construction periods. This impact should be addressed as it is identified and quantified in the field. Currently a “TRAFFIC STOPPED AHEAD WHEN FLASHING” sign and beacons alert drivers when this queuing condition is occurring. During construction, this signage will continue to notify drivers of extended queuing on I-89 northbound. Should queuing extend further beyond the sign, a UTO could help manage the condition during the peak period.

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Queuing should also be managed between locations to avoid queue spillback between signalized intersections.

Performance Measure Target

(1) ~~Exit 16~~

a. ~~Vehicle queues affect mainline I-89 operations.~~

b. ~~Vehicle queues affect Winooski Circulator or Spring Street intersection operation~~

c. ~~Vehicle queues affect Severance Corners (US2/Blakely/Severance)~~

(2) Exit 17

a. Vehicle queues affect mainline I-89 operations.

b. Vehicle queues extend thru other intersections along the US-7 or US-2 study area intersections.

- (c) Crashes. ~~At Exit 16, The US 2/7 corridor experienced 201 reported crashes between Tigan Street and Hercules Drive from January 1, 2011 to January 1, 2016, or approximately 40 crashes per year, or 3-4 crashes per month. During the 18 months of construction, a slightly higher rate of crashes can be expected. It is estimated that the crash rate may increase 10% associated with the additional congestion in the project area. Although the overall number of crashes may increase, with an overall reduction in traffic speeds it is anticipated that the severity of these crashes should remain the same or lessen.~~

The US-2/Exit 17 Interchange experienced 66 total crashes from January 1, 2012 through December 31, 2016, or approximately 13 crashes per year, or 1 crash per month. The US-7 Chimney Corners experienced 27 total crashes from January 1, 2012 through December 31, 2016. The I-89 /Exit 17 Interchange area experienced 57 total crashes from January 1, 2012 through December 31, 2016, or approximately 11-12 crashes per year, or 1 crash per month. It is expected that during construction crash rates could increase by 10% due to new traffic patterns and traffic congestion during the construction periods. While the crash rate is expected to slightly increase the crash severity is not forecast to increase.

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Crash details should be reviewed by the RE, Contractor, and VTrans Construction Occupation Safety Technician in conjunction with the Vermont State Police or emergency services. For any crashes that result in death or significant injury, all work should stop immediately until any contributing factors to the crash relating to the construction area can be determined with necessary mitigating actions completed. The traffic control layout and positioning of flaggers and UTOs should be documented.

Performance Measure Target

- (1) Crash rate should not exceed 110% of the pre-project monthly average.
- (d) Roadway Surface Condition. The roadway surface condition is expected to deteriorate during construction. However, unacceptably poor surface conditions may affect travel times outside of the construction activity periods and may result in higher likelihood of crashes. Unacceptable surface conditions include the following:

~~(1) — Exit 16~~

- ~~a. — Unpaved (gravel) surface condition for more than 24 hours without continuing/adjacent work planned during the following construction period. When work is completed in a logical paving region, the unpaved surface should be paved with a temporary wearing course and temporary striping. The intention of this condition is to limit the extent of unpaved surfaces at any time within the work zone while also minimizing the number of paving crew mobilizations necessary to install temporary wearing courses.~~
- ~~b. — Cold planed/grooved asphalt without lane markings for any period of time.~~
- ~~c. — Unpaved (gravel) surfaces spanning more than two lanes along the length of the roadway open to traffic for any period of time without clear lane designations. The intention of this condition is to ensure drivers understand the number of lanes, lane boundaries, and turn-lane designations when open to traffic.~~
- ~~d. — Temporary or permanent surfaces spanning lanes without lane markings for any period of time.~~
- ~~e. — Unpaved (gravel) surfaces over a weekend or holiday.~~
- ~~f. — Excessive aggregate tracking onto paved surfaces.~~
- ~~g. — Stormwater impacting the levelness of unpaved (gravel) surfaces.~~

(1) Exit 17

- a. Unpaved (gravel) surface condition on the mainline travel way for any period of time. When work is completed in a logical paving pattern, the unpaved surface should be paved with a temporary wearing course and temporary striping. ~~The intention of this condition is to limit the extent of unpaved surfaces at any time within the work zone while also minimizing the number of paving crew mobilizations necessary to install temporary wearing courses.~~
- b. Cold planed/grooved asphalt without lane markings for any period of time.
- c. Temporary or permanent surfaces spanning lanes without lane markings for any period of time.
- d. Excessive aggregate tracking onto paved surfaces.
- e. ~~Stormwater impacting the levelness of unpaved (gravel) surfaces.~~

Performance Measure Target

- (1) Presence of the above conditions at the end of daily construction.

78. MAINTENANCE AND SUPPORT. The Contractor shall employ a System Manager for the SWZ system. The System Manager shall be locally available to maintain system components, maintain the data, move portable devices as necessary, and respond to emergency situations. The System Manager shall be responsible for coordinating the placement of the devices in the project area. It is the responsibility of the System Manager to move the system components that interfere with construction operations and relocate the components to another area. The System Manager shall supply a local telephone number and/or toll-free number to the Engineer to contact the System Manager or other system representative at any time.

The system shall be maintained, supported, and guaranteed against material defects by its supplier through the duration of the deployment.

The Contractor shall be required to respond immediately to any call from the Engineer or his/her designated representative concerning any equipment/software malfunction and request for correcting any deficiency in the system.

Any software licenses that may be needed ~~for communication with the TOC central system software and for field communications~~ shall be provided by the Contractor. The Bluetooth software shall offer an XML schema available to the Agency at no cost for integration with third party software and systems.

- 89. OPERATIONAL TEST.** Once the SWZ System is installed in the field, it shall undergo a five (5) day operational test. The operational test shall include a test of the system in operation during a lane closure to ensure that all the equipment is operating in a fully functional manner and in accordance with the approved SWZ System Plan. The Contractor shall provide both complete operations support from the vendor during the operational test and verification that the reported time driven through the work zone accurately reflects field conditions. If any equipment malfunctions occur for a combined period of four (4) hours or more during this operational test on any day, no credit will be given for that day for the operation test period. Data from that one test day will be discarded and the test will continue until 5 days of good data has been collected.

The Contractor shall maintain records of equipment stoppages and resumptions during the five (5)-day operational test for submission to the Engineer for the Engineer's approval. In the event that ten (10) percent or more of the time similar malfunctions occur that affect the proper operation of the SWZ System, the Engineer may declare a system component defective and require replacement of the equipment at no additional cost to the Agency. When a system component defect is declared, the five (5)-day operational test shall begin again after all defective equipment is replaced and the system is fully operational.

If a device fails to work at all, that device shall be retested for compliance with the test. If the same device fails three (3) times, the device shall be replaced with a new device and the testing shall begin again at the start of the test.

- (a) Report. The Contractor shall submit a report to the Engineer detailing the daily activity of the system during the operational test. The report shall indicate the date and time of any activity necessary to maintain operation of the SWZ System during the operational test period. Each entry shall include the following information:

- (1) Time required to repair equipment malfunction.
- (2) Identity of the equipment on which work was performed.
- (3) Causes of equipment malfunction (if known).
- (4) A description of the type of work performed.

Once the operational test report is received and approved by the Engineer, the SWZ System will be considered operational and the system will be accepted for use.

- 910. METHOD OF MEASUREMENT.** The quantity of Special Provision (Smart Work Zone System) to be measured for payment will be on a lump sum basis in the complete and accepted work.

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1011. BASIS OF PAYMENT. The accepted quantity of Special Provision (Smart Work Zone System) will be paid for at the Contract lump sum price. Payment will be full compensation for performing the work specified, including preparing, submitting, and revising, if necessary, the Smart Work Zone System Plan; furnishing, installing, operational and acceptance testing, relocating, operating, maintaining, monitoring, and removing the Bluetooth detector-based travel time reporting system; employing a System Manager; preparing and submitting daily and monthly reports as specified; and for furnishing all labor, tools, equipment, and incidentals necessary to complete the work.

Payment will be made as follows:

- (a) Thirty-five (35) percent of the Contract lump sum price will be paid when the SWZ System Plan is approved, and all required SWZ System components are delivered to the jobsite.
- (b) An additional twenty-five (25) percent of the Contract lump sum price will be paid upon Engineer's approval of the successful completion of the operational test.
- (c) An additional twenty (20) percent of the Contract lump sum price will be paid after 30 calendar days of full system operation.
- (d) The final twenty (20) percent of the Contract lump sum price will be paid after traffic has returned to normal non-construction flow, the Contractor's equipment has been removed from the project, and all data has been provided to the satisfaction of the Engineer.

When and as determined by the Engineer, five (5) percent of the Contract lump sum price will be deducted should the system malfunction for any period of time greater than 10 minutes for three (3) consecutive days, or any total of five (5) calendar days in any 30 calendar days following approval of the operational test.

This deduction will not reduce the total system payment to less than 75% of the overall Contract lump sum price bid for Special Provision (Smart Work Zone System).

Payment will be made under:

Pay Item

Pay Unit

~~900.645 Special Provision (Smart Work Zone, Exit 16)~~

~~Lump Sum~~

900.645 Special Provision (Smart Work Zone, Exit 17)

Lump Sum

GNSS MACHINE CONTROL GRADING

1. DESCRIPTION. This specification contains requirements for grading construction using Global Navigation Satellite System (GNSS) machine control grading techniques.

The Contractor shall use grading equipment controlled with a GNSS machine control system in the construction of the roadway design and build the required surface models to facilitate GNSS machine control grading.

The Contractor may use any type of GNSS machine control equipment and systems that results in achieving the existing grading requirements and shall convert the electronic data provided by the Agency into the format required by the machine control grading system.

2. EQUIPMENT. The Contractor shall provide all equipment required to accomplish GNSS machine control grading and use that equipment to generate end results meeting all of the Contract requirements.

3. CONSTRUCTION REQUIREMENTS.

- (a) Agency Responsibilities.

- (1) The Engineer will set the initial horizontal and vertical control points in the field for the project as indicated in the Contract Documents.
- (2) The Engineer will provide the project specific localized coordinate system. The control information utilized in establishing the localized coordinate system, specifically the rotation, scaling, and translation, can be obtained from the Engineer upon request.
- (3) Following the award of the Contract, the Agency will make available the following electronic data files. The files that will be made available were originally created with the computer software applications MicroStation® (CADD software) and InRoads® (civil engineering software). The data files will be in the native formats and other software formats as described below.

The Contractor will perform any and all necessary conversion of the files for theselected grade control equipment.

- a. CAD Files.

1. InRoads® DTM files representing the design surfaces.
 2. InRoads® ALG files containing horizontal and vertical geometry.
 3. MicroStation® alignment design file.
 4. MicroStation® cross section design files.
 5. MicroStation® ROW design file.
 6. MicroStation® Existing Ground topography design file.
- b. Machine Control Surface Model Files.
1. LandXML (ASCII format).
- c. Alignment Data Files.
1. Alignment Geometry Report (ASCII Report format).
 2. LandXML (ASCII format).

The Contractor is notified that VTrans utilizes the US Survey Foot as a basis for all engineering work. Particular care shall be taken to ensure that the US Survey Foot is utilized in any and all conversion/evaluation of the files provided. This includes any required conversion from MicroStation® DGN to AutoCAD® DWG; as well as from Bentley InRoads® to other engineering formats.

The XML files shall also be checked to ensure that the US Survey Foot is utilized.

Information shown on the Plans governs over the provided electronic data. The electronic information is not to be considered a representation of actual conditions to be encountered during construction. Providing the Contractor this information does not relieve the Contractor from the responsibility of making an investigation of conditions to be encountered, including but not limited to site visits, and basing any bid on information obtained from these investigations and their professional interpretations and judgment.

The Contractor assumes all risk of error if the information is used for any purposes for which the information was not intended.

Any assumptions the Contractor makes from this electronic information is at their risk.

The Engineer will perform spot checks of the machine control grading results, surveying calculations, records, field procedures, and actual staking. If the Engineer determines the work is not being performed in a manner that will assure accurate results, the Engineer will order such work to be redone, to the requirements of the Contract Documents, at no additional cost to the Agency.

(b) Contractor's Responsibilities.

- (1) Provide the Engineer with a GNSS rover (with the same capabilities as units used by the Contractor) for use during the duration of the Contract. At the end of the Contract, the GNSS rover unit will be returned. Provide the Engineer 8 hours of formal training on the Contractor's GNSS machine control systems. The Contractor's attention is directed to the possible inclusion of separate pay items requiring Contractor supply of GNSS rover units within this Contract rendering the above duplication unnecessary.
- (2) Review and apply the data the Agency has provided to perform GNSS machine control grading and build the 3D model to do the same.
- (3) The Contractor bears all costs, including but not limited to the cost of actual reconstruction of work, that may be incurred due to errors in application of GNSS machine control grading techniques. Grade elevation errors and associated quantity adjustments resulting from the Contractor's activities are at no cost to the Agency.
- (4) Convert the Agency's electronic data into a format compatible with the machine control system.
- (5) Manipulation of the Agency's electronic data is taken at the Contractor's own risk.
- (6) Check and recalibrate, if necessary, the GNSS machine control system at the beginning of each work day.
- (7) Meet the same accuracy requirements as conventional grading construction as required by the Standard Specifications.

- (8) Establish secondary control points at appropriate intervals and at locations along the length of the project and outside the project limits and/or where work is performed beyond the project limits as required at intervals not to exceed 1000 feet. Determine the horizontal position of these points using static GNSS sessions or by traverse connection from the original baseline control points.

Establish the elevation of these control points using differential leveling from the project benchmarks, forming closed loops. Provide a copy of all new control point information to the Engineer prior to construction activities.

The Contractor is responsible for all errors resulting from their efforts and shall correct all deficiencies to the satisfaction of the Engineer at no additional cost to the Agency.

- (9) Preserve all reference points and monuments that are established by the Engineer within the project limits. Reestablish reference points that have not been preserved at no additional cost to the Agency.
- (10) Set hubs at the top of the finished subgrade at all hinge points on the cross section at 1000 foot intervals on mainline and at least two cross sections on the side roads and ramps. Establish these hubs, using conventional survey methods, for use by the Engineer to check the accuracy of the construction.
- (11) Provide controls points and conventional grade stakes at critical points such as, but not limited to, PC's, PT's, superelevation points, and other critical points required for the construction of drainage and roadway structures.
- (12) At least one week prior to the preconstruction conference, submit to the Regional Construction Engineer for review a written machine control grading work plan which includes the equipment type, control software manufacture and version, and the proposed location of the local GNSS base station used for broadcasting differential correction data to rover units.

4. METHOD OF MEASUREMENT. The quantity of Special Provision (GNSS Machine Control Grading) to be measured for payment will be on a lump sum basis in the complete and accepted work.

5. BASIS OF PAYMENT. The accepted quantity of Special Provision (GNSS Machine Control Grading) will be paid for at the Contract lump sum price. Payment will be full compensation for furnishing all labor, equipment, and material necessary in preparing the electronic data files for use in the Contractor's machine control system, the required system check and needed recalibration, training for the Engineer, machine control equipment, and for furnishing all materials, labor, tools, equipment, and incidentals necessary to complete the work.

The unit price bid shall include the costs of all labor, materials, and equipment necessary to satisfactorily complete the work, including required training and maintenance.

Delays due to satellite reception of signals to operate the GNSS machine control system will not result in adjustment to the Contract unit price for any Contract items or be justification for granting Contract time extensions.

Partial payments will be made as follows:

- (a) The first payment of 50 percent of the Contract lump sum price for Special Provision (GNSS Machine Control Grading) or 5 percent of the adjusted Contract price, whichever is less, will be made with the first biweekly estimate as determined by the Engineer pending progress on other Contract Items.
- (b) The second payment of 40 percent of the Contract lump sum price for Special Provision (GNSS Machine Control Grading) or 5 percent of the adjusted Contract price, whichever is less, will be made on the first estimate following the completion of 50 percent of the Contract.
- (c) Payment of any remaining amount of the Contract lump sum price bid for Special Provision (GNSS Machine Control Grading) will be made after the Contract Substantial Completion Date as determined by the Engineer.

Payment will be made under:

<u>Pay Item</u>	<u>Pay Unit</u>
900.645 Special Provision (GNSS Machine Control Grading)	Lump Sum

PUBLIC PROTECTION FOR BRIDGE PROJECTS

1. DESCRIPTION. This work shall consist of providing protection for vehicular and pedestrian traffic traveling below or adjacent to a bridge that is under construction.
2. SUBMITTALS. The Contractor shall submit Construction Drawings in accordance with the requirements of Section 105 for the methods and sequence of work, including the materials and equipment to be used for the work. The plan shall contain provisions for all stages of construction where any member of the public could be exposed to danger from falling objects or construction operations. Any calculations required to prepare the Construction Drawings shall be included in the submittal.
3. GENERAL REQUIREMENTS. The Contractor shall determine the materials and methods to use for this work based on the conditions at a particular location.
 - (a) Shielding. Should the Contractor choose to use shielding supported by the existing structure, it shall be made of material of adequate strength and size to completely protect the public from any falling object(s) related to the construction activities. The existing structure shall be evaluated to determine if it can support the additional loads from the shielding system.
 - (b) Enclosures. Should the Contractor choose to use an enclosure, it shall be made of material of adequate strength and size to completely protect the public from any falling object(s) related to the construction activities. Any roadway enclosure or containment system shall be of adequate width and height to allow passage of oversize vehicles. If required by the Engineer, vehicular enclosures which are more than 50 feet long shall have their interior illuminated during daylight hours. Pedestrian enclosures of any length shall have their interior illuminated for the full duration of their use.
 - (c) Diversions. Should the Contractor choose to divert the vehicular and pedestrian traffic from passing beneath the bridge under construction, the diversion course shall be as shown in the approved traffic control plan and meet the requirements of this specification. Diversions are only allowed when specified in the Contract.
 - (d) Interruptions. Should the Contractor choose to interrupt the flow of vehicular or pedestrian traffic below a bridge under construction, flaggers shall be used. An interruption shall be defined as the stopping of traffic. The duration of time for each individual interruption shall not exceed ten minutes, and the total of the interruptions shall not exceed thirty minutes in any hour. Interruptions are not allowed on Interstate highways or limited access highways unless otherwise specified in the Contract.

The method or combination of methods the Contractor chooses to use shall be fully operational before any construction work which might endanger the public begins on the bridge.

4. METHOD OF MEASUREMENT. The quantity of Special Provision (Public Protection for Bridge Projects) to be measured for payment will be on a lump sum basis in the complete and accepted work.

The quantities for Uniformed Traffic Officers and Flaggers will be measured separately in accordance with Section 630.

5. BASIS OF PAYMENT. The accepted quantity of Special Provision (Public Protection for Bridge Projects) will be paid for at the Contract lump sum price. Payment will be full compensation for preparing a public protection plan, and for furnishing all labor, materials, tools, equipment, and incidentals necessary to complete the work.

Partial payments will be made as follows:

- (a) The first 25% of the Contract lump sum price will be paid once the Construction Drawings are returned as Conforming or Conforming with Comments.
- (b) The remaining 75% of the Contract lump sum price will be paid on a prorated basis for the estimated duration of the Contract work remaining.

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 (Public Protection for Bridge Projects)	Lump Sum

CONCRETE BRIDGE DECK SURFACE PREPARATION

1. DESCRIPTION. This work shall consist of blanket diamond grinding concrete bridge decks.
2. MATERIALS. Materials shall meet the requirements of the following subsections:
 Water..... 745.01
3. SUBMITTALS. The Contractor shall submit a blanket grinding work plan to the Engineer. At a minimum, the submittal shall include detailed procedures and information for the following:
 - (a) Determining initial grinding depth.
 - (b) Monitoring depth of grinding.
 - (c) Determining location of wheel paths.
 - (d) Depth of grinding for the second pass and any subsequent passes.
 - (e) Repair procedures if the deck is damaged during grinding operations.
 - (f) Remedial action if depressions exceed geometric limits of grinding.
 - (1) Means of determining remaining clear cover over reinforcing steel for further grinding.
 - (2) Subsequent grinding patterns if sufficient clear cover remains over the reinforcing steel.
 - (g) Manufacturer's specifications for concrete bridge deck grinding equipment.

The Agency will review the submittal for compliance with the requirements of the Contract. If the procedures or information do not conform to the Contract requirements, the submittal will be returned as rejected. The submittal shall not be marked as approved or approved as noted until all of the required information has been received and reviewed.

Once a complete submittal has been received, the Agency shall be allowed 21 calendar days for the initial review period and 14 calendar days for the review of each subsequent resubmittal.

The Contractor will not be permitted to begin grinding until the blanket grinding work plan has been marked as approved or approved as noted by the Agency. After the blanket grinding work plan has been marked approved or approved as noted, no changes shall be made without the written approval of the Agency.

4. CONSTRUCTION REQUIREMENTS.

4. CONSTRUCTION REQUIREMENTS.

- (a) Concrete Bridge Deck Grinding Equipment. The grinding equipment shall be power driven, self-propelled, and specifically designed to smooth and texture Portland cement concrete with diamond blades or diamond impregnated cylinder rings. The equipment shall have a minimum weight of 35,000 pounds, including the grinding head, and shall be capable of grinding a strip at least 3 feet wide. The effective wheelbase of the machine shall be no less than 12 feet. The equipment shall have a positive means of vacuuming the grinding residue from the deck pavement surface, leaving the surface in a clean, near-dry condition.

The equipment shall have a set of pivoting tandem bogey wheels at the front of the machine and rear wheels or tandem bogies that travel and track on the freshly cut surface. The equipment shall be maintained to ensure it is in proper working order, with attention paid to the roundness of the match and depth control wheels. Any wheels found to be out of round shall be immediately replaced.

The equipment shall be capable of grinding the surface in the longitudinal direction without causing spalls or other damage at cracks, joints, and other locations. Grinding equipment that causes raveling, aggregate fractures, or disturbance to the joints shall not be permitted. The equipment shall be capable of correcting the bridge deck profile and providing the proper cross slope.

The equipment shall be capable of grinding all concrete bridge deck materials, including rapid set concrete and ultra-high performance concrete (UHPC). If the Contract specifies the use of UHPC, the grinding of the UHPC surface shall be performed when a minimum compressive strength of 10 ksi has been achieved and per the manufacturer's recommendations. If significant fiber pullout is observed during grinding operations, grinding shall be suspended and not resumed until approved by the Engineer.

The Contractor shall provide equipment capable of feathering longitudinal ridges along the limits of grinding that remain after grinding is complete.

- (b) Concrete Bridge Deck Grinding. Grinding operations shall not begin until the effective cure time for the bridge deck concrete is complete and the wearing course or temporary wearing course of bituminous concrete pavement has been placed on the bridge approaches. A minimum of two passes are required.

Grinding operations shall be performed in a longitudinal direction and provide a uniform finished texture. The beginning and end grinding lines shall be normal to the bridge centerline or along the deck skew. Grinding shall terminate 10 feet beyond the ends of the concrete bridge deck in the bituminous concrete pavement, except for locations with steel bridge joints or as otherwise directed by the Engineer. Unless otherwise indicated in the Contract, grinding shall be terminated as specified in Table 509.04A.

TABLE 509.04A – GRINDING TERMINATION DISTANCE REQUIREMENTS

Location	Closest Allowable Distance (in.)	Farthest Allowable Distance (in.)
Drainage structure	4	15
Face of curb or barrier	4	15
Steel bridge joint system ¹	4	15

¹ Dimension measured perpendicular to the centerline of the steel bridge joint system.

- (1) Geometric Requirements. Each pass shall grind a strip at least 3 feet wide and not exceed the following vertical criteria:
 - a. Unless otherwise noted on the Plans, the maximum depth of material removed by diamond grinding shall be 3/4 inch.
 - b. The maximum vertical difference between longitudinal passes shall be 1/8 inch.
 - c. Proposals to correct depressions exceeding the allowable grinding depth shall be submitted to the Engineer for approval. All depressions shall meet the specified grinding smoothness and texture requirements post remediation.
- (2) Smoothness. After grinding, the deck shall have a uniform transverse and longitudinal slope with no depressions or misalignment of slope greater than 1/8 inch in 10 feet when tested with a 10 foot straightedge. The surface will be checked at random by the Engineer during the grinding operation to ensure that no depressions exist that will pond water. The straightedge will be placed in contact with the surface in successive positions parallel to and perpendicular to the centerline of the structure. If the existing concrete surface is parabolic, the straight edge test shall not be used across the parabolic surface.
- (3) Texture. The surface texture shall be a parallel, corduroy-type consisting of grooves between 1/16 inch and 1/8 inch wide. The peaks of the ridges shall be approximately 1/16 inch higher than the bottom of the grooves.
- (4) Cleaning. Grinding residue shall be removed with a vacuum attached to the grinding machine. The vacuum shall leave the deck surface in a clean, near dry condition. Grinding residue shall be disposed of at an appropriate disposal facility.
- (5) Grinding Operations. Grinding shall continue until one of the following criteria is

approved by the Engineer:

- a. The surface meets the smoothness and texture required.
- b. The maximum depth of grinding, texture, and depression remediation measures are met.

- (6) Feathering Ridges along Limits of Grinding. Longitudinal ridges along the limits of grinding that remain after grinding is complete shall be feathered out to provide a uniform transition from the deck surface at the face of curb or barrier to the finished deck surface after grinding.

5. METHOD OF MEASUREMENT. The quantity of Special Provision (Concrete Bridge Deck Surface Preparation) to be measured for payment will be the number of square feet of concrete bridge deck surface prepared in the complete and accepted work. Measurement will be based on the horizontal distance between the face of curb or barrier as shown on the Plans and the longitudinal length of the bridge deck. The longitudinal length measured for payment will be extended by 10 feet beyond each end of the bridge deck except for locations with steel bridge joints or as otherwise directed by the Engineer.
6. BASIS OF PAYMENT. The accepted quantity of Special Provision (Concrete Bridge Deck Surface Preparation) will be paid for at the Contract unit price per square foot. Payment will be full compensation for grinding the bridge deck; furnishing and implementing the required submittals; and for furnishing all materials, labor, tools, equipment, and incidentals necessary to complete the work.

Payment will be made under:

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

PRECAST PRESTRESSED CONCRETE DECK PANEL

1. DESCRIPTION. This work shall consist of manufacturing, transporting, and installing precast prestressed concrete deck panels at the locations 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 510 of the Standard Specifications.

2. FABRICATION AND CONSTRUCTION REQUIREMENTS. Concrete deck panels shall be fabricated and installed to the configuration shown in the Plans and in accordance with Section 510.
2. METHOD OF MEASUREMENT. The quantity of Special Provision (Precast Prestressed Concrete Deck Panel) to be measured for payment will be the number of square feet of deck panel used in the complete and accepted work.
4. BASIS OF PAYMENT. The accepted quantity of Special Provision (Precast Prestressed Concrete Deck Panel) will be paid for at the Contract unit price per square foot. Payment will be full compensation for detailing, fabricating, repairing, sandblasting, quality control testing, transporting, handling, and installing the materials specified, including concrete, reinforcement, prestressing steel, transverse ties, enclosures for prestressing steel, anchorages, anchor rods, and any other material contained within or attached to the members; for furnishing and implementing the erection plan; 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>
900.670 Special Provision (Precast Prestressed Concrete Deck Panel)(3 1/2 INCH)(FPQ)	Square Foot

GREEN PAVEMENT MARKINGS

1. DESCRIPTION. This work shall consist of furnishing and installing non-retroreflective green pavement markings at the locations and in accordance with the patterns shown in the Plans and as directed by the Engineer and in conformance with these specifications.

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

2. MATERIALS. Materials for green pavement markings shall be an MMA (Methyl Methacrylate) in the approved FHWA Green color as specified in Interim Approval IA-14 for use in bike lanes as identified below:

CycleGripMMA by Ennis-Flint,

Color-Safe by Transpo Industries,

or approved equal.

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

3. CONSTRUCTION REQUIREMENTS. The marking material shall be placed in accordance with this special provision and the manufacturer's recommendations, including, but not limited to; material requirements, surface preparation, atmospheric conditions, application equipment and required personal protective equipment.

Existing pavement markings shall be removed prior to placing new markings. All surfaces shall be thoroughly clean, dry, and free of all dirt, grease, and other contaminants that might interfere with proper adhesion.

Cleaning and marking removal operations shall be conducted such that the finished pavement surface is not damaged and does not exhibit a pattern that will mislead or misdirect the road user. Vacuum-type equipment or equivalent shall be used to collect and contain debris generated by cleaning and marking removal.

Following surface preparation, the Contractor shall broom the pavement surface and use compressed air cleaning to remove all residue and debris resulting from the preparation work. The Contractor shall control and minimize airborne dust and similar debris generated by surface preparation and cleanup to prevent a hazard to motor vehicle operation or nuisance to adjacent property.

After application, markings shall be protected from crossing vehicles for a time at least equivalent to the drying time of the marking material used. Markings shall be protected from the moment of application until they are sufficiently dry to bear traffic without damage to the marking, tracking, or adhering to vehicle tires.

Any pavement marking materials spilled or tracked on the roadway surfaces shall be removed by the Contractor to the satisfaction of the Engineer and at no additional cost to the State. The method of removal shall be acceptable to the Engineer and not injurious to the roadway or other surfaces.

4. METHOD OF MEASUREMENT. The quantity of Special Provision (Green Pavement Markings) to be measured for payment will be the number of square yards complete in place in the accepted work.
5. BASIS OF PAYMENT. The accepted quantities of Special Provision (Green Pavement Markings) of the types and sizes specified will be paid for at the Contract unit prices per square yard.

Payment will be full compensation for removal of existing pavement markings, surface preparation, furnishing, transporting, handling, assembling, 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>
900.675 Special Provision (Green Pavement Markings)	Square Yard

PART I – ADDITIONAL NOTICE TO BIDDERS

43. NOTICE TO BIDDERS – WINTER WORK. With reference to Subsection 108.09(b), work will be allowed during the seasonal closure period from December 2 to April 14, inclusive, of each year. Approval to work during this timeframe is hereby given subject to the following conditions:
- (a) That all permits and specifications for the items worked on will be strictly adhered to, especially temperature, moisture, and seasonal limitation requirements.
 - (b) Concrete Class PCD is not allowed to be placed during the winter work timeframe.
 - (c) The start-up time that work will begin and/or terminate will be as determined by the Resident Engineer on a daily basis. This may be the result of a request by VTrans, State or Local Police, if the weather and/or traffic conditions will affect the safety of the traveling public.
 - (d) Roadway work will not hinder ongoing winter maintenance work (i.e., plowing, sanding/salting, etc.).

The allowance for winter work may be rescinded at any time, if it is determined to be in the best interest of VTrans, the integrity of the project and/or the safety of the traveling public.

PART II – ADDITIONAL SPECIAL PROVISIONS

PERFORMANCE-BASED STRUCTURAL CONCRETE

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

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

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

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

Polystyrene Insulation Board.....	735.01
Blanket Insulation Material.....	735.02
Pipe Insulation	740.08
Water.....	745.01
Concrete Repair Materials	780.01

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

3. CLASSIFICATION AND PROPORTIONING. Concrete shall meet the requirements specified in Table 1 and shall be used as shown on the Plans.

TABLE 1 – PERFORMANCE-BASED CONCRETE CLASSES AND PROPERTIES

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

¹ PCD = Performance Concrete, Deck

PCS = Performance Concrete,
Substructure
SCC = Self-Consolidating Concrete

² The concrete may be accepted if the design compressive strength from standard cured cylinders has been obtained at 28 days. Any 56 day acceptance cylinders shall be tested regardless of the results of earlier tests.

³ The maximum W/CM ratio shall be determined by the Contractor as established by mix qualification testing. During production, the W/CM ratio shall be less than or equal to the W/CM ratio from the approved qualification mix. See [Subsection 3\(b\)](#). The W/CM ratio shall be rounded to two decimal places in accordance with *ASTM E29*.

⁴ Visual stability index (VSI) as determined in accordance with *ASTM C1611*.

⁵ The freeze/thaw durability of the proposed mix design may be established by providing mix qualification testing demonstrating conformance with either of the two requirements. Testing shall meet the requirements of either *AASHTO T 161, Procedure A*, or *ASTM C457*, as applicable. See [Subsection 3\(b\)\(2\)](#).

- ⁶ The minimum air content shall be determined by the Contractor as established by mix qualification testing. During production, the air content shall be greater than or equal to the air content from the approved qualification mix. See [Subsection 3\(b\)\(2\)](#).
- ⁷ The Contractor shall determine the surface resistivity in accordance with [Subsection 3\(b\)\(4\)](#).
- ⁸ The mix shall not exhibit segregation. If the mix does exhibit segregation, the load shall be rejected. If the spread is equal to or exceeds 20 inches, the mix shall be classified as Class SCC concrete.
- ⁹ The Contractor shall determine the spread limits in accordance with [Subsection 3\(b\)\(5\)](#). The spread shall be maintained within the determined spread limits for the placement. The mix shall not exhibit segregation. If the mix does exhibit segregation or exceeds the upper spread limit, the load shall be rejected, and subsequent loads shall be tested by the Contractor until the mix meets the allowable limits. The Engineer may perform a J-ring test at the time of placement if blocking is a concern.
- ¹⁰ The Contractor shall determine the free shrinkage in accordance with [Subsection 3\(b\)\(1\)](#). Class SCC concrete will be allowed for use in superstructure elements if the free shrinkage meets the requirements for Class PCD. Class SCC concrete will be allowed for use in substructure elements if the free shrinkage meets the requirements for Class PCS.

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

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

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

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

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

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

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

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

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

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

(a) Mix Design Information. The mix design shall contain the following information:

- (1) Class of concrete.
- (2) Type of mix, conventional or self-consolidating concrete (SCC).
- (3) Saturated surface dry or dry weights (specify which).
- (4) Aggregate types, sources, specific gravities, and absorption values.
- (5) 56 day design compressive strength, psi.

- (6) Cementitious content and the amount of each, pounds per cubic yard.
- (7) Air content lower limit, percent.
- (8) 56 day surface resistivity value.
- (9) Determined spread lower limit and upper limit for SCC.
- (10) Maximum water/cementitious materials (W/CM) ratio.
- (11) Volumetric quantities of each material in the mix design.
- (12) Design unit weight of the mix.
- (13) Chemical admixture types, brand names, and dosages.

Concrete test mixes shall be used to obtain the test results where applicable. All wet testing shall be done by personnel with current ACI Concrete Field Testing Technician Grade I certifications. All other tests shall be performed by a laboratory that is accredited by AASHTO resource or the Concrete and Cement Reference Laboratory (CCRL) in the particular test method, or as allowed by the Engineer. All test reports pertaining to the qualification testing shall be date traceable to concrete test batches whether produced at a concrete producer's facility or an independent laboratory facility. All qualification batches shall have weight tickets and fresh concrete property test results included.

- (b) Mix Qualification Tests. The following mix qualification tests shall be performed. Samplings shall be performed in accordance with *AASHTO R 60* on a qualification batch of concrete that is a minimum of 3 cubic yards. Specimens for tests to determine freeze-thaw durability, strength, surface resistivity, and SCC spread limits shall be made from the qualification batch. The qualification batch shall also be tested for air content (*AASHTO T 152*), concrete temperature (*ASTM C1064*), and unit weight (*AASHTO T 121*). The air content value and the water/ cementitious materials ratio of the material used to pass the mix qualification tests shall become the minimum air content value and the maximum water/cementitious materials ratio allowed during production.

The free shrinkage specimens may be obtained from the qualification batch, except the Contractor will be required to submit a plan on how they will comply with *AASHTO T 160, Section 10*, which shall be approved by the Structural Concrete Engineer prior to the beginning of qualification testing.

- (1) The Contractor shall provide test results that establish the shrinkage tendency of the concrete. The free shrinkage rate of the concrete shall be tested per the requirements of *AASHTO T 160*. The cross-section of the prism shall be 4 inches × 4 inches. The requirements of *AASHTO T 160, Section 11.1.2* shall be followed for storage and measurements, and all specified test age results shall be submitted. Specimen testing may be terminated after 28 days of drying.

Testing shall be performed by a laboratory accredited in the specific test method. Concrete produced by the testing laboratory to make the specimens shall have an air content equal to the Contractor's proposed minimum air content with a tolerance of + 1%. The air content value from laboratory produced concrete used for this testing will not be considered in determination of the minimum air content value allowed during production.

- (2) The Contractor shall provide test results that establish the freeze-thaw durability of the concrete. At the Contractor's choice, either *AASHTO T 161* or *ASTM C457* may be used to demonstrate freeze/thaw durability meeting the specification requirements.

The durability factor shall be tested in accordance with *AASHTO T 161, Procedure A*.

The air void spacing factor shall be tested in accordance with *ASTM C457*. The Contractor shall make a minimum of two concrete cylinders per *AASHTO R 100* and report the average air-void spacing factor obtained from testing these two specimens. The cylinders shall be cured for a minimum of 5 days prior to being tested according to the requirements of *ASTM C457*.

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

- (3) The compressive strength of the concrete shall be measured based on the requirements of *AASHTO T 22* for 28 day and 56 day standard cured cylinders.

- (4) The surface resistivity of the test mix shall be measured at 56 days based on the requirements of *AASHTO T 358*. Results shall be categorized as Low, Very Low, or Negligible in accordance with *AASHTO T 358, Table 1*. The surface resistivity may be accepted prior to 56 days if the results meet these requirements. The 56 day test results shall be completed and submitted regardless of the results of earlier tests.
 - (5) The Contractor shall determine the lower and upper spread limit for Class SCC concrete. *ASTM C1621* shall be performed at the proposed upper and lower spread limits. Each spread limit shall not exceed a blocking assessment of “Minimal to Noticeable Blocking”. The slump cone shall be filled in accordance with *ASTM C1621, Procedure B*. At both the upper and lower limits, the visual stability index (VSI) shall not be greater than 1.
- (c) Alkali-Silica Reactivity. The alkali-silica reactivity (ASR) of each type of aggregate shall be measured separately based on the requirements of *AASHTO T 303* or *ASTM C1260*. If one or more of the aggregates exceeds 0.10% expansion, then the aggregate shall be tested again according to the requirements of *ASTM C1567* or *CRD-C 662*.

The Contractor may elect to go directly to *ASTM C1567*, or *CRD-C 662* if using lithium nitrate, if they suspect that the aggregate may exceed the 0.10% expansion if tested by *AASHTO T 303* or *ASTM C1260*.

If a lithium nitrate admixture will be used, no matter the cementitious materials combination, each aggregate will be tested by *CRD-C 662*. *CRD-C 662, Section 9* shall be replaced using *ASTM C1567, Section 9*.

The aggregates shall not exceed 0.10% expansion when tested by any of the four allowable test methods.

Testing shall be performed by a laboratory accredited in the *ASTM C1260*, *ASTM C1567*, or *AASHTO T303* test method.

Test results shall be submitted with the mix design.

- (d) Mix Design Approval and Changes. After the mix design furnished by the Contractor has been reviewed and approved by the Structural Concrete Engineer, no changes to the mix design shall be allowed except as defined in Table 2. Following an approved change in accordance with Table 2, the Contractor may still revert to the original approved mix design formulation. If a source change is requested due to a change in product or material name that does not include any significant change in product formulation or material characteristic, and this is substantiated by the product or material supplier in writing, re-testing is not required.

TABLE 2 – ALLOWABLE MIX DESIGN CHANGES FOR ALL MIX TYPES

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

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

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

The approved mix design will be allowed consecutive re-approval if no material proportioning or material sources have changed from the previous year's approved mix design and the mix design is submitted with updated aggregate properties and volumes adjusted accordingly. The aggregate properties shall be tested annually. Aggregate property values will be valid for 14 months from the date tested. The properties to be tested include, but are not limited to, specific gravity and absorption.

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

4. BATCHING.

- (a) General Requirements. Measuring and batching of materials shall be performed at an approved batch plant. Batch plants shall have an inspection completed prior to the first concrete placement on an Agency project if it has been more than 12 calendar months since the last inspection. Requests for inspection and required documentation shall be received by the Agency's Materials Testing and Certification Section a minimum of 21 calendar days prior to the date of the requested inspection.

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

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

Proper facilities shall be provided for the Engineer to inspect ingredients and processes used in the batching and delivery of the concrete. The Contractor shall, without charge, afford the Engineer all reasonable facilities for securing samples to determine whether the concrete is being furnished in accordance with these specifications. In the batch room area, the producer shall provide the inspector with a 24 inch $\times$ 18 inch horizontal working surface, at a sufficient working height, with a seat and an adequate view of the batching controls, display, and power supply.

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

(b) Batch Weight Tickets. Batch weight tickets shall include the following information:

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

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

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

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

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

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

Adequate ventilation, lighting, heating, and any necessary electrical or gas connections shall be provided. Proper sanitary toilet facilities with a lavatory shall be available for use by Agency personnel at the plant site. Dedicated private telephone and internet services shall be provided to the laboratory in accordance with Subsection 631.02(a)(4), except that selection of the service by the Engineer is not required.

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

- 1 Standard office desk, with lockable drawers or a separate lockable two-drawer file cabinet and chair
- 1 Agency *Qualified Laboratory Binder* with producer equipment calibration data
- 1 Set of bench sections at least 2 feet wide providing a minimum of 28 square feet of working area with under-counter shelving
- 1 Standard laboratory stool
- 1 Electronic calculator with eight digit capacity
- 1 Standard laboratory sink and faucet provided with an adequate supply of water meeting the requirements of Subsection 745.01. The sink shall drain to the outside of the laboratory.
- 1 Bench brush
- 1 Floor brush

- 1 Motorized 8-inch sieve shaker with an adjustable timer. The shaker's operation shall be conducted by means of lateral and vertical motion of the sieve accompanied by jarring action with the following 8-inch diameter sieves: 3/8 inch (9.50 mm), No. 4 (4.75 mm), No. 8 (2.36 mm), No. 16 (1.18 mm), No. 30 (0.600 mm), No. 50 (0.300 mm), No. 100 (0.150 mm), plus pan and cover.
- 1 Mechanical aggregate shaker with an adjustable timer, a 1 cubic foot capacity, together with the following screens: 1-3/4 inch (43.0 mm), 1-1/2 inch (37.5 mm), 1 inch (25.0 mm), 3/4 inch (19.0 mm), 1/2 inch (12.5 mm), 3/8 inch (9.50 mm), 1/4 inch (6.30 mm), No. 4 (4.75 mm), No. 8 (2.36 mm), No. 16 (1.18 mm), and pan. The aggregate shaker may be placed in a separate enclosed area or be shielded for dust and sound control. When the aggregate shaker is placed in a separate enclosed area, there shall be a minimum of 5 feet of clear space measured from the front frame of the aggregate shaker outward, as well as a bench section measuring approximately 36 inches high, 24 inches deep, and 50 inches long located adjacent to the aggregate shaker. The area shall be well lit and ventilated.
- 1 Square pointed shovel
- 5 Five gallon plastic buckets, with handles
- 1 Electronic balance with a minimum capacity of 50 pounds and accurate to 0.0002 pounds. If separate fine and coarse aggregate scales are to be used, the fine aggregate scale shall meet the requirements of *AASHTO M 231, Table 2*, Class G2 with a minimum capacity of 1.75 pounds and readable to 0.0002 pounds. The coarse aggregate scale shall meet the requirements of *AASHTO M 231, Table 2*, Class G5 with a minimum capacity of 50 pounds and readable to 0.002 pounds.
- 1 Set of standard masses (weights) to use for verifying the accuracy of the electronic balance
- 2 Double-burner hot plates with variable temperature controls
- 3 Metal pans with a nominal size of 9 inches × 9 inches × 2 inches
- 5 Metal pans with a nominal size of 9 inches × 13 inches × 2 inches
- 1 Sample splitter with a 2-1/2-inch chute
- 1 10-inch blunted trowel

- 1 4 foot × 4 foot minimum heavy canvas for quartering samples
- 1 Brass wire-bristle brush
- 1 Pair of heat-resistant gloves (500°F, short-contact)
- 2 1-1/2 inch soft bristle paint brushes

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

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

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

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

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

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

Adequate means for checking the accuracy of the scales shall be provided by the Contractor either using 50 pound weights or by other methods approved by the Structural Concrete Engineer. Weights shall be certified annually by the Weights and Measures Section of the Vermont Agency of Agriculture, Food, and Markets. All exposed fulcrums, clevises, and similar working parts of scales shall be kept clean.

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

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

The ready-mixed concrete producer shall hire a licensed hopper scale service person for annual checking and service of scales. In addition, Vermont producers shall schedule an inspection with the Weights and Measures Section between February 16th and April 30th of each year, inclusive. After April 30th, Vermont plants without current seals affixed to the hopper scales will not be permitted to supply concrete to Agency projects, unless otherwise directed by the Engineer or until the seals are affixed.

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

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

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

Batching shall be conducted to accurately measure the desired quantities of materials within the tolerances specified in [Table 3](#).

TABLE 3 – CONCRETE PRODUCTION TOLERANCES FOR BATCHING

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

(g) Storage and Proportioning of Materials.

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

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

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

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

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

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

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

Stockpiles shall be constructed as follows:

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

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

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

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

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

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

- d. Lightweight coarse aggregate stockpiles shall be presoaked for a minimum period of time to ensure that the aggregate is completely saturated surface dry or greater immediately prior to use as indicated by moisture testing. Soaking shall be accomplished by continuous sprinkling or other suitable means that will provide a uniform moisture content throughout the stockpile. The stockpile shall be allowed to drain for 12 hours to 15 hours immediately prior to use.

- (4) Admixtures. The Contractor shall follow an approved procedure for adding the necessary amounts of admixtures to each batch. Admixtures shall be dispensed in such a manner that will ensure uniform distribution of the material throughout the batch within the required mixing period. Except as specified herein, all admixtures shall be added to the batch at the plant, unless otherwise authorized by the Structural Concrete Engineer.

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

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

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

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

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

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

- a. Air-entraining admixtures shall be used as required to obtain the specified air content.
 - b. The dosages of water-reducing, retarding, and water-reducing and retarding admixtures, accelerators and specialty admixtures shall be in the recommended range as stated by the manufacturer, unless otherwise approved by the manufacturer.
- (5) Fly Ash or GGBFS. Fly ash or GGBFS shall be stored at the batch plant in separate storage or holding bins or other approved holding containers and shall be protected from rain and moisture.

5. MIXING AND DELIVERY.

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

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

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

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

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

- (2) To obtain the required concrete characteristics, a representative from the concrete producer shall be present on the project to determine the final admixture dosage and water addition for each load of concrete. The dosage shall be applied by means of a dispenser, or by other means of accurately measuring volume as approved by the Engineer. The Contractor shall provide QC concrete testing personnel, with current ACI Concrete Field Testing Technician Grade I Certification, to confirm the concrete is within specifications for the required work.
- (3) Addition of water or admixtures at the project site shall be communicated to field inspection personnel. If additional mixing water, admixtures, or other additions are required, a minimum of 30 revolutions of the mixer drum at mixing speed shall be required before discharge of any concrete. If water is added in excess of the specified maximum W/CM ratio, the concrete shall not be used.
- (4) The Engineer may require the Contractor to perform uniformity tests on a transit mixer or agitator, in accordance with *AASHTO M 157* and reported except as modified below. Two samples shall be taken. The first sample shall be taken after 15% of the load volume has been discharged, and the second prior to 85% of the load volume being discharged.

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

- (5) Each load of concrete delivered to the job site shall be accompanied by a batch weight ticket meeting the requirements of Subsection 4(b).
- (6) The Contractor shall provide direct communication service from the site of the work to the batch plant that shall be available to the Engineer at all times during concrete operations. The cost of this service will be considered incidental to the work.
- (7) All concrete shall be discharged into the forms before 300 revolutions of the drum or blades, not including initial mixing revolutions. The total allowed number of revolutions may be increased as directed by the Engineer.

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

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

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

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

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

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

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

All mechanical details of the mixer or agitator such as water measuring and discharge apparatus, condition of the blades, speed of rotation of the drum, general mechanical condition of the unit and clearance of the drum shall be checked before a further attempt to use the unit will be permitted.

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

Concrete containing silica fume shall be mixed in accordance with the appropriate situation:

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

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

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

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

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

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

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

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

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

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

- (b) Sampling. Sampling for tests shall be taken in accordance with the requirements of *AASHTO R 60* or other procedures approved by the Agency. Sampling will be done at the point of placement or as close to it as practical.
 - (1) Changes. Any time that there is a change in admixture dosage outside of the allowable tolerances, whether modified at the batch plant or at the site, additional QC sampling and testing shall be performed on the modified load prior to incorporating the concrete into the work.
 - (2) Beginning of Load Sampling. Beginning of load sampling is sampling for QC testing purposes that is taken before 15% of the load has been discharged. Beginning of load sampling shall be performed as required by the Engineer, or as needed to ensure that the concrete meets the Contract requirements at the point of placement. The QC personnel shall monitor the placement operation and adjust the mix accordingly to ensure that the material being incorporated into the work meets Contract requirements.
- (c) Slump Tests. Slump tests shall be made in accordance with *AASHTO T 119*.
- (d) Spread Tests. Spread tests for Class SCC concrete shall be performed in accordance with *ASTM C1611, Procedure B*. The concrete inside the cone shall not be tamped.
- (e) Visual Stability Index (VSI) Tests. VSI tests for Class SCC concrete shall be performed in accordance with *ASTM C1611, Appendix X.1* and shall be performed on each completed spread test.

- (f) Air Content Tests. Air content tests shall be made in accordance with the pressure method specified in *AASHTO T 152*.

For Class SCC concrete, the specimens shall be fabricated in accordance with *ASTM C1758*.

- (g) Compressive Strength Tests.

- (1) General Requirements. The number of compressive strength tests performed for acceptance will be as specified in the *Materials Sampling Manual*. The Engineer may order additional tests as deemed necessary.

Compressive test cylinders shall be made in accordance with the requirements of *AASHTO R 100* and tested for compressive strength in accordance with the requirements of *AASHTO T 22*.

For Class SCC concrete, the specimens shall be fabricated in accordance with *ASTM C1758*.

- (2) Categories of Testing.

- a. Acceptance Testing. Acceptance testing uses specimens to determine the compliance with requirements for the project. All test cylinders used for quality acceptance testing shall be stored in an approved curing box until they are shipped to the Agency's Materials Testing and Certification Section Central Laboratory.
- b. Job Control Testing. Job control testing uses specimens to determine whether adequate curing procedures are being followed and for early form removal or early loading of structure.
 1. All job control specimens shall be stored on the structure and shall receive the same curing and protection from the elements as the concrete that they represent up until 24 hours before anticipated testing of specimens.
 2. The maturity method may be used as an alternative to compressive strength testing for estimating the concrete strength. The procedures of *ASTM C1074* shall be followed for the maturity method except as noted below:

- i. For *ASTM C1074, Section 8.1* there shall be a minimum of 17 cylinders cast. Two of the 17 shall have temperature sensors embedded in them to be used for monitoring.
- ii. For *ASTM C1074, Section 8.4* there shall be 3 cylinders tested for each test age.
- iii. For *ASTM C1074, Section 8.4* for rapid set concrete mixes the test ages shall be 12 hours, 1 day, 2 days, 7 days, and 28 days. The Contractor may adjust or add test ages if approved by the Engineer.

All temperature measuring devices shall be verified or calibrated on a 12 month basis or sooner if there are questions about their accuracy. The devices shall have an accuracy of $\pm 2^{\circ}$ F.

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

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

TABLE 4 – CONCRETE SPECIMEN CURING REQUIREMENTS

Testing Category	Number of Specimens	Curing Location
Acceptance	See the <i>Materials Sampling Manual</i>	Curing box
Job control	2 per test	On structure

- (h) Concrete Temperature. Concrete temperature tests shall be conducted in accordance with the requirements of *ASTM C1064*.

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

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

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

- (b) Cold Weather Concrete.

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

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

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

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

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

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

- (3) Antifreeze Compounds. Salts, chemicals, or other foreign materials shall not be used in the mix to lower the freezing point of the concrete.
- (4) Preparation of Forms. Before placing concrete, any ice, snow, or frost shall be completely removed from the forms.

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

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

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

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

- (6) Heating the Enclosure. The enclosure shall be heated in such a manner that the temperature of the concrete and the enclosed air shall be kept above 50°F, and not more than 40°F above the internal concrete temperature, for the designated curing period. During this time, the concrete shall be kept continuously wet to provide proper curing. The internal concrete temperature shall not exceed 160°F. After the curing period, the temperature shall be gradually lowered to that of the surrounding atmosphere, taking at least 48 hours for the transition but at no time exceeding a 1°F change per hour.

When dry heat is used, a means of maintaining atmospheric moisture shall be supplied. The Contractor shall also maintain adequate fire protection and shall provide personnel to keep the heating units in continuous operation. When concrete placement operations are in locations where water levels may fluctuate, the supports for heating equipment shall be built so that the heating equipment can be raised, and steam lines shall be placed above the probable high water level.

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

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

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

Temperature sensors shall be carefully placed within the curing enclosure or in the concrete to ensure that temperatures are measured at typical locations. Concrete temperature sensors shall be embedded between 2 inches and 3 inches into the concrete or as directed by the Engineer. The recorder's accuracy shall be certified once every 12 months, with the certificate displayed with each recorder. The Engineer may make random checks of each recorder.

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

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

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

When the Contractor places concrete at more than one location within the specified curing period or if the Engineer determines that monitoring of a single pour is necessary in multiple locations, additional monitoring and recording equipment shall be furnished to provide temperature records at each location.

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

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

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

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

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

Falsework and forms for Class SCC concrete construction shall be designed with consideration given to concrete placement rates, mix temperature, additives, and placement procedures that affect hydrostatic pressure of the concrete. Forms shall be water-tight and sufficiently rigid to prevent distortion due to the pressure of the concrete and other loads incidental to the construction operations, including vibration.

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

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

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

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

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

Unless otherwise specified, cavities shall be filled with a product that meets the requirements of Subsection 780.01. The manufacturer's recommendations shall be followed for surface preparation, mixing, application, and curing.

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

All bolt and rivet heads shall be countersunk. Clamps, pins, or other connecting devices shall be designed to hold the forms rigidly together and to allow removal without injury to the concrete. Metal forms that do not present a smooth surface or do not line up properly shall not be used. Care shall be exercised to keep metal forms free from rust, grease, or other foreign matter.

- (g) Removal of Forms.
 - (1) Deck Superstructure. The forms, or their supports, for any portion of a structure shall not be removed before the end of the cure period for the deck specified in Table 5. Forms under beams or floor slabs may be removed upon approval of the Engineer after the concrete attains 85% of the minimum compressive strength as specified in Table 1, but not prior to the end of the cure period specified in Table 5.
 - (2) Substructure. The forms, or their supports, for any portion of a substructure shall not be removed before the end of the cure period specified in Table 5 unless otherwise approved by the Engineer. Removal of forms prior to the end of the cure period will only be allowed if a vertical surface curing plan has been approved by the Engineer. Forms under arches, pier caps, or other special design conditions may be removed upon approval of the Engineer after the concrete attains 85% of the minimum compressive strength as specified in Table 1, but not prior to the end of the cure period specified in [Table 5](#).

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

- (b) Stay-In-Place Corrugated Metal Forms (SIPCMF) for Superstructure Deck Slabs.

- (1) General Requirements. When SIPCMF are allowed, their use for superstructure deck slab construction shall be subject to the following requirements:
 - a. Fascia overhangs shall be formed with removable forms that leave the resulting concrete with a flat-surfaced finish.
 - b. Bays that are constructed in stages such that a longitudinal joint is required shall be made with removable forms.
 - c. Form flutes (or valleys) shall be filled with closed cell foam, or approved equal, to maintain the deck thicknesses shown on the Plans.
- (2) Design Requirements. The following requirements shall govern the design of SIPCMF:
 - a. The design span shall be the clear span of the form plus 2 inches, measured parallel to the form flute (also referred to as the form valley).
 - b. The design load shall be the sum of the weight of forms, bar reinforcement, plastic concrete, and 55 pounds per square foot for construction loads.
 - c. The unit working stress shall not exceed 75% of the specified minimum yield strength of the material.
 - d. The dead load deflection shall not exceed 1/180 times the form span length or 1/2 inch, whichever is less.
 - e. Physical design properties shall be computed with the requirements of the *AISI North American Specification for the Design of Cold-Formed Steel Structural Members*.
- (3) Construction Requirements. The following construction requirements shall apply to the use of SIPCMF:
 - a. Construction Drawings. The Contractor shall submit construction drawings for SIPCMF in accordance with the requirements of Subsection 105.03. These drawings shall contain the following information as a minimum:
 1. The name of the SIPCMF supplier.

2. A layout showing the compression and tension region of each beam or girder.
 3. The method of SIPCMF attachment for the compression and tension regions.
 4. The geometric properties of each type of panel being used.
 5. The number, location, and type of panels being used within each girder bay.
 6. Panel laps, considering the direction of concrete pours.
 7. The specifications for the material used to fill the flutes.
 8. Any other material data, erection information, or miscellaneous notes that may be required.
- b. Handling and Installation. Care and protection shall be given the metal form sheets, supports, and accessory items during handling, shipping, and storage. During loading, hoisting, and unloading operations, extra precautions and care shall be taken to prevent damage to ends, corners, and edges of form sheets, supports, and accessory items.

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

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

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

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

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

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

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

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

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

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

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

The form sections shall be removed by a metal saw or air-carbon-arc gouging with minimum damage to the concrete. Cuts shall only be sufficiently deep to sever the form. Any other method of removal shall be submitted to the Engineer for approval. Cuts parallel to the corrugations in the forms shall be located on the sloping surface midway between a crest and valley. Cuts parallel to the supporting beams or girders shall be made through the supporting angles taking care not to damage the structural steel beams or girders.

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

9. PLACING CONCRETE.

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

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

- (1) Time of concrete placement and amount
- (2) Batch plant testing

- (3) Delivery of concrete
- (4) Method of concrete placement on the deck
- (5) Consolidation and finishing of concrete
- (6) QC testing of the plastic concrete
- (7) Protection of the concrete from evaporation
- (8) Curing of the concrete
- (9) How to avoid long delays for balance loads
- (10) Screed, work bridge, and rail set-up
- (11) Dry run schedule
- (12) Contingency plans for long delays, break downs, weather events and other potential problems
- (13) Crew size and responsibilities
- (14) Available equipment
- (15) Project layout, including locations for all pumps, cranes, testing, cleanouts, staging, etc.

- (c) Placement Limitations. All concrete shall be placed in daylight, unless otherwise authorized in writing by the Engineer. Authorization to place concrete at any other time shall not be given unless an adequate lighting system is provided prior to beginning the concrete placement operations.

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

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

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

For deck pours, the Contractor shall submit the required retarder schedule to the Engineer a minimum of 3 working days in advance of the placement. The retarder schedule shall demonstrate how the Contractor will ensure that concrete will remain plastic until the deck is fully placed. The retarder schedule shall include considerations for the maximum time between batching and discharge, duration of the pour, weather, possible delays, and any other factors that may impact the time to initial set.

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

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

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

Concrete shall not be deposited in the forms more than 4 feet from its final position. The dropping of unconfined concrete more than 5 feet will not be permitted.

Concrete shall not be deposited in running water.

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

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

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

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

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

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

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

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

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

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

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

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

Unless otherwise specified, Class SCC concrete shall not be consolidated with mechanical vibrators. If the Engineer requests the use of a vibrator, it shall be of an approved type and design, operating within the concrete. To avoid segregation of the concrete, it shall be used as little as possible.

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

10. DEPOSITING CONCRETE UNDER WATER.

- (a) General Requirements. Concrete shall not be deposited under water except as specified by the Contract or upon approval of the Engineer. Class SCC concrete shall be used for all underwater concrete, unless otherwise approved by the Engineer. An anti-washout admixture shall be added to the mix design for all underwater concrete. Underwater concrete with an anti-washout admixture shall have a minimum air content of 3%. The anti-washout admixture may cause a delay in set times.

The anti-washout admixture is not required to be included in mix qualification testing. If the anti-washout admixture is not included in the mix design for qualification testing, an administrative submittal with the addition of the anti-washout admixture to an approved mix design shall be submitted in accordance with Subsection 3.

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

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

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

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

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

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

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

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

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

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

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

12. CONSTRUCTION JOINTS.

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

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

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

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

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

14. CONCRETE FINISHING.

- (a) Formed Concrete. Unless otherwise specified, all concrete surfaces shall be given a dressed finish. Other finish classes may be shown on the Plans for designated surfaces.
 - (1) Dressed Finish. All fins and irregular projections shall be removed from all surfaces except from those that are not to be exposed. On all surfaces, the cavities produced by form ties and all other holes, honeycomb spots, broken corners or edges, and other minor defects shall be thoroughly cleaned, saturated with water, and carefully pointed and trued with a product that meets the requirements of Subsection 780.01. The manufacturer's recommendations shall be followed for surface preparation, mixing, application, and curing.

All construction and expansion joints in the completed work shall be left carefully tooled and free of all mortar and concrete. The joint shall be left exposed to its full length with clean and true edges.

Areas that contain minor defects shall be repaired to the satisfaction of the Engineer. Minor defects are defined as the intermittent presence of holes, honeycombing, chips, or spalls, which are 6 inches or less in the longest dimension, and that 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.

Major defects are anything beyond the scope of minor as described above. The Contractor shall submit a corrective action proposal to the Engineer for all major defects.

- (2) Aesthetic Finish. In addition to the requirements for a dressed finish, the following work shall be performed when an aesthetic finish is specified.

On all exposed surfaces, the cavities produced by form ties and all other holes, honeycomb spots, broken corners or edges, and other minor defects shall be thoroughly cleaned, saturated with water, and carefully pointed and trued with a mortar composed of the same cement and fine aggregate and mixed in the same proportions used in the concrete being finished, unless otherwise directed by the Engineer. Mortar used in pointing shall be not more than 1 hour old. The mortar patches shall be cured for a minimum of 72 hours in accordance with Subsection 15.

- (b) Float Finish. This finish for horizontal surfaces shall be achieved by placing an excess of material in the form and removing or striking off the excess with a template, forcing the coarse aggregate below the mortar surface. Creation of concave surfaces shall be avoided. After the concrete has been struck off, the surface shall be smoothed with a magnesium float.

Immediately after float finishing, the surface shall be given a broom finish, burlap drag finish, or left smooth as determined by the Engineer.

- (c) Bridge Seats. Surfaces of bridge seats under bearing devices shall be level. The entire bridge seat surface shall be smoothed with a magnesium float.

- (d) Finishing Bridge Decks and Overlays.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

The concrete finishing machine, or screed, shall be oriented perpendicular to centerline of the bridge. Screed supports shall extend beyond the end of the deck as needed to ensure that the finishing machine can operate over the full length of the bridge deck segment to be placed. The finishing machine or screed shall not be operated on a skew unless the Contractor is able to demonstrate by calculation that the design deck thickness and cross slopes can be maintained throughout the full length of the segment placed.

In areas that are inaccessible to finishing machines, an approved manual vibratory-equipped power screed with an approved grade-control method may be used with approval from the Engineer. Smoothness shall be checked as specified in Subsection 14(d)(1) to ensure a smooth ride and seamless transition to the finishing machine's finished area. If manual vibratory-equipped power screeds are used, then initial vibration of the concrete for consolidation in those areas shall be of the minimal duration possible to avoid over-vibration and loss of air entraining of the surface concrete in these areas.

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

15. CURING CONCRETE.

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

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

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

Concrete components shall be cured for the times specified in [Table 5](#).

TABLE 5 – CURING TIMES FOR CONCRETE COMPONENTS

Type of Construction	Curing Methods (Subsection)	Effective Cure Time (Days)
Substructure	15(b)(1) , (2) , (3) , (5) , (7) , and (8)	7
Superstructure	15(b)(2) and (8)	7 ¹
Retaining walls	15(b)(1) , (2) , (5) , (6) , and (8)	7
Headwalls	15(b)(1) , (2) , (5) , (6) , and (8)	7
Sidewalks, curbs, and gutters	15(b)(2) and (8)	7

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

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

- (1) Water Curing. Curing with water shall be performed by continuously sprinkling or flooding all exposed surfaces with water for the entire required curing period.
- (2) Burlap Curing. The entire exposed surface of the concrete shall be covered with two layers of approved burlap that has been pre-soaked with water. The burlap shall then be covered with a lapped layer of white polyethylene sheeting. Once the concrete superstructure has hardened sufficiently, a stream of water, applied with a soaker hose or similar device, shall be run continuously under the polyethylene sheeting until the cure period is complete.
- (3) Sand Cover. The entire exposed surface of the concrete shall be covered with at least 3 inches of approved sand that shall be kept wet for the entire curing period.

- (4) White Polyethylene Sheeting. The entire exposed surface of the concrete shall be covered with a blanket of white polyethylene sheeting, maintained and fastened to provide a nearly airtight condition in contact with the surface where possible. If, in the opinion of the Engineer, this cover is not adequately provided or maintained to ensure the proper conditions for the concrete cure, then the white polyethylene sheeting cure shall be terminated and another method substituted.
- (5) White Burlap-Polyethylene Sheeting. The entire exposed surface of the concrete shall be covered with a blanket of white burlap-polyethylene sheeting. The burlap shall be thoroughly dampened prior to placing and shall be placed next to the concrete. All joints shall be lapped a minimum of 18 inches. The burlap shall be kept damp throughout the curing period.
- (6) Membrane-Forming Curing Compounds. White-pigmented or fugitive-dye membrane- forming curing compounds may be used for curing concrete in minor drainage structures. All other uses of curing compounds shall be approved in writing by the Engineer. Only membrane-forming curing compounds approved by the Agency's Materials Testing and Certification Section shall be used.

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

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

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

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

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

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

- (c) Bridge Decks. For bridge decks, the curing method shall promptly follow the screed machine, within a maximum lag time of 10 minutes and without interruption. If this lag time cannot be met, then fogging of the area shall be performed in a manner that keeps the relative humidity above the evaporation rate of the concrete surface, but not so excessive that water begins to collect on the surface prior to texturing or other surface manipulating procedures.
16. LOADING OF CONCRETE. After the concrete has been placed and the finishing operations concluded, it shall not be walked on or disturbed in any manner, including removal of forms, for a minimum period of 18 hours. If retarder is used as an admixture, this minimum period may be extended as directed by the Engineer.
- (a) Substructure. No backfill material shall be placed against a newly completed structure unless the concrete cure is maintained in accordance with Table 5, and until the field cured test cylinders have attained 85% of the compressive strength specified in Table 1. However, the Contractor may erect forms for subsequent concrete placement on footings after 18 hours have elapsed from the time that the footing placement was completed, provided the concrete has sufficient strength to allow it to be worked on without damage, and proper cure is maintained.

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

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

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

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

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

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

If a trial pour is performed at the request of the Engineer, the quantity of concrete to be measured for payment will be the number of cubic yards of the class of concrete specified for the trial pour, as determined by the prismatic method using dimensions specified in the Contract or as directed by the Engineer.

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

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

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

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

Payment will be made under:

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

TEMPORARY PAVEMENT

1. DESCRIPTION. This work shall consist of constructing a temporary pavement surface for vehicular traffic as defined by the Contractor's traffic control plan and as directed by the Engineer.

The work under this Section shall be performed in accordance with these provisions, the Plans, and the appropriate provisions of Section 406 of the Standard Specifications. Plant inspection requirements and Agency acceptance testing requirements of Section 406 shall not apply.

2. MATERIALS. The materials shall conform to the appropriate provisions of Section 406 of the Standard Specifications.

3. CONSTRUCTION DETAILS. Temporary pavement shall be provided where identified in the Contractor's temporary traffic control plan or as directed by the Engineer to accommodate vehicular traffic. Temporary pavement will not be allowed to be used in areas of milling. For all roadways, vehicle traffic shall only be allowed to travel on paved surfaces. The temporary pavement shall be kept reasonably smooth and hard at all times, and shall be well drained, free of potholes, bumps, irregularities, and depressions. The temporary pavement section shall consist of a bituminous concrete surface placed on an appropriate subbase. The thickness of temporary bituminous concrete pavement shall be a minimum of 2" or as directed by the Engineer.

The necessary equipment and personnel to attain and maintain a satisfactory riding surface shall be available and used as needed, at all times. Special attention to maintenance of the temporary pavement shall be given during weekends, holidays, and during the winter season.

The specified asphalt material shall be placed in accordance with the appropriate construction details as outlined in Section 406 of the Standard Specifications.

Asphalt cold patch shall be placed only when hot mix asphalt is not available due to weather restrictions or as directed by the Engineer.

Upon completion of the period that the temporary pavement will be required, bituminous concrete material shall be removed and become the property of the Contractor and shall be disposed of properly.

3. METHOD OF MEASUREMENT. The quantity of Special Provision (Temporary Pavement) to be measured for payment will be the number of tons complete in place in the accepted work as determined from the weigh tickets.

4. BASIS OF PAYMENT. The measured quantity of Special Provision (Temporary Pavement) will be paid for at the Contract unit price per ton. Payment shall be full compensation for furnishing, mixing, hauling, placing, and removing the material specified and for furnishing all labor, tools, equipment, and incidentals necessary to complete the work.

When not specified as items in the Contract, the costs of correcting deficiencies in the existing pavement, 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 (Temporary Pavement).

Payment will be made under:

<u>Pay Item</u>	<u>Pay Unit</u>
900.680 Special Provision (Temporary Pavement)	Ton

MAINTENANCE OF STRUCTURES AND APPROACHES

1. **DESCRIPTION.** This work shall consist of the maintenance of existing structures and approaches within the Project limits.
2. **ROAD MAINTENANCE.** The Contractor shall maintain all highway sections within the confines of the work under the Contract to the satisfaction of the Engineer. When traffic is to be maintained over the present highway, the full width of the roadway shall be maintained. The maintenance shall be done by means of an approved road grader or other approved equipment of a type that will be efficient in keeping the roadway in a reasonably smooth and passable condition for traffic and shall be subject to the approval of the Engineer. The material for and the necessary filling of holes and similar depressions that develop in the roadway shall be included in the Contract price for this item. If, in the opinion of the Engineer, the Contractor fails to maintain a reasonably smooth roadway surface, and fails to fix the same after written notification, the Engineer will make the necessary provisions to maintain the roadway surface, and the cost shall be deducted from any money due or to become due under the Contract.
3. **BRIDGE MAINTENANCE.** When traffic is maintained over an existing structure, the Contractor shall keep all parts of the structure safe for the legal or posted load of the structure including satisfactory maintenance of the substructures, superstructure, and bridge surface. The Contractor shall strengthen, patch, shore, or renew any part or parts of this substructure or superstructure when necessary for the safety of the traveling public. If the existing structure over which traffic is being maintained becomes unsafe for public travel, and if, on Written Order by the Engineer, the Contractor fails to make satisfactory repairs, the Engineer will make the necessary provisions to repair the structure, and the cost will be deducted from any monies due under the Contract.
4. **METHOD OF MEASUREMENT.** The quantity of Special Provision (Maintenance of Structures and Approaches) to be measured for payment will be on a lump unit basis in the complete and accepted work.
5. **BASIS OF PAYMENT.** The accepted quantity of Special Provision (Maintenance of Structures and Approaches) will be paid for as specified for Force Account Work in **Subsection 109.06.** Payment 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. If the actual cost of maintenance exceeds the amount in the proposal, a change order will be processed and the Contractor paid for the actual cost of the maintenance. All maintenance required caused by Contractor operations will not be paid for and shall be repaired at the Contractor's expense.

Payment will be made under:

<u>Pay Item</u>
900.650 Special Provision (Maintenance of Structures and Approaches) (N.A.B.I.)

<u>Pay Unit</u>
Lump Unit

STATE OF VERMONT
AGENCY OF NATURAL RESOURCES
DEPARTMENT OF ENVIRONMENTAL CONSERVATION
WATERSHED MANAGEMENT DIVISION
1 NATIONAL LIFE DRIVE, DAVIS 3
MONTPELIER, VT 05620-3522

DISCHARGE PERMIT
NPDES Number: VTS007283
Permit Number: 8938-INDC.1

For stormwater discharges from the construction and construction-related activities associated with the construction of the **Colchester - NH 028-1(31) project located at Interstate 89, Exit 17** in Colchester, Vermont.

In compliance with provisions of the following state and federal laws and rules: the Vermont Water Pollution Control statute, 10 V.S.A. Chapter 47, including §§1258, 1259 and 1263 and 1264; the Stormwater Permitting Rule (Chapter 22: Vermont Environmental Protection Rules); the Vermont Water Pollution Control Rules, Chapter 13, the federal Clean Water Act, as amended, 33 U.S.C. 1251 et seq., including 33 USC 1342(p); and the regulations of the federal Environmental Protection Agency including 40 CFR 122.26 and in accordance with terms and conditions hereinafter specified,

Permittee(s) and Co-Permittees: (All landowners and operators shall obtain coverage as co-permittees prior to the commencement of construction activities.)

Vermont Agency of Transportation
219 North Main Street
Barre, VT 04641

are hereby authorized by the Secretary of the Agency of Natural Resources (ANR), to discharge stormwater runoff from construction and construction-related activities associated with the construction of Colchester - NH 028-1(31) located at Interstate 89, Exit 17 in Colchester, Vermont discharging to unnamed tributary to Lake Champlain; Allen Brook.

This authorization incorporates by reference the following Erosion Prevention and Sediment Control Plan (EPSC Plan) provided by the applicant to the Secretary:

Plan Set Reference:

VHB;

Project Plans

Sheet 1 of 150, Cover Sheet, dated 4/21/23; Sheet 2 of 150, Bridge Typical Section Sheet, dated 4/21/23; Sheet 3-13 of 150, Typical Section Sheets, dated 4/21/23; Sheet 14-15 of 150, Stormwater Detail Sheets, dated 4/21/23; Sheet 16 of 150, Gravel Wetland Detail Sheet, dated 4/21/23; Sheet 17 of 150 Conventional Symbolology Legend Sheet, dated 4/21/23; Sheet 18 of 150, Project Layout Key Sheet, dated 4/21/23; Sheet 19-84 of 150, Cross Section Sheets, dated 4/21/23; Sheet 85-87 of 150, EPSC Narrative Sheets, dated 4/21/23, last revised 4/26/23; Sheet 88-89 of 150, EPSC Details Sheet, dated 4/21/23; Sheet 90 of 150, EPSC Symbolology Sheet, dated 4/21/23; Sheet 91-110 of 150, EPSC

Existing Conditions Sheets, dated 4/21/23; Sheet 111-130 of 150, EPSC Construction Site Plan

Sheets, dated 4/21/23; Sheet 131-150 of 150, EPSC Final Conditions Plan Sheets, dated 4/21/23; VAOT Standard Detail E-10, "Rolled Erosion Control Product, Type I," dated 4/07/2020; VAOT Standard Detail E-11, "Check Dam, Type I," dated 04/07/2020; VAOT Standard Detail E-12, "Stabilized Construction Entrance," dated 04/07/2020; VAOT Standard Detail E-13, "Inlet Protection Device, Type I," dated 04/07/2020; VAOT Standard Detail E-14, "Inlet Protection Device, Type III," dated 04/07/2020; VAOT Standard Detail E-15, "Silt Fence," dated 04/07/2020;

Drainage and Phasing Exhibit

Sheet 1 of 2, Drainage Areas Site Plan, dated 4/21/23; Sheet 2 of 2, Project Phasing Areas Site Plan, dated 4/21/23.

Part. I Coverage Under this Permit

A. Discharges Covered by this Permit

Subject to compliance with the terms and conditions of this permit, this permit authorizes the discharge of pollutants in stormwater associated with the construction and construction-related activity associated with the construction of **Colchester - NH 028-1(31)** located at Interstate 89, Exit 17 in Colchester, Vermont discharging to **unnamed tributary to Lake Champlain; Allen Brook**. This permit only applies to construction and construction-related activities performed in accordance with the approved EPSC Plan. This permit also authorizes discharges from excavation dewatering activities in accordance with Part II.H of this permit.

B. Limitations on Coverage

1. The Secretary has determined that an individual permit is required for this project.
2. This permit does not authorize:
 - a. Discharges of post-construction regulated stormwater runoff from impervious surfaces regulated pursuant to Vermont's stormwater statute (10 V.S.A. Section §1264) and Vermont Department of Environmental Conservation's (DEC) Stormwater Permitting Rule (Chapter 22: Vermont Environmental Protection Rules);
 - b. Stormwater discharges not associated with construction and construction-related activities;
 - c. Stormwater discharges from construction and construction-related activities when the discharge or activity is likely to jeopardize the continued existence of any State or federally listed threatened or endangered species or result in the destruction or adverse modification of critical habitat.

C. Support Activities

The permittee shall obtain permit coverage from the Secretary prior to the use of any support activities occurring outside of the identified project limits of disturbance (e.g., equipment staging areas, material storage areas, excavated material disposal areas and borrow areas). Support activities outside of the approved project boundaries shown in the EPSC Plan shall obtain coverage by amending this permit, or by obtaining coverage under a different individual discharge permit or under DEC's General Permit for Stormwater Runoff from Construction Sites.

D. Co-Permittees

1. In addition to the permittee, all landowners and operators associated with the construction activity who meet either of the following two criteria must obtain coverage under this permit as co-permittee prior to the commencement of construction activities:
 - a. The party has operational control over construction plans and specifications, including but not limited to the ability to make modifications to those plans and specifications; or
 - b. The party has continuous day-to-day operational control of those activities authorized by the permit, which shall include all construction and construction-related activities involving earth disturbance and EPSC Plan implementation.

Part II. Erosion Prevention and Sediment Control Requirements

A. Implementation of EPSC Plan

1. Each permittee is responsible for implementing the approved EPSC Plan and shall at all times comply with the approved EPSC Plan or amended versions of the EPSC Plan updated in accordance with this permit.
2. The EPSC Plan is incorporated by reference and included in the terms of this permit, and each permittee shall implement the provisions of the EPSC Plan, and all amendments thereto, as a condition of this permit. Failure to comply with the EPSC Plan, and all amendments thereto, shall be deemed a violation of this permit and subject to potential enforcement.
3. Each permittee is responsible for ensuring that each co-permittee involved in construction activities is familiar with the terms and conditions of the EPSC Plan and that each co-permittee's activities are carried out in accordance with the EPSC Plan.
4. The permittee shall assure that construction of all small and large sediment control practices, where proposed on the site, are completed in accordance with the 2020 "The Vermont Standards and Specifications for Erosion Prevention and Sediment Control" prior to upslope earth disturbance of areas for which these features are designed to provide sediment control.
5. The permittee shall assure that, prior to earth disturbance within any area of the site located within 100 feet upslope of a stream or wetland, silt fence or approved perimeter control shall be installed in accordance with the 2020 "The Vermont Standards and Specifications for Erosion Prevention and Sediment Control" and the EPSC Plan at an appropriate distance down slope from disturbed areas and upslope from such waters.
6. The permittee shall install all required elements as set forth in the EPSC Plan within a given work area prior to earth disturbance within that work area. Earth disturbance includes, but is not limited to, stumping and grubbing of cleared areas.

B. On-Site Plan Coordinator (OSPC)

1. The permittee shall designate a person as the OSPC who shall be directly responsible for on-site implementation of the EPSC Plan. Such person shall be knowledgeable in the principles and practice of erosion prevention and sediment controls and possess the skills to assess conditions at the construction site that could impact stormwater quality and to assess the effectiveness of all erosion prevention and sediment control measures selected to control the quality of stormwater discharges from the construction and construction-related activity.

2. The OSPC shall have the authority to stop and/or modify construction activities as necessary to comply with the EPSC Plan and the terms and conditions of this permit and shall be responsible for inspections and record keeping. The OSPC or their designee shall be on site on a daily basis during construction and construction-related activity. The OSPC does not have to be the permit applicant.
3. The name, email, and daytime telephone number of the OSPC shall be filed in writing by email with the DEC Stormwater Management Program district staff member prior to the commencement of construction and construction-related activities.

C. Maintenance of Erosion Prevention and Sediment Control Measures

1. All erosion prevention and sediment control measures (Best Management Practices) identified in the EPSC Plan shall be maintained in effective operating condition. If site inspections required by Part III.A identify Best Management Practices (BMPs) that are not operating effectively, maintenance shall be performed as soon as possible and before the next storm or snowmelt event to maintain the continued effectiveness of the measures. If implementing BMPs is impracticable before the next storm or snowmelt event, then the affected area shall be stabilized temporarily until such time that the BMPs can be installed.
2. If existing BMPs need to be modified or if additional BMPs are necessary for any reason, implementation shall be completed before the next storm event. If implementing BMPs is impracticable before the next storm event, then the affected area shall be stabilized temporarily until such time that the BMPs can be installed. These instances shall be documented pursuant to OSPC inspections required under this permit.

D. Modifications to the EPSC Plan Identified as Necessary During Inspections

1. If, based upon inspections or investigations by representatives of the Secretary, it is determined that the EPSC Plan may not consider a given site condition and there is a reasonable potential to cause, or contribute to a release of a visibly discolored discharge, or other discharge from the construction site that would cause or contribute to a violation of Vermont's Water Quality Standards, the permittee shall be required to:
 - a. Modify the EPSC Plan and implement a project change to adequately address the identified concern within seven (7) calendar days following the inspection or per a schedule as otherwise established in a directive by the Secretary; or
 - b. Cease discharges of pollutants to surface waters from the construction activity; or
 - c. Submit valid and verifiable data with seven (7) days, to be reviewed and approved by the Secretary, containing information representative of current conditions, including stormwater discharges, and any known or identifiable impacts that occurred to waters, wetlands, or established buffers specific to stormwater discharges, including sediment transport or deposition.
2. At any time after issuing this permit, the Secretary may, in their sole discretion, determine that a stormwater discharge may cause, has reasonable potential to cause, or contribute to a violation of Vermont's Water Quality Standards. If such a determination is made, the Secretary will require the permittee to:
 - a. Amend the EPSC Plan to address adequately the identified water quality concerns.
 - b. Submit valid and verifiable data and information that are representative of ambient conditions and indicate that the receiving water is attaining water quality standards; or
 - c. Cease discharges of pollutants to surface waters from the construction activity.

3. The Secretary has the sole discretion to order a permittee to immediately stop all ongoing construction and construction-related activities upon a finding that a discharge or potential discharge from such activities presents a current or potential threat of harm to the environment. The Secretary's stop work order may also require the permittee to take all actions to prevent or correct the discharge or potential discharge. Any action taken by the Secretary pursuant to this subpart shall not limit the Secretary's authority to pursue other enforcement actions pursuant to 10 V.S.A Chapters 47 and 201.
4. Each revised EPSC Plan prepared pursuant to this Part shall be maintained on-site and shall be made available to the Secretary's representatives upon request.

E. EPSC Plan Availability

The permittee shall maintain a copy of the EPSC Plan, including any amendments thereto, and all records of co-permittee status for additional landowners and operators responsible for construction and construction-related activities onsite at all times. A copy of the EPSC Plan shall be made available to the Secretary, or his or her designated representative, upon request.

F. Project Changes

1. Project Changes That Do Not Require a Permit Amendment
 - a. Use of interchangeable practices found in "The Vermont Standards and Specifications for Erosion Prevention and Sediment Control". Interchangeable practices include those identified to serve similar or equivalent erosion prevention or sediment control.
 - b. A change that increases the total project-related earth disturbance by 10 percent or less than the previously authorized total, provided that
 - i. The increased area(s) of disturbance are contiguous to the disturbed area authorized.
 - ii. The permittee documents this change on a form provided by the Secretary. This documentation shall be completed and maintained on site with the permittee's existing authorization.
 - c. The use of active stormwater treatments, including flocculants, provided a permittee has obtained the Secretary's written approval and has revised any EPSC Plan applicable to the project.
 - i. When the use of active stormwater treatments, including flocculants, was not previously approved as part of an existing authorization, a permittee shall submit in writing a request for the Secretary's written approval, including a detailed description of the proposed use of active stormwater treatments and any additional information requested by the Secretary.
 - d. The permittee shall update the EPSC Plan prior to implementing any change in the design, construction, operation, or other procedure which would alter the grading plan, construction sequence, or the location or implementation of any BMPs.
 - e. An update to the EPSC Plan is required, if after taking corrective action, as required in Part III.B, it is determined that the EPSC Plan requires modification to be effective in future efforts in preventing erosion and controlling the discharge of sediment.
 - f. An update to the EPSC Plan is required if the Secretary makes this determination pursuant to Part II.D.1 of this permit.

- g. The OSPC is authorized to implement project changes that involve substituting interchangeable erosion prevention and sediment control practices in "The Vermont Standards and Specifications for Erosion Prevention and Sediment Control". Interchangeable practices include those identified to serve similar or equivalent erosion prevention or sediment control. The substitution shall be noted on the on-site EPSC Plan.
 - h. For changes to the EPSC Plan other than substitution of interchangeable practices, the permittee shall have the EPSC Plan modified to reflect the change by either the original designer, a professional engineer licensed in the State of Vermont or a Certified Professional in EPSC. Such modification shall include a certification that the modified EPSC Plan meets the requirements of this permit and "The Vermont Standards and Specifications for Erosion Prevention and Sediment Control".
 - i. All proposed changes to the EPSC Plan that do not conform to The Vermont Standards and Specifications for Erosion Prevention and Sediment Control must be submitted to the Secretary for formal approval prior to implementation of the changes in the field.
 - j. Any project change involving earth disturbance substantially outside (non-contiguous) of the originally authorized limits of disturbance, provided the permittee submits to the Secretary request for written approval prior to implementation of the change. The Secretary may consider several factors in determining whether the change is substantial and requires an amendment to the permit. Such considerations may include, but are not limited to, size of additional area(s) to be disturbed, existing condition of area(s) to be disturbed, proximity to water resources and their buffers, proximity to existing development, and whether the change will present a reasonable potential to cause or contribute to water resources impacts.
 - k. The modified EPSC Plan submitted pursuant to Part II.F.1(h) shall include:
 - i. A narrative description of the change(s);
 - ii. Justification for the change(s);
 - iii. An updated EPSC Plan sheets showing the proposed change(s);
 - iv. Any additional information required by the Secretary
2. Project Changes that Require an Amendment to the Permit
- a. All project changes determined by the Secretary to present a reasonable potential to cause or contribute to water resource impacts.
 - b. Increases to the total project-related area of earth disturbance by more than 10 percent of the previously authorized total area of earth disturbance.
 - c. Increases to the total amount of concurrent earth disturbance.
 - d. Decreases in the effectiveness or length of vegetated buffers between the construction site earth disturbance and the receiving waters, such that the risk score calculated in the *Appendix A – Risk Evaluation of Vermont’s Construction General Permit 3-9020* and completed at the time of application, increases.
 - e. Increases to the slope or erodibility of soils within the limits of disturbance, such that the risk score calculated in the *Appendix A – Risk Evaluation of Vermont’s Construction General Permit 3-9020* and completed at the time of application, increases.
- G. Winter Construction Period (late fall/winter/early spring construction activities)

1. If construction activities involving earth disturbance continue past October 15 or begin before April 15 (Winter Construction), the permittee shall implement Winter Construction EPSC practices as outlined in the EPSC Plan and as identified in "The Vermont Standards and Specifications for Erosion Prevention and Sediment Control".
2. If a permittee plans to undertake construction activities during Winter Construction and the EPSC Plan does not identify EPSC measures during this time period, the permittee shall submit a stand-alone EPSC Plan for this late fall/winter/early spring work to the Secretary for formal approval prior to undertaking such activities. The submission shall include a narrative description of the proposed work and the stand-alone EPSC Plan shall include only this work. The stand-alone EPSC Plan shall be designed according to "The Vermont Standards and Specifications for Erosion Prevention and Sediment Control".
3. All possible measures will be taken to limit the exposure of soils during all late fall/winter/early spring construction activities. The Secretary reserves the right to require suspension of construction activities until after April 15 if late fall/winter/early spring construction is determined to present a significant risk to water quality. Also, the Secretary reserves the right to prohibit construction activities from October 15 through April 15 if construction activity during the Winter Construction Period is determined to present a significant risk to water quality.

H. Dewatering Activities

1. A site-specific dewatering plan shall be employed for any dewatering activities. The dewatering plan shall detail the following:
 - a. Nature of activity requiring dewatering;
 - b. Location of the dewatering pumpage show on plan;
 - c. EPSC practice(s) to be used during dewatering activities; and
 - d. Anticipated duration of dewatering activities.

The use of EPSC practice(s) for dewatering activities not included in the original EPSC Plan are subject to the requirements of Part II.F.

Pumpage from areas excavated for the construction of the project shall be treated or disposed of in such manner that any dewatering discharge to waters of the state is visibly clear and does not present a significant risk of environmental harm or significant risk to public health and safety. Prior to any dewatering activities which may result in the pumpage reaching State waters by surface flow, the permittee shall measure and document the turbidity value to ensure that it is sufficient to comply with the terms and conditions of this permit. The inspection reports shall contain information on when dewatering is being done, measures being utilized for treatment, and effectiveness of those measures.

If the receiving water is off-site, the permittee shall confirm the runoff flow path will not present a significant risk to environmental harm or public health and safety in route to the stormwater discharge location. If the stormwater discharge results in a significant risk of environmental harm or a significant risk to public health and safety, the permittee shall cease dewatering activities and evaluate whether the dewatering plan requires modification to minimize or prevent such risks.

I. Disturbance Limitations/Stabilization

1. The total earth disturbance associated with construction of this project is **27.91** acres. The maximum area of concurrent earth disturbance at any one time allowed under this permit is **8.00** acres.

2. All areas of earth disturbance must have temporary or final stabilization within **14** days of initial disturbance. After this initial 14 day period, all disturbance in these areas must be temporarily or permanently stabilized in advance of any runoff producing event. A runoff producing event is an event that produces runoff from the construction site. The following exception to the above stabilization requirements applies:
 - a. Stabilization is not required if the work is occurring in a self-contained excavation (i.e. no outlet for stormwater) with a depth of 2 feet or greater (e.g. underground utility installation). Areas of a construction site that drain to sediment basins are not considered eligible for this exemption and the exemption applies only to the excavated area itself.

J. Pre-construction Conferences

The permittee shall notify the Secretary of the planned start date and schedule a pre-construction conference at least two weeks prior to commencing construction. The pre-construction conference shall occur prior to initiating construction activities and shall be attended by the OSPC, EPSC Specialist, and a representative of the Secretary. At the discretion of the Secretary, a Pre-Construction Conference may be completed off-site from location of the project site and may also occur via video or phone conference if determined to be acceptable and preferable to all parties involved.

K. Presumption of Compliance with Vermont's Anti-Degradation Policy and Water Quality Standards

The Secretary has determined that the permitted discharges satisfy Vermont's Anti-Degradation Policy described in the DEC's Interim Anti-Degradation Implementation Procedure (Procedure), because the procedure allows a presumption of compliance for discharges that meet the requirements of a BMP or treatment and control manual as described in Section IX.D.1.a of the Procedure. The Secretary has also determined that for such discharges that qualify for the presumption under IX.D.1.a, all existing uses of surface waters, and the level of water quality necessary to protect those existing uses will be maintained and protected. The Secretary has determined that if the permittee is in full compliance with all permit conditions, including approved plans, sampling, monitoring, reporting and recordkeeping conditions, and is fully implementing stormwater BMPs required by this permit, the permitted discharges will meet the requirements of "The Vermont Standards and Specifications for Erosion Prevention and Sediment Control" and qualify for the presumption described in Section IX.D.1.a of the Procedure and will be presumed to comply with the Vermont Water Quality Standards, including but not limited to §1-03 (Vermont's Anti-degradation Policy).

Part III. Inspections, Discharge Sampling, Corrective Action, and Recordkeeping

A. General Inspection Requirements

1. The permittee is responsible for inspecting and maintaining erosion prevention and sediment controls that minimize or eliminate pollutants in the discharge in accordance with the requirements of this permit.
2. Inspections shall be conducted at least once every seven (7) calendar days and as required in Part III.B of this permit.
3. During the Winter Construction period (October 15 through April 15), daily inspections shall be conducted of areas that have been disturbed and are not yet finally stabilized (70 percent vegetated cover or equivalent stabilization with stone or other material).

4. Inspections and corresponding reports may be reduced to not less than one (1) per month if the entire site is temporarily stabilized.
5. Inspections may be postponed indefinitely if the entire site has achieved final stabilization.
6. Inspections shall be conducted by, or under the direction of, the OSPC.
7. Inspections shall include all areas of the site disturbed by construction activity and construction-related activity, and all discharge locations, including areas with temporary stabilization.
8. An inspection report shall be completed for each inspection and signed by the OSPC or the person acting under the direction of the OSPC. At a minimum, each inspection report shall include:
 - a. The inspection date and time;
 - b. Names, titles, and qualifications of personnel making the inspection;
 - c. A general description of weather information for the period since the last inspection (or since commencement of construction or construction-related activity if the first inspection) including a general description of any precipitation, any runoff of visibly discolored stormwater from the construction site and any discharges of visibly discolored stormwater from the construction site to waters of the state;
 - d. A description of current weather information, including approximate duration and accumulation of any precipitation or snowmelt, and a description of any runoff or discharges of visibly discolored stormwater from the site or to waters of the state occurring at the time of the inspection;
 - e. Confirmation that the inspection was performed during the precipitation or snowmelt event, and if not an explanation;
 - f. Location(s) of clear discharges of stormwater runoff from the site, with a description of any evidence of prior or current sediment transport at this location, including resuspension and transport of previously deposited sediment;
 - g. Location(s) of runoff or discharges of visibly discolored stormwater from the site or to waters of the state;
 - h. Location(s) of BMPs that need to be maintained;
 - i. Location(s) of BMPs that failed to operate as designed or proved inadequate for a particular location;
 - j. Location(s) where additional BMPs are needed that did not exist at the time of inspection;
 - k. Any corrective action required including any necessary changes to the EPSC Plan and implementation dates, to be completed prior to the next event that produces runoff from the construction site;
 - l. Description of areas that are currently disturbed, areas that have been temporarily stabilized, and/or areas that have achieved final stabilization since last inspection;
 - m. A description of the soil conditions (e.g. dry, wet, saturated); and
 - n. A certification that the construction activities are now in compliance with the EPSC Plan and this permit.
9. A record of each inspection report and of any actions taken in accordance with this Subpart shall be maintained on-site with the EPSC Plan and shall be made available upon request by the Secretary's representatives.

10. When site conditions occurring outside of the Winter Construction period (October 15 – April 15) are similar to winter conditions (e.g. snow cover, frozen ground and/or saturated soils) within the areas of planned earth disturbance, the appropriate winter restrictions from the 2020 "The Vermont Standards and Specifications for Erosion Prevention and Sediment Control" selected by the OSPC shall be applied to the portions of the site that are experiencing those conditions.

B. Inspection, Sampling and Corrective Action Requirements

1. As soon as reasonably possible, during, or after, every rainfall event or snowmelt event which produces runoff from the construction site, the OSPC shall inspect for the runoff of visibly discolored stormwater from the construction site. If there is runoff of visibly discolored water from the construction site, the OSPC shall as soon as practicable inspect and maintain BMPs for compliance with the approved EPSC plan. For purposes of this permit, "construction site" shall mean the land or water area where any facility or activity is physically located or conducted, including adjacent land used in connection with the facility or activity or the area of earth disturbance directly associated with the permitted construction activity.
2. If after inspecting and maintaining existing BMPs in accordance with Part III.B.1, the runoff of visibly discolored stormwater continues, the OSPC shall sample the runoff as follows:
 - a. A turbidity sample shall be taken at each point where visibly discolored stormwater runs off the construction site. Samples shall be representative of the flow and characteristics of the runoff.
 - b. If due to unexpected circumstances an OSPC is unable to sample during periods of runoff, the monitoring report shall include a brief explanation of such circumstances.
 - c. Sampling is required at all points where visibly discolored stormwater runoff from disturbed areas that have not been finally stabilized leaves the construction site.
 - d. All sampling points shall be identified on the EPSC Plan site map and be clearly marked in the field with a flag, tape, stake, or other visible marker.
 - e. After approval by the Secretary, sampling may be discontinued at those points of stormwater runoff that are deemed to pose no risk of discharge to waters of the state.
3. If the turbidity sample taken is 25 NTU or lower, no further sampling or action is required during this particular event.
4. If the turbidity sample taken is greater than 25 NTU:
 - a. The OSPC shall as soon as practicable evaluate the need for supplemental BMPs and install such BMPs as necessary to correct the runoff.
 - b. The OSPC shall, within 72 hours of first discovering the runoff, submit a written report about the runoff and resulting corrective action to the Secretary. The report shall:
 - i. Be on a form provided by the Secretary
 - ii. Describe the cause, time and date, and location of the runoff;
 - iii. Describe the status of construction and conformance with the EPSC Plan at the time of the runoff;
 - iv. Detail the corrective action taken to stop the runoff, including a description of the actions taken, their location, and the time and date of the corrective action; and
 - v. Be copied and a copy retained on-site with the EPSC Plan.
 - c. The EPSC Plan shall be updated within 72 hours to reflect the actions taken.

5. After taking the actions required in Part III.B.4.a above, and if the runoff of visibly discolored stormwater continues, the OSPC shall again follow the inspection and sampling requirements in Part III.B.2 above. If the turbidity sample is less than 25 NTU then no further action is needed. If the turbidity sample is greater than 25 NTU, the OSPC shall immediately notify DEC's Stormwater Program. The Secretary may require the OSPC to reevaluate existing BMPs and install supplemental BMPs as necessary to correct the runoff. At the Secretary's discretion, the OSPC may also be required to continue sampling runoff daily when runoff is occurring until:
 - a. Turbidity is 25 NTU or lower; or
 - b. The runoff stops or is eliminated.

C. Recordkeeping

1. The following records shall be maintained on-site with the EPSC Plan:
 - a. Inspection reports prepared pursuant to Part III.A of this permit;
 - b. Discharge Reports, Corrective Action reports and Summaries of Releases prepared pursuant to Parts III.B and VIII.C of this permit;
 - c. Notices of Addition or Termination of Co-Permittees submitted to the Secretary in accordance with Part V of this permit;
 - d. Any Notices of Termination for Portions of the On-going Construction Site in accordance with Part V of this permit; and
 - e. Any project changes or amendments to the EPSC Plan required by this permit, including the initials of the person or persons that revised the plans with dates of revision.
2. A copy of the authorized EPSC Plan shall be on-site during normal working hours from the date of commencement of construction activities to the date of final stabilization. EPSC Plans shall be made available upon request by the Secretary's representatives. The EPSC Plan maintained on site may be available in paper format or in electronic format via a computer maintained on the project site.
3. The OSPC shall have a copy of the EPSC Plan and all amendments available at a central location on-site for the use of all those identified as having responsibilities under the EPSC Plan whenever they are on the construction site.
4. The permittee shall post a Notice of Authorization, provided by the Secretary, demonstrating authorization under this permit. The notice shall be placed near the construction entrance at a location visible to the public. If displaying near the main entrance is infeasible, the notice shall be posted in a local public building such as the municipal office or public library. For linear projects, the notice shall be posted at a publicly accessible location near the active part of the construction project (e.g., where a utility project crosses a public road) or, in the event posting in a publicly accessible location near the active part of the project is infeasible, the permittee shall post in a local public building such as the municipal office or public library.

Part IV. EPSC Specialist Oversight

A. EPSC Specialist

1. In addition to the regular inspections required under Part III.A., the permittee shall designate an EPSC Specialist who will be responsible for performing environmental inspections during the project; confirming water resources protection throughout the project, assisting the permittee(s) with EPSC Plan implementation, and for related record keeping and reporting to the Secretary per the schedule established in this permit. The name, address, telephone number, email address, and basic qualifications of the person shall be provided to the Secretary for approval before the commencement of construction. This person shall not be the OSPC.
2. The EPSC Specialist shall determine, confirm, and report whether the EPSC Plan is being implemented and that appropriate revisions or updates are being made to the EPSC Plan when the EPSC Plan proves inadequate. In addition, the EPSC Specialist shall, in conjunction with the OSPC bear the responsibility of reviewing the site to ensure compliance with the approved EPSC Plan and to direct corrective action in accordance with Part III.B of this permit.
3. The EPSC Specialist shall notify the permittee(s) and operator(s) when changes in practice are necessary to comply with the EPSC Plan and the terms and conditions of this permit. The EPSC Specialist shall be responsible for inspections, photo documentation, and record keeping and shall, biweekly during earth disturbance activities and monthly during no earth disturbance activities, file by email to DEC Stormwater Program district staff, a report outlining:
 - a. Construction status;
 - b. Dates of inspection(s)
 - c. EPSC practices installed and removed since last report;
 - d. New measures undertaken subsequent to the prior report;
 - e. Erosion problems encountered and how and when resolved;
 - f. Discussion and summary of OSPC inspection reporting as described within Part III.B.1;
 - g. Status of the project in terms of consistency with the planned construction sequence;
 - h. Description, including location and total area (acres), of disturbed land at the time of the inspection;
 - i. Description of areas temporarily or permanently stabilized since the last inspection record;
 - j. Changes in the EPSC Plan that are required (including submission for authorization from the Secretary, when necessary);
 - k. When dewatering is underway, discussion and photographs of measures being utilized for treatment, and turbidity monitoring results in conformance with Part III.H of this permit;
 - l. Photographs of areas stabilized since the prior report;
 - m. Photographs of all disturbed areas;
 - n. Photographs of receiving water(s) at turbidity monitoring location(s); and
 - o. All turbidity monitoring results collected since prior report in accordance with Subpart III.B of this permit.

4. Prior to commencement of construction or construction-related activities, the EPSC Specialist shall present to the Secretary for approval the proposed reporting format. Construction may not commence prior to the Secretary's written approval of the reporting format and schedule for report submittal. Bi-weekly reports shall be submitted by the Wednesday, or as soon as responsibly possible, following the end of the bi-weekly period. The Department may approve an alternative reporting deadline to the permittee in writing. EPSC Specialist reports shall be filed via email with DEC Stormwater Program district staff. Submittal of reports by mail to the mailing address below will not be accepted without prior approval:

Department of Environmental Conservation
Watershed Management Division
Stormwater Management Program
One National Life Drive, Davis 3
Montpelier, VT 05620-3522

5. Each inspection report shall be prepared in consultation with the OSPC, shall include a review of the OSPC's inspection reports since the last inspection period, and shall be signed by the EPSC Specialist.

Part V. Transfers of Permit, Co-Permittees, and Termination

A. Transfer of Permit Coverage

1. A transfer of this permit may occur only in connection with the transfer of the entire construction site to a new owner.
2. A Notice of Transfer must be submitted to the Secretary not later than thirty (30) days prior to the transfer and shall include the following:
 - a. The name and address of the present permittee;
 - b. The name and address of the prospective permittee;
 - c. The proposed date of transfer; and
 - d. A statement signed by the prospective permittee, stating that:
 - i. The conditions of the facility operation that contribute to, or affect, any discharge will not be materially different under the new ownership;
 - ii. The prospective permittee has read and is familiar with the terms of the permit and agrees to comply with all the terms and conditions of the permit; and
 - iii. The prospective permittee has adequate funding or other means to affect compliance with all the terms of the permit.

B. Adding or Terminating Co-Permittees

1. An owner or principal operator may be added as a co-permittee by filing a Notice of Addition of Co-Permittee form with the Secretary. The Co-Permittee shall be subject to all the terms and conditions of this permit and the EPSC Plan.
2. If the owner of the construction site obtains coverage under this permit and the owner is not the principal operator or the sole principal operator, then all principal operators shall obtain coverage as co-permittees in accordance with this Subpart prior to the commencement of construction activities.

3. A co-permittee may be terminated as a Co-Permittee by filing a Notice of Termination of Co-Permittee form on a form provided by the Secretary. The Co-Permittee shall only be terminated from the permit upon approval by the Secretary.

C. Notice of Termination for Portions of an On-going Construction Site

1. A permittee may submit a Notice of Termination (NOT) for a portion of the on-going construction project in the following instances:
 - a. When final stabilization has been achieved on the portion of the site for which termination is sought;
 - b. When title to a portion of the construction site has been transferred to a new owner and the new owner has obtained separate coverage under an individual construction permit or DEC's General Permit 3-9020 for Stormwater Runoff from Construction Sites (February 2020) or its replacement;
 - c. When another operator has assumed control over the portion of the site for which termination is sought and the new operator has obtained coverage under an individual construction permit or DEC's General Permit 3-9020 for Stormwater Runoff from Construction Sites (February 2020) or its replacement;
 - d. For residential construction only, temporary stabilization has been completed and the residence has been transferred to the homeowner.
2. To obtain a notice of termination for a portion of an on-going construction site, the permittee shall follow the requirements of Part V.E of this permit.

D. Notice of Termination for the Entire Construction Site

1. The permittee may submit a NOT for the entire construction site in the following instances:
 - a. Final stabilization has been achieved on the entire construction site for which the permittee is responsible;
 - b. Another operator has assumed control over all areas of the site that have not been finally stabilized and has obtained permit coverage; or
 - c. Coverage under an individual or DEC's General Permit 3-9020 for Stormwater Runoff from Construction Sites (February 2020) or its replacement has been obtained.
2. To obtain a notice of termination for the entire construction site, the permittee shall follow the requirements of Part V.E of this permit.

E. Submitting a Notice of Termination

1. A permittee shall submit a complete and accurate NOT, on a form provided by the Secretary.
2. A NOT shall include, at a minimum, the following information:
 - a. The permit number for which termination is sought;
 - b. The basis for submission of the NOT;
 - c. The owner's and operator's name, address and telephone number;
 - d. The name of the project and address (or a description of location if no street address is available) of the construction site for which the notification is submitted;
 - e. A certification statement, signed and dated by the OSPC and by an authorized representative as defined in the signature requirements in Part VIII.I, and the name and title of that authorized representative; and

- f. If the NOT is for only a portion of an ongoing construction project, a description of the portion of the site to which the NOT will apply and a plan showing the boundaries of this portion.

Part VI. Violation of Permit Requirements; Enforcement

- A. The permittee shall comply with all terms and conditions of this permit. Any permit noncompliance constitutes a violation of 10 V.S.A. Chapter 47 and the federal Clean Water Act and is grounds for an enforcement action; for permit termination, revocation and reissuance, or modification; or denial of a permit renewal application.

Part VII. Appeals

- A. Renewable Energy Projects – Right to Appeal to Public Utility Commission

Any appeal of this decision must be filed with the clerk of the Vermont Public Utility Commission pursuant to 10 V.S.A. §8506 within 30 days of the date of this decision. The appellant must file with the Clerk an original and six copies of its appeal. The appellant shall provide notice of the filing of an appeal in accordance with 10 V.S.A. §8504(c)(2) and shall also serve a copy of the Notice of Appeal on the Vermont Department of Public Service. For information, see the Rules and General orders of the Public Utility Commission available online at www.puc.vermont.gov. The address for the Public Utility Commission is 112 State Street Montpelier, Vermont 05620-2701 (Tel. #802-828-2358).

- B. All Other Projects – Right to Appeal to Environmental Court

Pursuant to 10 V.S.A. Chapter 220, if this decision relates to all other projects, any appeal of this decision must be filed with the clerk of the Environmental Court within 30 days of the date of the decision. The appellant must attach to the Notice of Appeal the entry fee of \$250.00 payable to the State of Vermont. The Notice of Appeal must specify the parties taking the appeal and the statutory provision under which each party claims party status; must designate the act or decision appealed from; must name the Environmental Court; and must be signed by the appellant or their attorney. In addition, the appeal must give the address or location and description of the property, project or facility with which the appeal is concerned and the name of the applicant or any permit involved in the appeal. The appellant must also serve a copy of the Notice of Appeal in accordance with Rule 5(b)(4)(B) of the Vermont Rules for Environmental Court Proceedings. For additional information, see the Vermont Rules for Environmental Court Proceedings, available online at www.vermontjudiciary.org or call (802) 951-1740. The address for the Environmental Court is 32 Cherry Street, 2nd Floor Suite 303, Burlington, Vermont 05401.

Part VIII. Standard Permit Conditions

- A. Permit Actions

This permit may be modified, revoked and reissued, or terminated for cause as set forth in Stormwater Permitting Rule § 22-310 (Environmental Protection Rules, Ch. 22). The filing of a request by the permittee for a permit modification, revocation and reissuance, or termination, or a notification of planned changes or anticipated noncompliance does not stay any permit condition.

B. Limitations

1. This permit conveys no vested rights or exclusive privileges. The permit conveys no title to land nor authorizes any injury to public or private property. The permit does not authorize infringement of any applicable federal, state or local laws or regulations nor obviate the necessity of obtaining such additional permits as may be required.
2. Nothing in this permit shall be construed as having relieved, modified, or in any manner affected the permittee's ongoing obligation to comply with all other federal, state or local statutes, regulations or directives applicable to the permittee in the operation of its business, nor does it relieve the permittee of the obligation to obtain all necessary federal, state and local permits.

C. Prohibitions

1. This permit does not relieve any person of the federal reporting requirements of 40 Part 110, 40 Part 117 and 40 Part 302 relating to spills or other releases of oils or hazardous substances. Nothing in this permit shall be construed to preclude the institution of legal action or relieve the permittee from any responsibilities, liabilities, or penalties to which the permittee is or may be subject under 10 V.S.A. § 1281. This permit does not authorize the discharge of hazardous substances or oil resulting from an on-site spill.
2. If a release of oil or hazardous substances in excess of reportable quantities occurs, the permittee must modify the EPSC Plan required under Part III within 7 calendar days of knowledge of the release to: provide a description of the release, the circumstances leading to the release, and the date of the release. The EPSC Plan must identify measures to prevent the reoccurrence of such releases and to respond to such releases.
3. Discharges of any material other than stormwater, such as vehicle and equipment maintenance spills, fuels, wash water, construction debris, oil, wet concrete (including washout water from concrete batch trucks or equipment used to mix concrete), and other substances are prohibited.
4. Sediments and other pollutants collected and removed in the course of treatment of stormwater runoff shall be disposed in a manner that will not result in the sediments and pollutants entering waters of the State.

D. Right of Entry

The permittee shall allow the Secretary and their authorized representatives, at reasonable times, and upon presentation of credentials, to:

1. Enter upon and inspect the property on which the construction activities are occurring or the premises where records must be kept under the conditions of this permit;
2. Have access to and copy, at reasonable times, any records required to be kept pursuant to the permit;
3. Inspect at reasonable times any facilities, equipment – including monitoring and control equipment – practices, or operations regulated or required under this permit; and;
4. Sample or monitor at reasonable times any construction-related discharges.

E. Historic Properties

Each permittee must comply with any applicable state and local laws concerning the protection of historic properties and places.

F. Retention of Records

The permittee shall retain records of all monitoring information, including all calibration and maintenance records and all original strip chart recordings for continuous monitoring instrumentation, copies of all reports required by this permit, and records of all data used to complete the application for this permit for a period of at least five years from the date of the sample, measurement, report, or application, in accordance with Stormwater Permitting Rule § 1201(c) (Environmental Protection Rules, Ch. 22). This period may be extended by request of the Secretary at any time.

G. Need to Halt or Reduce Activity Not a Defense

It shall not be a defense in an enforcement action that it would have been necessary to halt or reduce the permitted activity in order to maintain compliance with the conditions of this permit.

H. Duty to Mitigate

A permittee shall take all reasonable steps to minimize or prevent any discharge or sludge use or disposal in violation of this permit which has a reasonable likelihood of adversely affecting human health or the environment.

I. Signatory Requirements

1. All applications must be signed as follows:

- a. For a corporation: by a responsible corporate officer. For the purposes of this section, a responsible corporate officer means:
 - i. A president, secretary, treasurer, or vice-president of the corporation in charge of a principal business function, or any other person who performs similar policy- or decision-making functions for the corporation;
 - ii. The manager of one or more manufacturing, production, or operating facilities, provided, the manager is authorized to make management decisions which govern the operation of the regulated facility including having the explicit or implicit duty of making major capital investment recommendations, and initiating and directing other comprehensive measures to assure long term environmental compliance with environmental laws and regulations; the manager can ensure that the necessary systems are established or actions taken to gather complete and accurate information for permit application requirements; and where authority to sign documents has been assigned or delegated to the manager in accordance with corporate procedures.
 - b. For a partnership or sole proprietorship: by a general partner or the proprietor, respectively; or
 - c. For a municipality, State, Federal or other public agency: by either a principal executive officer or a ranking elected official. For purposes of this section, a principal executive officer of a Federal Agency includes: the chief executive officer of the agency or a senior executive officer having responsibility for the overall operations of a principal geographic unit of the agency.
2. All reports required by this permit, including but not limited to EPSC Plans, must be signed by a person described above or by a duly authorized representative of that person. A person is a duly authorized representative only if:
- a. The authorization is made in writing by a person described above;

- b. The authorization specifies either an individual or a position having responsibility for the overall operation of the regulated facility or activity such as the position of plant manager, operator of a well or a well field, superintendent, position of equivalent responsibility, or an individual or position having overall responsibility for environmental matters for the company. A duly authorized representative may thus be either a named individual or any individual occupying a named position.
 - c. The signed and dated written authorization is included in the EPSC Plan. A copy must be submitted to the Secretary, if requested.
3. Any person signing documents required under the terms of this permit must include the following certification:

“I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.”

J. Duty to Reapply

If a discharge from the construction site is anticipated to continue after the expiration date of this permit, the permittee must reapply for coverage under a new permit sixty (60) days prior to the expiration date of this permit.

K. Proper Operation and Maintenance

The permittee shall at all times properly operate and maintain all facilities and systems of treatment and control which are installed or used by the permittee to achieve compliance with the conditions of this permit.

L. Notice of Planned Changes

The permittee shall give notice to the Secretary as soon as possible of any planned physical alterations to the permitted facility.

M. Notice of Anticipated Noncompliance

The permittee shall give advance notice to the Secretary of any planned changes in the permitted facility or activity which may result in noncompliance with permit requirements.

N. Duty to Provide Information

The permittee shall furnish to the Secretary, within a reasonable time, any information which the Secretary may request to determine whether cause exists for modifying, revoking and reissuing, or terminating this permit or to determine noncompliance with this permit. The permittee shall also furnish to the Secretary upon request, copies of records to be kept pursuant to this permit. Where the permittee becomes aware that it failed to submit any relevant facts in a permit application or submitted incorrect information in a permit application or in a report to the Secretary, it shall promptly submit such facts or information.

O. Penalty for Permit Violation

10 V.S.A. Section 1275(a) provides that:

Any person who violations any provision of this subchapter or who fails, neglects, or refuses to obey or comply with any order or the terms of any permit issued in accordance with this subchapter, shall be fined not more than \$25,000.00 or imprisoned not more than six months, or both. Each violation may be a separate offense, and, in the case of a continuing violation, each day's continuance may be deemed a separate offense.

10 V.S.A. Section 8010(c) provides that:

A penalty of not more than \$42,500 may be assessed for each determination of a separate violation. In addition, if the secretary determines that a violation is continuing the secretary may assess a penalty of not more than \$17,000.00 for each day the violation continues. The maximum amount of penalty assessed under this subsection shall not exceed \$170,000.00.

P. Penalty for False Statement

10 V.S.A. Section 1275(b) provides that:

Any person who knowingly makes any false statement, representation or certification in any application, record, report, plan, or other document filed or required to be maintained under this subchapter, or by any permit, rule, regulation or order issued under this subchapter, or who falsifies, tampers with, or knowingly renders inaccurate any monitoring device or method required to be maintained under this subchapter or by any permit, rule, regulation, or order issued under this subchapter, shall upon conviction, be punished by a fine of not more than \$10,000.00 or by imprisonment for not more than six months, or by both.

Q. Severability

The provisions of this permit are severable, and if any provision of this permit, or the application of any provision of this permit to any circumstance, is held invalid, the application of such provision to other circumstances, and the remainder of this permit, shall not be affected thereby.

R. Monitoring

Samples and measurements taken for the purpose of monitoring shall be representative of the monitored activity.

S. Twenty-four-hour Reporting

Unless provided otherwise by this permit, the permittee shall report any noncompliance which may endanger health or the environment. Any information shall be provided orally within 24 hours from the time the permittee becomes aware of the circumstances. A written submission shall also be provided within 5 days of the time the permittee becomes aware of the circumstances. The written submission shall contain a description of the noncompliance and its cause; the period of noncompliance, including exact dates and times, and if the noncompliance has not been corrected, the anticipated time it is expected to continue; and steps taken or planned to reduce, eliminate, and prevent recurrence of the noncompliance.

Part IX. Effective Date of Permit and Permit Term

This permit shall become effective on **7/3/2023** and shall expire on **7/2/2028**. The permittee shall reapply for coverage at least sixty (60) days prior to the expiration if the project has not achieved final stabilization or if the construction activities are expected after the date of expiration.

Dated July 03, 2023

Julia S. Moore, Secretary
Agency of Natural Resources



By:

Thomas A. Benoit Sr., Construction Section Supervisor
Stormwater Management Program

Notice of Authorization Individual Discharge Permit for Stormwater Runoff from Construction Activities	
Project Name: Colchester - NH 028-1(31) Permittee Name(s): Vermont Agency of Transportation	Permit Number: 8938-INDC.1 Date of Issuance: 7/3/2023 Date of Expiration: 7/2/2028
<i>The above project has been issued an Individual Permit to discharge stormwater for the construction of the Colchester - NH 028-1(31) project. This project involves The project would consist of a new 3-lane bridge across I-89. The bridge would be complemented by a new loop ramp in the northwest quadrant of the interchange which would serve as an I-89 southbound on-ramp for traffic proceeding westbound on U.S. Route 2. Existing signalized intersections at chimney corners and the I-89 ramps would be reconfigured to provide greater efficiency of traffic movement. The U.S. Route 2/I-89 southbound ramps intersection would be relocated approximately 300 feet west of the current location. Existing westbound left turns would be reallocated to right turns due to the new loop ramp and would eliminate conflicts with U.S. Route 2 eastbound traffic. The existing high-speed right-turn ramp from I-89 northbound to U.S. Route 2 westbound would be replaced with an un-channelized or slightly channelized approach controlled by a traffic signal, which would meter vehicular entry onto U.S. Route 2 reducing the potential for vehicular crashes and reduce conflicts with cyclists on the Lake Champlain Bikeway..</i>	
This permit includes the following requirements: 1. Implementation of the authorized site-specific Erosion Prevention and Sediment Control Plan. 2. All areas of disturbance must have temporary or final stabilization within 14 days of the initial disturbance. After this time, any disturbance in the area must be stabilized in advance of any runoff producing event. The following exceptions apply: a. Stabilization is not required if work is occurring in a self-contained excavation (i.e. no outlet for stormwater) with a depth of 2 feet or greater. b. During Winter Construction areas of disturbed soil must be stabilized prior to any runoff producing event, in accordance with the previous exception. 3. The total earth disturbance associated with construction of this project is approximately 27.91 acres. The maximum area of earth disturbance at any one time allowed under this permit is 8.00 acres. 4. With certain exceptions described in Part III A. of the permit, Inspections shall be conducted at least once every seven (7) calendar days and as soon as reasonably possible, during, or after, every rainfall event which produces runoff from the construction site. 5. If there is a discharge of visibly discolored stormwater from the construction site or from the construction site to waters of the State, the permittee shall inspect and maintain Best Management Practices as soon as practicable and take corrective action in accordance with Part III. B. of this permit. 6. The On-site Plan Coordinator shall have a copy of the EPSC Plan and all amendments available at a central location on-site for the use of all those identified as having responsibilities under the EPSC Plan whenever they are on the construction site. If an on-site location is unavailable to store the EPSC Plan when no personnel are present, notice of the plan's location shall be posted near the main entrance at the construction site.	

Permit Number: 8938-INDC.1
NPDES Permit Number: VTS007283
Permit Name: Colchester - NH 028-1(31)

To request information on this authorization or to report compliance concerns please contact:

Vermont DEC, Watershed Management Division

Davis Building, Third Floor

One National Life Drive

Montpelier, VT 05620-3222

(802) 828-1115

[See next page for posting requirements]

Permittee Directions for Posting:

This notice shall be placed near the construction entrance at a location visible to the public. If displaying near the main entrance is infeasible, the notice shall be posted in a local public building such as the town hall or public library. For linear projects, the notice shall be posted at a publicly accessible location near the active part of the construction project (e.g. where a pipeline project crosses a public road or at a project staging area).

VERMONT DEPARTMENT OF ENVIRONMENTAL CONSERVATION
AUTHORIZATION TO DISCHARGE UNDER
GENERAL PERMIT 3-9015

A determination has been made that the applicant(s):

Vermont Agency of Transportation
219 North Main Street, 4th Floor
Barre, VT 04641

Impervious Area: 8.14 acres

meets the criteria necessary for inclusion under General Permit 3-9015. Hereinafter, the named applicant shall be referred to as the permittee. Subject to the conditions of General Permit No. 3-9015, the permittee is authorized to discharge stormwater as described herein:

Project Name: Colchester - NH 028-1(31)

Project Location: Interstate 89, Exit 17 and US 2 / 7 in Colchester, Vermont

Receiving Waters:

- Allen Brook
- Unnamed tributary to Allen Brook
- Unnamed tributary to Lake Champlain

Manner of Discharge:

S/N 001: Stormwater runoff from new and redeveloped portions of US-2 via sheet flow to a pre-treatment filter strip, routed to Media Filter #1 with underdrain, discharging via open and closed drainage systems to an unnamed tributary to Allen Brook.

S/N 002: Stormwater runoff from new and redeveloped portions of US-2 via sheet flow to a pre-treatment filter strip, routed to Media Filter #2 with underdrain, discharging to an unnamed tributary to Lake Champlain; stormwater runoff from new and redeveloped portions of US-2, new southbound on-ramp, and portions of I-89 via sheet flow and closed drainage system to a pre-treatment forebay, routed to a gravel wetland, discharging via controlled outlet structure, closed drainage system, and dry basin, to an unnamed tributary to Lake Champlain; stormwater runoff from existing and redeveloped portions of I-89 and northbound off-ramp via sheet flow and closed drainage system to a dry detention basin, discharging via controlled outlet structure to an unnamed tributary to Lake Champlain.

S/N 003: Stormwater runoff from new and redeveloped portions of US-2/7 via sheet flow to a pre-treatment filter strip, routed to a dry swale with underdrain, discharging to Allen Brook.

Design:

This project shall be constructed and operated in accordance with the site plans and details designed by VHB; Sheets 1-2, "Jurisdictional Areas", dated 04/03/2020; Sheets 13-14, "Stormwater Details", dated 04/03/2020; Sheet 15, "Gravel Wetland Details", dated 04/01/2020; Sheet 23, "Conventional Symbolology Legend Sheet", dated 04/01/2020; Sheet 27, "Project Layout Key Sheet", dated 04/01/2020; Sheets 73-75, "Drainage Sheets", dated 04/01/2020; Sheet 76, "Drainage Sheet 4", dated 04/03/2020; Sheets 77-89, "Drainage Sheets", dated 04/01/2020; Sheets 222-238, "EPSC Existing Conditions Plans", dated 04/01/2020; Sheets 256-272, "EPSC Final Conditions Plans", dated 04/01/2020; and all supporting information.

By reference, the above noted plans are made part of this authorization.

Compliance with General Permit 3-9015 and this Authorization

The permittee shall comply with this authorization and all the terms and conditions of General Permit 3-9015, including the payment of annual operating fees to the Department. A billing statement for such fees will be sent to the permittee each year. An invoice for the first year's operating fee will be sent separately. Any permit non-compliance, including a failure to pay the annual operating fee, constitutes a violation of 10 V.S.A. Chapter 47 and may be grounds for an enforcement action or revocation of this authorization to discharge.

Transferability

This authorization to discharge is not transferable to any person except in compliance with Part VI.D. of General Permit 3-9015. A copy of General Permit 3-9015 is available from the Department via the internet at https://dec.vermont.gov/sites/dec/files/wsm/stormwater/docs/GeneralPermit9015/sw_3-9015_final_signed.pdf

Changes to Permitted Development

In accordance with Part V.G. of General Permit 3-9015, the permittee shall notify the Department of any planned development or facility expansions or changes that may result in new or increased stormwater discharges. The Department shall determine the appropriateness of continued inclusion under General Permit 3-9015 by the modified development or facility.

Annual Inspection and Report

The stormwater collection, treatment and control system shall be properly operated. The permittee shall submit an annual inspection report on the operation, maintenance and condition of the stormwater collection, treatment and control system. The inspection report shall be submitted regardless of whether the project has been constructed. The inspection shall be conducted between the conclusion of spring snow melt and June 15th of each year and the inspection report shall be submitted to the Secretary by July 15th of each year, or by July 30th if performed by a utility or municipality pursuant to a duly adopted stormwater management ordinance. The inspection report shall note all problem areas and all measures taken to correct any problems and to prevent future problems. The online submittal system, ANR Online, can be accessed at <https://anronline.vermont.gov>.

Initial Statement of Compliance

An initial statement of compliance, signed by a designer, must be submitted to the Stormwater Management Program no later than 6 months following completion of construction of the stormwater management system. Failure to submit an initial statement of compliance shall constitute a violation of General Permit 3-9015 and may result in the revocation of this authorization to discharge. Forms for completing this requirement are available on the Stormwater Management Program's website. The online submittal system, ANR Online, can be accessed at <https://anronline.vermont.gov>.

Recording in Land Records

The permittee shall record a one-page town recording form for this discharge permit in the local land records within fourteen (14) days of issuance of this authorization to discharge on the form provided by the Secretary, per §22-901 of Stormwater Permitting Rule. The permittee shall provide a copy of the recording to the Stormwater Management Program within fourteen (14) days of the permittee's receipt of the copy of the recording from the local land records.

Right to Appeal

(A) Pursuant to 10 V.S.A. Chapter 220, any appeal of this permit, except for appeal of a renewable energy plant as described in (B), must be filed with the clerk of the Environmental Division of the Superior Court within 30 days of the date of the decision. The notice of appeal must specify the parties taking the appeal and the statutory provision under which each party claims party status; must designate the act or decision appealed from; must name the Environmental Division; and must be signed by the appellant or the appellant's attorney. In addition, the appeal must give the address or location and description of the property, project, or facility with which the appeal is concerned and the name of the applicant or any permit involved in the appeal. The appellant must also serve a copy of the notice of appeal in accordance with Rule 5(b)(4)(B) of the Vermont Rules for Environmental Court Proceedings. For further information, see the Vermont Rules for Environmental Court Proceedings.

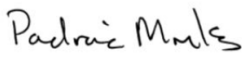
(B) If this permit relates to a renewable energy plant for which a certificate of public good is required under 30 V.S.A. § 248, any appeal of this decision must be filed with the Vermont Public Utility Commission pursuant to 10 V.S.A. § 8506. This section does not apply to a facility that is subject to 10 V.S.A. § 1004 (dams before the Federal Energy Regulatory Commission), 10 V.S.A. § 1006 (certification of hydroelectric projects), or 10 V.S.A. Chapter 43 (dams). Any appeal under this section must be filed with the clerk of the Public Utility Commission within 30 days of the date of this decision; the appellant must file with the clerk an original and six copies of its appeal. The appellant shall provide notice of the filing of an appeal in accordance with 10 V.S.A. § 8504(c)(2) and shall also serve a copy of the notice of appeal on the Vermont Public Service Department. For further information, see the Rules and General Orders of the Public Utility Commission.

Effective Date and Expiration Date of this Authorization

This authorization to discharge shall become effective on May 29, 2020 and shall expire on May 28, 2025. The permittee shall reapply for coverage at least sixty (60) days prior to May 28, 2025.

Dated May 29, 2020.

Peter Walke, Commissioner
Department of Environmental Conservation

By: 
Padraic Monks, Stormwater Program Manager



VERMONT DEPARTMENT OF
ENVIRONMENTAL CONSERVATION
WATERSHED
MANAGEMENT DIVISION
STORMWATER PROGRAM

Town Recording of Permit Issued

FOR STORMWATER DISCHARGE PERMIT BY THE VERMONT DEPARTMENT OF ENVIRONMENTAL CONSERVATION

Notice is hereby given that the Vermont Department of Environmental Conservation gives authorization to discharge pursuant to a general stormwater discharge permit that has been issued to Permittee(s) named herein for the discharge of stormwater runoff for the property identified below from impervious surfaces (e.g. roadways, rooftops, parking lots, walkways) pursuant to 10 V.S.A. 1264. The authorization requires treatment and control of stormwater runoff, long-term maintenance of the treatment and control structures and payment of yearly operational fees.

Permittee(s): **Vermont Agency of Transportation**

Permit/Authorization Number: **8938-9015**

911 Address of Property: **Interstate 89, Exit 17 and US 2 / 7, Colchester**

Name of association (if applicable): _____
(condominium, subdivision or planned community)

Printed Name of Permittee or Authorized Representative: _____

Signature of Permittee or Authorized Representative: _____ Date: _____

FOR TOWN CLERK USE ONLY:

Recorded under Book: _____ Page: _____

Date Recorded with Town: _____ Signature / Stamp: _____

Recording information for Municipal Clerks - please index this document listing the State of Vermont, Department of Environmental Conservation as "Grantee," and listing the above-named Permittee(s) as "Grantor(s)." Additionally, if this notice lists the name of a condominium, subdivision or planned community association, please list the named association as an additional "Grantor."

Can be Completed by Clerk or Permittee:

Please upload this completed form to ANR Online by visiting the following link
<https://anronline.vermont.gov>



DEPARTMENT OF THE ARMY
US ARMY CORPS OF ENGINEERS
NEW ENGLAND DISTRICT
696 VIRGINIA ROAD
CONCORD MA 01742-2751

June 16, 2020

Regulatory Division
File No. NAE-2017-00358

Mr. Glenn Gingras
Vermont Agency of transportation
219 N. Main Street
Barre, Vermont 05641

Dear Mr. Gingras:

Enclosed are two copies of a Department of the Army permit authorizing your project. **Please sign both copies of the permit and return one signed copy to this office at the address above.** The authorized work cannot start until we receive a complete, signed copy of the permit.

You are required to complete and return the enclosed forms to this office:

1. Preliminary Jurisdictional Determination Form to be submitted along with your signed copy of the permit.
2. Work Start Notification Form at least two weeks before the anticipated work start date.
3. Compliance Certification Form within one month following the completion of the authorized work.

This permit is a limited authorization containing a specific set of conditions. Please read the permit thoroughly to familiarize yourself with those conditions, **including any conditions contained on the enclosed state water quality certification.** If a contractor does the work for you, both you and the contractor are responsible for ensuring that the work is done in compliance with the permit's terms and conditions, as any violations could result in civil or criminal penalties.

Our verification of this project's wetland delineation under the Corps of Engineers Wetlands Delineation Manual, and its applicable supplement, is valid for a period of five years from the date of this letter unless new information warrants revision of the determination before the expiration date.

A combined Notification of Administrative Appeal Options and Process (NAP) and Request for Appeal (RFA) form, and flow chart explaining the appeals process and your options, are enclosed. If you desire to appeal this proffered permit, you must submit a completed RFA form along with any supporting or clarifying information to Michael Vissichelli; Operations Program Manager; North Atlantic Division, Corps of Engineers; North Atlantic Fort Hamilton Military Community, Bldg. 301; General Lee Avenue; Brooklyn, NY 11252-6700. Contact info: (347) 370-4663 or michael.g.vissichelli@usace.army.mil.

In order for an RFA to be accepted by the Corps, the Corps must determine that it is complete, that it meets the criteria for appeal under 33 CFR 331.5, and that it has been received by the Division Office within 60 days of the date of the NAP.

You may not appeal conditions contained in the State water quality certification or the CZM consistency determination under this program as they are automatically included in the Federal permit. This authorization does not obviate the need to obtain other Federal, state, or local authorizations required by law.

We continually strive to improve our customer service. In order for us to better serve you, we would appreciate your completing our Customer Service Survey located at http://corpsmapu.usace.army.mil/cm_apex/f?p=regulatory_survey.

If you have any questions regarding this correspondence, please contact Michael S. Adams at (978) 318-8485.

Sincerely,

DELGIUDICE.FRA Digitally signed by
NKJ.1228916567 DELGIUDICE.FRA Date: 2021.06.17 07:14:39 -0400

Frank J. DelGiudice
Chief, Permits and Enforcement Branch
Regulatory Division

Enclosures

cc:

Beth Alafat, U.S. Environmental Protection Agency Region 1, alafat.beth@epa.gov
Glenn Gingras, Vermont Agency of Transportation, Glenn.gingras@vermont.gov

DEPARTMENT OF THE ARMY PERMIT

Permittee: Vermont Agency of Transportation

Permit No: NAE-2017-00358

Issuing Office: New England District

NOTE: The term "you" and its derivatives, as used in this permit, means the permittee or any future transferee. The term "this office" refers to the appropriate district or division office of the Corps of Engineers having jurisdiction over the permitted activity or the appropriate official of that office acting under the authority of the commanding officer.

You are authorized to perform work in accordance with the terms and conditions specified below.

Project Description:

Place fill within 1.66 acres of wetlands in conjunction with the replacement of existing US Route 2 bridge over Interstate 89, and the partial reconstruction of the Exit 17 interchange. The project will permanently impact approximately 50,772 sq. ft. (1.17 acre) of wetlands from the reconfiguration of the existing I-89 northbound off-ramp, construction of a new southbound off-ramp and new southbound on-ramp, and construction of stormwater improvements. The work will temporarily impact approximately 21,706 sq. ft. (0.5 acre) of wetlands during construction. The wetlands to be impacted are emergent wetlands immediately adjacent to a heavily travelled highway and function primarily to maintain water quality.

The purpose of the project is to rehabilitate the I-89 Exit 17 interchange and adjacent intersection of US Route 2 and 7 to current AASHTO standards to improve safety and mobility for drivers, pedestrians and bicyclists.

The work is shown on the enclosed plans, in five sheets, entitled "Colchester NH 028-1(31) I-89 Exit 17 Interchange Reconstruction" (dated "August 01, 2019"), "Colchester NH 028-1(31) Exit 17 Interchange Project" (dated "August 05, 2019"), and "COLCHESTER NH 028-1(31)" (dated "8/2/2019").

Project Location:

The work is located in wetlands off I-89 Exit 17 interchange and adjacent intersection of US Route 2 and 7 in Colchester, Vermont.

Permit Conditions:

General Conditions:

1. The time limit for completing the work authorized ends on June 16, 2025. If you find that you need more time to complete the authorized activity, submit your request for a time extension to this office for consideration at least one month before the above date is reached.
2. You must maintain the activity authorized by this permit in good condition and in conformance with the terms and conditions of this permit. You are not relieved of this requirement if you abandon the permitted activity, although you may make a good faith transfer to a third party in compliance with General Condition 4 below. Should you wish to cease to maintain the authorized activity or should you desire to abandon it without a good faith transfer, you must obtain a modification of this permit from this office, which may require restoration of the area.
3. If you discover any previously unknown historic or archeological remains while accomplishing the activity authorized by this permit, you must immediately notify this office of what you have found. We will initiate the Federal and State coordination required to determine if the remains warrant a recovery effort or if the site is eligible for listing in the National Register of Historic Places.

4. If you sell the property associated with this permit, you must obtain the signature of the new owner in the space provided and forward a copy of the permit to this office to validate the transfer of this authorization.
5. If a conditioned water quality certification has been issued for your project, you must comply with the conditions specified in the certification as special conditions to this permit. For your convenience, a copy of the certification is attached if it contains such conditions.
6. You must allow representatives from this office to inspect the authorized activity at any time deemed necessary to ensure that it is being or has been accomplished in accordance with the terms and conditions of your permit.

Special Conditions:

1. The permittee shall ensure that a copy of this permit is at the work site (and the project office) authorized by this permit whenever work is being performed, and that all personnel with operational control of the site ensure that all appropriate personnel performing work are fully aware of its terms and conditions. The entire permit shall be made a part of any and all contracts and sub-contracts for work that affects areas of Corps jurisdiction at the site of the work authorized by this permit. This shall be achieved by including the entire permit in the specifications for work. The term "entire permit" means this permit (including its drawings, plans, appendices and other attachments) and also includes permit modifications.

If the permit is issued after the construction specifications, but before receipt of bids or quotes, the entire permit shall be included as an addendum to the specifications. If the permit is issued after receipt of bids or quotes, the entire permit shall be included in the contract or sub-contract. Although the permittee may assign various aspects of the work to different contractors or sub-contractors, all contractors and sub-contractors shall be obligated by contract to comply with all environmental protection provisions contained within the entire permit, and no contract or sub-contract shall require or allow unauthorized work in areas of Corps jurisdiction.

2. The permittee shall complete and return the enclosed Compliance Certification Form within one month following the completion of the authorized work.

3. Compensatory mitigation shall consist of purchasing 1,166 credits from the Ducks Unlimited – Vermont In-Lieu Fee (ILF) Program for impacts to the Richelieu Service Area. The permittee shall pay \$210,106.83 to "Ducks Unlimited, Inc." for the purchase of these credits and send a cashier's check or bank draft to "Michelle Burdick, Ducks Unlimited, 7322 Newman Boulevard, Building 1, Dexter, MI 48130." The check must include the Corps file number NAE-2017-00358 and the statement: "For ILF account only". Work shall not begin until the Corps receives a copy of the letter from Ducks Unlimited to the permittee stating that Ducks Unlimited has received the check and accepts responsibility for mitigation. The in-lieu fee amount is valid for one year from the date of this permit and is subject to change.

4. Adequate sedimentation and erosion control devices, such as geotextile silt fences or other devices capable of filtering the fines involved, shall be implemented and properly maintained to minimize impacts during construction. These devices must be removed upon completion of work and stabilization of disturbed areas. The sediment collected by these devices must also be removed and placed upland, in a manner that will prevent its later erosion and transport into a waterway or wetland.

5. No temporary fill (e.g., access roads, cofferdams) may be placed in waters or wetlands unless specifically authorized by this permit. The slope of all temporary fills must be stabilized to prevent erosion, through such means as placing weighted geotextile fabric on the slope. The temporary fill shall be completely removed upon completion of the project, and shall be placed upland in a manner that will prevent its later erosion and transport to a waterway or wetland. The temporary fill area shall be restored to its approximate original contours (but not higher).

6. All excess material shall be disposed of at an upland, non-wetland site.

7. Only clean fill shall be used.

8. All contractors' equipment shall be cleaned so as to contain no observable soil or vegetation prior to work in wetlands and waterways to prevent the spread of invasive species.

9. Disposal site(s) for temporary fills and for any excess material shall not be used without prior written approval from the New England District Corps of Engineers, Vermont Project Office.

Further Information:

1. Congressional Authorities: You have been authorized to undertake the activity described above pursuant to:
 - () Section 10 of the Rivers and Harbors Act of 1899 (33 U.S.C. 403).
 - (X) Section 404 of the Clean Water Act (33 U.S.C. 1344).
 - () Section 103 of the Marine Protection, Research and Sanctuaries Act of 1972 (33 U.S.C. 1413).
2. Limits of this authorization.
 - a. This permit does not obviate the need to obtain other Federal, State, or local authorizations required by law.
 - b. This permit does not grant any property rights or exclusive privileges.
 - c. This permit does not authorize any injury to the property or rights of others.
 - d. This permit does not authorize interference with any existing or proposed Federal project.
3. Limits of Federal Liability. In issuing this permit, the Federal Government does not assume any liability for the following:
 - a. Damages to the permitted project or uses thereof as a result of other permitted or unpermitted activities or from Natural causes.
 - b. Damages to the permitted project or uses thereof as a result of current or future activities undertaken by or on behalf of the United States in the public interest.
 - c. Damages to persons, property, or to other permitted or unpermitted activities or structures caused by the activity authorized by this permit.
 - d. Design or construction deficiencies associated with the permitted work.
 - e. Damage claims associated with any future modification, suspension, or revocation of this permit.
4. Reliance on Applicant's Data: The determination of this office that issuance of this permit is not contrary to the public interest was made in reliance on the information you provided.
5. Reevaluation of Permit Decision. This office may reevaluate its decision on this permit at any time the circumstances warrant. Circumstances that could require a reevaluation include, but are not limited to, the following:
 - a. You fail to comply with the terms and conditions of this permit.
 - b. The information provided by you in support of your permit application proves to have been false, incomplete, or inaccurate (See 4 above).
 - c. Significant new information surfaces which this office did not consider in reaching the original public interest decision.

Such a reevaluation may result in a determination that it is appropriate to use the suspension, modification, and revocation procedures contained in 33 CFR 325.7 or enforcement procedures such as those contained in 33 CFR 326.4 and 326.5. The referenced enforcement procedures provide for the issuance of an administrative order requiring you to comply with the terms and conditions of your permit and for the initiation of legal action where appropriate. You will be required to pay for any corrective measures ordered by this office, and if you fail to comply with such directive, this office may in certain situations (such as those specified in 33 CFR 209.170) accomplish the corrective measures by contract or otherwise and bill you for the cost.

Your signature below, as permittee, indicates that you accept and agree to comply with the terms and conditions of this permit.

(PERMITTEE)

(DATE)

This permit becomes effective when the Federal official, designated to act for the Secretary of the Army, has signed below.

DELGIUDICE.FRANK.J. Digitally signed by
1228916567 DELGIUDICE.FRANK.J.1228916567
Date: 2020.06.17 08:03:19 -04'00'

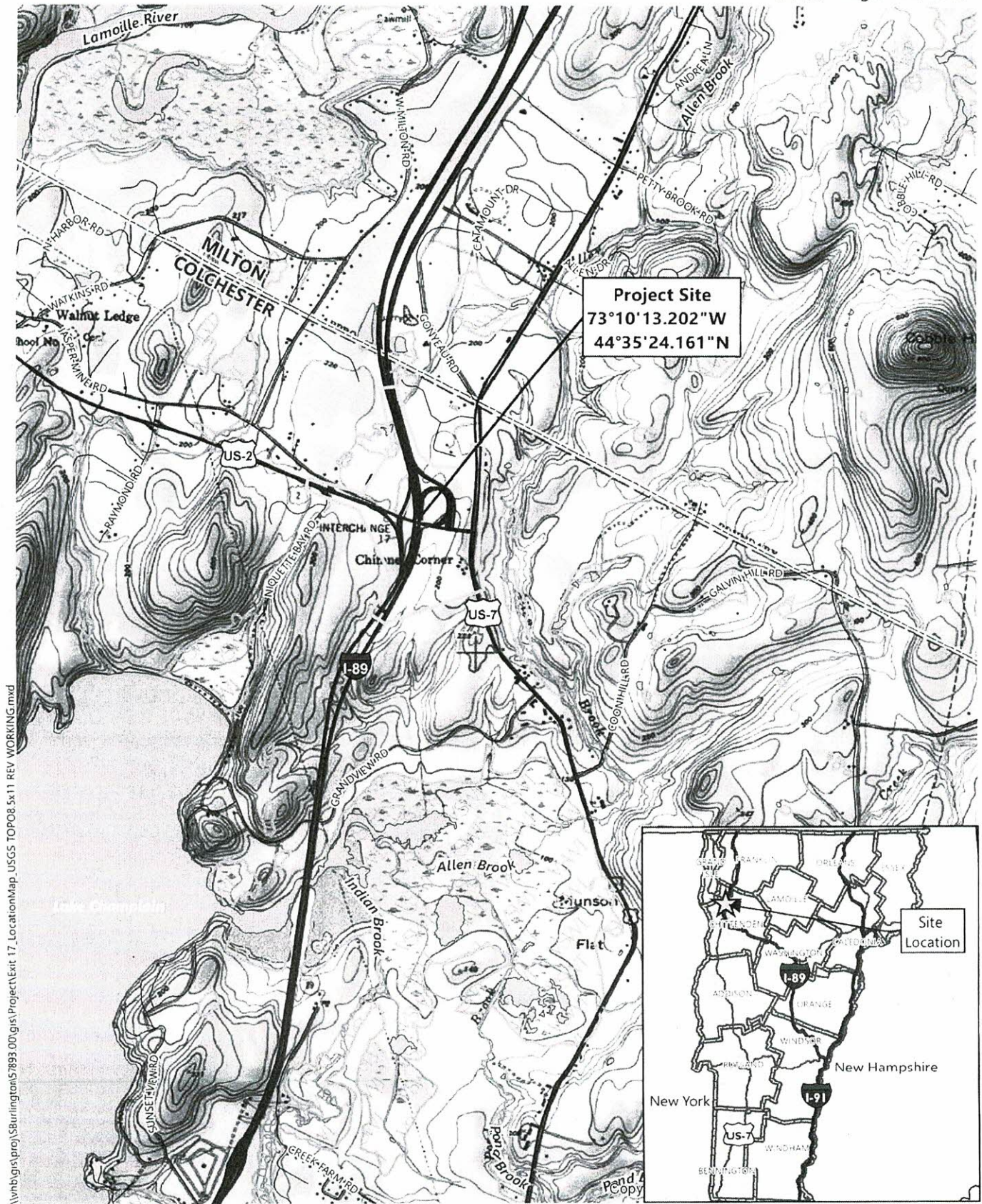
Frank J. DelGiudice, Chief, Permits & Enforcement Branch C
Chief, Permits and Enforcement Branch
Regulatory Division
For District Engineer

(DATE)

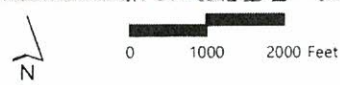
When the structures or work authorized by this permit are still in existence at the time the property is transferred, the terms and conditions of this permit will continue to be binding on the new owner(s) of the property. To validate the transfer of this permit and the associated liabilities associated with compliance with its terms and conditions, have the transferee sign and date below.

(TRANSFEREE)

(DATE)

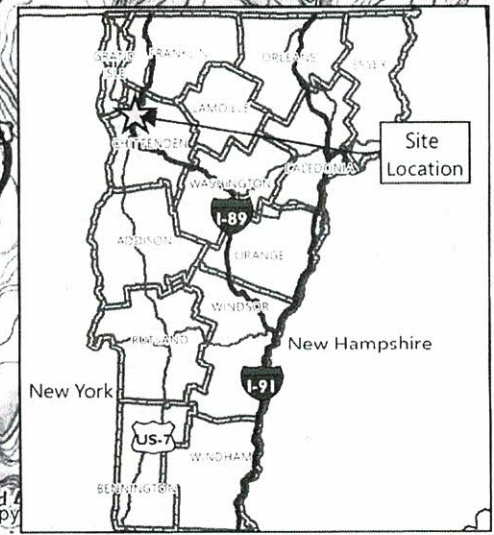


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Colchester NH 028-1(31)
I-89 Exit 17 Interchange Reconstruction

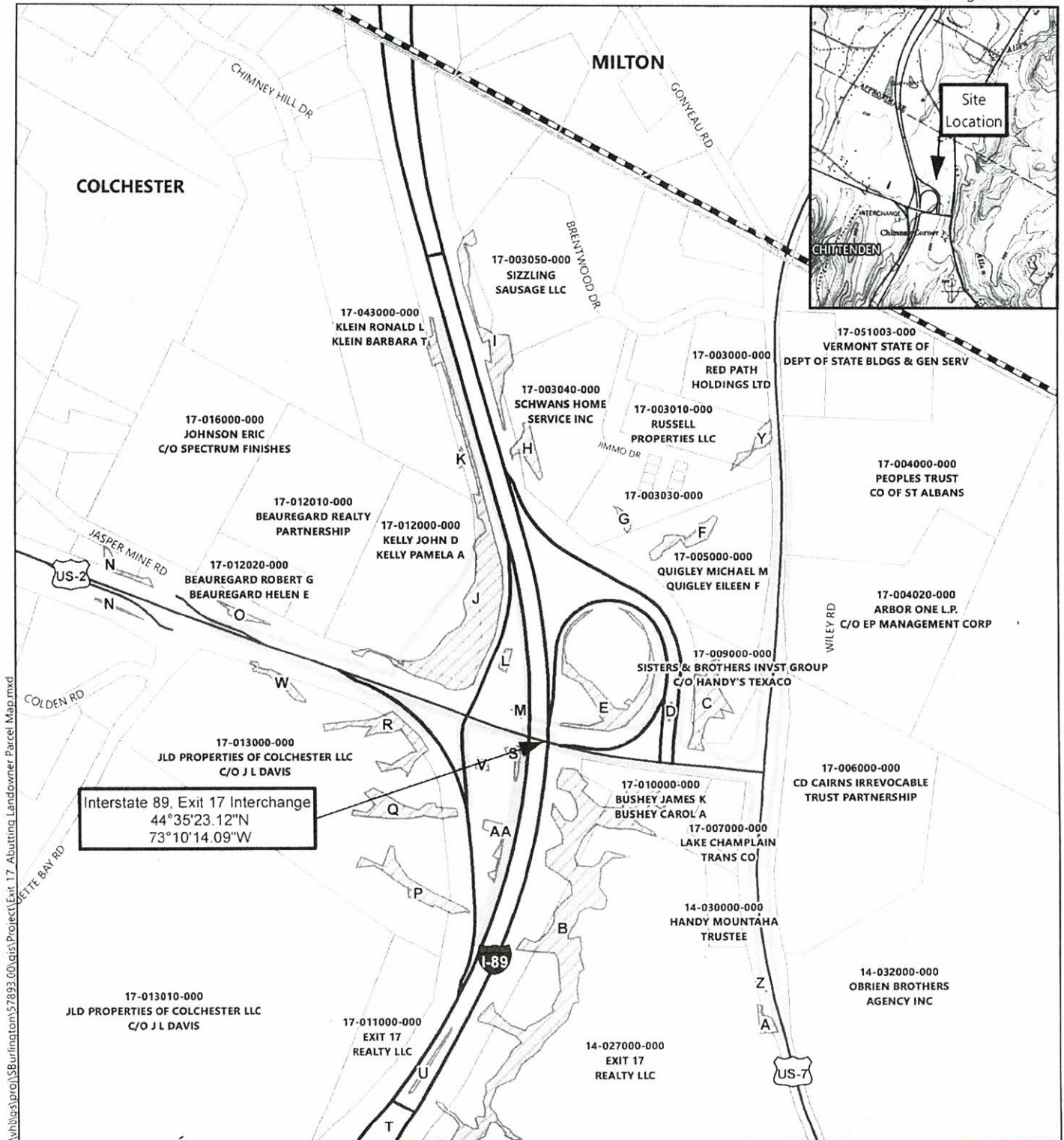
Colchester, Vermont



Location Map

Study Area	VHD Stream (VCGI)	US Highway (VTrans)
VSWI Wetland (ANR)	Town Boundary (VCGI)	State Highway (VTrans)
VHD Waterbody (VCGI)	Interstate (VTrans)	Town Road (VTrans)

Sources:
VCGI (Vermont Center for Geographic Information - Various Dates)
VTrans (Vermont Agency of Transportation - 2018)
VHB/ERE - 2018



\\vhb\gis\proj\58\Burlington\57893.00\GIS\Project\Exit 17 Abutting Landowner Parcel Map.mxd



- Limit of Disturbance (VHB 2019)
- Delineated Wetland (NEC 2016)
- Parcel Boundaries (VCGI)
- Interstate
- US Highway
- State Highway
- Town Road

Sources

VCGI (Vermont Center for Geographic Information - Various Dates)
 VOGP (Vermont Open Geodata Portal - Various Dates)
 VHD (Vermont Hydrography Dataset - 2017)
 VTTrans (Vermont Agency of Transportation - 2017)
 Town of Colchester Online GIS Map & Assessment Data - Various Dates
 VHB - 2017/2018



DEPARTMENT OF THE ARMY
US ARMY CORPS OF ENGINEERS
NEW ENGLAND DISTRICT
696 VIRGINIA ROAD
CONCORD MA 01742-2751

August 14, 2023

CENAE-RDNH/VT-62
Regulatory Division
File Number: NAE-2017-00358-M1

Mr. Glenn Gingras
VTrans Senior Biologist
Vermont Agency of Transportation
219 North Main Street
Barre, Vermont 05641
Sent by email: Glenn.Gingras@vermont.gov

Dear Mr. Gingras:

In accordance with VHB's request on your behalf, your Department of the Army permit, number NAE-2017-00358, which was issued June 16, 2020, is hereby amended as shown on the attached plans, in four sheets, entitled "COLCHESTER NH 028-1(31)" (dated "6/22/2023") and "I-89 Exit 17 interchange Project – Colchester NH 028-1(31)" (dated "August 22, 2019", last revised "July 25, 2023"). The new work will impact an additional 16,068 sq. ft. of waters of the United States in conjunction with the I-89 Exit 17 Interchange Reconstruction Project in Colchester, Vermont.

The permit Special Condition #3 is also amended as follows:

Compensatory mitigation shall consist of purchasing 1.243 credits from the Ducks Unlimited – Vermont In-Lieu Fee (ILF) Program for impacts to the Richelieu Service Area. The permittee shall pay \$248,600.00 to "Ducks Unlimited, Inc." for the purchase of these credits and send a cashier's check or bank draft to "Michelle Burdick, Ducks Unlimited, 7322 Newman Boulevard, Building 2, Dexter, MI 48130." The check must include the Corps file number NAE-2017-00358 and the statement: "For ILF account only". Work shall not begin until the Corps receives a copy of the letter from Ducks Unlimited to the permittee stating that Ducks Unlimited has received the check and accepts responsibility for mitigation. The in-lieu fee amount is valid for one year from the date of this permit and is subject to change.

All other terms and conditions of the original permit remain in full force and effect.

We continually strive to improve our customer service. In order for us to better serve you, we would appreciate your completing our Customer Service Survey located at <https://regulatory.ops.usace.army.mil/customer-service-survey>.

If you have any questions, please contact Michael S. Adams of my staff at (802) 872-2893.

Sincerely,

Frank J Del
Giudice

Digitally signed by Frank J Del Giudice
Date: 2023.08.15 10:29:50 -0400

Frank J. DelGiudice
Chief, NH & VT Section
Regulatory Division

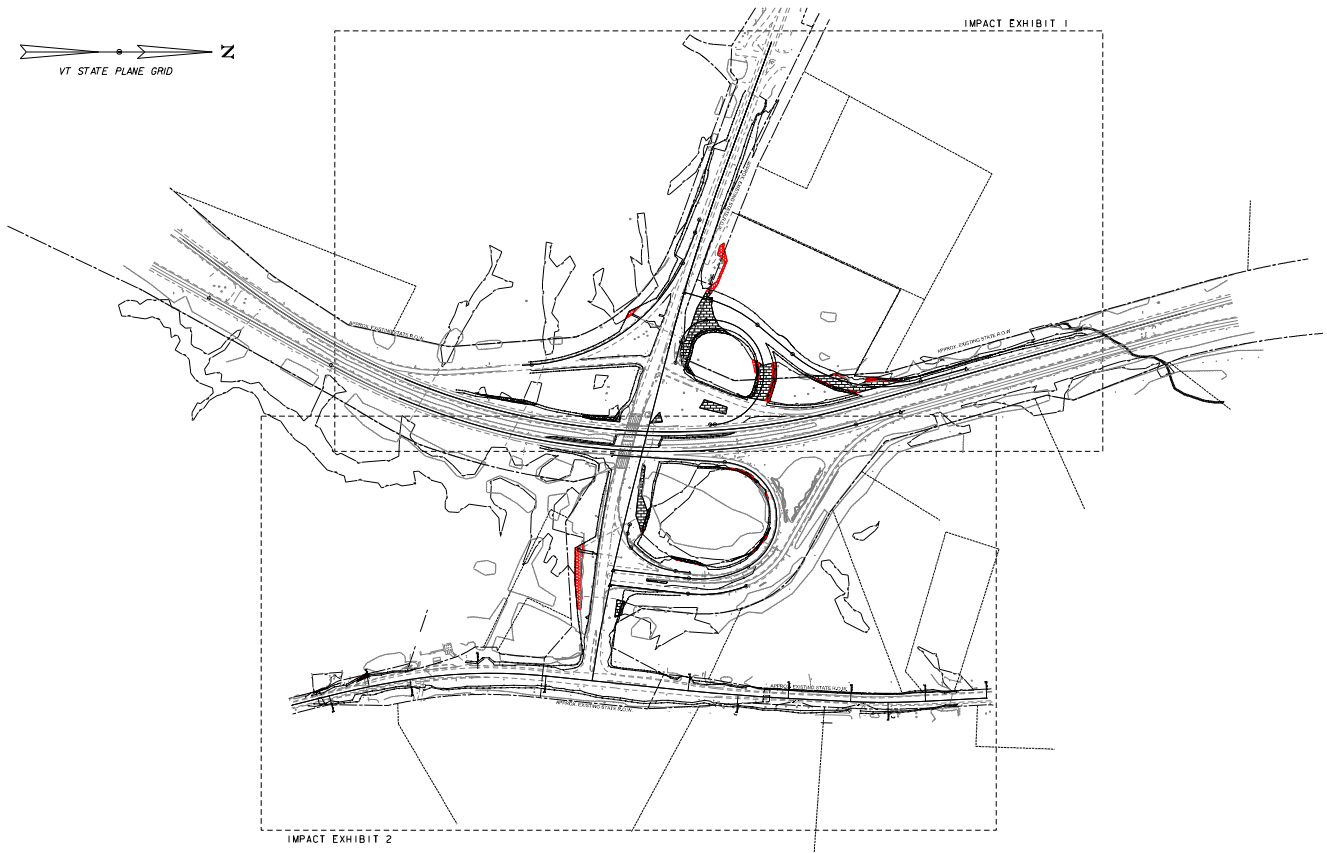
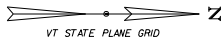
Attachments

Copies Furnished:

Ms. Tina Heath, VT DEC, tina.heath@vermont.gov

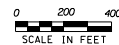
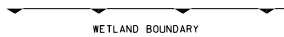
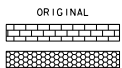
Ms. Patti Kallfelz-Werts, VHB, pkallfelz-werts@vhb.com

Mr. Glenn Gingras, VTrans, Glenn.Gingras@vermont.gov



PERMANENT WETLAND IMPACT

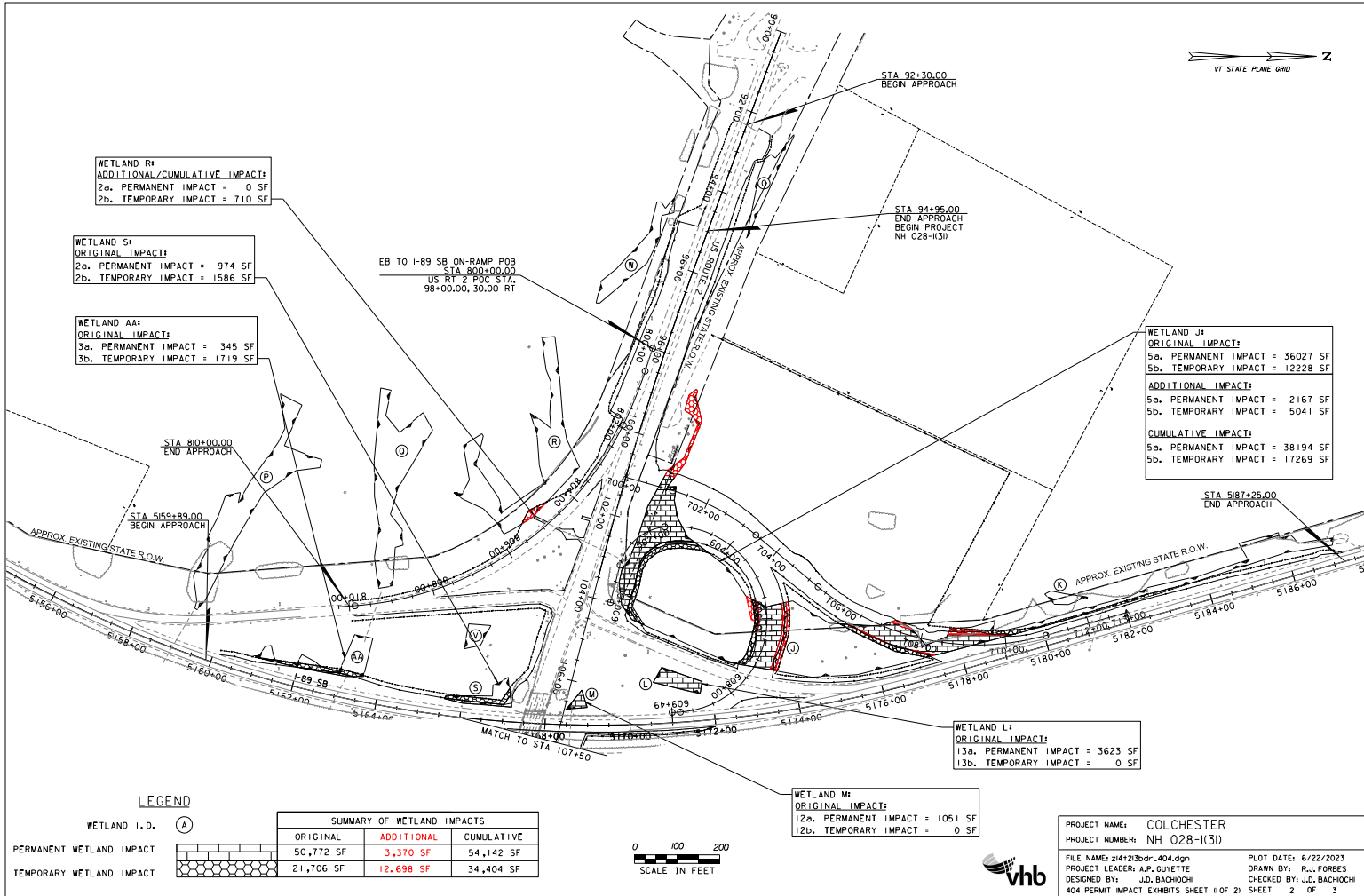
TEMPORARY WETLAND IMPACT

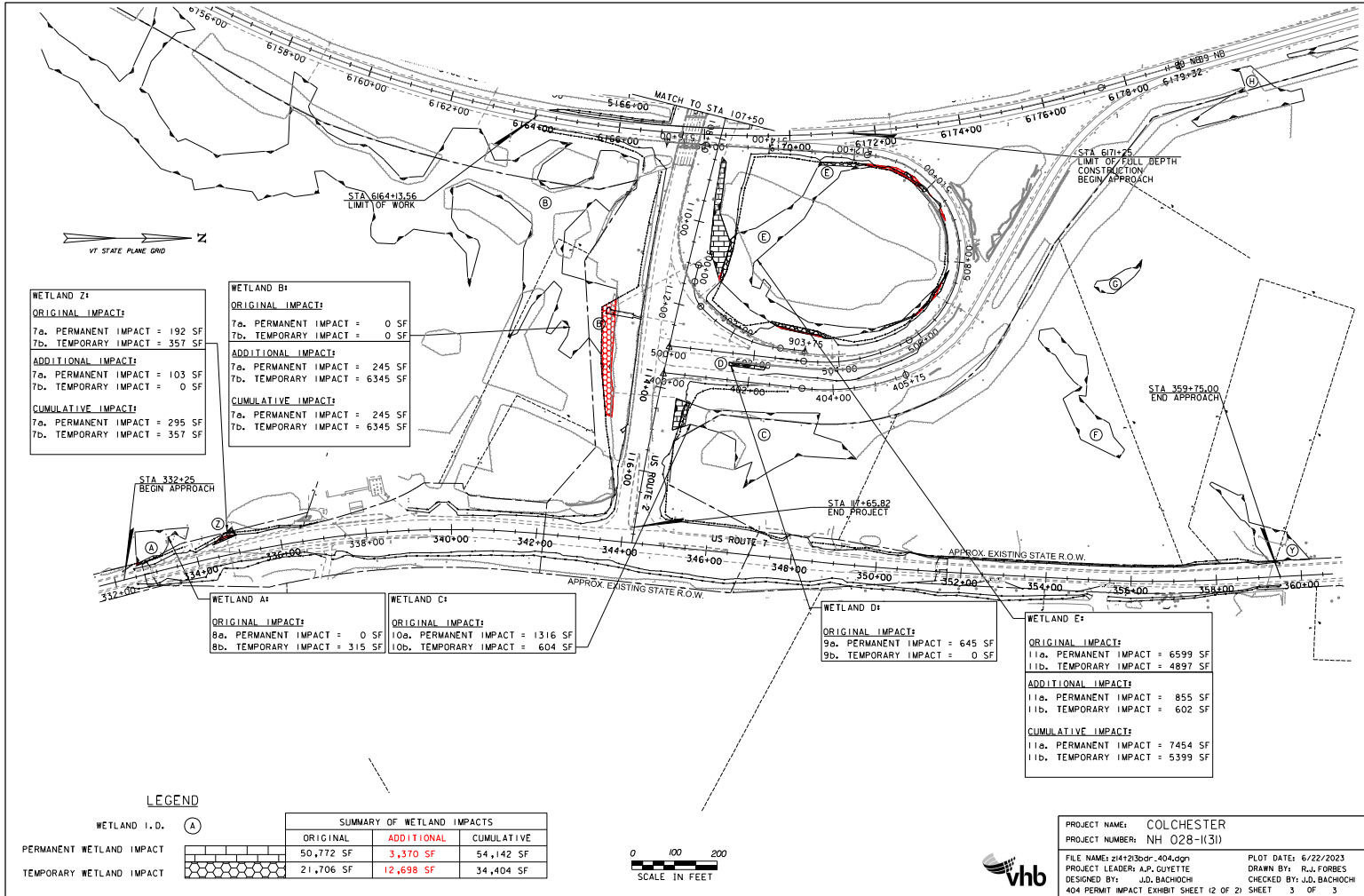


PROJECT NAME: COLCHESTER
PROJECT NUMBER: NH 028-1(31)

FILE NAME: z14+213dr_404.dgn
PROJECT LEADER: A.P. GUYETTE
DESIGNED BY: J.D. BACHIOCHI
404 PERMIT IMPACT INDEX SHEET

PLOT DATE: 6/22/2023
DRAWN BY: R.J. FORBES
CHECKED BY: J.D. BACHIOCHI
SHEET 1 OF 3







Vermont Agency of Transportation
I-89 Exit 17 Interchange Project - Colchester NH 028-1(31)
USACE Individual CWA Section 404 Permit NAE-2017-00358
Prepared by: VHB
August 22, 2019
Last Revised: July 25, 2023

Wetland ID	USACE Individual CWA Section 404 Permit - Summary of Impacts							
	Permitted Permanent Wetland Impact Area (SF)	Additional Permanent Wetland Impact Area (SF)	Permitted Temporary Wetland Impact Area (SF)	Additional Temporary Wetland Impact Area (SF)	Total Permanent Wetland Impacts (SF)	Total Temporary Wetland Impacts (SF)	TOTAL WETLAND IMPACTS (SF)	TOTAL WETLAND IMPACTS (ACRES)
A	0	0	315	0	0	315	315	0.007
B	0	245	0	6,345	245	6,345	6,590	0.151
C	1,316	0	604	0	1,316	604	1,920	0.044
D	645	0	0	0	645	0	645	0.015
E	6,599	855	4,897	602	7,454	5,499	12,953	0.297
J	36,027	2,167	12,228	5,041	38,194	17,269	55,463	1.273
L	3,623	0	0	0	3,623	0	3,623	0.083
M	1,051	0	0	0	1,051	0	1,051	0.024
R	0	0	0	710	0	710	710	0.016
S	974	0	1,586	0	974	1,586	2,560	0.059
Z	192	103	357	0	295	357	652	0.015
AA	345	0	1,719	0	345	1,719	2,064	0.047
TOTAL IMPACTS:	50,772	3,370	21,706	12,698	54,142	34,404	88,546	2.033

**VERMONT AGENCY OF NATURAL RESOURCES
DEPARTMENT OF ENVIRONMENTAL CONSERVATION**

INDIVIDUAL WETLAND PERMIT AND DETERMINATION

In the matter of:

Vermont Agency of Transportation (VTrans) c/o Glenn Gingras
One National Life Drive
Montpelier, VT 05633

**Application for the improvements at the existing Interstate 89 (“I-89”) Exit 17 interchange
including roadway reconstruction to reduce traffic congestion and improve safety for
vehicles, cyclists, and pedestrians with proposed impacts to 61,671 square feet of wetland
and 54,694 square feet of buffer zone.**

I-89 Exit 17 interchange, Colchester

File #: 2016-649
DEC ID #: EJ19-0301

Date of Decision: June 29, 2020
Permit Decision: **Approved**
Wetland Determination: **Class II**
Permit Expiration: June 29, 2024

Any activity in a Class I or Class II wetland or its associated buffer zone is prohibited unless it is an allowed use under the Vermont Wetland Rules (VWR) or unless it receives a permit allowing such activity. 10 V.S.A. § 913. Applicants for an individual permit for a proposed activity in any Class I or Class II wetland or its buffer zone must demonstrate that the proposed activity complies with the VWR and will have no undue adverse effects on protected functions and values. VWR § 9.5(a).

The Secretary may, upon a petition or on his or her own motion, determine whether any wetland is a Class II wetland or a Class III wetland, pursuant to 10 V.S.A. § 914 and the Vermont Wetland Rules, Vt. Code R. 12 004 056 (VWR). The Secretary may establish the necessary width of a buffer zone of any Class II wetland as part of any wetland determination pursuant to the Rules.

As required under 10 V.S.A. § 914 and Section 8 of the VWR, this wetland determination is based on an evaluation of the functions and values of the subject wetland as described in Section 5 of the VWR. Public notice of this wetland determination has been given in accordance with Section 8.3 of the VWR.

The Vermont Agency of Natural Resources (Agency) received an application and petition (application) dated October 8, 2019 from Vermont Agency of Transportation (VTrans) c/o Glenn Gingras (permittee) seeking an individual Vermont Wetland Permit for a project involving activities in wetlands and associated buffer zones located in Colchester, Vermont. The Agency gave notice of the application in accordance with the VWR. The Agency considered all comments

received during the public comment period during review of the application and issuance of this permit.

DECISION AND PERMIT CONDITIONS

1. Based on the Findings contained in this permit below, the Secretary has determined that the proposed project will comply with 10 V.S.A. chapter 37 and the VWR and will have no undue adverse effect on protected functions and values of the wetlands. The permittee has demonstrated that the project will have no undue adverse effects on the protected functions and values of the significant wetlands and associated buffer zones, provided the project is conducted in accordance with the following conditions:
 - A. All activities in the wetlands and buffer zones shall be completed, operated, and maintained as set forth in the permit application #2016-649 and the supporting materials submitted with the permit application including site plans titled *VWP Impact Exhibit, I-89 Exit 17 Interchange Project – Colchester, NH 028-1(31), Sheet 1 of 3 through 3 of 3, dated 9/24/2019*. No material or substantial changes shall be made to the project without the prior written approval of the Vermont Wetlands Program. Project changes, including transfer of property ownership prior to commencement of a project, may require a permit amendment and additional public notice.
 - B. Prior to commencement of the approved project, the permittee shall notify the Vermont Wetlands Program electronically in writing of the date the project will commence.
 - C. **Prohibitions:** No additional activities are allowed in the wetlands and associated buffer zones without the approval of the Secretary unless such activities are allowed uses under VWR § 6. No draining, dredging, filling, grading, or alterations of the water flow is allowed. No cutting, clearing, or removal of vegetation within the wetlands and buffer zones is allowed with the exception of the proposed project area as approved by this permit.
 - D. This permit expires five years from the date of issuance. If the permittee has not completed all construction activities covered by this permit before the expiration date and wishes to continue construction, the permittee must request a permit extension or apply for a new permit. Any request for an extension must be received by the Agency at least 30 days prior to the end of the five-year period in order to prevent the expiration of the permit. A request for extension may be considered a minor modification at the discretion of the Secretary. Pursuant to VWR § 9.1, projects may not be extended beyond ten years of the issuance date.
 - E. Wetland boundary delineations are valid for five years. The delineations will need to be re-evaluated by a qualified wetland consultant if the project is not constructed during the five-year period and a request for an extension is submitted.
 - F. Within 30 days of completion of the work approved by this permit, the permittee shall supply the Vermont Wetlands Program with a letter certifying that the project was constructed in compliance with the conditions of this permit.

- G. If a stormwater construction permit is obtained for this project, the erosion prevention and control requirements of that permit shall be followed. At minimum, the permittee shall comply with the following: A continuous line of silt fence shall be properly installed by the permittee immediately upgradient of the snow fence or tape prior to any construction and shall be regularly maintained. Care shall be taken to ensure that silt fence is installed on the contour and not in areas of concentrated flow such as stream channels or ditches. Sediment shall be cleaned out before and after any significant storm event or when sediment has reached less than half the height of the fence. Removed sediments shall be disposed of in a stable, upland area outside the 50-foot buffer zone at least 100 feet from waters of the state and stabilized immediately with seed and mulch at a minimum. All other disturbed soils shall be seeded and mulched within 48 hours of final grading. All sediment barriers and construction fencing shall be removed following the successful establishment of vegetation.
- H. If a stream alteration permit is obtained for this project, the requirements of that permit shall be followed. If no stream alteration permit was required, the permittee shall comply with the following: The method of installing culverts and improving existing hydrologic connections shall be that which presents the least disturbance of stream flow and prevents any discharge of sediment downstream. Stream flow at all times shall be diverted from the work area. The contractor's equipment shall be clean and well maintained, free of fuel, hydraulic, and gear oil leaks, especially if such equipment is to be used in or adjacent to the water. There shall be absolutely no discharge of uncured concrete to the stream flow. Pumping from excavation areas shall be discharged to an overland area or settling basin such that the effluent shall be essentially clarified before reentering the stream flow. All areas of stream bank disturbed during construction shall be suitably reshaped and stabilized with stone fill or a vegetative planting prior to completion of the project. Additionally, the extent of stream bank disturbance shall be strictly limited, and all existing vegetation maintained to the greatest degree practicable. Stream work shall be limited to the period June 1 to October 1. Culvert invert elevations shall be installed six inches below the stream bed level.
- I. All contractors' equipment shall be cleaned so as to contain no observable soil or vegetation prior to work in wetlands and buffer zones to prevent the spread of invasive species. The permittee shall monitor the portion of the wetlands in question annually during early July for five years following construction for project introduced nuisance plant species such as purple loosestrife (*Lythrum salicaria*) and common reed (*Phragmites australis*). All nuisance plants found shall be pulled by hand and disposed of by burial or burning in a non-wetland location. If hand pulling is not feasible, a state approved invasive species control plan is required.
- J. The permittee shall retain an environmental compliance monitor to be on site during all site preparation and construction related activities taking place in the Class II wetland and buffer zone to assure compliance with the conditions of this permit. An onsite preconstruction meeting shall be scheduled with the Agency Wetlands Program prior to project commencement.

- K. A preconstruction meeting will be scheduled with the monitor and Agency Wetlands Program prior to project commencement. The permittee shall contact the Agency two weeks in advance of the proposed preconstruction meeting date. The monitor will immediately notify the Agency of any non-permitted disturbance to the wetland or buffer zone. A site inspection with the Agency Wetlands Program will be scheduled within 20 days of the completion of construction and installation.
 - L. The Permittee will purchase mitigation credits from the Vermont in-lieu fee program, administered by Ducks Unlimited, Inc. for Vermont, as compensation for unavoidable impacts which would result from Project execution. The credit amounts are to be calculated by the Army Corps of Engineers and approved by the Agency.
-
- 2. The Secretary maintains continuing jurisdiction over this project and may at any time order that remedial measures be taken if it appears that undue adverse impacts to the protected functions and values of the wetland or buffer are occurring or will occur.
 - 3. This permit does not relieve the permittee of the responsibility to comply with any other applicable federal, state, and local laws, regulations, and permits.
 - 4. The permittee shall allow the Secretary or the Secretary's representatives, at reasonable times and upon presentation of credentials, to enter upon and inspect the permitted property for the purpose of ascertaining compliance with this permit, the VWR, and the Vermont Water Quality Standards, and to have access to and copy all records required to be prepared pursuant to this permit.
 - 5. The Agency accepts no legal responsibility for any damage direct or indirect of whatever nature and by whomever suffered arising out of the approved project. This permit does not convey any property rights in either real or personal property, or any exclusive privileges, nor does it authorize any injury to public or private property, or any invasion of personal rights, or any infringement of federal, state, or local laws or regulations. This permit does not obviate the necessity of obtaining such federal, state, or local permits or approvals as may be required by law. Nothing in this permit shall be construed to preclude the institution of legal action or relieve the permittee from any responsibilities, liabilities, or penalties to which the permittee is or may be subject to under other laws.
 - 6. Within 15 days of the date of the decision, the permittee, any person entitled to notice under VWR § 9.2, or any person who filed written comments regarding the permit application may request in writing reconsideration of the decision by the Secretary in accordance with VWR § 9.6.

DETERMINATION DECISION

- 1. Based on the Findings listed below, the Secretary has determined that the wetlands J, C, and E under consideration are Class II wetlands.
- 2. Unless otherwise designated by the Secretary, a fifty (50) foot buffer zone is established contiguous to the boundaries of a Class II wetland. VWR §4.2.

3. Activity in a Class II wetland or its associated buffer zone is prohibited unless it is an allowed use under the VWR, or unless it is authorized by a permit, conditional use determination or order issued by the Secretary. The Secretary may impose any permit conditions as necessary to achieve the purposes of the VWR. Section 9.1 of the VWR. This Determination does not relieve the petitioner or any other person of the responsibility to comply with all other applicable federal, state or local laws. The attached mapping of the wetland shall be added to the Vermont Significant Wetlands Inventory.
4. Activity in a Class III wetland or its associated buffer zone is not prohibited under the Vermont Wetland Rules. This Determination does not relieve the petitioner or any other person of the responsibility to comply with all other applicable federal, state or local laws.
5. Within 15 days of the date of this decision, the applicant, any person entitled to notice under Section 8.3(a) of the VWR, or any person who filed written comments regarding the permit application may request in writing reconsideration by the Secretary. Section 8.4 of the VWR. Such a request shall specify all action(s) for which reconsideration is sought and shall provide an explanation of the reason(s) why the request is filed. Where a request for reconsideration has been properly filed, additional evidence may be submitted concerning the functions and values of the wetland and concerning any other material issue as deemed appropriate by the Secretary. The Secretary may appoint a designee, who shall be at the Division Director level or higher, to render a decision on the request for reconsideration. The Secretary's written reconsideration decision shall be issued as expeditiously as possible under the circumstances and shall be distributed in accordance with §8.3(c) of the Wetland Rules. If the Secretary fails to act on a request for reconsideration within 20 days of its filing, the request shall be deemed to be denied. The Secretary's written reconsideration decision shall constitute a final act or decision of the Secretary, subject to appeal pursuant to 10 V.S.A. § 8504 and Section 10 of these Rules.
6. No request for reconsideration may be filed concerning or resulting from a request for reconsideration. If the Secretary fails to act on a request for reconsideration within 20 days of its filing, the request shall be deemed to be denied.
7. Filing a timely request for reconsideration with the Secretary tolls the 30-day period for filing an appeal with the Environmental Court. The full time for appeal shall commence to run and shall be computed from the date of the issuance of the Secretary's decision on the reconsideration request.

GENERAL CONDITIONS

The following conditions shall apply to both the wetlands permit and determination:

1. **Appeals.** Any person with an interest in this matter may appeal this decision pursuant to 10 V.S.A. § 917. Pursuant to 10 V.S.A. chapter 220, an aggrieved person shall not appeal this permit to the Environmental Division of the Vermont Superior Court unless the person submitted to the Secretary a written comment during the applicable public comment period

or an oral comment at the public meeting conducted by the Secretary. Absent a determination of the Environmental judge to the contrary, an aggrieved person may only appeal issues related to the person's comments to the Secretary as prescribed by 10 V.S.A. § 8504(d)(2). Any appeal of this decision must be filed with the clerk of the Environmental Division of the Superior Court within 30 days of the date of the decision. The Notice of Appeal must specify the parties taking the appeal and the statutory provision under which each party claims party status; must designate the act or decision appealed from; must name the Environmental Division; and must be signed by the appellant or their attorney. In addition, the appeal must give the address or location and description of the property, project, or facility with which the appeal is concerned; the name of the permittee; and any permit involved in the appeal. The appellant must also serve a copy of the Notice of Appeal in accordance with Rule 5(b)(4)(B) of the Vermont Rules for Environmental Court Proceedings. For further information, see the Vermont Rules for Environmental Court Proceedings, available on line at www.vermontjudiciary.org. The address for the Environmental Division is: 32 Cherry Street, 2nd Floor, Suite 303, Burlington, VT 05401 (Tel. # 802-951-1740).

FINDINGS

1. The Agency received a complete permit application and determination petition from Vermont Agency of Transportation (VTrans) c/o Glenn Gingras for a Vermont Wetland Permit and wetland determination on October 8, 2019.
2. The wetlands and adjacent 50-foot buffer zones are located around the I-89 Exit 17 interchange and/or junctions of US 2 and US 7 (Chimney Corners).
3. Brock Freyer District Wetlands Ecologist, conducted a site visit to the subject property with April Moulaert and Alex Marcucci (NEC) on 11/14/2016.
4. The wetland J is identified as a palustrine wetland on the Vermont Significant Wetlands Inventory maps and therefore designated as a Class II wetland under VWR § 4.6.
5. The wetlands C and E meet the presumptions listed in VWR § 4.6, the wetland is of the same type and threshold size as those mapped on the VSWI maps or greater than 0.5 acres (VWR §4.6a).
6. The wetland complexes and the subject wetlands in question are described in detail in the multiple wetland application table of the permit application and summarized in Table 1.

Table 1: Wetland Descriptions

Wetland IDs	Location of Wetland	Classification Presumption	Size of Wetland in Acres	Vegetation Cover Types	Landscape Position	Wetland Hydrology
J	West of the I-89 South Entrance/Exit and directly east of Jasper Mine Road terminus.	The wetland is mapped on the VSWI map.	~3.4 acres	50% emergent wetland, 50% emergent swamp	Depressional area adjacent to interstate entrance/exit ramp	Poorly drained soils that collect precipitation and stormwater runoff
C	East of the I-89 North Entrance/Exit Ramp, directly north of Roosevelt Hwy (US 2) and 115 feet west of US 7.	Same type and size as VSWI wetlands or over 0.5 acres	~0.83 acre	100% emergent wetland	Depressional area adjacent to interstate entrance/exit ramp	Poorly drained soils that collect precipitation and stormwater runoff
E	Within the I-89 North Entrance/Exit Ramp and directly north of Roosevelt Hwy (US Route 2).	Same type and size as VSWI wetlands or over 0.5 acres	~1.1 acres	100% emergent wetland	Depressional area within interstate entrance/exit ramp	Poorly drained soils that collect precipitation and stormwater runoff

7. The proposed project is described in detail in Sections 17 and 18 of the permit application. The project consists of improvements at the existing Interstate 89 (“I-89”) Exit 17 interchange including roadway reconstruction to reduce traffic congestion and improve safety for vehicles, cyclists, and pedestrians.
8. Proposed impacts to the wetlands and buffer zones, summarized in Section 19 of the permit application and multiple wetland application table of the permit application, are as follows:

Wetland Alteration:		Buffer Zone Alteration:	
Wetland Fill:	43,942 sq.ft.		
Temporary:	17,729 sq.ft.	Temporary:	10,303 sq.ft.
Other Permanent:	0 sq.ft.	Permanent:	44,391 sq.ft.
Total Wetland Impact	61,671 sq.ft.	Total Buffer Zone Impact:	54,694 sq.ft.

9. The protected functions of the wetlands include the following: water storage for flood water and storm runoff (VWR § 5.1), surface and groundwater protection (VWR § 5.2), and wildlife (VWR § 5.4).
10. The following functions are either not present or are present at such a minimal level as to not be protected functions: fish habitat (VWR § 5.3), exemplary wetland natural community (VWR § 5.5), threatened and endangered species habitat (VWR § 5.6), education and research in natural sciences (VWR § 5.7), recreational value and economic benefits (VWR § 5.8), open space and aesthetics (VWR § 5.9), and erosion control through binding and stabilizing the soil (VWR § 5.10).
11. Wetlands J, C, and E are significant for water storage for flood water and storm runoff function as demonstrated in Section 7 of the permit application and wetlands evaluation form. Based on the factors described in Section 7.2 of the application, as confirmed through a site visit by Agency staff, the proposed project will not result in an undue adverse impact to this function.
12. Wetlands J, C, and E are significant for the surface and ground water protection function as described in Section 8 of the permit application and wetlands evaluation form. Based on the factors described in Section 8.2 of the application and multiple wetlands application table, as confirmed through a site visit by Agency staff, the proposed project will not result in an undue adverse impact to this function.
13. Wetlands J is significant for the wildlife habitat function as described in Section 10 of the permit application and wetlands evaluation form. Based on the factors described in Section 10.2 of the application and multiple wetlands application table, as confirmed through a site visit by Agency staff, the proposed project will not result in an undue adverse impact to this function.
14. Under 10 V.S.A. § 913 and VWR § 9.5, the Secretary may authorize activities in a Class II wetland or in its buffer zone if the Secretary determines that it complies with the VWR and will have no undue adverse effect on the protected functions and values. Based on the permit application, the site visit(s) by Agency staff, and the foregoing findings and analysis, the

Secretary has determined that the proposed project will have no undue adverse effects on the protected functions and values of the Class II wetlands.

15. Pursuant to VWR § 9.5(b), the permittee has demonstrated that the proposed activity in the wetlands cannot practicably be located outside the wetlands or on another site owned, controlled, or available to satisfy the basic project purpose. All practicable measures have been taken in this proposal to avoid adverse impacts on protected functions, as described in the application.

In summary, the Project performed an Alternatives Analysis and determined the proposed alternative to be the most practicable and least adverse to wetland impacts. For those unavoidable impacts, the Project will be purchasing mitigation credits from the Vermont in-lieu fee program as determined by the Army Corps of Engineers and approved by the Agency.

16. No public comments were received during the public comment period.

Peter Walke, Commissioner
Department of Environmental Conservation

E-SIGNED by Laura Lapierre
by: on 2020-06-29 15:39:35 GMT

Laura Lapierre, Program Manager
Wetlands Program
Watershed Management Division

Dated at Montpelier, Vermont
this twenty-ninth day of June 2020

PW/LVPL/JBF

**VERMONT AGENCY OF NATURAL RESOURCES
DEPARTMENT OF ENVIRONMENTAL CONSERVATION**

INDIVIDUAL WETLAND PERMIT MAJOR AMENDMENT

In the matter of:

Vermont Agency of Transportation, c/o Glenn Gingras
219 North Main Street
Barre, Vermont 05641

I-89 Exit 17 Interchange, Colchester

File #: 2016-649.01

Date of Amendment: October 10, 2023
Decision: **Amended**

The Vermont Agency of Natural Resources (Agency) received a request dated May 2, 2023, from the Vermont Agency of Transportation, c/o Glenn Gingras (permittee) seeking an amendment to an Individual Wetland Permit for a project involving activities in a wetland and associated buffer zone located in Colchester, Vermont.

This amendment is for the need of additional staging and access space, as well as hydrology improvements for the reconstruction of the I-89 Exit 17 Interchange permitted under 2016-649, with additional impacts to 15,965 square feet of wetland and 24,446 square feet of buffer zone.

Total impacts for the project are 77,636 square feet of wetland and 79,140 square feet of buffer zone.

The Permittee is required to purchase additional mitigation credits for the Vermont In-Lieu Fee Program, administered by Ducks Unlimited, Inc. for Vermont, as compensation for unavoidable impacts which would result from Project execution. An additional 0.077 credits (\$37,893.17) are required, for a total of 1.243 credits (\$248,000.00), and are to be paid prior to construction commencement.

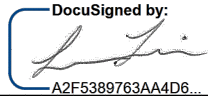
The Agency of Natural Resources finds that the proposed amendment will not result in an undue adverse effect to any of the functions provided by the Class Two wetland or the adjacent 50-foot buffer zone located at the I-89 Exit 17 Interchange, Colchester, Vermont. Other than the revisions described in this amendment, all other aspects of this project, such as the expiration date or reporting

2 of 2

Vermont Agency of Transportation, c/o Glenn Gingras
2016-649.01

requirements, shall be carried out consistent with the original proposal and conditions listed in Vermont Wetlands Individual Permit 2016-649.

Julie S. Moore, Secretary
Agency of Natural Resources

by: 
Laura Lapierre, Program Manager
Wetlands Program
Watershed Management Division

Dated at Montpelier, Vermont
this tenth day of October 2023

JSM/LVPL/TMH

State of Vermont
NATURAL RESOURCES BOARD
DISTRICT #4 ENVIRONMENTAL COMMISSION
111 West Street Essex Junction VT 05452

State of Vermont
Agency of Transportation
219 North Main Street
Barre, VT 05641

Application #4C1326
Decision and Order
10 V.S.A. Chapter 151 (Act 250)

Decision and Order
Re: Permittee's Motion to Alter

I. Procedural Background

On October 17, 2019, the State of Vermont Agency of Transportation, 1 National Life Drive, Montpelier, VT 05633 filed application number #4C1326 for a project generally described as improvements to the existing I-89 interchange at Exit 17 including reconstruction of the highway overpass and reconfiguration of the on and off-ramps. The Project is located on I-89 at Exit 17 in Colchester, Vermont.

On October 8, 2020, the Commission issued Land Use Permit #4C1326, with permit conditions that had been included in the Commission's draft Permit issued on November 6, 2019.

On October 14, 2020, the District Commission received a Motion to Alter from the Agency of Transportation. The Motion to Alter has three parts relating to the Project completion date, Individual Wetland Permit and Construction Stormwater Permit. No rebuttals were filed.

II. Decision and Order

The Commission considers each item in turn. The first request relates to the Project completion date. Permit Condition 27 states:

27. All site work and construction shall be completed in accordance with the approved plans by October 1, 2023, unless an extension of this date is approved in writing by the Commission. Such requests to extend must be filed prior to the deadline and approval may be granted without public hearing.

The Permittee requests that this condition be revised to state a Project completion date of December 15, 2025.

The Commission denies the request to alter Permit Condition 27. Act 250 has a routine process for extending construction completion dates through administrative amendments. This standard process is an expedited way of allowing Permittees additional construction time within the confines of their other permits. The standard construction completion period is three years; a five-year period is irregular, and no justification for the additional two years was filed.

The second request relates to the Vermont Wetland Permit (Individual Wetland Permit #2016-649 issued on June 29, 2020 by the ANR Watershed Management Division) issued for the Project. Permit Condition 18 states:

18. The Permittee shall maintain an undisturbed, naturally vegetated, unmowed 50-foot buffer from the edge of wetlands and any disturbed areas. Snowplowing or storage of materials within this buffer is prohibited.

The Permittee requests that this condition be removed because it conflicts with the Individual Wetland Permit. Condition 18 imposes a 50 ft wetland buffer on all wetlands, including Class III wetlands. However, the Vermont Wetland Rules regulate Class I & II Wetlands and associated buffers and do not regulate Class III Wetlands. The Individual Wetland Permit allows for construction related impacts to both wetlands and wetland buffers. Additionally, the Individual Wetland Permit allows for final conditions that do not maintain 50 ft. wetland buffers. There are both existing and proposed conditions related to this Project that do not maintain 50 ft. buffers to wetlands. These grassed areas adjacent to the edge of the roadway will be mowed annually and will also be locations where snow is plowed.

The Commission understands the potential conflicting guidance between Permit Condition 18 and the Individual Wetland Permit. The Commission will replace Condition 18 with the following language which should address any potential conflicting guidance:

“The Permittee shall maintain an undisturbed, naturally vegetated buffer zone on the Project Tract within 50 feet of any wetlands as depicted on Exhibit #063 (Individual Wetland Permit) except for impacts authorized by the Vermont Wetland Permit #2016-649. The term “undisturbed” means that there shall be no activities that may cause or contribute to ground or vegetation disturbance or soil compaction, including but not limited to construction, earth-moving activities, storage of materials, tree trimming or canopy removal, tree, shrub or groundcover removal; plowing or disposal of snow, grazing or mowing.”

The third request relates to the Construction Stormwater Permit (Authorization of Notice of Intent #8938-INDC under Individual Discharge Permit for Stormwater Runoff from Construction Activities (NPDES Number: VTS006217) issued on June 11, 2020 by the ANR Watershed Management Division) issued for the Project. The three permit conditions at issue are as follows:

15. All disturbed areas of the site shall be stabilized, seeded and mulched immediately upon completion of final grading. All disturbed areas not involved in winter construction shall be mulched and seeded before October 15. Between the periods of October 15 to April 15, all earth disturbing work shall conform with the “Requirements for Winter Construction” standards and specifications of the Department of Environmental Conservation’s *Low Risk Site Handbook for Erosion Prevention and Sediment Control* (February 2020).
16. Prior to construction of the approved work, the Permittee shall: a) clearly delineate the construction limits with flagging or snowfencing; b) place diversion ditches on the uphill limits of the construction area; and c) place temporary siltation controls on the downhill limits of construction.
22. Prior to any site work, the Permittee shall install and maintain temporary fencing along the tree line and around trees to be retained as depicted on Exhibit #021 (Area of Disturbance Map).

The Permittee requests that these three conditions be removed because they conflict with the Construction Stormwater Permit.

The Construction Stormwater Permit contains language that says, “If construction activities involving earth disturbance continue past October 15 or begin before April 15 (Winter Construction), the Permittee shall implement Winter Construction EPSC practices as outlined in the EPSC Plan”. The Permittee asserts that Condition 15 should not refer to stabilization methods

and should not refer to the Low Risk Site Handbook for Erosion Prevention and Sediment Control, since the Project has a site-specific EPSC plan.

The Permittee further asserts that Condition 16 requires construction of EPSC measures that are in conflict with the Project's Construction Stormwater Permit and approved EPSC Plan. The Permittee states that it is impractical to delineate all limits of construction as there are limits of construction within active roadways. Diversion ditches on the uphill limits of the construction area are not required per the Project's Construction Stormwater Permit.

Finally, the Permittee contends that Condition 22 is confusing and contradictory with the Project's Construction Stormwater Permit. The Construction Stormwater Permit identifies areas where Project demarcation fencing and barrier fencing are required. In addition, Exhibit #021 is a general figure of the entire project area and does not show tree lines or any specific trees to be retained.

The Commission grants the requests to remove Permit Conditions 15 and 16 because the Construction Stormwater Permit establishes higher standards for the Project than either of these two conditions. The Commission denies the request to remove Permit Condition 22 as it does not conflict with the Construction Stormwater Permit. To clarify Condition 22, the Commission will reference the Construction Stormwater Permit (Exhibit #060) instead of Exhibit #021 so that there is no question as to the location of Project demarcation fencing and barrier fencing associated with the Project.

In summary, the Commission grants in part and denies in part the Permittee's Motion to Alter request. Permit Condition 27 shall remain unchanged. Permit Conditions 18 and 22 shall be altered with clarifying language. And Permit Conditions 15 and 16 shall be deleted. The Commission will issue Land Use Permit 4C1326 (Altered).

DATED at Essex Junction, Vermont, this 16th day of November, 2020.

By /s/Thomas A. Little, Chair
Thomas A. Little, Chair
District #4 Environmental Commission

Commissioners participating in this decision:

Parker Riehle
James McNamara

Any appeal of this decision must be filed with the Superior Court, Environmental Division within 30 days of the date the decision was issued, pursuant to 10 V.S.A. Chapter 220. The Notice of Appeal must comply with the Vermont Rules for Environmental Court Proceedings (VRECP). The appellant must file with the Notice of Appeal the \$295 entry fee required by 32 V.S.A. § 1431.

The appellant must also serve a copy of the Notice of Appeal on the Natural Resources Board, 10 Baldwin Street, Montpelier, VT 05633-3201, and on other parties in accordance with Rule 5(b)(4)(B) of the Vermont Rules for Environmental Court Proceedings.

Decisions on minor applications may be appealed only if a hearing was held by the district commission. Please note that there are certain limitations on the right to appeal. See 10 V.S.A. § 8504(k).

For additional information on filing appeals, see the Court's website at:

<http://www.vermontjudiciary.org/GTC/environmental/default.aspx> or call 802-951-1740. The Court's mailing address is: Vermont Superior Court, Environmental Division, 32 Cherry Street, 2nd Floor, Suite 303, Burlington, VT 05401.

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State of Vermont

LAND USE PERMIT

CASE NO: 4C1326 (Altered)
State of Vermont
Agency of Transportation
219 North Main Street
Barre, VT 05641

LAWS/REGULATIONS INVOLVED
10 V.S.A. §§ 6001 - 6093 (Act 250)

District Environmental Commission #4 hereby issues Land Use Permit #4C1326, pursuant to the authority vested in it by 10 V.S.A. §§ 6001-6093. This permit applies to the lands identified in deeds recorded in Book 505, Pages 349-354; Book 379, Pages 447-449; Book 129, Pages 355-356; Book 247, Pages 630-632; and Book 380, Page 422 of the land records of Colchester, Vermont.

This permit specifically authorizes improvements to the existing I-89 interchange at Exit 17 including reconstruction of a highway overpass and reconfiguration of on and off-ramps. The Project is located on I-89 at Exit 17 in Colchester, Vermont.

Jurisdiction attaches because the Project constitutes construction of improvements on a tract of land involving more than 10 acres that is to be used for municipal, county or State purposes, pursuant to 10 V.S.A. § 6001 3(A)(v).

1. The Permittee, and its assigns and successors in interest, is obligated by this permit to complete, operate and maintain the project as approved by the District Commission in accordance with the following conditions.
2. The Project shall be completed, operated and maintained in accordance with the conditions of this permit and the permit application, plans, and exhibits on file with the District Environmental Commission and other material representations.

The approved plans are:

Sheets 1-17 of 17 - "Layout Plan (17)," dated October 16, 2019 (Exhibit #004-020);

Sheets 4-6 of 61 - "EPSC Narrative Sheet (3)," dated September 20, 2019 (Exhibit #022-024);

Sheets 24-40 of 61 - "EPSC Construction Site Plan (17)," dated September 20, 2019 (Exhibit #025-041); and

Sheets 58-61 of 61 - "EPSC Details (4)," dated September 20, 2019 (Exhibit #042-045).

3. The Permittee shall comply with all of the conditions of the following Agency of Natural Resources Permits:
 - a. Authorization of Notice of Intent #8938-INDC under Individual Discharge Permit for Stormwater Runoff from Construction Activities (NPDES Number: VTS006217) issued on June 11, 2020 by the ANR Watershed Management Division;

- b. Authorization of Notice of Intent #8938-9015 under General Permit #3-9015 (Stormwater Discharge General Permit), issued on May 29, 2020 by the ANR Watershed Management Division; and
 - c. Individual Wetland Permit #2016-649 issued on June 29, 2020 by the ANR Watershed Management Division.
4. Any nonmaterial changes to the permits listed in the preceding condition shall be automatically incorporated herein upon issuance by the Agency of Natural Resources.
5. Representatives of the State of Vermont shall have access to the property covered by this permit, at reasonable times, for the purpose of ascertaining compliance with Vermont environmental and health statutes and regulations and with this permit.
6. A copy of this permit and plans shall be on the site at all times throughout the construction process.
7. No change shall be made to the design, operation or use of this project without a permit amendment issued by the District Commission or a jurisdictional opinion from the District Coordinator that a permit is not required.
8. Pursuant to 10 V.S.A. § 8005(c), the District Commission may at any time require that the permit holder file an affidavit certifying that the project is in compliance with the terms of this permit.
9. The conditions of this permit and the land uses permitted herein shall run with the land and are binding upon and enforceable against the Permittee and their successors and assigns.
10. The Permittee shall apply and maintain water and/or other agents approved by the Watershed Management Division in the Project's Erosion Prevention and Control Plan on all roadways or disturbed areas within the project during construction and until pavement and/or vegetation is fully established to control dust.
11. The Permittee shall comply with the Agency of Natural Resources' *Best Management Practices for Blasting Activities to Avoid Environmental Contamination* (2016). The Permittee shall also comply with Exhibit #065 (Sample Drilling and Blasting Specification) should blasting be required.
12. The Permittee shall comply with Exhibits #022-045 (EPSC Plans) for erosion prevention and sediment control. The Permittee shall prevent the transport of any sediment beyond that area necessary for construction approved herein. All erosion prevention and sediment control devices shall be periodically cleaned, replaced and maintained until vegetation is permanently established on all slopes and disturbed areas.
13. All mulch, siltation dams, water bars and other temporary devices shall be installed immediately upon grading and shall be maintained until all roads are permanently surfaced and all permanent vegetation is established on all slopes and disturbed areas. Topsoil stockpiles shall have the exposed earth completely mulched and have siltation checks around the base.
14. All areas of disturbance must have temporary or permanent stabilization within 14 days of the initial disturbance. After this time, any disturbance in the area must be stabilized at

the end of each work day. The following exceptions apply: i) Stabilization is not required if work is to continue in the area within the next 24 hours and there is no precipitation forecast for the next 24 hours. ii) Stabilization is not required if the work is occurring in a self-contained excavation (i.e. no outlet) with a depth of 2 feet or greater (e.g. house foundation excavation, utility trenches).

15. Deleted
16. Deleted
17. In addition to conformance with all erosion prevention and sediment control conditions, the Permittee shall not cause, permit or allow the discharge of waste material into any surface waters. Compliance with the requirements of this condition does not absolve the Permittee from compliance with 10 V.S.A. (§§ 1250-1284) Chapter 47, Vermont's Water Pollution Control Law.
18. [Altered] The Permittee shall maintain an undisturbed, naturally vegetated buffer zone on the Project Tract within 50 feet of any wetlands as depicted on Exhibit #063 except for impacts authorized by the Vermont Wetland Permit #2016-649. The term "undisturbed" means that there shall be no activities that may cause or contribute to ground or vegetation disturbance or soil compaction, including but not limited to construction, earth-moving activities, storage of materials, tree trimming or canopy removal, tree, shrub or groundcover removal; plowing or disposal of snow, grazing or mowing.
19. The Project impacts 0.88 of primary agricultural soils (PAS) for which 1.79 acres mitigation are calculated. The Permittee shall mitigate the 0.88 acres of PAS impact if/when the cumulative PAS impacts (from this pending Act 250 Permit application and subsequent amendment impacts on this parcel or involved lands) result in a mitigation area of 2.0 or more acres, as further outlined in Exhibit #049 (Letter dated 5/9/2018 from the Vermont Agency of Agriculture, Food & Markets).
20. Any extracted stumps shall be disposed of on-site above the seasonal high water table and not in any wetland, or at a state-certified stump and inert waste disposal facility, so as to prevent groundwater pollution.
21. The Permittee and all assigns and successors in interest shall continually maintain the landscaping as approved in Exhibit #047 (Natural Resource Assessment Report, pages B-1 – B-3) by replacing any dead or diseased plantings within the season or as soon as possible after the ground thaws, whichever is sooner.
22. [Altered] Prior to any site work, the Permittee shall install and maintain temporary fencing along the tree line and around trees to be retained as depicted in Exhibit #060 (Construction Stormwater Permit).
23. The installation of exterior light fixtures is limited to streetlights for safety purposes in accordance with the VTrans Lighting Design Guide and will be similar to existing light fixtures. Exhibit #001a (Revised Schedule B).
24. Highway signs shall be installed in accordance with the Manual on Uniform Traffic Control Devices, and will be similar in size, appearance, and configuration to existing signs. Exhibit #001a (Revised Schedule B).

25. The Permittee shall provide each prospective purchaser of any interest in this Project a copy of the Land Use Permit before any written contract of sale is entered into.
26. Pursuant to 10 V.S.A. § 6090(b)(1) this permit is hereby issued for an indefinite term, as long as there is compliance with the conditions herein. Notwithstanding any other provision herein, this permit shall expire three years from the date of issuance if the Permittee has not commenced construction and made substantial progress toward completion within the three year period in accordance with 10 V.S.A. § 6091(b).
27. All site work and construction shall be completed in accordance with the approved plans by **October 1, 2023**, unless an extension of this date is approved in writing by the Commission. Such requests to extend must be filed prior to the deadline and approval may be granted without public hearing.
28. The Permittee shall file a Certificate of Actual Construction Costs, on forms available from the Natural Resources Board, pursuant to 10 V.S.A. § 6083a(g) within one month after construction has been substantially completed or two years from the date of this permit, whichever shall occur first. Application for extension of time for good cause shown may be made to the District Commission. If actual construction costs exceed the original estimate, a supplemental fee based on actual construction costs must be paid at the time of certification in accordance with the fee schedule in effect at the time of application. Upon request, the Permittee shall provide all documents or other information necessary to substantiate the certification. Pursuant to existing law, failure to file the certification or pay any supplemental fee due constitutes grounds for permit revocation. The certificate of actual construction costs and any supplemental fee (by check payable to the "State of Vermont") shall be mailed to: Natural Resources Board, 10 Baldwin Street, Montpelier, VT 05633-3201; Attention: Certification.
29. Failure to comply with any condition herein may be grounds for permit revocation pursuant to 10 V.S.A. sec. 6027(g).

Dated at Essex Junction, Vermont, this 16th day of November, 2020.

By /s/Thomas A. Little, Chair
Thomas A. Little, Chair
District #4 Commission

Members participating in this decision:
Parker Riehle
James McNamara

This is an amended decision issued pursuant to Act 250 Rule 31.

If the District Commission issued this amended decision on its own motion, any party may file a motion to alter with the Commission within 15 days from the date of this decision, pursuant to Act 250 Rule 31(A). If the District Commission issued this amended decision in response to a motion to alter filed by a party, then no additional motions to alter this amended decision may be filed.

Any appeal of the Commission's decisions must be filed with the Superior Court, Environmental Division within 30 days of the date this amended decision was issued, pursuant to 10 V.S.A. Chapter 220. The Notice of Appeal must comply with the Vermont Rules for Environmental Court Proceedings. The appellant must file with the Notice of Appeal the relevant entry fee required by 32 V.S.A. § 1431.

The appellant must also serve a copy of the Notice of Appeal on the Natural Resources Board, 10 Baldwin Street, Montpelier, VT 05633-3201, and on other parties in accordance with Rule 5(b)(4)(B) of the Vermont Rules for Environmental Court Proceedings.

Decisions on minor applications may be appealed only if a hearing was held by the district commission. Please note that there are certain limitations on the right to appeal, including appeals from Administrative Amendments and interlocutory appeals. See 10 V.S.A. § 8504(k), 3 V.S.A. § 815, and Vermont Rule of Appellate Procedure 5.

For additional information on filing appeals, see the Court's website at:

<http://www.vermontjudiciary.org/GTC/environmental/default.aspx> or call (802) 951-1740. The Court's mailing address is: Vermont Superior Court, Environmental Division, 32 Cherry Street, 2nd Floor, Suite 303, Burlington, VT 05401.

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Exhibit List

Application #	4C1326 (10/14/20)
Applicant(s)	Vermont Agency of Transportation
Landowner(s)	Vermont Agency of Transportation
Project Town(s):	Colchester



No.	Date Received (Office Use Only)	Document Name/Description	Submitted By (Office Use Only)
000		000 Exhibit List	
001	10/17/19	001 Act 250 Application	Applicant
001a	10/23/19	001a Act 250 Application Revised 10-23-19	Applicant
002	10/17/19	002 Schedule G	Applicant
003	10/17/19	003 Location Title Sheet	Applicant
004	10/17/19	004 10/16/19 Preliminary Layout Sheets 1	Applicant
005	10/17/19	005 10/16/19 Preliminary Layout Sheets 2	Applicant
006	10/17/19	006 10/16/19 Preliminary Layout Sheets 3	Applicant
007	10/17/19	007 10/16/19 Preliminary Layout Sheets 4	Applicant
008	10/17/19	008 10/16/19 Preliminary Layout Sheets 5	Applicant
009	10/17/19	009 10/16/19 Preliminary Layout Sheets 6	Applicant
010	10/17/19	010 10/16/19 Preliminary Layout Sheets 7	Applicant
011	10/17/19	011 10/16/19 Preliminary Layout Sheets 8	Applicant
012	10/17/19	012 10/16/19 Preliminary Layout Sheets 9	Applicant
013	10/17/19	013 10/16/19 Preliminary Layout Sheets 10	Applicant
014	10/17/19	014 10/16/19 Preliminary Layout Sheets 11	Applicant
015	10/17/19	015 10/16/19 Preliminary Layout Sheets 12	Applicant
016	10/17/19	016 10/16/19 Preliminary Layout Sheets 13	Applicant
017	10/17/19	017 10/16/19 Preliminary Layout Sheets 14	Applicant
018	10/17/19	018 10/16/19 Preliminary Layout Sheets 15	Applicant
019	10/17/19	019 10/16/19 Preliminary Layout Sheets 16	Applicant

No.	Date Received (Office Use Only)	Document Name/Description	Submitted By (Office Use Only)
020	10/17/19	020 10/16/19 Preliminary Layout Sheets 17	Applicant
021	10/17/19	021 Area of disturbance	Applicant
022	10/17/19	022 09/20/19 EPSC Plans 1	Applicant
023	10/17/19	023 09/20/19 EPSC Plans 2	Applicant
024	10/17/19	024 09/20/19 EPSC Plans 3	Applicant
025	10/17/19	025 09/20/19 EPSC Plans 4	Applicant
026	10/17/19	026 09/20/19 EPSC Plans 5	Applicant
027	10/17/19	027 09/20/19 EPSC Plans 6	Applicant
028	10/17/19	028 09/20/19 EPSC Plans 7	Applicant
029	10/17/19	029 09/20/19 EPSC Plans 8	Applicant
030	10/17/19	030 09/20/19 EPSC Plans 9	Applicant
031	10/17/19	031 09/20/19 EPSC Plans 10	Applicant
032	10/17/19	032 09/20/19 EPSC Plans 11	Applicant
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043	10/17/19	043 09/20/19 EPSC Plans 22	Applicant
044	10/17/19	044 09/20/19 EPSC Plans 23	Applicant
045	10/17/19	045 09/20/19 EPSC Plans 24	Applicant
046	10/17/19	046 2014 Project Scoping study	Applicant
047	10/17/19	047 Natural Resources assessment report	Applicant
048	10/17/19	048 Archeological investigation report	Applicant
049	10/17/19	049 Letter from AAFM re Prime Agricultural Soils	Applicant

No.	Date Received (Office Use Only)	Document Name/Description	Submitted By (Office Use Only)
050	10/17/19	050 2019 Colchester Town Plan	Applicant
051	10/17/19	051 Chittenden County ECOS Plan	Applicant
052	10/17/19	052 CCMPO Exit 17 study	Applicant
053	10/17/19	053 ECOS Plan Supplement 3	Applicant
054	10/17/19	054 ECOS Plan Supplement 5	Applicant
055	10/17/19	055 DEC Wetland Letter	Applicant
056	10/17/19	056 Section 106 Determination FHWA	Applicant
057	10/17/19	057 Municipal Impact Questionnaire	Applicant
058	3/16/20	058 Email by Jeff Ramsey, VTrans re No CWRP Needed 3-13-20	Applicant
059	7/21/20	059 Individual Stormwater Discharge Permit #8938-INDC Cover Letter	Applicant
060	7/21/20	060 Individual Stormwater Discharge Permit #8938-INDC (6/11/20)	Applicant
061	7/21/20	061 Individual Stormwater Discharge Permit #8938-INDC Notice of Authorization	Applicant
062	7/21/20	062 Stormwater Discharge Permit #8938-9015 (5/29/20)	Applicant
063	7/21/20	063 Individual Wetland Permit #2016-649 (6/29/20)	Applicant
064	10/1/20	064 Draft Transportation Management Plan (9/30/20)	Applicant
065	10/1/20	065 Sample Drilling and Blasting Specifications	Applicant
066	10/14/20	066 Email by Jeff Ramsey, Vtrans re Motion to Alter (10/14/20)	Applicant
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CERTIFICATE OF SERVICE

I hereby certify on this 16th day of November, 2020, a copy of the foregoing ACT 250 DECISION AND ORDER/LAND USE PERMIT #4C1326(Altered), was sent by U.S. mail, postage prepaid to the following individuals without email addresses and by email to the individuals with email addresses listed.

Note: any recipient may change its preferred method of receiving notices and other documents by contacting the District Office staff at the mailing address or email below. If you have elected to receive notices and other documents by email, it is your responsibility to notify our office of any email address changes. All email replies should be sent to NRB.Act250Essex@vermont.gov

Vermont Agency of Transportation
c/o Jeff Ramsey
Barre City Place
219 N. Main Street
Barre, VT 05641
Jeff.ramsey@vermont.gov

Dated at Essex Junction, Vermont, this 16th day of November, 2020.

Christine A. Commo

Natural Resources Board Technician
879-5614
christine.commo@vermont.gov

Julie Graeter, Town Clerk
Chair, Selectboard/Chair, Planning Commission
Town of Colchester
781 Blakely Road
Colchester, VT 05446
jgraeter@colchestervt.gov

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Chittenden County Regional Planning Commission
110 West Canal Street, Suite 202
Winooski, VT 05404
permitting@ccrpcvt.org

Agency of Natural Resources
1 National Life Drive, Davis 2
Montpelier, VT 05602-3901
ANR.Act250@vermont.gov

Dept. of Public Service
112 State Street, Drawer 20
Montpelier, VT 05620-2601
barry.murphy@vermont.gov; PSD.VTDPS@vermont.gov

VTrans Policy, Planning & Research Bureau
Barre City Place
219 N. Main Street
Barre, VT 05641
AOT.Act250@vermont.gov

Agency of Agriculture, Food & Markets
116 State Street, Drawer 20
Montpelier, VT 05620-2901
AGR.Act250@vermont.gov

Division for Historic Preservation
National Life Building, Drawer 20
Montpelier, VT 05620
scott.dillon@vermont.gov; james.duggan@vermont.gov
ACCD.ProjectReview@vermont.gov

FOR YOUR INFORMATION

District #4 Environmental Commission
Thomas Little, Chair
Parker Riehle/James McNamara
111 West Street
Essex Junction, VT 05452



LAND USE PERMIT AMENDMENT

State of Vermont
Natural Resources Board
District 4 Environmental Commission
111 West Street
Essex Junction, VT 05452
<https://nrb.vermont.gov/>

[phone] 802-879-5614

CASE NO: 4C1326-1

LAW/REGULATIONS INVOLVED

10 V.S.A. §§ 6001 – 6111 (Act 250)

State of Vermont Agency of Transportation
Attn: Jeff Ramsey, VTrans Environmental
Section
219 North Main Street
Barre, VT 05641

The District 4 Environmental Commission hereby issues Land Use Permit amendment 4C1326-1, pursuant to the authority vested in it by 10 V.S.A. §§ 6001-6111. This permit amendment applies to the lands identified in Book 247, Page 632 of the land records of the Town of Colchester, Vermont as the subject of a deed to the State of Vermont.

This permit specifically authorizes the use of 4.4 adjoining acres to Exit 17 of Interstate 89 for project staging, laydown, etc. relating to previously permitted improvements at this interchange. The project includes extension of the construction completion deadline to December 31, 2026. The project is located on I-89 at Exit 17 in Colchester, Vermont.

Jurisdiction attaches because the Project constitutes a material change to a permitted development or subdivision, and thus requires a permit amendment pursuant to Act 250 Rule 34.

1. The Permittee and its assigns and successors in interest are obligated by this permit to complete, operate, and maintain the project as approved by the District Commission (the "Commission") in accordance with the following conditions.
2. The project shall be completed, operated, and maintained in accordance with: (a) the conditions of this permit, and (b) the permit application, plans, and exhibits on file with the Commission and other material representations. In the event of any conflict, the terms and conditions of this permit shall supersede the approved plans and exhibits.



The approved plans are:

Sheet 1 of 1 - "Conceptual Layout 1," dated 9/25/2023 (Exhibit 005);

Sheet 1 of 1 - "Conceptual Layout 2," dated 9/25/2023 (Exhibit 006);

Sheet 1 of 1 - "Project Limits," dated 9/25/2023 (Exhibit 009);

Sheet 2 of 3 - "VWP Permit Impact Exhibit," dated 6/22/2023 (Exhibit 017);

"Amended EPSC Plans," dated 4/7/2023 (Exhibit 019);

Sheet 1 of 2 - "Drainage Areas Site Plan," dated 4/21/2023 (Exhibit 026);

Sheet 2 of 2 - "Project Phasing Areas Site Plan," dated 4/21/2023 (Exhibit 027); and

Sheet 101 of 362 - "Drainage Sheet," dated 4/4/2023 (Exhibit 028).

3. The Permittee shall comply with all of the conditions of the following Agency of Natural Resources Permits:
 - a. Authorization of Notice of Intent #8938-INDC.1 under Individual Discharge Permit for Stormwater Runoff from Construction Activities (NPDES Number: VTS007283) issued on July 3, 2023, by the ANR Watershed Management Division;
 - b. Authorization of Notice of Intent #8938-9015 under General Permit #3-9015 (Stormwater Discharge General Permit), issued on May 29, 2020, by the ANR Watershed Management Division; and
 - c. Individual Wetland Permit #2016-649.01 issued on October 10, 2023, by the ANR Watershed Management Division.
4. Any nonmaterial changes to the permits listed in the preceding condition shall be automatically incorporated herein upon issuance by the Agency of Natural Resources.
5. All conditions of Land Use Permit 4C1326 are in full force and effect except as further amended herein.
6. Representatives of the State of Vermont shall have access to the property covered by this permit, at reasonable times, for the purpose of ascertaining compliance with Vermont environmental and health statutes and regulations and with this permit.
7. A copy of this permit and plans shall be on the site at all times throughout the construction process.
8. No change shall be made to the design, operation, or use of this project without a permit amendment issued by the Commission or a jurisdictional opinion from the District Coordinator that a permit amendment is not required.
9. No further subdivision, alteration, and/or development on the tracts of land approved herein shall be permitted without a permit amendment issued by the Commission or a jurisdictional opinion from the District Coordinator that a permit is not required.

10. Pursuant to 10 V.S.A. § 8005(c), the Commission or the Natural Resources Board may at any time require that the permit holder file an affidavit certifying that the project is in compliance with the terms of this permit.
11. The conditions of this permit and the land uses permitted herein shall run with the land and are binding upon and enforceable against the Permittee and its successors and assigns.
12. The Permittee shall apply and maintain water and/or other agents approved by the Watershed Management Division in the Project's Erosion Prevention and Control Plan on all roadways or disturbed areas within the project during construction and until pavement and/or vegetation is fully established to control dust.
13. The Permittee shall comply with Exhibits 019, 026, and 028 (EPSC Plans; and Drainage Plans (2)) for erosion prevention and sediment control. The Permittee shall prevent the transport of any sediment beyond that area necessary for construction approved herein. All erosion prevention and sediment control devices shall be periodically cleaned, replaced, and maintained until vegetation is permanently established on all slopes and disturbed areas.
14. All mulch, siltation dams, water bars and other temporary devices shall be installed immediately upon grading and shall be maintained until all roads are permanently surfaced and all permanent vegetation is established on all slopes and disturbed areas. Topsoil stockpiles shall have the exposed earth completely mulched and have siltation checks around the base.
15. All areas of disturbance must have temporary or permanent stabilization within 14 days of the initial disturbance. After this time, any disturbance in the area must be stabilized at the end of each workday. The following exceptions apply: i) Stabilization is not required if work is to continue in the area within the next 24 hours and there is no precipitation forecast for the next 24 hours. ii) Stabilization is not required if the work is occurring in a self-contained excavation (i.e., no outlet) with a depth of 2 feet or greater (e.g., house foundation excavation, utility trenches).
16. In addition to conformance with all erosion prevention and sediment control conditions, the Permittee shall not cause, permit, or allow the discharge of waste material into any surface waters. Compliance with the requirements of this condition does not absolve the Permittees from compliance with 10 V.S.A. (§§ 1250-1284) Chapter 47, Vermont's Water Pollution Control Law.
17. The Permittee shall maintain an undisturbed, naturally vegetated buffer zone on the Project Tract within 50 feet of any wetlands as depicted on Exhibit 017 (Wetland Impact Plan), except for impacts authorized by the Vermont Wetland Permit #2016-649.01. The term "undisturbed" means that there shall be no activities that may cause or contribute to ground or vegetation disturbance or soil compaction, including but not limited to construction, earth-moving activities, storage of materials, tree trimming or canopy removal, tree, shrub or groundcover removal; plowing or disposal of snow, grazing or mowing.

18. The project will impact 5.08 acres of primary agricultural soils. The District Commission has found appropriate circumstances and authorizes offsite mitigation of these soils. The Permittee shall, prior to commencement of construction, submit the calculated off-site mitigation fee payment of **\$48,762.69** to the Vermont Housing and Conservation Board (VHCB, General Counsel, 58 East State Street, Montpelier, VT 05602). The off-site mitigation fee is calculated as follows: $[4.94 \text{ acres (number of acres of Primary Agricultural Soils to be impacted)} \times 2 \text{ (multiplier)}] + [0.14 \text{ acres} \times 2.25 \text{ multiplier}] \times \$4,783 \text{ (cost to acquire conservation easements for primary agricultural soils in the same geographic region)} = \textbf{\$48,762.69}$. If the mitigation fee is not paid within one year from the date that a Land Use Permit is issued, the amount of the fee will be subject to a simple interest annual inflation factor increase of 2.8% and the fee will increase each year on the anniversary of the Land Use Permit to an amount equal to 102.8% of the previous year's amount, rounded to the nearest dollar. Exhibit 033 (November 7, 2023, AAFM Review Letter).
19. The Permittee shall either: a) undertake a Phase III Data Recovery prior to construction to mitigate the adverse effect of the project on the site, or b) avoid the site during the property's use as a staging area with a protective buffer as indicated in Figure 9. This recommended protective buffer surrounds the site, plotted at least 10 m (32 ft) off the nearest positive test pit. If avoidance of the site is not possible, the scale and size of the Phase III Data Recovery will need to be determined in consultation with VTrans and the VDHP. Exhibit 032 (VDHP 10/24/2023 Concurrence with UVM CAP End of Field Letter Report).
20. Any extracted stumps shall be disposed of on-site above the seasonal high water table and not in any wetland, or at a state-certified stump and inert waste disposal facility, so as to prevent groundwater pollution.
21. Prior to any site work, the Permittee shall install and maintain temporary fencing along the tree line and around trees to be retained as depicted in Construction Stormwater Permit #8938-INDC.1 issued on July 3, 2023, by the ANR Watershed Management Division. Exhibit 015.
22. The Permittee shall provide each prospective purchaser of any interest in this Project with a copy of the Land Use Permit amendment before any written contract of sale is entered into.
23. Pursuant to 10 V.S.A. § 6090(b)(1), this permit amendment is hereby issued for an indefinite term, as long as there is compliance with the conditions herein. Notwithstanding any other provision herein, this permit shall expire three years from the date of issuance if the Permittee has not commenced construction and made substantial progress toward completion within the three-year period in accordance with 10 V.S.A. § 6091(b).
24. All site work and construction shall be completed in accordance with the approved plans by **December 31, 2026**, unless an extension of this date is approved in writing by the Commission. Such requests to extend must be filed prior to the deadline and approval may be granted without a public hearing.

25. Failure to comply with any condition herein may be grounds for permit revocation pursuant to 10 V.S.A. sec. 6027(g).

Dated this December 11, 2023.

By /s/ Thomas A. Little
Thomas A. Little, Chair
District 4 Commission

Members participating in this decision:
Parker Riehle
Kate Purcell

Any party, or person denied party status, may file within 15 days from the date of a decision of the District Commission one and only one motion to alter with respect to the decision, pursuant to Act 250 Rule 31(A). Under Rule 31(A), no party, or person denied party status, may file a motion to alter a District Commission decision concerning or resulting from a motion to alter. Per Rule 31(A)(3), the running of the time for filing a notice of appeal is terminated as to all parties by a timely motion to alter.

Any person aggrieved by an act or decision of a District Commission or District Coordinator, or any party by right, may appeal to the Environmental Division of Vermont Superior Court within 30 days of the act or decision pursuant to 10 V.S.A. § 8504. Such appeals are governed by Rule 5 of the Vermont Rules for Environmental Court Proceedings. The appellant must file a notice of appeal with the clerk of the court and pay any fee required under 32 V.S.A. § 1431.

The appellant must also serve a copy of the Notice of Appeal on the Natural Resources Board and on other parties in accordance with Rule 5(b)(4)(B) of the Vermont Rules for Environmental Court Proceedings. The Natural Resources Board's copy may be sent to NRB.Legal@vermont.gov and/or 10 Baldwin Street, Montpelier, VT 05633-3201.

Note, there are certain limitations on the right to appeal, including on interlocutory appeals. See, e.g., 10 V.S.A. § 8504(k), 3 V.S.A. § 815, and Vermont Rule of Appellate Procedure 5. There shall be no appeal from a District Commission decision when the Commission has issued a permit and no hearing was requested or held, or no motion to alter was filed following the issuance of an administrative amendment. 10 V.S.A. § 8504(k)(1). If a District Commission issues a partial decision under 10 V.S.A. § 6086(b), any appeal of that decision must be taken within 30 days of the date of that decision. 10 V.S.A. § 8504(k)(3). For additional information on filing appeals, see the Court's website at: <http://www.vermontjudiciary.org/GTC/environmental/default.aspx> or call (802) 951-1740. The Court's mailing address is Vermont Superior Court, Environmental Division, 32 Cherry Street, 2nd Floor, Suite 303, Burlington, VT 05401.

The foregoing statements regarding motions to alter and appeals are intended for informational purposes only. They neither supplant nor augment any rights or obligations provided for by law nor do they constitute a complete statement of the rights or obligations of any person or party.



State of Vermont*Agency of Transportation*

To: Program Manager; Materials and Certifications Manager; Chief Engineer's Office**From: Patti Coburn, Project Manager****Date: November 13, 2023****Contract: Colchester NH 028-1(31)****Subject: Contract Public Interest Finding (CPIF) for Foamed Glass Aggregate**

Project Location:

Located in Chittenden County, in the Town of Colchester, beginning at a point 0.461 miles west of the intersection of US Route 2 and US Route 7, and extending easterly along US Route 2 to the intersection with US Route 7 in Colchester. Also included is 0.511 miles of US Route 7 centered about the intersection of US Route 7 and US Route 2, and Interstate 89 ramps at Exit 17.

Project Description:

Work to be performed includes the realignment of US Route 2 including a new bridge over Interstate 89, realignment of Interstate ramps at Exit 17, resurfacing of US Route 7 with the addition of stripping, guardrail improvements, signage, bike corridor improvements, and other highway related items.

Reason that a Patented or Proprietary Product or Process is Required:

The project will be realigning the bridge slightly north from the existing alignment. This realignment will require adding significant fill to the proposed bridge approaches to move the roadway further north from the existing bridge location. Because of poor underlying geotechnical conditions throughout this corridor there is a risk that adding embankment fill could result in significant long-term settlement or the potential for a global slope failure. To prevent this slope stability issue lightweight fill must be used as backfill within the Abutment No. 1 mechanically stabilized earth (MSE) retaining wall and in the roadway approach to abutment No. 2. Foamed Glass Aggregate (FGA) will be used as the lightweight fill material to give VTrans the opportunity to perform a case study on FGA.

Product or Process Description:

Foamed Glass Aggregate (FGA) is a lightweight fill material that is manufactured from post-consumed recycled glass. FGA is a non-combustible, inert, non-leaching, self-interlocking and highly frictional, and a closed cell material. There are currently only two manufacturers of FGA in the U.S., Aero Aggregates of North America, LLC in Eddystone, PA and Glavel Foam Glass Gravel in Burlington, VT. Based on input from the Geotechnical Engineer who researched this product, it was decided that the experience and quality assurance practices of Aero Aggregates, which has supplied their product to at least seven other DOTs for use as lightweight fill, would be the product to use for this case study. Glavel, which is manufactured locally in Vermont, has currently only supplied their product for smaller scale residential and commercial projects.

Category C Determination:

As performing case studies on these products is in the best interest of the Public as it will ultimately determine if these products can be by VTrans and its Contractors and if approved provide VTrans and its Contractors with additional diversity in product selection, and the best means of doing this is monitoring these products with the required instrumentation, these products meet the requirements to be approved as a Category C Contract PIF.

Quantity and Cost:

This contract will use approximately 12,000 cubic yards of Foamed Glass Aggregate (FGA) on the Colchester NH 028-1(31) project. The estimated cost for the FGA is approximately \$1,920,000.00 for the Colchester NH 028-1(31) project (\$160 per cubic yard).

Effective Period:

This Contract PIF will only be effective for the contract identified above.

Vermont Agency of Transportation
Contract Public Interest Finding Related to Materials Procurement for a Project

The categories listed below describe the specific conditions under which a patented or proprietary product or process may be authorized. This form contains attachments that document the necessary facts, conditions, and citations to authorize a Contract Public Interest Finding for the use of Foamed Glass Aggregate on the subject contract.

Despite responsible efforts to identify the most competitive material to perform this function, the Agency, through its Project and Program Managers, has found that the patented or proprietary product or process (check the appropriate box):

- ☐ Category A – is the only product or process available that fulfills the required function; or
- ☐ Category B – is necessary for synchronization with other adjacent resources or existing facilities; or
- ☒ Category C – is being specified for research or experimental evaluation; or
- ☐ Category D – has been shown to be cost effective; or
- ☐ Category E – is for emergency or temporary use and its use is in the interests of public safety.

These findings have been made in accordance with Agency practices, including documentation of the underlying facts compelling the Public Interest Finding.

Recommended by: DocuSigned by:
Patti Colburn 11/15/2023, Project Manager
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Approved by: DocuSigned by:
Carolyn Cota 11/15/2023, Program Manager
4726E89B394B431...

Approved by: DocuSigned by:
Nick VanDenberg 11/15/2023, Materials and Certifications Manager
57D4DD3560C24C2...

Approved by: DocuSigned by:
Erin Sisson 11/16/2023, Chief Engineer's Office
D104F679F55643B...



State of Vermont

Agency of Transportation

To: Nick Van Den Berg, Materials & Certifications Manager, AOT Chief Engineer's Office

From: Michael LaCroix, Traffic Design Project Manager, Street Lighting SME
 Ben Tietze, Traffic Design Engineer
 Derek Lyman, Traffic Signal and ITS Manager

Date: July 28, 2023

Subject: Global Public Interest Finding (GPIF) for Cree Roadway Lighting Products

DS DS
 BT DL

Reason that a Patented or Proprietary Product or Process is Required:

The Vermont Agency of Transportation wishes to increase design and maintenance efficiencies and increase safety to the traveling public by standardizing the type of street lighting used on our roadways. Currently lighting design requires three different designs for each of the luminaires that could be used on a project and then creating a compromise luminaire placement that best meets the guidelines set forth in the VTrans Lighting Guide (2015). This means that the design is never able to optimize luminaire placement to maximize user safety and is always a compromise that meets acceptable limits. Additionally, our operations group who maintains the state lighting system, uses Cree-branded luminaire heads and drivers for ease of use and cost effectiveness. Traffic Signal Operations, who currently manages the state street lighting network, uses exclusively Cree products, and will replace failed luminaires of other types with Cree products.

Product or Process Description:

Cree LEDway lighting is a line of LED street lighting that are in wide use by the Agency in lighting maintenance. They provide a range of products that fit all VTrans intersection lighting designs.

Category B Determination:

To increase design efficiency and produce safer roadway lighting designs for all users, Cree LEDway products should be installed to meet any intersection lighting requirements. Furthermore, this will increase efficiencies in maintenance of our roadway lighting network, allowing our Traffic Signal Operations group to already know the equipment that is out there. Cree LEDway luminaires are also compatible with remote monitoring technology which could be deployed in the future to monitor outages and determine maintenance needs without a crew needing to deploy.

Cost:

The estimated cost for this product or process is approximately \$1,000 per assembly.

Effective Period:

This Global PIF may be used for contracts advertised within five years of the date specified above, **July 28, 2028**. After this time, the products or processes will be re-evaluated by the Agency.

Vermont Agency of Transportation
Global Public Interest Finding Related to Materials Procurement for Multiple Projects

The categories listed below describe the specific conditions under which a patented or proprietary product or process may be authorized. This form contains attachments that document the necessary facts, conditions, and citations to authorize a Global Public Interest Finding for the use of **Cree LEDway branded street light products** on Agency contracts.

Despite responsible efforts to identify the most competitive material to perform this function, the Agency, through its Subject Matter Experts, has found that the patented or proprietary product or process (check the appropriate box):

- ☐ Category A – is the only product or process available that fulfills the required function; or
- ☒ Category B – is necessary for synchronization with other adjacent resources or existing facilities; or
- ☐ Category C – is being specified for research or experimental evaluation; or
- ☐ Category D – has been shown to be cost effective; or
- ☐ Category E – is for emergency or temporary use and its use is in the interests of public safety.

These findings have been made in accordance with Agency practices, including documentation of the underlying facts compelling the Public Interest Finding.

Recommended by: DocuSigned by:
Michael LaCorte
530983C07EF54F2..., Project Manager or Subject Matter Expert

Approved by: DocuSigned by:
Nick Vandenberg
57D4DD3560C24C2... Materials and Certifications Manager

Approved by: DocuSigned by:
Erin Sisson
D104F679F55643B..., Chief Engineer's Office

Certificate Of Completion

Envelope Id: EAF7EA3B3A6D4F3AAA4344D07E31A299

Status: Completed

Subject: Complete with DocuSign: 2023 Cree Lighting Products GPIF.pdf

Source Envelope:

Document Pages: 2

Signatures: 3

Envelope Originator:

Certificate Pages: 2

Initials: 2

Michael LaCroix

AutoNav: Enabled

One National Life Drive - Dewey Building

Envelopel Stamping: Enabled

Montpelier, VT 05620-2001

Time Zone: (UTC-05:00) Eastern Time (US & Canada)

Michael.LaCroix@vermont.gov

IP Address: 73.227.54.116

Record Tracking

Status: Original

Holder: Michael LaCroix

Location: DocuSign

7/28/2023 7:31:21 AM

Michael.LaCroix@vermont.gov

Security Appliance Status: Connected

Pool: StateLocal

Storage Appliance Status: Connected

Pool: AOT - Agency of Transportation - AOT40

Location: DocuSign

Signer Events**Signature****Timestamp**

Michael LaCroix

michael.lacroix@vermont.gov

Project Manager

Vermont Agency of Transportation

Security Level: Email, Account Authentication
(None)

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Signed: 7/28/2023 7:37:17 AM

Signature Adoption: Pre-selected Style

Using IP Address: 73.227.54.116

Electronic Record and Signature Disclosure:

Not Offered via DocuSign

Benjamin Tietze

Benjamin.Tietze@vermont.gov

Civil Engineer II

SOV

Security Level: Email, Account Authentication
(None)

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Signature Adoption: Pre-selected Style

Using IP Address: 104.219.99.224

Electronic Record and Signature Disclosure:

Not Offered via DocuSign

Derek Lyman

Derek.Lyman@vermont.gov

State Signal & ITS Engineer

SOV

Security Level: Email, Account Authentication
(None)

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Viewed: 7/29/2023 8:47:02 AM

Signed: 7/29/2023 8:47:28 AM

Signature Adoption: Pre-selected Style

Using IP Address: 75.69.8.104

Electronic Record and Signature Disclosure:

Not Offered via DocuSign

Nick VanDenBerg

Nick.VanDenBerg@vermont.gov

Materials Manager

SOV

Security Level: Email, Account Authentication
(None)

DocuSigned by:


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Signed: 7/29/2023 9:03:36 AM

Signature Adoption: Pre-selected Style

Using IP Address: 69.63.86.155

Electronic Record and Signature Disclosure:

Not Offered via DocuSign

Signer Events	Signature	Timestamp
Erin Sisson Erin.Sisson@vermont.gov Deputy Chief Engineer SOV Signing Group: AOT - Highway Division - Chief Engineer's Office Security Level: Email, Account Authentication (None) Electronic Record and Signature Disclosure: Not Offered via DocuSign	DocuSigned by:  Erin Sisson D104F679F55643B... Signature Adoption: Pre-selected Style Using IP Address: 159.105.57.157	Sent: 7/29/2023 9:03:37 AM Viewed: 7/31/2023 6:30:52 AM Signed: 7/31/2023 6:30:59 AM

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Carbon Copy Events	Status	Timestamp
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Completed	Security Checked	7/31/2023 6:30:59 AM
Payment Events	Status	Timestamps



State of Vermont*Agency of Transportation*

To: Program Manager; Materials and Certifications Manager; Chief Engineer's Office**From: Patti Coburn, Project Manager****Date: November 13, 2023****Contract: Colchester NH 028-1(31)****Subject: Contract Public Interest Finding (CPIF) for Inclinometer System**

Project Location:

Located in Chittenden County, in the Town of Colchester, beginning at a point 0.461 miles west of the intersection of US Route 2 and US Route 7, and extending easterly along US Route 2 to the intersection with US Route 7 in Colchester. Also included is 0.511 miles of US Route 7 centered about the intersection of US Route 7 and US Route 2, and Interstate 89 ramps at Exit 17.

Project Description:

Work to be performed includes the realignment of US Route 2 including a new bridge over Interstate 89, realignment of Interstate ramps at Exit 17, resurfacing of US Route 7 with the addition of stripping, guardrail improvements, signage, bike corridor improvements, and other highway related items.

Reason that a Patented or Proprietary Product or Process is Required:

The proposed project includes large fills over Champlain Sea gray silt and clay. The use of foamed glass aggregate (FGA) will be used to mitigate the excessive settlement calculated. Geotechnical instrumentation will be installed to monitor the settlements and pressures within the embankments and MSE abutments during and after installation. As part of the instrumentation plan, inclinometers are to be installed and an inclinometer system is used to monitor global stability of the embankments. The inclinometer system from Durham Geo Slope Indicator (DGSI) is one that VTrans is familiar with and has products and data currently within that system, therefore the need to acquire more equipment and utilization of the same DGSI software is required.

Product or Process Description:

The Inclinometer system shall include an inclinometer probe, control cable and storage reel, inclinometer readout, and a software license key. The system is able to utilize the probe within the installed inclinometer casing to get readings at depth increments to monitor and track slope movement over time. The DGSI system includes a readout and software that VTrans currently has been needs upgrading and renewal. This will allow use of this equipment for this project and other projects that are currently in the monitoring phase that require the DGSI readout and software for data reduction.

Category B Determination:

This product is necessary to synchronize with existing resources/facilities, such as existing baseline data on this and other projects in the monitoring phase.

Quantity and Cost:

This contract will use approximately 1 inclinometer system on the Colchester NH 028-1(31) project. The estimated cost for the inclinometer system is approximately \$11,500.00 for the Colchester NH 028-1(31) project.

Effective Period:

This Contract PIF will only be effective for the contract identified above.

Vermont Agency of Transportation
Contract Public Interest Finding Related to Materials Procurement for a Project

The categories listed below describe the specific conditions under which a patented or proprietary product or process may be authorized. This form contains attachments that document the necessary facts, conditions, and citations to authorize a Contract Public Interest Finding for the use of DGSI Inclinometer System on the subject contract.

Despite responsible efforts to identify the most competitive material to perform this function, the Agency, through its Project and Program Managers, has found that the patented or proprietary product or process (check the appropriate box):

- ☐ Category A – is the only product or process available that fulfills the required function; or
- ☒ Category B – is necessary for synchronization with other adjacent resources or existing facilities; or
- ☐ Category C – is being specified for research or experimental evaluation; or
- ☐ Category D – has been shown to be cost effective; or
- ☐ Category E – is for emergency or temporary use and its use is in the interests of public safety.

These findings have been made in accordance with Agency practices, including documentation of the underlying facts compelling the Public Interest Finding.

Recommended by: DocuSigned by:
Patti Colburn 11/15/2023, Project Manager
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Approved by: DocuSigned by:
Carolyn Cota 11/15/2023, Program Manager
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Approved by: DocuSigned by:
Nick VanDenberg 11/15/2023, Materials and Certifications Manager
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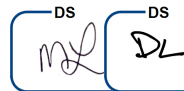
Approved by: DocuSigned by:
Erin Sisson 11/16/2023, Chief Engineer's Office
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State of Vermont

Agency of Transportation

To: Nick Van Den Berg, Materials & Certifications Manager, AOT Chief Engineer's Office

From: Michael LaCroix, Traffic Design Project Manager &
Derek Lyman, Traffic Signal Operations Engineer, Subject Matter Expert 

Date: January 12, 2022

Subject: Global Public Interest Finding (GPIF) for Econolite Traffic Signal Products

Reason that a Patented or Proprietary Product or Process is Required:

In 2017, the Vermont Agency of Transportation procured and installed a centralized Advanced Transportation Management System (ATMS), Econolite Centrac. To exploit all system functionalities to their fullest efficiencies, Econolite and/or EDI (an Econolite re-brand) field products should be installed at all new traffic signal system locations.

Product or Process Description:

The Econolite Centrac 2.0 system is designed and operated such that traffic signals can be interconnected to provide communications between other signal systems but also to Traffic Management Center in Berlin or at the Traffic Signal Operations' remote location, 24 hours a day, 7 days a week. The system can, and continues to be, accessed remotely where operators can monitor and maintain system health, respond to non-physical incidents such as timing and phasing failures, and to make periodic optimization implementations. The system can also collect and report out system information and real-time traffic data, dependent on the type of vehicle detection present at the individual intersections.

Category B Determination:

To take advantage of all the functionality of the Centrac 2.0 ATMS system, Econolite-branded field products should be installed at traffic signal locations for the Agency's capital program. These field products include but are not limited to: Econolite NEMA TS2-Type 1 P44 Controller Cabinet, Econolite Cobalt TS2-Type 2 Signal Controller with Connected Vehicle Co-Processor, Econolite BIU-64 Bus Interface Unit, Econolite or EDI MMU2-16LEip Malfunction Management Unit, Econolite PS-200 or EDI PS-250 TS2 Power Supply and any successor products released by Econolite or EDI during the life of this GPIF. Vehicle Detection for traffic signal systems is covered under a separate, active, GPIF. Furthermore, using exclusively Econolite products for future systems will keep them compatible with the remaining existing traffic signal system infrastructure, which will allow for easier and more cost-effective maintenance of the entire system given the small number of staff and limited budget allocated to traffic signal maintenance.

Cost:

The estimated cost for this product or process is approximately \$25,000 per assembly.

Effective Period:

This Global PIF may be used for contracts advertised within five years of the date specified above, **January 12, 2027**. After this time, the products or processes will be re-evaluated by the Agency.

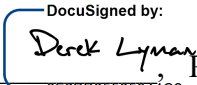
Vermont Agency of Transportation
Global Public Interest Finding Related to Materials Procurement for Multiple Projects

The categories listed below describe the specific conditions under which a patented or proprietary product or process may be authorized. This form contains attachments that document the necessary facts, conditions, and citations to authorize a Global Public Interest Finding for the use of **Econolite-branded Traffic Signal field products** on Agency contracts.

Despite responsible efforts to identify the most competitive material to perform this function, the Agency, through its Subject Matter Experts, has found that the patented or proprietary product or process (check the appropriate box):

- ☐ Category A – is the only product or process available that fulfills the required function; or
- ☒ Category B – is necessary for synchronization with other adjacent resources or existing facilities; or
- ☐ Category C – is being specified for research or experimental evaluation; or
- ☐ Category D – has been shown to be cost effective; or
- ☐ Category E – is for emergency or temporary use and its use is in the interests of public safety.

These findings have been made in accordance with Agency practices, including documentation of the underlying facts compelling the Public Interest Finding.

Recommended by:  DocuSigned by:  Project Manager and Subject Matter Expert
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Approved by:  DocuSigned by:  Materials and Certifications Manager 1/11/2022
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Approved by:  DocuSigned by:  Chief Engineer's Office 1/12/2022
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Certificate Of Completion

Envelope Id: ADD4BF8D731942C18074B45DF4A4FC30

Status: Completed

Subject: Please DocuSign: GPIF - Econolite 01.12.2022.pdf

Source Envelope:

Document Pages: 2

Signatures: 4

Envelope Originator:

Certificate Pages: 2

Initials: 2

Michael LaCroix

AutoNav: Enabled

One National Life Drive - Dewey Building

Envelopel Stamping: Enabled

Montpelier, VT 05620-2001

Time Zone: (UTC-05:00) Eastern Time (US & Canada)

Michael.LaCroix@vermont.gov

IP Address: 73.227.54.116

Record Tracking

Status: Original

Holder: Michael LaCroix

Location: DocuSign

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Michael.LaCroix@vermont.gov

Security Appliance Status: Connected

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Storage Appliance Status: Connected

Pool: AOT Agency of Transportation

Location: DocuSign

Signer Events**Signature****Timestamp**

Michael LaCroix

michael.lacroix@vermont.gov

Project Manager

Vermont Agency of Transportation

Security Level: Email, Account Authentication
(None)

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Electronic Record and Signature Disclosure:

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Derek Lyman

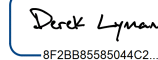
Derek.Lyman@vermont.gov

Traffic Signal & ITS Manager

SOV

Security Level: Email, Account Authentication
(None)

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Electronic Record and Signature Disclosure:

Not Offered via DocuSign

Nick VanDenBerg

Nick.VanDenBerg@vermont.gov

SOV

Security Level: Email, Account Authentication
(None)

DocuSigned by:


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Signature Adoption: Pre-selected Style

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Electronic Record and Signature Disclosure:

Not Offered via DocuSign

Erin Parizo

Erin.Parizo@vermont.gov

SOV

Signing Group: AOT - Highway Division - Chief

Engineer's Office

Security Level: Email, Account Authentication
(None)

DocuSigned by:


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Sent: 1/11/2022 1:26:31 PM

Viewed: 1/11/2022 1:27:10 PM

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Signature Adoption: Pre-selected Style

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Electronic Record and Signature Disclosure:

Not Offered via DocuSign

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Payment Events	Status	Timestamps



State of Vermont*Agency of Transportation*

To: Program Manager; Materials and Certifications Manager; Chief Engineer's Office**From: Patti Coburn, Project Manager****Date: November 13, 2023****Contract: Colchester NH 028-1(31)****Subject: Contract Public Interest Finding (CPIF) for GTT Opticom Preemption System**

Project Location:

Located in Chittenden County, in the Town of Colchester, beginning at a point 0.461 miles west of the intersection of US Route 2 and US Route 7, and extending easterly along US Route 2 to the intersection with US Route 7 in Colchester. Also included is 0.511 miles of US Route 7 centered about the intersection of US Route 7 and US Route 2, and Interstate 89 ramps at Exit 17.

Project Description:

Work to be performed includes the realignment of US Route 2 including a new bridge over Interstate 89, realignment of Interstate ramps at Exit 17, resurfacing of US Route 7 with the addition of stripping, guardrail improvements, signage, bike corridor improvements, and other highway related items.

Reason that a Patented or Proprietary Product or Process is Required:

VTrans has included preemption for local emergency services at this location. The GTT Opticom preemption system meets all the requirements needed for this project. GTT Opticom is the preemption system used on the majority of signalized intersections in adjacent towns and throughout the state. Having GTT Opticom will ensure synchronization with the other signals in the area and allow for emergency services to only need one transponder in their vehicles to operate preemption throughout the area. Synchronization also allows for easier and more cost-effective maintenance of the system.

Product or Process Description:

GTT Opticom Preemption System

Category B Determination:

This is a Category B determination as described above.

Quantity and Cost:

This contract will install the GTT Opticom Preemption System at three intersections within the Colchester NH 028-1(31) project. The estimated cost for these products is approximately \$25,000/intersection.

Effective Period:

This Contract PIF will only be effective for the contract identified above.

Vermont Agency of Transportation
Contract Public Interest Finding Related to Materials Procurement for a Project

The categories listed below describe the specific conditions under which a patented or proprietary product or process may be authorized. This form contains attachments that document the necessary facts, conditions, and citations to authorize a Contract Public Interest Finding for the use of GTT Opticom Preemption System on the subject contract.

Despite responsible efforts to identify the most competitive material to perform this function, the Agency, through its Project and Program Managers, has found that the patented or proprietary product or process (check the appropriate box):

- ☐ Category A – is the only product or process available that fulfills the required function; or
- ☒ Category B – is necessary for synchronization with other adjacent resources or existing facilities; or
- ☐ Category C – is being specified for research or experimental evaluation; or
- ☐ Category D – has been shown to be cost effective; or
- ☐ Category E – is for emergency or temporary use and its use is in the interests of public safety.
- ☐ Category F – was approved on a prior PIF. That PIF is valid for municipal, regional, or statewide systems that require integration or synchronization.

These findings have been made in accordance with Agency practices, including documentation of the underlying facts compelling the Public Interest Finding.

Recommended by: DocuSigned by: Patti Colburn 11/15/2023, Project Manager
E1F3B98EFC5D427...

Approved by: DocuSigned by: Carolyn Cota 11/15/2023, Program Manager
4726E89B394B431...

Approved by: DocuSigned by: Nick VanDenBerg 11/15/2023, Materials and Certifications Manager
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Approved by: DocuSigned by: Erin Sisson 11/16/2023, Chief Engineer's Office
D104F679F55643B...

**Vermont Agency of Transportation
Public Interest Finding Related to Materials Procurement for a Project**

The federal regulation detailed in 23CFR Part 635.411 provides specific conditions under which a proprietary item, or reduced competition may be authorized. This form contains attachments that document the necessary facts, conditions and citation to authorize a Public Interest Finding.

To encompass the entire State of Vermont for five (5) years, this Public Interest Finding is intended to allow for procurement of proprietary equipment for safe and efficient mobility on federal-aid capital projects. The Vermont Agency of Transportation specifies Wavetronix SmartSensor Matrix and Wavetronix SmartSensor Advanced for Vehicle Stop Bar and Vehicle Advanced Detection, respectively. Documentation supporting this "Finding" is attached.

Despite responsible efforts to identify the most competitive material to perform this function, the Agency through its Project and Program Managers has found that (check appropriate box):

☒ there is only one item available that can fulfill the necessary function required for the project (Category A); or

☐ the proprietary products are necessary for synchronization with other adjacent resources or existing facilities (Category B); or

☐ the proprietary product has been incorporated for research or experimental evaluation in relatively short sections of road (Category C); or

☐ the proprietary product is shown to be cost effective (Category D).

Or

☐ the material being specified was approved on a prior VDPIF. That VDPIF is valid for this project as it is for municipal, regional or statewide systems that require integration or synchronization. It was approved on (fill in date) and has a sunset date of (fill in date).

These findings have been made in accordance with Agency practices, including documentation of the underlying facts compelling the Public Interest Finding.

Recommended by: E-SIGNED by Michael LaCroix
on 2019-03-29 17:00:58 UTC, Project Manager Date: March 29, 2019

Recommended by: E-SIGNED by Derek Lyman
on 2019-03-29 17:09:26 UTC, Signal Ops Engineer Date: March 29, 2019

Approved by: E-SIGNED by Jesse Devlin
on 2019-03-29 17:19:25 UTC, Program Manager Date: March 29, 2019
(signature)

FHWA's approval required: ☐ Yes ☒ No

FHWA _____
(signature, if FHWA approval is required)

Date: _____

cc: FHWA Division Administrator
Director Project Delivery
VTrans M&R Division
Contract Administration Section

TO: JESSE DEVLIN, P.E., HIGHWAY SAFETY & DESIGN PROGRAM MANAGER

FROM: MICHAEL LACROIX, TRAFFIC DESIGN PROJECT MANAGER and *ML*
DEREK LYMAN, P.E., TRAFFIC SIGNAL OPERATIONS ENGINEER *DLL*

DATE: MARCH 29, 2019

SUBJECT: VERMONT STATEWIDE
VERMONT DETERMINATION OF PUBLIC INTEREST FINDING (VDPIF)
VEHICLE DETECTION SYSTEMS

In 2017, the Vermont Agency of Transportation (VTrans) implemented a Traffic Signal Central Management System (CMS), called Econolite Centrac. This system allows Operations staff to better monitor traffic signal statuses, provide opportunity to make signal system operational modifications and will allow for the collection of high-resolution traffic data. This data can be used for many purposes including timing optimization programs and the deployment of Traffic Responsive plans. In urban areas, this data collection process is primarily charged by the use of advanced vehicle detectors. For rural and/or high-speed approaches, advanced vehicle detectors are used to provide dilemma zone protection at signalized intersections.

Currently, there is only one radar product that provides true *continuous* stop bar vehicle detection. The Wavetronix SmartSensor Matrix uses high-definition multi-beam radar technology with a patented radar imaging process that "sees" all vehicles, moving or stopped, covering up to 10 lanes simultaneously in nearly all-weather conditions.

In addition, currently, there is only one product on the commercial market that can provide complete dilemma zone protection in addition to providing high-resolution traffic data collection. The Wavetronix SmartSensor Advance uses high-definition radar detection technology with a patented Dynamic ETA Tracking system to *continuously* monitor the speed, distance from stop bar and estimated time of arrival of individual vehicles approaching a signalized intersection.

These products also provide flexible mounting options, which allows for maximum potential for the best possible detection angles. The SmartSensor Matrix has three mounting options for optimal performance: on either side of a cantilevered mast arm, near side pole and far side pole. Additionally, the SmartSensor Advance can utilize the same three options as the Matrix and can be mounted on luminaire arms as well. These options make these products preferable over all video detectors and other radar products, which require cantilevered mast arm mounting in a forward-fire application for optimal performance. Furthermore, these options also give system designers flexibility, especially at sites where complex roadway geometries exist.

Radar, in general, also has the highest detection accuracy, as it is not affected by time of day (i.e. nighttime, sun glare) or adverse weather conditions (i.e. snow, wind, rain).

For these reasons, VTrans is seeking a Public Interest Finding under **Category A – One Item Available**.

Furthermore, specifying these products also creates other efficiencies for VTrans. There are numerous types of vehicle detection options for signalized intersections. VTrans recognizes the difficulty of managing a plethora of different makes and models of vehicle detection products. Different physical connections and interfaces, various forms of software and the proprietary nature of the hardware and applicable software and algorithms are reasoning the Agency would like to limit the number of different types of detectors. The Agency's limited traffic signal maintenance staff is made up of five (5) members responsible for over 160 traffic signals in all corners of the State of Vermont. Restricting the types of detectors focuses maintenance protocols and consolidates vendor interactions for the small group of signal technicians, has the potential of eliminating significant amounts of travel time in emergencies and reduces the need for a large replacement stockpile. The radar sensors also do not have a lens that needs to be cleaned on a periodic basis, which reduces the burden on the maintenance staff.

The estimated total material cost for the Wavetronix SmartSensor Matrix at a typical 4-approach intersection is \$22,000.

The estimated total material cost for the Wavetronix SmartSensor Advance at a typical 2-approach intersection is \$14,000.

VTrans is proposing that this Public Interest Finding to be in effect for a period of 5 years and shall have a sunset date of March 31st, 2024, after which the products will be re-evaluated by the Agency.

MBL/DLL: dll



REQUIRED CONTRACT PROVISIONS FEDERAL-AID CONSTRUCTION CONTRACTS

- I. General
- II. Nondiscrimination
- III. Non-segregated Facilities
- IV. Davis-Bacon and Related Act Provisions
- V. Contract Work Hours and Safety Standards Act Provisions
- VI. Subletting or Assigning the Contract
- VII. Safety: Accident Prevention
- VIII. False Statements Concerning Highway Projects
- IX. Implementation of Clean Air Act and Federal Water Pollution Control Act
- X. Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion
- XI. Certification Regarding Use of Contract Funds for Lobbying
- XII. Use of United States-Flag Vessels:

ATTACHMENTS

A. Employment and Materials Preference for Appalachian Development Highway System or Appalachian Local Access Road Contracts (included in Appalachian contracts only)

I. GENERAL

1. Form FHWA-1273 must be physically incorporated in each construction contract funded under title 23, United States Code, as required in 23 CFR 633.102(b) (excluding emergency contracts solely intended for debris removal). The contractor (or subcontractor) must insert this form in each subcontract and further require its inclusion in all lower tier subcontracts (excluding purchase orders, rental agreements and other agreements for supplies or services). 23 CFR 633.102(e).

The applicable requirements of Form FHWA-1273 are incorporated by reference for work done under any purchase order, rental agreement or agreement for other services. The prime contractor shall be responsible for compliance by any subcontractor, lower-tier subcontractor or service provider. 23 CFR 633.102(e).

Form FHWA-1273 must be included in all Federal-aid design-build contracts, in all subcontracts and in lower tier subcontracts (excluding subcontracts for design services, purchase orders, rental agreements and other agreements for supplies or services) in accordance with 23 CFR 633.102. The design-builder shall be responsible for compliance by any subcontractor, lower-tier subcontractor or service provider.

Contracting agencies may reference Form FHWA-1273 in solicitation-for-bids or request-for-proposals documents, however, the Form FHWA-1273 must be physically incorporated (not referenced) in all contracts, subcontracts and lower-tier subcontracts (excluding purchase orders, rental agreements and other agreements for supplies or services related to a construction contract). 23 CFR 633.102(b).

2. Subject to the applicability criteria noted in the following sections, these contract provisions shall apply to all work

performed on the contract by the contractor's own organization and with the assistance of workers under the contractor's immediate superintendence and to all work performed on the contract by piecework, station work, or by subcontract. 23 CFR 633.102(d).

3. A breach of any of the stipulations contained in these Required Contract Provisions may be sufficient grounds for withholding of progress payments, withholding of final payment, termination of the contract, suspension / debarment or any other action determined to be appropriate by the contracting agency and FHWA.

4. Selection of Labor: During the performance of this contract, the contractor shall not use convict labor for any purpose within the limits of a construction project on a Federal-aid highway unless it is labor performed by convicts who are on parole, supervised release, or probation. 23 U.S.C. 114(b). The term Federal-aid highway does not include roadways functionally classified as local roads or rural minor collectors. 23 U.S.C. 101(a).

II. NONDISCRIMINATION (23 CFR 230.107(a); 23 CFR Part 230, Subpart A, Appendix A; EO 11246)

The provisions of this section related to 23 CFR Part 230, Subpart A, Appendix A are applicable to all Federal-aid construction contracts and to all related construction subcontracts of \$10,000 or more. The provisions of 23 CFR Part 230 are not applicable to material supply, engineering, or architectural service contracts.

In addition, the contractor and all subcontractors must comply with the following policies: Executive Order 11246, 41 CFR Part 60, 29 CFR Parts 1625-1627, 23 U.S.C. 140, Section 504 of the Rehabilitation Act of 1973, as amended (29 U.S.C. 794), Title VI of the Civil Rights Act of 1964, as amended (42 U.S.C. 2000d et seq.), and related regulations including 49 CFR Parts 21, 26, and 27; and 23 CFR Parts 200, 230, and 633.

The contractor and all subcontractors must comply with: the requirements of the Equal Opportunity Clause in 41 CFR 60-1.4(b) and, for all construction contracts exceeding \$10,000, the Standard Federal Equal Employment Opportunity Construction Contract Specifications in 41 CFR 60-4.3.

Note: The U.S. Department of Labor has exclusive authority to determine compliance with Executive Order 11246 and the policies of the Secretary of Labor including 41 CFR Part 60, and 29 CFR Parts 1625-1627. The contracting agency and the FHWA have the authority and the responsibility to ensure compliance with 23 U.S.C. 140, Section 504 of the Rehabilitation Act of 1973, as amended (29 U.S.C. 794), and Title VI of the Civil Rights Act of 1964, as amended (42 U.S.C. 2000d et seq.), and related regulations including 49 CFR Parts 21, 26, and 27; and 23 CFR Parts 200, 230, and 633.

The following provision is adopted from 23 CFR Part 230, Subpart A, Appendix A, with appropriate revisions to conform to the U.S. Department of Labor (US DOL) and FHWA requirements.

1. Equal Employment Opportunity: Equal Employment Opportunity (EEO) requirements not to discriminate and to take affirmative action to assure equal opportunity as set forth under laws, executive orders, rules, regulations (see 28 CFR Part 35, 29 CFR Part 1630, 29 CFR Parts 1625-1627, 41 CFR Part 60 and 49 CFR Part 27) and orders of the Secretary of Labor as modified by the provisions prescribed herein, and imposed pursuant to 23 U.S.C. 140, shall constitute the EEO and specific affirmative action standards for the contractor's project activities under this contract. The provisions of the Americans with Disabilities Act of 1990 (42 U.S.C. 12101 et seq.) set forth under 28 CFR Part 35 and 29 CFR Part 1630 are incorporated by reference in this contract. In the execution of this contract, the contractor agrees to comply with the following minimum specific requirement activities of EEO:

a. The contractor will work with the contracting agency and the Federal Government to ensure that it has made every good faith effort to provide equal opportunity with respect to all of its terms and conditions of employment and in their review of activities under the contract. 23 CFR 230.409 (g)(4) & (5).

b. The contractor will accept as its operating policy the following statement:

"It is the policy of this Company to assure that applicants are employed, and that employees are treated during employment, without regard to their race, religion, sex, sexual orientation, gender identity, color, national origin, age or disability. Such action shall include: employment, upgrading, demotion, or transfer; recruitment or recruitment advertising; layoff or termination; rates of pay or other forms of compensation; and selection for training, including apprenticeship, pre-apprenticeship, and/or on-the-job training."

2. EEO Officer: The contractor will designate and make known to the contracting officers an EEO Officer who will have the responsibility for and must be capable of effectively administering and promoting an active EEO program and who must be assigned adequate authority and responsibility to do so.

3. Dissemination of Policy: All members of the contractor's staff who are authorized to hire, supervise, promote, and discharge employees, or who recommend such action or are substantially involved in such action, will be made fully cognizant of and will implement the contractor's EEO policy and contractual responsibilities to provide EEO in each grade and classification of employment. To ensure that the above agreement will be met, the following actions will be taken as a minimum:

a. Periodic meetings of supervisory and personnel office employees will be conducted before the start of work and then not less often than once every six months, at which time the contractor's EEO policy and its implementation will be reviewed and explained. The meetings will be conducted by the EEO Officer or other knowledgeable company official.

b. All new supervisory or personnel office employees will be given a thorough indoctrination by the EEO Officer, covering all major aspects of the contractor's EEO obligations within thirty days following their reporting for duty with the contractor.

c. All personnel who are engaged in direct recruitment for the project will be instructed by the EEO Officer in the contractor's procedures for locating and hiring minorities and women.

d. Notices and posters setting forth the contractor's EEO policy will be placed in areas readily accessible to employees, applicants for employment and potential employees.

e. The contractor's EEO policy and the procedures to implement such policy will be brought to the attention of employees by means of meetings, employee handbooks, or other appropriate means.

4. Recruitment: When advertising for employees, the contractor will include in all advertisements for employees the notation: "An Equal Opportunity Employer." All such advertisements will be placed in publications having a large circulation among minorities and women in the area from which the project work force would normally be derived.

a. The contractor will, unless precluded by a valid bargaining agreement, conduct systematic and direct recruitment through public and private employee referral sources likely to yield qualified minorities and women. To meet this requirement, the contractor will identify sources of potential minority group employees and establish with such identified sources procedures whereby minority and women applicants may be referred to the contractor for employment consideration.

b. In the event the contractor has a valid bargaining agreement providing for exclusive hiring hall referrals, the contractor is expected to observe the provisions of that agreement to the extent that the system meets the contractor's compliance with EEO contract provisions. Where implementation of such an agreement has the effect of discriminating against minorities or women, or obligates the contractor to do the same, such implementation violates Federal nondiscrimination provisions.

c. The contractor will encourage its present employees to refer minorities and women as applicants for employment. Information and procedures with regard to referring such applicants will be discussed with employees.

5. Personnel Actions: Wages, working conditions, and employee benefits shall be established and administered, and personnel actions of every type, including hiring, upgrading, promotion, transfer, demotion, layoff, and termination, shall be taken without regard to race, color, religion, sex, sexual orientation, gender identity, national origin, age or disability. The following procedures shall be followed:

a. The contractor will conduct periodic inspections of project sites to ensure that working conditions and employee facilities do not indicate discriminatory treatment of project site personnel.

b. The contractor will periodically evaluate the spread of wages paid within each classification to determine any evidence of discriminatory wage practices.

c. The contractor will periodically review selected personnel actions in depth to determine whether there is evidence of discrimination. Where evidence is found, the contractor will promptly take corrective action. If the review indicates that the discrimination may extend beyond the actions reviewed, such corrective action shall include all affected persons.

d. The contractor will promptly investigate all complaints of alleged discrimination made to the contractor in connection with its obligations under this contract, will attempt to resolve such complaints, and will take appropriate corrective action

within a reasonable time. If the investigation indicates that the discrimination may affect persons other than the complainant, such corrective action shall include such other persons. Upon completion of each investigation, the contractor will inform every complainant of all of their avenues of appeal.

6. Training and Promotion:

a. The contractor will assist in locating, qualifying, and increasing the skills of minorities and women who are applicants for employment or current employees. Such efforts should be aimed at developing full journey level status employees in the type of trade or job classification involved.

b. Consistent with the contractor's work force requirements and as permissible under Federal and State regulations, the contractor shall make full use of training programs (i.e., apprenticeship and on-the-job training programs for the geographical area of contract performance). In the event a special provision for training is provided under this contract, this subparagraph will be superseded as indicated in the special provision. The contracting agency may reserve training positions for persons who receive welfare assistance in accordance with 23 U.S.C. 140(a).

c. The contractor will advise employees and applicants for employment of available training programs and entrance requirements for each.

d. The contractor will periodically review the training and promotion potential of employees who are minorities and women and will encourage eligible employees to apply for such training and promotion.

7. Unions: If the contractor relies in whole or in part upon unions as a source of employees, the contractor will use good faith efforts to obtain the cooperation of such unions to increase opportunities for minorities and women. 23 CFR 230.409. Actions by the contractor, either directly or through a contractor's association acting as agent, will include the procedures set forth below:

a. The contractor will use good faith efforts to develop, in cooperation with the unions, joint training programs aimed toward qualifying more minorities and women for membership in the unions and increasing the skills of minorities and women so that they may qualify for higher paying employment.

b. The contractor will use good faith efforts to incorporate an EEO clause into each union agreement to the end that such union will be contractually bound to refer applicants without regard to their race, color, religion, sex, sexual orientation, gender identity, national origin, age, or disability.

c. The contractor is to obtain information as to the referral practices and policies of the labor union except that to the extent such information is within the exclusive possession of the labor union and such labor union refuses to furnish such information to the contractor, the contractor shall so certify to the contracting agency and shall set forth what efforts have been made to obtain such information.

d. In the event the union is unable to provide the contractor with a reasonable flow of referrals within the time limit set forth in the collective bargaining agreement, the contractor will, through independent recruitment efforts, fill the employment vacancies without regard to race, color, religion, sex, sexual orientation, gender identity, national origin, age, or disability; making full efforts to obtain qualified and/or qualifiable minorities and women. The failure of a union to provide

sufficient referrals (even though it is obligated to provide exclusive referrals under the terms of a collective bargaining agreement) does not relieve the contractor from the requirements of this paragraph. In the event the union referral practice prevents the contractor from meeting the obligations pursuant to Executive Order 11246, as amended, and these special provisions, such contractor shall immediately notify the contracting agency.

8. Reasonable Accommodation for Applicants /

Employees with Disabilities: The contractor must be familiar with the requirements for and comply with the Americans with Disabilities Act and all rules and regulations established thereunder. Employers must provide reasonable accommodation in all employment activities unless to do so would cause an undue hardship.

9. Selection of Subcontractors, Procurement of Materials and Leasing of Equipment:

The contractor shall not discriminate on the grounds of race, color, religion, sex, sexual orientation, gender identity, national origin, age, or disability in the selection and retention of subcontractors, including procurement of materials and leases of equipment. The contractor shall take all necessary and reasonable steps to ensure nondiscrimination in the administration of this contract.

a. The contractor shall notify all potential subcontractors, suppliers, and lessors of their EEO obligations under this contract.

b. The contractor will use good faith efforts to ensure subcontractor compliance with their EEO obligations.

10. Assurances Required:

a. The requirements of 49 CFR Part 26 and the State DOT's FHWA-approved Disadvantaged Business Enterprise (DBE) program are incorporated by reference.

b. The contractor, subrecipient or subcontractor shall not discriminate on the basis of race, color, national origin, or sex in the performance of this contract. The contractor shall carry out applicable requirements of 49 CFR part 26 in the award and administration of DOT-assisted contracts. Failure by the contractor to carry out these requirements is a material breach of this contract, which may result in the termination of this contract or such other remedy as the recipient deems appropriate, which may include, but is not limited to:

- (1) Withholding monthly progress payments;
- (2) Assessing sanctions;
- (3) Liquidated damages; and/or
- (4) Disqualifying the contractor from future bidding as non-responsible.

c. The Title VI and nondiscrimination provisions of U.S. DOT Order 1050.2A at Appendixes A and E are incorporated by reference. 49 CFR Part 21.

11. Records and Reports: The contractor shall keep such records as necessary to document compliance with the EEO requirements. Such records shall be retained for a period of three years following the date of the final payment to the contractor for all contract work and shall be available at reasonable times and places for inspection by authorized representatives of the contracting agency and the FHWA.

a. The records kept by the contractor shall document the following:

(1) The number and work hours of minority and non-minority group members and women employed in each work classification on the project;

(2) The progress and efforts being made in cooperation with unions, when applicable, to increase employment opportunities for minorities and women; and

(3) The progress and efforts being made in locating, hiring, training, qualifying, and upgrading minorities and women.

b. The contractors and subcontractors will submit an annual report to the contracting agency each July for the duration of the project indicating the number of minority, women, and non-minority group employees currently engaged in each work classification required by the contract work. This information is to be reported on [Form FHWA-1391](#). The staffing data should represent the project work force on board in all or any part of the last payroll period preceding the end of July. If on-the-job training is being required by special provision, the contractor will be required to collect and report training data. The employment data should reflect the work force on board during all or any part of the last payroll period preceding the end of July.

III. NONSEGREGATED FACILITIES

This provision is applicable to all Federal-aid construction contracts and to all related construction subcontracts of more than \$10,000. 41 CFR 60-1.5.

As prescribed by 41 CFR 60-1.8, the contractor must ensure that facilities provided for employees are provided in such a manner that segregation on the basis of race, color, religion, sex, sexual orientation, gender identity, or national origin cannot result. The contractor may neither require such segregated use by written or oral policies nor tolerate such use by employee custom. The contractor's obligation extends further to ensure that its employees are not assigned to perform their services at any location under the contractor's control where the facilities are segregated. The term "facilities" includes waiting rooms, work areas, restaurants and other eating areas, time clocks, restrooms, washrooms, locker rooms and other storage or dressing areas, parking lots, drinking fountains, recreation or entertainment areas, transportation, and housing provided for employees. The contractor shall provide separate or single-user restrooms and necessary dressing or sleeping areas to assure privacy between sexes.

IV. DAVIS-BACON AND RELATED ACT PROVISIONS

This section is applicable to all Federal-aid construction projects exceeding \$2,000 and to all related subcontracts and lower-tier subcontracts (regardless of subcontract size), in accordance with 29 CFR 5.5. The requirements apply to all projects located within the right-of-way of a roadway that is functionally classified as Federal-aid highway. 23 U.S.C. 113. This excludes roadways functionally classified as local roads or rural minor collectors, which are exempt. 23 U.S.C. 101. Where applicable law requires that projects be treated as a project on a Federal-aid highway, the provisions of this subpart will apply regardless of the location of the project. Examples include: Surface Transportation Block Grant Program projects funded under 23 U.S.C. 133 [excluding recreational trails projects], the Nationally Significant Freight and Highway

Projects funded under 23 U.S.C. 117, and National Highway Freight Program projects funded under 23 U.S.C. 167.

The following provisions are from the U.S. Department of Labor regulations in 29 CFR 5.5 "Contract provisions and related matters" with minor revisions to conform to the FHWA-1273 format and FHWA program requirements.

1. Minimum wages (29 CFR 5.5)

a. *Wage rates and fringe benefits.* All laborers and mechanics employed or working upon the site of the work (or otherwise working in construction or development of the project under a development statute), will be paid unconditionally and not less often than once a week, and without subsequent deduction or rebate on any account (except such payroll deductions as are permitted by regulations issued by the Secretary of Labor under the Copeland Act ([29 CFR part 3](#))), the full amount of basic hourly wages and bona fide fringe benefits (or cash equivalents thereof) due at time of payment computed at rates not less than those contained in the wage determination of the Secretary of Labor which is attached hereto and made a part hereof, regardless of any contractual relationship which may be alleged to exist between the contractor and such laborers and mechanics. As provided in paragraphs (d) and (e) of 29 CFR 5.5, the appropriate wage determinations are effective by operation of law even if they have not been attached to the contract. Contributions made or costs reasonably anticipated for bona fide fringe benefits under the Davis-Bacon Act ([40 U.S.C. 3141\(2\)\(B\)](#)) on behalf of laborers or mechanics are considered wages paid to such laborers or mechanics, subject to the provisions of paragraph 1.e. of this section; also, regular contributions made or costs incurred for more than a weekly period (but not less often than quarterly) under plans, funds, or programs which cover the particular weekly period, are deemed to be constructively made or incurred during such weekly period. Such laborers and mechanics must be paid the appropriate wage rate and fringe benefits on the wage determination for the classification(s) of work actually performed, without regard to skill, except as provided in paragraph 4. of this section. Laborers or mechanics performing work in more than one classification may be compensated at the rate specified for each classification for the time actually worked therein: *Provided*, That the employer's payroll records accurately set forth the time spent in each classification in which work is performed. The wage determination (including any additional classifications and wage rates conformed under paragraph 1.c. of this section) and the Davis-Bacon poster (WH-1321) must be posted at all times by the contractor and its subcontractors at the site of the work in a prominent and accessible place where it can be easily seen by the workers.

b. *Frequently recurring classifications.* (1) In addition to wage and fringe benefit rates that have been determined to be prevailing under the procedures set forth in [29 CFR part 1](#), a wage determination may contain, pursuant to § 1.3(f), wage and fringe benefit rates for classifications of laborers and mechanics for which conformance requests are regularly submitted pursuant to paragraph 1.c. of this section, provided that:

(i) The work performed by the classification is not performed by a classification in the wage determination for which a prevailing wage rate has been determined;

(ii) The classification is used in the area by the construction industry; and

(iii) The wage rate for the classification bears a reasonable relationship to the prevailing wage rates contained in the wage determination.

(2) The Administrator will establish wage rates for such classifications in accordance with paragraph 1.c.(1)(iii) of this section. Work performed in such a classification must be paid at no less than the wage and fringe benefit rate listed on the wage determination for such classification.

c. *Conformance.* (1) The contracting officer must require that any class of laborers or mechanics, including helpers, which is not listed in the wage determination and which is to be employed under the contract be classified in conformance with the wage determination. Conformance of an additional classification and wage rate and fringe benefits is appropriate only when the following criteria have been met:

(i) The work to be performed by the classification requested is not performed by a classification in the wage determination; and

(ii) The classification is used in the area by the construction industry; and

(iii) The proposed wage rate, including any bona fide fringe benefits, bears a reasonable relationship to the wage rates contained in the wage determination.

(2) The conformance process may not be used to split, subdivide, or otherwise avoid application of classifications listed in the wage determination.

(3) If the contractor and the laborers and mechanics to be employed in the classification (if known), or their representatives, and the contracting officer agree on the classification and wage rate (including the amount designated for fringe benefits where appropriate), a report of the action taken will be sent by the contracting officer by email to DBAconformance@dol.gov. The Administrator, or an authorized representative, will approve, modify, or disapprove every additional classification action within 30 days of receipt and so advise the contracting officer or will notify the contracting officer within the 30-day period that additional time is necessary.

(4) In the event the contractor, the laborers or mechanics to be employed in the classification or their representatives, and the contracting officer do not agree on the proposed classification and wage rate (including the amount designated for fringe benefits, where appropriate), the contracting officer will, by email to DBAconformance@dol.gov, refer the questions, including the views of all interested parties and the recommendation of the contracting officer, to the Administrator for determination. The Administrator, or an authorized representative, will issue a determination within 30 days of receipt and so advise the contracting officer or will notify the contracting officer within the 30-day period that additional time is necessary.

(5) The contracting officer must promptly notify the contractor of the action taken by the Wage and Hour Division

under paragraphs 1.c.(3) and (4) of this section. The contractor must furnish a written copy of such determination to each affected worker or it must be posted as a part of the wage determination. The wage rate (including fringe benefits where appropriate) determined pursuant to paragraph 1.c.(3) or (4) of this section must be paid to all workers performing work in the classification under this contract from the first day on which work is performed in the classification.

d. *Fringe benefits not expressed as an hourly rate.* Whenever the minimum wage rate prescribed in the contract for a class of laborers or mechanics includes a fringe benefit which is not expressed as an hourly rate, the contractor may either pay the benefit as stated in the wage determination or may pay another bona fide fringe benefit or an hourly cash equivalent thereof.

e. *Unfunded plans.* If the contractor does not make payments to a trustee or other third person, the contractor may consider as part of the wages of any laborer or mechanic the amount of any costs reasonably anticipated in providing bona fide fringe benefits under a plan or program, *Provided*, That the Secretary of Labor has found, upon the written request of the contractor, in accordance with the criteria set forth in § 5.28, that the applicable standards of the Davis-Bacon Act have been met. The Secretary of Labor may require the contractor to set aside in a separate account assets for the meeting of obligations under the plan or program.

f. *Interest.* In the event of a failure to pay all or part of the wages required by the contract, the contractor will be required to pay interest on any underpayment of wages.

2. Withholding (29 CFR 5.5)

a. *Withholding requirements.* The contracting agency may, upon its own action, or must, upon written request of an authorized representative of the Department of Labor, withhold or cause to be withheld from the contractor so much of the accrued payments or advances as may be considered necessary to satisfy the liabilities of the prime contractor or any subcontractor for the full amount of wages and monetary relief, including interest, required by the clauses set forth in this section for violations of this contract, or to satisfy any such liabilities required by any other Federal contract, or federally assisted contract subject to Davis-Bacon labor standards, that is held by the same prime contractor (as defined in § 5.2). The necessary funds may be withheld from the contractor under this contract, any other Federal contract with the same prime contractor, or any other federally assisted contract that is subject to Davis-Bacon labor standards requirements and is held by the same prime contractor, regardless of whether the other contract was awarded or assisted by the same agency, and such funds may be used to satisfy the contractor liability for which the funds were withheld. In the event of a contractor's failure to pay any laborer or mechanic, including any apprentice or helper working on the site of the work all or part of the wages required by the contract, or upon the contractor's failure to submit the required records as discussed in paragraph 3.d. of this section, the contracting agency may on its own initiative and after written notice to the contractor, take such action as may be necessary to cause the suspension of any further payment, advance, or guarantee of funds until such violations have ceased.

b. *Priority to withheld funds.* The Department has priority to funds withheld or to be withheld in accordance with paragraph

2.a. of this section or Section V, paragraph 3.a., or both, over claims to those funds by:

- (1) A contractor's surety(ies), including without limitation performance bond sureties and payment bond sureties;
- (2) A contracting agency for its procurement costs;
- (3) A trustee(s) (either a court-appointed trustee or a U.S. trustee, or both) in bankruptcy of a contractor, or a contractor's bankruptcy estate;
- (4) A contractor's assignee(s);
- (5) A contractor's successor(s); or
- (6) A claim asserted under the Prompt Payment Act, [31 U.S.C. 3901–3907](#).

3. Records and certified payrolls (29 CFR 5.5)

a. *Basic record requirements* (1) *Length of record retention.* All regular payrolls and other basic records must be maintained by the contractor and any subcontractor during the course of the work and preserved for all laborers and mechanics working at the site of the work (or otherwise working in construction or development of the project under a development statute) for a period of at least 3 years after all the work on the prime contract is completed.

(2) *Information required.* Such records must contain the name; Social Security number; last known address, telephone number, and email address of each such worker; each worker's correct classification(s) of work actually performed; hourly rates of wages paid (including rates of contributions or costs anticipated for bona fide fringe benefits or cash equivalents thereof of the types described in [40 U.S.C. 3141\(2\)\(B\)](#) of the Davis-Bacon Act); daily and weekly number of hours actually worked in total and on each covered contract; deductions made; and actual wages paid.

(3) *Additional records relating to fringe benefits.* Whenever the Secretary of Labor has found under paragraph 1.e. of this section that the wages of any laborer or mechanic include the amount of any costs reasonably anticipated in providing benefits under a plan or program described in [40 U.S.C. 3141\(2\)\(B\)](#) of the Davis-Bacon Act, the contractor must maintain records which show that the commitment to provide such benefits is enforceable, that the plan or program is financially responsible, and that the plan or program has been communicated in writing to the laborers or mechanics affected, and records which show the costs anticipated or the actual cost incurred in providing such benefits.

(4) *Additional records relating to apprenticeship.* Contractors with apprentices working under approved programs must maintain written evidence of the registration of apprenticeship programs, the registration of the apprentices, and the ratios and wage rates prescribed in the applicable programs.

b. *Certified payroll requirements* (1) *Frequency and method of submission.* The contractor or subcontractor must submit weekly, for each week in which any DBA- or Related Acts-covered work is performed, certified payrolls to the contracting

agency. The prime contractor is responsible for the submission of all certified payrolls by all subcontractors. A contracting agency or prime contractor may permit or require contractors to submit certified payrolls through an electronic system, as long as the electronic system requires a legally valid electronic signature; the system allows the contractor, the contracting agency, and the Department of Labor to access the certified payrolls upon request for at least 3 years after the work on the prime contract has been completed; and the contracting agency or prime contractor permits other methods of submission in situations where the contractor is unable or limited in its ability to use or access the electronic system.

(2) *Information required.* The certified payrolls submitted must set out accurately and completely all of the information required to be maintained under paragraph 3.a.(2) of this section, except that full Social Security numbers and last known addresses, telephone numbers, and email addresses must not be included on weekly transmittals. Instead, the certified payrolls need only include an individually identifying number for each worker (e.g., the last four digits of the worker's Social Security number). The required weekly certified payroll information may be submitted using Optional Form WH-347 or in any other format desired. Optional Form WH-347 is available for this purpose from the Wage and Hour Division website at <https://www.dol.gov/sites/dolgov/files/WHDL/legacy/files/wh347.pdf> or its successor website. It is not a violation of this section for a prime contractor to require a subcontractor to provide full Social Security numbers and last known addresses, telephone numbers, and email addresses to the prime contractor for its own records, without weekly submission by the subcontractor to the contracting agency.

(3) *Statement of Compliance.* Each certified payroll submitted must be accompanied by a "Statement of Compliance," signed by the contractor or subcontractor, or the contractor's or subcontractor's agent who pays or supervises the payment of the persons working on the contract, and must certify the following:

(i) That the certified payroll for the payroll period contains the information required to be provided under paragraph 3.b. of this section, the appropriate information and basic records are being maintained under paragraph 3.a. of this section, and such information and records are correct and complete;

(ii) That each laborer or mechanic (including each helper and apprentice) working on the contract during the payroll period has been paid the full weekly wages earned, without rebate, either directly or indirectly, and that no deductions have been made either directly or indirectly from the full wages earned, other than permissible deductions as set forth in [29 CFR part 3](#); and

(iii) That each laborer or mechanic has been paid not less than the applicable wage rates and fringe benefits or cash equivalents for the classification(s) of work actually performed, as specified in the applicable wage determination incorporated into the contract.

(4) *Use of Optional Form WH-347.* The weekly submission of a properly executed certification set forth on the reverse side of Optional Form WH-347 will satisfy the requirement for submission of the "Statement of Compliance" required by paragraph 3.b.(3) of this section.

(5) *Signature.* The signature by the contractor, subcontractor, or the contractor's or subcontractor's agent must be an original handwritten signature or a legally valid electronic signature.

(6) *Falsification.* The falsification of any of the above certifications may subject the contractor or subcontractor to civil or criminal prosecution under [18 U.S.C. 1001](#) and [31 U.S.C. 3729](#).

(7) *Length of certified payroll retention.* The contractor or subcontractor must preserve all certified payrolls during the course of the work and for a period of 3 years after all the work on the prime contract is completed.

c. *Contracts, subcontracts, and related documents.* The contractor or subcontractor must maintain this contract or subcontract and related documents including, without limitation, bids, proposals, amendments, modifications, and extensions. The contractor or subcontractor must preserve these contracts, subcontracts, and related documents during the course of the work and for a period of 3 years after all the work on the prime contract is completed.

d. *Required disclosures and access* (1) *Required record disclosures and access to workers.* The contractor or subcontractor must make the records required under paragraphs 3.a. through 3.c. of this section, and any other documents that the contracting agency, the State DOT, the FHWA, or the Department of Labor deems necessary to determine compliance with the labor standards provisions of any of the applicable statutes referenced by § 5.1, available for inspection, copying, or transcription by authorized representatives of the contracting agency, the State DOT, the FHWA, or the Department of Labor, and must permit such representatives to interview workers during working hours on the job.

(2) *Sanctions for non-compliance with records and worker access requirements.* If the contractor or subcontractor fails to submit the required records or to make them available, or refuses to permit worker interviews during working hours on the job, the Federal agency may, after written notice to the contractor, sponsor, applicant, owner, or other entity, as the case may be, that maintains such records or that employs such workers, take such action as may be necessary to cause the suspension of any further payment, advance, or guarantee of funds. Furthermore, failure to submit the required records upon request or to make such records available, or to permit worker interviews during working hours on the job, may be grounds for debarment action pursuant to § 5.12. In addition, any contractor or other person that fails to submit the required records or make those records available to WHD within the time WHD requests that the records be produced will be precluded from introducing as evidence in an administrative proceeding under [29 CFR part 6](#) any of the required records that were not provided or made available to WHD. WHD will take into consideration a reasonable request from the contractor or person for an extension of the time for submission of records. WHD will determine the reasonableness of the request and may consider, among other things, the location of the records and the volume of production.

(3) *Required information disclosures.* Contractors and subcontractors must maintain the full Social Security number and last known address, telephone number, and email address

of each covered worker, and must provide them upon request to the contracting agency, the State DOT, the FHWA, the contractor, or the Wage and Hour Division of the Department of Labor for purposes of an investigation or other compliance action.

4. Apprentices and equal employment opportunity (29 CFR 5.5)

a. *Apprentices (1) Rate of pay.* Apprentices will be permitted to work at less than the predetermined rate for the work they perform when they are employed pursuant to and individually registered in a bona fide apprenticeship program registered with the U.S. Department of Labor, Employment and Training Administration, Office of Apprenticeship (OA), or with a State Apprenticeship Agency recognized by the OA. A person who is not individually registered in the program, but who has been certified by the OA or a State Apprenticeship Agency (where appropriate) to be eligible for probationary employment as an apprentice, will be permitted to work at less than the predetermined rate for the work they perform in the first 90 days of probationary employment as an apprentice in such a program. In the event the OA or a State Apprenticeship Agency recognized by the OA withdraws approval of an apprenticeship program, the contractor will no longer be permitted to use apprentices at less than the applicable predetermined rate for the work performed until an acceptable program is approved.

(2) *Fringe benefits.* Apprentices must be paid fringe benefits in accordance with the provisions of the apprenticeship program. If the apprenticeship program does not specify fringe benefits, apprentices must be paid the full amount of fringe benefits listed on the wage determination for the applicable classification. If the Administrator determines that a different practice prevails for the applicable apprentice classification, fringe benefits must be paid in accordance with that determination.

(3) *Apprenticeship ratio.* The allowable ratio of apprentices to journeyworkers on the job site in any craft classification must not be greater than the ratio permitted to the contractor as to the entire work force under the registered program or the ratio applicable to the locality of the project pursuant to paragraph 4.a.(4) of this section. Any worker listed on a payroll at an apprentice wage rate, who is not registered or otherwise employed as stated in paragraph 4.a.(1) of this section, must be paid not less than the applicable wage rate on the wage determination for the classification of work actually performed. In addition, any apprentice performing work on the job site in excess of the ratio permitted under this section must be paid not less than the applicable wage rate on the wage determination for the work actually performed.

(4) *Reciprocity of ratios and wage rates.* Where a contractor is performing construction on a project in a locality other than the locality in which its program is registered, the ratios and wage rates (expressed in percentages of the journeyworker's hourly rate) applicable within the locality in which the construction is being performed must be observed. If there is no applicable ratio or wage rate for the locality of the project, the ratio and wage rate specified in the contractor's registered program must be observed.

b. *Equal employment opportunity.* The use of apprentices and journeyworkers under this part must be in conformity with

the equal employment opportunity requirements of Executive Order 11246, as amended, and [29 CFR part 30](#).

c. Apprentices and Trainees (programs of the U.S. DOT).

Apprentices and trainees working under apprenticeship and skill training programs which have been certified by the Secretary of Transportation as promoting EEO in connection with Federal-aid highway construction programs are not subject to the requirements of paragraph 4 of this Section IV. 23 CFR 230.111(e)(2). The straight time hourly wage rates for apprentices and trainees under such programs will be established by the particular programs. The ratio of apprentices and trainees to journeyworkers shall not be greater than permitted by the terms of the particular program.

5. Compliance with Copeland Act requirements. The contractor shall comply with the requirements of 29 CFR part 3, which are incorporated by reference in this contract as provided in 29 CFR 5.5.

6. Subcontracts. The contractor or subcontractor must insert FHWA-1273 in any subcontracts, along with the applicable wage determination(s) and such other clauses or contract modifications as the contracting agency may by appropriate instructions require, and a clause requiring the subcontractors to include these clauses and wage determination(s) in any lower tier subcontracts. The prime contractor is responsible for the compliance by any subcontractor or lower tier subcontractor with all the contract clauses in this section. In the event of any violations of these clauses, the prime contractor and any subcontractor(s) responsible will be liable for any unpaid wages and monetary relief, including interest from the date of the underpayment or loss, due to any workers of lower-tier subcontractors, and may be subject to debarment, as appropriate. 29 CFR 5.5.

7. Contract termination: debarment. A breach of the contract clauses in 29 CFR 5.5 may be grounds for termination of the contract, and for debarment as a contractor and a subcontractor as provided in 29 CFR 5.12.

8. Compliance with Davis-Bacon and Related Act requirements. All rulings and interpretations of the Davis-Bacon and Related Acts contained in 29 CFR parts 1, 3, and 5 are herein incorporated by reference in this contract as provided in 29 CFR 5.5.

9. Disputes concerning labor standards. As provided in 29 CFR 5.5, disputes arising out of the labor standards provisions of this contract shall not be subject to the general disputes clause of this contract. Such disputes shall be resolved in accordance with the procedures of the Department of Labor set forth in 29 CFR parts 5, 6, and 7. Disputes within the meaning of this clause include disputes between the contractor (or any of its subcontractors) and the contracting agency, the U.S. Department of Labor, or the employees or their representatives.

10. Certification of eligibility. a. By entering into this contract, the contractor certifies that neither it nor any person or firm who has an interest in the contractor's firm is a person or firm ineligible to be awarded Government contracts by virtue of [40 U.S.C. 3144\(b\)](#) or § 5.12(a).

b. No part of this contract shall be subcontracted to any person or firm ineligible for award of a Government contract by virtue of [40 U.S.C. 3144\(b\)](#) or § 5.12(a).

c. The penalty for making false statements is prescribed in the U.S. Code, Title 18 Crimes and Criminal Procedure, [18 U.S.C. 1001](#).

11. Anti-retaliation. It is unlawful for any person to discharge, demote, intimidate, threaten, restrain, coerce, blacklist, harass, or in any other manner discriminate against, or to cause any person to discharge, demote, intimidate, threaten, restrain, coerce, blacklist, harass, or in any other manner discriminate against, any worker or job applicant for:

a. Notifying any contractor of any conduct which the worker reasonably believes constitutes a violation of the DBA, Related Acts, this part, or [29 CFR part 1](#) or [3](#);

b. Filing any complaint, initiating or causing to be initiated any proceeding, or otherwise asserting or seeking to assert on behalf of themselves or others any right or protection under the DBA, Related Acts, this part, or [29 CFR part 1](#) or [3](#);

c. Cooperating in any investigation or other compliance action, or testifying in any proceeding under the DBA, Related Acts, this part, or [29 CFR part 1](#) or [3](#); or

d. Informing any other person about their rights under the DBA, Related Acts, this part, or [29 CFR part 1](#) or [3](#).

V. CONTRACT WORK HOURS AND SAFETY STANDARDS ACT

Pursuant to 29 CFR 5.5(b), the following clauses apply to any Federal-aid construction contract in an amount in excess of \$100,000 and subject to the overtime provisions of the Contract Work Hours and Safety Standards Act. These clauses shall be inserted in addition to the clauses required by 29 CFR 5.5(a) or 29 CFR 4.6. As used in this paragraph, the terms laborers and mechanics include watchpersons and guards.

1. Overtime requirements. No contractor or subcontractor contracting for any part of the contract work which may require or involve the employment of laborers or mechanics shall require or permit any such laborer or mechanic in any workweek in which he or she is employed on such work to work in excess of forty hours in such workweek unless such laborer or mechanic receives compensation at a rate not less than one and one-half times the basic rate of pay for all hours worked in excess of forty hours in such workweek. 29 CFR 5.5.

2. Violation; liability for unpaid wages; liquidated damages. In the event of any violation of the clause set forth in paragraph 1. of this section the contractor and any subcontractor responsible therefor shall be liable for the unpaid wages and interest from the date of the underpayment. In addition, such contractor and subcontractor shall be liable to the United States (in the case of work done under contract for the District of Columbia or a territory, to such District or to such territory), for liquidated damages. Such liquidated damages shall be computed with respect to each individual laborer or

mechanic, including watchpersons and guards, employed in violation of the clause set forth in paragraph 1. of this section, in the sum currently provided in 29 CFR 5.5(b)(2)* for each calendar day on which such individual was required or permitted to work in excess of the standard workweek of forty hours without payment of the overtime wages required by the clause set forth in paragraph 1. of this section.

* \$31 as of January 15, 2023 (See 88 FR 88 FR 2210) as may be adjusted annually by the Department of Labor, pursuant to the Federal Civil Penalties Inflation Adjustment Act of 1990.

3. Withholding for unpaid wages and liquidated damages

a. *Withholding process.* The FHWA or the contracting agency may, upon its own action, or must, upon written request of an authorized representative of the Department of Labor, withhold or cause to be withheld from the contractor so much of the accrued payments or advances as may be considered necessary to satisfy the liabilities of the prime contractor or any subcontractor for any unpaid wages; monetary relief, including interest; and liquidated damages required by the clauses set forth in this section on this contract, any other Federal contract with the same prime contractor, or any other federally assisted contract subject to the Contract Work Hours and Safety Standards Act that is held by the same prime contractor (as defined in § 5.2). The necessary funds may be withheld from the contractor under this contract, any other Federal contract with the same prime contractor, or any other federally assisted contract that is subject to the Contract Work Hours and Safety Standards Act and is held by the same prime contractor, regardless of whether the other contract was awarded or assisted by the same agency, and such funds may be used to satisfy the contractor liability for which the funds were withheld.

b. *Priority to withheld funds.* The Department has priority to funds withheld or to be withheld in accordance with Section IV paragraph 2.a. or paragraph 3.a. of this section, or both, over claims to those funds by:

- (1) A contractor's surety(ies), including without limitation performance bond sureties and payment bond sureties;
- (2) A contracting agency for its procurement costs;
- (3) A trustee(s) (either a court-appointed trustee or a U.S. trustee, or both) in bankruptcy of a contractor, or a contractor's bankruptcy estate;
- (4) A contractor's assignee(s);
- (5) A contractor's successor(s); or
- (6) A claim asserted under the Prompt Payment Act, [31 U.S.C. 3901](#)–3907.

4. Subcontracts. The contractor or subcontractor must insert in any subcontracts the clauses set forth in paragraphs 1. through 5. of this section and a clause requiring the subcontractors to include these clauses in any lower tier subcontracts. The prime contractor is responsible for compliance by any subcontractor or lower tier subcontractor with the clauses set forth in paragraphs 1. through 5. In the

event of any violations of these clauses, the prime contractor and any subcontractor(s) responsible will be liable for any unpaid wages and monetary relief, including interest from the date of the underpayment or loss, due to any workers of lower-tier subcontractors, and associated liquidated damages and may be subject to debarment, as appropriate.

5. Anti-retaliation. It is unlawful for any person to discharge, demote, intimidate, threaten, restrain, coerce, blacklist, harass, or in any other manner discriminate against, or to cause any person to discharge, demote, intimidate, threaten, restrain, coerce, blacklist, harass, or in any other manner discriminate against, any worker or job applicant for:

- a. Notifying any contractor of any conduct which the worker reasonably believes constitutes a violation of the Contract Work Hours and Safety Standards Act (CWHSSA) or its implementing regulations in this part;
- b. Filing any complaint, initiating or causing to be initiated any proceeding, or otherwise asserting or seeking to assert on behalf of themselves or others any right or protection under CWHSSA or this part;
- c. Cooperating in any investigation or other compliance action, or testifying in any proceeding under CWHSSA or this part; or
- d. Informing any other person about their rights under CWHSSA or this part.

VI. SUBLETTING OR ASSIGNING THE CONTRACT

This provision is applicable to all Federal-aid construction contracts on the National Highway System pursuant to 23 CFR 635.116.

1. The contractor shall perform with its own organization contract work amounting to not less than 30 percent (or a greater percentage if specified elsewhere in the contract) of the total original contract price, excluding any specialty items designated by the contracting agency. Specialty items may be performed by subcontract and the amount of any such specialty items performed may be deducted from the total original contract price before computing the amount of work required to be performed by the contractor's own organization (23 CFR 635.116).

a. The term "perform work with its own organization" in paragraph 1 of Section VI refers to workers employed or leased by the prime contractor, and equipment owned or rented by the prime contractor, with or without operators. Such term does not include employees or equipment of a subcontractor or lower tier subcontractor, agents of the prime contractor, or any other assignees. The term may include payments for the costs of hiring leased employees from an employee leasing firm meeting all relevant Federal and State regulatory requirements. Leased employees may only be included in this term if the prime contractor meets all of the following conditions: (based on longstanding interpretation)

- (1) the prime contractor maintains control over the supervision of the day-to-day activities of the leased employees;
- (2) the prime contractor remains responsible for the quality of the work of the leased employees;

(3) the prime contractor retains all power to accept or exclude individual employees from work on the project; and

(4) the prime contractor remains ultimately responsible for the payment of predetermined minimum wages, the submission of payrolls, statements of compliance and all other Federal regulatory requirements.

b. "Specialty Items" shall be construed to be limited to work that requires highly specialized knowledge, abilities, or equipment not ordinarily available in the type of contracting organizations qualified and expected to bid or propose on the contract as a whole and in general are to be limited to minor components of the overall contract. 23 CFR 635.102.

2. Pursuant to 23 CFR 635.116(a), the contract amount upon which the requirements set forth in paragraph (1) of Section VI is computed includes the cost of material and manufactured products which are to be purchased or produced by the contractor under the contract provisions.

3. Pursuant to 23 CFR 635.116(c), the contractor shall furnish (a) a competent superintendent or supervisor who is employed by the firm, has full authority to direct performance of the work in accordance with the contract requirements, and is in charge of all construction operations (regardless of who performs the work) and (b) such other of its own organizational resources (supervision, management, and engineering services) as the contracting officer determines is necessary to assure the performance of the contract.

4. No portion of the contract shall be sublet, assigned or otherwise disposed of except with the written consent of the contracting officer, or authorized representative, and such consent when given shall not be construed to relieve the contractor of any responsibility for the fulfillment of the contract. Written consent will be given only after the contracting agency has assured that each subcontract is evidenced in writing and that it contains all pertinent provisions and requirements of the prime contract. (based on long-standing interpretation of 23 CFR 635.116).

5. The 30-percent self-performance requirement of paragraph (1) is not applicable to design-build contracts; however, contracting agencies may establish their own self-performance requirements. 23 CFR 635.116(d).

VII. SAFETY: ACCIDENT PREVENTION

This provision is applicable to all Federal-aid construction contracts and to all related subcontracts.

1. In the performance of this contract the contractor shall comply with all applicable Federal, State, and local laws governing safety, health, and sanitation (23 CFR Part 635). The contractor shall provide all safeguards, safety devices and protective equipment and take any other needed actions as it determines, or as the contracting officer may determine, to be reasonably necessary to protect the life and health of employees on the job and the safety of the public and to protect property in connection with the performance of the work covered by the contract. 23 CFR 635.108.

2. It is a condition of this contract, and shall be made a condition of each subcontract, which the contractor enters into pursuant to this contract, that the contractor and any subcontractor shall not permit any employee, in performance of the contract, to work in surroundings or under conditions which are unsanitary, hazardous or dangerous to his/her health or safety, as determined under construction safety and

health standards (29 CFR Part 1926) promulgated by the Secretary of Labor, in accordance with Section 107 of the Contract Work Hours and Safety Standards Act (40 U.S.C. 3704). 29 CFR 1926.10.

3. Pursuant to 29 CFR 1926.3, it is a condition of this contract that the Secretary of Labor or authorized representative thereof, shall have right of entry to any site of contract performance to inspect or investigate the matter of compliance with the construction safety and health standards and to carry out the duties of the Secretary under Section 107 of the Contract Work Hours and Safety Standards Act (40 U.S.C. 3704).

VIII. FALSE STATEMENTS CONCERNING HIGHWAY PROJECTS

This provision is applicable to all Federal-aid construction contracts and to all related subcontracts.

In order to assure high quality and durable construction in conformity with approved plans and specifications and a high degree of reliability on statements and representations made by engineers, contractors, suppliers, and workers on Federal-aid highway projects, it is essential that all persons concerned with the project perform their functions as carefully, thoroughly, and honestly as possible. Willful falsification, distortion, or misrepresentation with respect to any facts related to the project is a violation of Federal law. To prevent any misunderstanding regarding the seriousness of these and similar acts, Form FHWA-1022 shall be posted on each Federal-aid highway project (23 CFR Part 635) in one or more places where it is readily available to all persons concerned with the project:

18 U.S.C. 1020 reads as follows:

"Whoever, being an officer, agent, or employee of the United States, or of any State or Territory, or whoever, whether a person, association, firm, or corporation, knowingly makes any false statement, false representation, or false report as to the character, quality, quantity, or cost of the material used or to be used, or the quantity or quality of the work performed or to be performed, or the cost thereof in connection with the submission of plans, maps, specifications, contracts, or costs of construction on any highway or related project submitted for approval to the Secretary of Transportation; or

Whoever knowingly makes any false statement, false representation, false report or false claim with respect to the character, quality, quantity, or cost of any work performed or to be performed, or materials furnished or to be furnished, in connection with the construction of any highway or related project approved by the Secretary of Transportation; or

Whoever knowingly makes any false statement or false representation as to material fact in any statement, certificate, or report submitted pursuant to provisions of the Federal-aid Roads Act approved July 11, 1916, (39 Stat. 355), as amended and supplemented;

Shall be fined under this title or imprisoned not more than 5 years or both."

IX. IMPLEMENTATION OF CLEAN AIR ACT AND FEDERAL WATER POLLUTION CONTROL ACT (42 U.S.C. 7606; 2 CFR 200.88; EO 11738)

This provision is applicable to all Federal-aid construction contracts in excess of \$150,000 and to all related subcontracts. 48 CFR 2.101; 2 CFR 200.327.

By submission of this bid/proposal or the execution of this contract or subcontract, as appropriate, the bidder, proposer, Federal-aid construction contractor, subcontractor, supplier, or vendor agrees to comply with all applicable standards, orders or regulations issued pursuant to the Clean Air Act (42 U.S.C. 7401-7671q) and the Federal Water Pollution Control Act, as amended (33 U.S.C. 1251-1387). Violations must be reported to the Federal Highway Administration and the Regional Office of the Environmental Protection Agency. 2 CFR Part 200, Appendix II.

The contractor agrees to include or cause to be included the requirements of this Section in every subcontract, and further agrees to take such action as the contracting agency may direct as a means of enforcing such requirements. 2 CFR 200.327.

X. CERTIFICATION REGARDING DEBARMENT, SUSPENSION, INELIGIBILITY AND VOLUNTARY EXCLUSION

This provision is applicable to all Federal-aid construction contracts, design-build contracts, subcontracts, lower-tier subcontracts, purchase orders, lease agreements, consultant contracts or any other covered transaction requiring FHWA approval or that is estimated to cost \$25,000 or more – as defined in 2 CFR Parts 180 and 1200. 2 CFR 180.220 and 1200.220.

1. Instructions for Certification – First Tier Participants:

a. By signing and submitting this proposal, the prospective first tier participant is providing the certification set out below.

b. The inability of a person to provide the certification set out below will not necessarily result in denial of participation in this covered transaction. The prospective first tier participant shall submit an explanation of why it cannot provide the certification set out below. The certification or explanation will be considered in connection with the department or agency's determination whether to enter into this transaction. However, failure of the prospective first tier participant to furnish a certification or an explanation shall disqualify such a person from participation in this transaction. 2 CFR 180.320.

c. The certification in this clause is a material representation of fact upon which reliance was placed when the contracting agency determined to enter into this transaction. If it is later determined that the prospective participant knowingly rendered an erroneous certification, in addition to other remedies available to the Federal Government, the contracting agency may terminate this transaction for cause of default. 2 CFR 180.325.

d. The prospective first tier participant shall provide immediate written notice to the contracting agency to whom this proposal is submitted if any time the prospective first tier participant learns that its certification was erroneous when submitted or has become erroneous by reason of changed circumstances. 2 CFR 180.345 and 180.350.

e. The terms "covered transaction," "debarred," "suspended," "ineligible," "participant," "person," "principal," and "voluntarily excluded," as used in this clause, are defined in 2 CFR Parts 180, Subpart I, 180.900-180.1020, and 1200. "First Tier Covered Transactions" refers to any covered transaction between a recipient or subrecipient of Federal funds and a participant (such as the prime or general contract). "Lower Tier Covered Transactions" refers to any covered transaction under a First Tier Covered Transaction (such as subcontracts). "First Tier Participant" refers to the participant who has entered into a covered transaction with a recipient or subrecipient of Federal funds (such as the prime or general contractor). "Lower Tier Participant" refers any participant who has entered into a covered transaction with a First Tier Participant or other Lower Tier Participants (such as subcontractors and suppliers).

f. The prospective first tier participant agrees by submitting this proposal that, should the proposed covered transaction be entered into, it shall not knowingly enter into any lower tier covered transaction with a person who is debarred, suspended, declared ineligible, or voluntarily excluded from participation in this covered transaction, unless authorized by the department or agency entering into this transaction. 2 CFR 180.330.

g. The prospective first tier participant further agrees by submitting this proposal that it will include the clause titled "Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion-Lower Tier Covered Transactions," provided by the department or contracting agency, entering into this covered transaction, without modification, in all lower tier covered transactions and in all solicitations for lower tier covered transactions exceeding the \$25,000 threshold. 2 CFR 180.220 and 180.300.

h. A participant in a covered transaction may rely upon a certification of a prospective participant in a lower tier covered transaction that is not debarred, suspended, ineligible, or voluntarily excluded from the covered transaction, unless it knows that the certification is erroneous. 2 CFR 180.300; 180.320, and 180.325. A participant is responsible for ensuring that its principals are not suspended, debarred, or otherwise ineligible to participate in covered transactions. 2 CFR 180.335. To verify the eligibility of its principals, as well as the eligibility of any lower tier prospective participants, each participant may, but is not required to, check the System for Award Management website (<https://www.sam.gov/>). 2 CFR 180.300, 180.320, and 180.325.

i. Nothing contained in the foregoing shall be construed to require the establishment of a system of records in order to render in good faith the certification required by this clause. The knowledge and information of the prospective participant is not required to exceed that which is normally possessed by a prudent person in the ordinary course of business dealings.

j. Except for transactions authorized under paragraph (f) of these instructions, if a participant in a covered transaction knowingly enters into a lower tier covered transaction with a person who is suspended, debarred, ineligible, or voluntarily excluded from participation in this transaction, in addition to other remedies available to the Federal Government, the department or agency may terminate this transaction for cause or default. 2 CFR 180.325.

* * * * *

2. Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion – First Tier Participants:

a. The prospective first tier participant certifies to the best of its knowledge and belief, that it and its principals:

(1) Are not presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from participating in covered transactions by any Federal department or agency, 2 CFR 180.335;.

(2) Have not within a three-year period preceding this proposal been convicted of or had a civil judgment rendered against them for commission of fraud or a criminal offense in connection with obtaining, attempting to obtain, or performing a public (Federal, State, or local) transaction or contract under a public transaction; violation of Federal or State antitrust statutes or commission of embezzlement, theft, forgery, bribery, falsification or destruction of records, making false statements, or receiving stolen property, 2 CFR 180.800;

(3) Are not presently indicted for or otherwise criminally or civilly charged by a governmental entity (Federal, State or local) with commission of any of the offenses enumerated in paragraph (a)(2) of this certification, 2 CFR 180.700 and 180.800; and

(4) Have not within a three-year period preceding this application/proposal had one or more public transactions (Federal, State or local) terminated for cause or default. 2 CFR 180.335(d).

(5) Are not a corporation that has been convicted of a felony violation under any Federal law within the two-year period preceding this proposal (USDOT Order 4200.6 implementing appropriations act requirements); and

(6) Are not a corporation with any unpaid Federal tax liability that has been assessed, for which all judicial and administrative remedies have been exhausted, or have lapsed, and that is not being paid in a timely manner pursuant to an agreement with the authority responsible for collecting the tax liability (USDOT Order 4200.6 implementing appropriations act requirements).

b. Where the prospective participant is unable to certify to any of the statements in this certification, such prospective participant should attach an explanation to this proposal. 2 CFR 180.335 and 180.340.

3. Instructions for Certification - Lower Tier Participants:

(Applicable to all subcontracts, purchase orders, and other lower tier transactions requiring prior FHWA approval or estimated to cost \$25,000 or more - 2 CFR Parts 180 and 1200). 2 CFR 180.220 and 1200.220.

a. By signing and submitting this proposal, the prospective lower tier participant is providing the certification set out below.

b. The certification in this clause is a material representation of fact upon which reliance was placed when this transaction was entered into. If it is later determined that the prospective lower tier participant knowingly rendered an erroneous certification, in addition to other remedies available to the Federal Government, the department, or agency with which

this transaction originated may pursue available remedies, including suspension and/or debarment.

c. The prospective lower tier participant shall provide immediate written notice to the person to which this proposal is submitted if at any time the prospective lower tier participant learns that its certification was erroneous by reason of changed circumstances. 2 CFR 180.365.

d. The terms "covered transaction," "debarred," "suspended," "ineligible," "participant," "person," "principal," and "voluntarily excluded," as used in this clause, are defined in 2 CFR Parts 180, Subpart I, 180.900 – 180.1020, and 1200. You may contact the person to which this proposal is submitted for assistance in obtaining a copy of those regulations. "First Tier Covered Transactions" refers to any covered transaction between a recipient or subrecipient of Federal funds and a participant (such as the prime or general contractor). "Lower Tier Covered Transactions" refers to any covered transaction under a First Tier Covered Transaction (such as subcontracts). "First Tier Participant" refers to the participant who has entered into a covered transaction with a recipient or subrecipient of Federal funds (such as the prime or general contractor). "Lower Tier Participant" refers any participant who has entered into a covered transaction with a First Tier Participant or other Lower Tier Participants (such as subcontractors and suppliers).

e. The prospective lower tier participant agrees by submitting this proposal that, should the proposed covered transaction be entered into, it shall not knowingly enter into any lower tier covered transaction with a person who is debarred, suspended, declared ineligible, or voluntarily excluded from participation in this covered transaction, unless authorized by the department or agency with which this transaction originated. 2 CFR 1200.220 and 1200.332.

f. The prospective lower tier participant further agrees by submitting this proposal that it will include this clause titled "Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion-Lower Tier Covered Transaction," without modification, in all lower tier covered transactions and in all solicitations for lower tier covered transactions exceeding the \$25,000 threshold. 2 CFR 180.220 and 1200.220.

g. A participant in a covered transaction may rely upon a certification of a prospective participant in a lower tier covered transaction that is not debarred, suspended, ineligible, or voluntarily excluded from the covered transaction, unless it knows that the certification is erroneous. A participant is responsible for ensuring that its principals are not suspended, debarred, or otherwise ineligible to participate in covered transactions. To verify the eligibility of its principals, as well as the eligibility of any lower tier prospective participants, each participant may, but is not required to, check the System for Award Management website (<https://www.sam.gov/>), which is compiled by the General Services Administration. 2 CFR 180.300, 180.320, 180.330, and 180.335.

h. Nothing contained in the foregoing shall be construed to require establishment of a system of records in order to render in good faith the certification required by this clause. The knowledge and information of participant is not required to exceed that which is normally possessed by a prudent person in the ordinary course of business dealings.

i. Except for transactions authorized under paragraph e of these instructions, if a participant in a covered transaction knowingly enters into a lower tier covered transaction with a person who is suspended, debarred, ineligible, or voluntarily

excluded from participation in this transaction, in addition to other remedies available to the Federal Government, the department or agency with which this transaction originated may pursue available remedies, including suspension and/or debarment. 2 CFR 180.325.

* * * * *

4. Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion--Lower Tier Participants:

a. The prospective lower tier participant certifies, by submission of this proposal, that neither it nor its principals:

(1) is presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from participating in covered transactions by any Federal department or agency, 2 CFR 180.355;

(2) is a corporation that has been convicted of a felony violation under any Federal law within the two-year period preceding this proposal (USDOT Order 4200.6 implementing appropriations act requirements); and

(3) is a corporation with any unpaid Federal tax liability that has been assessed, for which all judicial and administrative remedies have been exhausted, or have lapsed, and that is not being paid in a timely manner pursuant to an agreement with the authority responsible for collecting the tax liability. (USDOT Order 4200.6 implementing appropriations act requirements)

b. Where the prospective lower tier participant is unable to certify to any of the statements in this certification, such prospective participant should attach an explanation to this proposal.

* * * * *

XI. CERTIFICATION REGARDING USE OF CONTRACT FUNDS FOR LOBBYING

This provision is applicable to all Federal-aid construction contracts and to all related subcontracts which exceed \$100,000. 49 CFR Part 20, App. A.

1. The prospective participant certifies, by signing and submitting this bid or proposal, to the best of his or her knowledge and belief, that:

a. No Federal appropriated funds have been paid or will be paid, by or on behalf of the undersigned, to any person for influencing or attempting to influence an officer or employee of any Federal agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with the awarding of any Federal contract, the making of any Federal grant, the making of any Federal loan, the entering into of any cooperative agreement, and the extension, continuation, renewal, amendment, or modification of any Federal contract, grant, loan, or cooperative agreement.

b. If any funds other than Federal appropriated funds have been paid or will be paid to any person for influencing or attempting to influence an officer or employee of any Federal agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with this Federal contract, grant, loan, or

cooperative agreement, the undersigned shall complete and submit Standard Form-LLL, "Disclosure Form to Report Lobbying," in accordance with its instructions.

2. This certification is a material representation of fact upon which reliance was placed when this transaction was made or entered into. Submission of this certification is a prerequisite for making or entering into this transaction imposed by 31 U.S.C. 1352. Any person who fails to file the required certification shall be subject to a civil penalty of not less than \$10,000 and not more than \$100,000 for each such failure.

3. The prospective participant also agrees by submitting its bid or proposal that the participant shall require that the language of this certification be included in all lower tier subcontracts, which exceed \$100,000 and that all such recipients shall certify and disclose accordingly.

XII. USE OF UNITED STATES-FLAG VESSELS:

This provision is applicable to all Federal-aid construction contracts, design-build contracts, subcontracts, lower-tier subcontracts, purchase orders, lease agreements, or any other covered transaction. 46 CFR Part 381.

This requirement applies to material or equipment that is acquired for a specific Federal-aid highway project. 46 CFR 381.7. It is not applicable to goods or materials that come into inventories independent of an FHWA funded-contract.

When oceanic shipments (or shipments across the Great Lakes) are necessary for materials or equipment acquired for a specific Federal-aid construction project, the bidder, proposer, contractor, subcontractor, or vendor agrees:

1. To utilize privately owned United States-flag commercial vessels to ship at least 50 percent of the gross tonnage (computed separately for dry bulk carriers, dry cargo liners, and tankers) involved, whenever shipping any equipment, material, or commodities pursuant to this contract, to the extent such vessels are available at fair and reasonable rates for United States-flag commercial vessels. 46 CFR 381.7.

2. To furnish within 20 days following the date of loading for shipments originating within the United States or within 30 working days following the date of loading for shipments originating outside the United States, a legible copy of a rated, 'on-board' commercial ocean bill-of-lading in English for each shipment of cargo described in paragraph (b)(1) of this section to both the Contracting Officer (through the prime contractor in the case of subcontractor bills-of-lading) and to the Office of Cargo and Commercial Sealift (MAR-620), Maritime Administration, Washington, DC 20590. (MARAD requires copies of the ocean carrier's (master) bills of lading, certified onboard, dated, with rates and charges. These bills of lading may contain business sensitive information and therefore may be submitted directly to MARAD by the Ocean Transportation Intermediary on behalf of the contractor). 46 CFR 381.7.

**ATTACHMENT A - EMPLOYMENT AND MATERIALS
PREFERENCE FOR APPALACHIAN DEVELOPMENT
HIGHWAY SYSTEM OR APPALACHIAN LOCAL ACCESS
ROAD CONTRACTS (23 CFR 633, Subpart B, Appendix B)**

This provision is applicable to all Federal-aid projects funded under the Appalachian Regional Development Act of 1965.

1. During the performance of this contract, the contractor undertaking to do work which is, or reasonably may be, done as on-site work, shall give preference to qualified persons who regularly reside in the labor area as designated by the DOL wherein the contract work is situated, or the subregion, or the Appalachian counties of the State wherein the contract work is situated, except:

a. To the extent that qualified persons regularly residing in the area are not available.

b. For the reasonable needs of the contractor to employ supervisory or specially experienced personnel necessary to assure an efficient execution of the contract work.

c. For the obligation of the contractor to offer employment to present or former employees as the result of a lawful collective bargaining contract, provided that the number of nonresident persons employed under this subparagraph (1c) shall not exceed 20 percent of the total number of employees employed by the contractor on the contract work, except as provided in subparagraph (4) below.

2. The contractor shall place a job order with the State Employment Service indicating (a) the classifications of the laborers, mechanics and other employees required to perform the contract work, (b) the number of employees required in each classification, (c) the date on which the participant estimates such employees will be required, and (d) any other pertinent information required by the State Employment Service to complete the job order form. The job order may be placed with the State Employment Service in writing or by telephone. If during the course of the contract work, the information submitted by the contractor in the original job order is substantially modified, the participant shall promptly notify the State Employment Service.

3. The contractor shall give full consideration to all qualified job applicants referred to him by the State Employment Service. The contractor is not required to grant employment to any job applicants who, in his opinion, are not qualified to perform the classification of work required.

4. If, within one week following the placing of a job order by the contractor with the State Employment Service, the State Employment Service is unable to refer any qualified job applicants to the contractor, or less than the number requested, the State Employment Service will forward a certificate to the contractor indicating the unavailability of applicants. Such certificate shall be made a part of the contractor's permanent project records. Upon receipt of this certificate, the contractor may employ persons who do not normally reside in the labor area to fill positions covered by the certificate, notwithstanding the provisions of subparagraph (1c) above.

5. The provisions of 23 CFR 633.207(e) allow the contracting agency to provide a contractual preference for the use of mineral resource materials native to the Appalachian region.

6. The contractor shall include the provisions of Sections 1 through 4 of this Attachment A in every subcontract for work which is, or reasonably may be, done as on-site work.

"General Decision Number: VT20230059 01/06/2023

Superseded General Decision Number: VT20220059

State: Vermont

Construction Type: Highway

County: Chittenden County in Vermont.

HIGHWAY CONSTRUCTION PROJECTS (excluding tunnels, building structures in rest area projects & railroad construction; bascule, suspension & spandrel arch bridges designed for commercial navigation, bridges involving marine construction; and other major bridges).

Note: Contracts subject to the Davis-Bacon Act are generally required to pay at least the applicable minimum wage rate required under Executive Order 14026 or Executive Order 13658. Please note that these Executive Orders apply to covered contracts entered into by the federal government that are subject to the Davis-Bacon Act itself, but do not apply to contracts subject only to the Davis-Bacon Related Acts, including those set forth at 29 CFR 5.1(a)(2)-(60).

If the contract is entered into on or after January 30, 2022, or the contract is renewed or extended (e.g., an option is exercised) on or after January 30, 2022:	. Executive Order 14026 generally applies to the contract. . The contractor must pay all covered workers at least \$16.20 per hour (or the applicable wage rate listed on this wage determination, if it is higher) for all hours spent performing on the contract in 2023.
If the contract was awarded on or between January 1, 2015 and January 29, 2022, and the contract is not renewed or extended on or after January 30, 2022:	. Executive Order 13658 generally applies to the contract. . The contractor must pay all covered workers at least \$12.15 per hour (or the applicable wage rate listed on this wage determination, if it is higher) for all hours spent performing on that contract in 2023.

The applicable Executive Order minimum wage rate will be adjusted annually. If this contract is covered by one of the Executive Orders and a classification considered necessary for performance of work on the contract does not appear on this wage determination, the contractor must still submit a conformance request.

Additional information on contractor requirements and worker protections under the Executive Orders is available at <http://www.dol.gov/whd/govcontracts>.

Modification Number Publication Date
0 01/06/2023

SUVT2017-020 08/06/2019

	Rates	Fringes
CARPENTER, Includes Form Work....	\$ 21.66	3.58
LABORER: Common or General, Includes Asphalt Raker, Shoveler, Spreader and Distributor.....	\$ 17.57	2.04
OPERATOR: Backhoe/Excavator/Trackhoe.....	\$ 20.76	1.96
OPERATOR: Bobcat/Skid Steer/Skid Loader.....	\$ 20.96	5.99
OPERATOR: Broom/Sweeper.....	\$ 18.57	2.47
OPERATOR: Loader.....	\$ 21.50	2.41
OPERATOR: Milling Machine.....	\$ 28.48	13.11
OPERATOR: Paver (Asphalt, Aggregate, and Concrete).....	\$ 21.41	3.55
OPERATOR: Pounder.....	\$ 22.30	5.04
TRAFFIC CONTROL: Flagger.....	\$ 12.66 **	0.00
TRUCK DRIVER, Includes all axles including Dump Trucks.....	\$ 18.88	2.33

WELDERS - Receive rate prescribed for craft performing
operation to which welding is incidental.

** Workers in this classification may be entitled to a higher
minimum wage under Executive Order 14026 (\$16.20) or 13658
(\$12.15). Please see the Note at the top of the wage
determination for more information.

Note: Executive Order (EO) 13706, Establishing Paid Sick Leave
for Federal Contractors applies to all contracts subject to the
Davis-Bacon Act for which the contract is awarded (and any
solicitation was issued) on or after January 1, 2017. If this
contract is covered by the EO, the contractor must provide
employees with 1 hour of paid sick leave for every 30 hours
they work, up to 56 hours of paid sick leave each year.
Employees must be permitted to use paid sick leave for their
own illness, injury or other health-related needs, including
preventive care; to assist a family member (or person who is
like family to the employee) who is ill, injured, or has other
health-related needs, including preventive care; or for reasons
resulting from, or to assist a family member (or person who is
like family to the employee) who is a victim of, domestic
violence, sexual assault, or stalking. Additional information
on contractor requirements and worker protections under the EO
is available at
<https://www.dol.gov/agencies/whd/government-contracts>.

Unlisted classifications needed for work not included within the scope of the classifications listed may be added after award only as provided in the labor standards contract clauses (29CFR 5.5 (a) (1) (ii)).

The body of each wage determination lists the classification and wage rates that have been found to be prevailing for the cited type(s) of construction in the area covered by the wage determination. The classifications are listed in alphabetical order of ""identifiers"" that indicate whether the particular rate is a union rate (current union negotiated rate for local), a survey rate (weighted average rate) or a union average rate (weighted union average rate).

Union Rate Identifiers

A four letter classification abbreviation identifier enclosed in dotted lines beginning with characters other than ""SU"" or ""UAVG"" denotes that the union classification and rate were prevailing for that classification in the survey. Example: PLUM0198-005 07/01/2014. PLUM is an abbreviation identifier of the union which prevailed in the survey for this classification, which in this example would be Plumbers. 0198 indicates the local union number or district council number where applicable, i.e., Plumbers Local 0198. The next number, 005 in the example, is an internal number used in processing the wage determination. 07/01/2014 is the effective date of the most current negotiated rate, which in this example is July 1, 2014.

Union prevailing wage rates are updated to reflect all rate changes in the collective bargaining agreement (CBA) governing this classification and rate.

Survey Rate Identifiers

Classifications listed under the ""SU"" identifier indicate that no one rate prevailed for this classification in the survey and the published rate is derived by computing a weighted average rate based on all the rates reported in the survey for that classification. As this weighted average rate includes all rates reported in the survey, it may include both union and non-union rates. Example: SULA2012-007 5/13/2014. SU indicates the rates are survey rates based on a weighted average calculation of rates and are not majority rates. LA indicates the State of Louisiana. 2012 is the year of survey on which these classifications and rates are based. The next number, 007 in the example, is an internal number used in producing the wage determination. 5/13/2014 indicates the survey completion date for the classifications and rates under that identifier.

Survey wage rates are not updated and remain in effect until a new survey is conducted.

Union Average Rate Identifiers

Classification(s) listed under the UAVG identifier indicate that no single majority rate prevailed for those classifications; however, 100% of the data reported for the classifications was union data. EXAMPLE: UAVG-OH-0010

08/29/2014. UAVG indicates that the rate is a weighted union average rate. OH indicates the state. The next number, 0010 in the example, is an internal number used in producing the wage determination. 08/29/2014 indicates the survey completion date for the classifications and rates under that identifier.

A UAVG rate will be updated once a year, usually in January of each year, to reflect a weighted average of the current negotiated/CBA rate of the union locals from which the rate is based.

WAGE DETERMINATION APPEALS PROCESS

1.) Has there been an initial decision in the matter? This can be:

- * an existing published wage determination
- * a survey underlying a wage determination
- * a Wage and Hour Division letter setting forth a position on a wage determination matter
- * a conformance (additional classification and rate) ruling

On survey related matters, initial contact, including requests for summaries of surveys, should be with the Wage and Hour National Office because National Office has responsibility for the Davis-Bacon survey program. If the response from this initial contact is not satisfactory, then the process described in 2.) and 3.) should be followed.

With regard to any other matter not yet ripe for the formal process described here, initial contact should be with the Branch of Construction Wage Determinations. Write to:

Branch of Construction Wage Determinations
Wage and Hour Division
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

2.) If the answer to the question in 1.) is yes, then an interested party (those affected by the action) can request review and reconsideration from the Wage and Hour Administrator (See 29 CFR Part 1.8 and 29 CFR Part 7). Write to:

Wage and Hour Administrator
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

The request should be accompanied by a full statement of the interested party's position and by any information (wage payment data, project description, area practice material, etc.) that the requestor considers relevant to the issue.

3.) If the decision of the Administrator is not favorable, an interested party may appeal directly to the Administrative Review Board (formerly the Wage Appeals Board). Write to:

Administrative Review Board
U.S. Department of Labor
200 Constitution Avenue, N.W.

Washington, DC 20210

4.) All decisions by the Administrative Review Board are final.

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END OF GENERAL DECISIO"

DISADVANTAGED BUSINESS ENTERPRISE (DBE) POLICY CONTRACT REQUIREMENTS

Disadvantaged Business Enterprise (DBE) Policy. It shall be the policy of the Vermont Agency of Transportation (VTrans) to ensure nondiscriminatory opportunity for Disadvantaged Business Enterprises (DBEs) to participate in the performance of all contracts and subcontracts financed with Federal funds as specified by the regulations of the United States Department of Transportation (USDOT), Federal Highway Administration and as set forth below.

1. **Policy.** It is the policy of USDOT that DBEs as defined in 49 Code of Federal Regulation (CFR) Part 26 shall have the maximum opportunity to participate in the performance of contracts financed in whole or in part with Federal funds. Consequently, the DBE requirements of 49 CFR Part 26 and 23 CFR, Chapter 1, Part 230, Subpart b apply to this contract.
2. **DBE Obligation.** The State and its Contractors agree to ensure that DBEs as defined in 49 CFR Part 26, have the maximum opportunity to participate in the performance of contracts and subcontracts financed in whole or in part with Federal funds. **Each subcontract the prime contractor signs with a subcontractor must include this assurance:** *The contractor, sub recipient or subcontractor shall not discriminate on the basis of race, color, national origin, or sex in the award and performance of this contract. The contractor shall carry out applicable requirements of 49 CFR Part 26 in the award and administration of USDOT-assisted contracts. Failure by the contractor to carry out these requirements is a material breach of this contract, which may result in the termination of this contract or such other remedy, as VTrans deems appropriate.*
3. **Sanctions for Noncompliance.** The Contractor is hereby advised that failure of the Contractor, or any Subcontractor performing work under this contract, to carry out the requirements set forth in paragraphs 1 and 2 above shall constitute a breach of contract and after the notification of the Vermont Agency of Transportation, Secretary of Transportation, may result in termination of this contract by the State or such remedy as the State deems necessary.
4. **Inclusion in Subcontracts.** The Contractor shall insert in each of its subcontracts this Disadvantaged Business Enterprise (DBE) Policy and also a clause requiring its subcontractors to include this same Policy in any lower tier subcontracts which they may enter into, together with a clause requiring the inclusion of the Policy in any further subcontract that may in turn be made. This Policy shall not be incorporated by reference.

Disadvantaged Business Enterprise (DBE) Program Goals. The Vermont Agency of Transportation (VTrans) is required to set an overall DBE goal for participation in all transportation related Federal-aid projects. The goal is determined following guidelines set forth in 49 CFR 26.45, and based on the availability of ready, willing and able DBEs who submitted bids and quotes for transportation related projects, compared as a percentage of all available contractors who submitted bids and quotes for transportation related projects during the same time period. The DBE goal may be adjusted to take into account other factors impacting DBE utilization, in an effort to narrowly tailor the overall DBE goal. The detailed goal setting methodology and current overall DBE goal may be viewed on the VTrans website at: <http://vtrans.vermont.gov/civil-rights/doing-business/dbe-center/program-goals>

The VTrans overall DBE goal is currently achieved by a combination of contract specific goals and a race/gender neutral policy. Contractors should be proactive and solicit bids and quotes from certified DBEs for use when submitting their own bids and employ certified DBEs when participating on transportation related projects.

Disadvantaged Business Enterprise (DBE) Definition. A DBE is defined as a business that is owned and controlled by one or more socially and economically disadvantaged person(s). For the purposes of this definition:

- (1) "Socially and economically disadvantaged person" means an individual who is a citizen or lawful permanent resident of the United States and who is a Woman, Black, Hispanic, Portuguese, Native American, Asian American, or a member of another group, or an individual found to be disadvantaged by the Small Business Administration pursuant to Section 3 of the Small Business Act.
- (2) "Owned and controlled" means a business which is:
 - a. A sole proprietorship legitimately owned and controlled by an individual who is a disadvantaged person.
 - b. A partnership, joint venture or limited liability company in which at least 51% of the beneficial ownership interests legitimately is held by a disadvantaged person(s).
 - c. A corporation or other entity in which at least 51% of the voting interest and 51% of the beneficial ownership interests legitimately are held by a disadvantaged person(s).

The disadvantaged group owner(s) or stockholder(s) must possess control over management, interest in capital, and interest in earnings commensurate with percentage of ownership. Disadvantaged participation in a joint venture must also be based on the sharing of real earnings, as above. If the disadvantaged group ownership interests are real, substantial and continuing and not created solely to meet the requirements of the program, a firm is considered a bona fide DBE.

Certified DBE Directory. The current Vermont Unified Disadvantaged Business Enterprise (DBE) Directory is available online at: <http://vtrans.vermont.gov/civil-rights/doing-business/dbe-center/directory>. This directory contains all currently certified DBEs available for work in Vermont and is updated continuously. Only firms listed in this directory are eligible for DBE credit on Vermont Federal-aid projects. If you have questions about DBE certification, or do not have access to the Internet, please call the [AOT DBE Program Manager](#) for assistance.

Counting DBE Participation Towards Project Goals. For payments made to DBE contractors to be counted toward DBE goals, the DBE contractors must perform a commercially useful function (CUF). The DBE must be responsible for execution of the work of the contract and must carry out its responsibilities by performing, managing, and supervising the work involved, consistent with standard industry practices.

This means that:

- The DBE must also be responsible for ordering its own materials and supplies, determining quantity and quality, negotiating price, installing (where applicable) and paying for the material itself;
- The DBE must perform work commensurate with the amount of its contract;
- The DBE's contribution cannot be that of an extra participant or a conduit through which funds are passed in order to obtain the appearance of DBE participation;
- The DBE must exercise responsibility for at least fifty percent of the total cost of its contract with its own workforce;
- None of the DBE's work can be subcontracted back to the prime contractor, nor can the DBE employ the prime's or other subcontractor's supervisors currently working on the project;
- The DBE's labor force must be separate and apart from that of the prime contractor or other subcontractors on the project. Transferring crews between primes, subcontractors, and DBE contractors is not acceptable;
- The DBE owner must hold necessary professional or craft license(s) or certification(s) for the type of work he/she performs on the project;
- The DBE may rent or lease, at competitive rates, equipment needed on the project from customary leasing sources or from other subcontractors on the project.

Allowable credit for payments made to DBEs for work performed. A contractor may take credit for payments made to a certified DBE that satisfies CUF requirements at the following rate:

- A DBE Prime Contractor: Count 100% of the value of the work performed by own forces, equipment and materials towards the DBE goals.
- An approved DBE subcontractor: Count 100% of the value of work performed by the DBE's own forces, equipment and materials, excluding the following:
 - The cost of materials/supplies purchased from a non-DBE Prime Contractor.
 - The value of work provided by non-DBE lower tier subcontractors, including non-DBE trucking to deliver asphalt to a DBE contractor.
- A DBE owner-operator of construction equipment: Count 100% of expenditures committed.
- A DBE manufacturer: Count 100% of expenditures committed. The manufacturer must be a firm that operates or maintains a factory or establishment that produces on the premises the materials or supplies obtained by the Contractor.

- A regular DBE dealer/supplier: Count 60% of expenditures committed. A regular dealer/supplier is defined as a firm that owns, operates, or maintains a store, warehouse or other establishment, in which the materials or supplies required for the performance of the contract are bought, kept in stock, and regularly sold or leased to the public in the usual course of business. A person may be a dealer in such bulk items as petroleum products, steel, cement, gravel, stone or asphalt without owning, operating or maintaining a place of business, if the person both owns and operates distribution equipment for the products, by the means of a long term agreement, and not by a contract by contract basis.
- A DBE broker: Count for DBE credit only the fees or commissions charged for assistance in the procurement, and, fees and transportation charges for the delivery of materials or supplies required at the job site, but not the cost of materials procured. A broker is defined as any person(s) or firm who arranges or expedites transactions for materials or supplies, and does not take physical possession of the materials or supplies at their place of business for resale.
- A DBE renter of construction equipment to a contractor: Count 20% of expenditures committed, with or without operator.
- A bona fide DBE service provider: Count 100% of reasonable fees or commissions. Eligible services include professional, technical, consultant, or managerial, services and assistance in the procurement of essential personnel, facilities, equipment, materials or supplies required for the performance of the contract. Eligible services also include agencies providing bonding and insurance specifically required for the performance of the contract.
- A trucking, hauling or delivery operation: Count 100% of expenditures committed when trucks are owned, operated, licensed and insured by the DBE and used on the contract and, if applicable, includes the cost of the materials and supplies. 100% of expenditures committed when the DBE leases trucks from another DBE firm including an owner-operator. 100% of reasonable fees, or commissions, the DBE receives as a result of a lease arrangement for trucks from a non-DBE, including an owner-operator.
- Any combination of the above.

Removal of Approved DBE From Transportation Related Project. Contractors may not terminate for convenience, any approved DBE subcontractor and perform the work with their own forces, without prior written consent from the [AOT DBE Program Manager or the AOT Civil Rights Director](#)

Federal-aid projects which specify a DBE contract goal. The provisions of the Vermont Agency of Transportation Supplemental Specification – Disadvantaged Business Enterprise (DBE) Utilization (CR 160) shall apply to all VTrans Federal-aid projects which specify a DBE contract goal.

Compliance With Prompt Payment Statute. In accordance with Vermont's Prompt Payment Act and VTrans Standard Specifications for Construction, Section 107.01(g), the Contractor

shall fully comply with the provisions of 9 V.S.A. Chapter 102, also referred to as Act No. 74 of 1991 or the Prompt Payment Act, as amended.

Subcontractor Payments. In accordance with VTrans Standard Specifications for Construction, Section 107.01(h), on all federal-aid and state funded contracts, the Contractor, during the life of the Contract and on a monthly basis, shall submit electronically, a listing of payments to subcontractors on the form specified by the State and made available at: <http://apps.vtrans.vermont.gov/promptpay/>. Electronic reports shall be filed with the Agency Office of Civil Rights by an authorized representative and received in the Agency Office of Civil Rights on or before the tenth working day after month end. Contractors without access to the internet shall obtain and submit manual reports to the Agency Office of Civil Rights. Manual reports shall be signed by an authorized representative, sent to the Agency Office of Civil Rights, and postmarked on or before the tenth working day after month end. There shall be no direct compensation allowed the Contractor for this work, but the cost thereof shall be included in the general cost of the work. In accordance with 9 V.S.A. Section 4003, notwithstanding any contrary agreement, payments made to subcontractors after seven days from receipt of a corresponding progress payment by the State to the Contractor, or seven days after receipt of a subcontractor's invoice, whichever is later, violate this agreement. Violations shall be reported to the Agency Office of Civil Rights for review. Failure to resolve disputes in a timely manner may result in a complaint made to the Agency Pre-qualification Committee. In this Committee's judgment, appropriate penalties may be involved for failure to comply with this specification. Penalties may include suspension, reduction or revocation of the Contractor's pre-qualification rating. This clause shall be included in the prime Contractor's Contract made with all if its subcontractors.

ATTACHMENT C: STANDARD STATE PROVISIONS FOR CONTRACTS AND GRANTS**REVISED DECEMBER 7, 2023**

1. Definitions: For purposes of this Attachment, “Party” shall mean the Contractor, Grantee, or Subrecipient, with whom the State of Vermont is executing this Agreement and consistent with the form of the Agreement. “Agreement” shall mean the specific contract or grant to which this form is attached.

2. Entire Agreement: This Agreement, whether in the form of a contract, State-funded grant, or Federally-funded grant, represents the entire agreement between the parties on the subject matter. All prior agreements, representations, statements, negotiations, and understandings shall have no effect. Where an authorized individual is either required to click-through or otherwise accept, or made subject to, any electronic terms and conditions to use or access any product or service provided hereunder, such terms and conditions are not binding and shall have no force or effect. Further, any terms and conditions of Party’s invoice, acknowledgment, confirmation, or similar document, shall not apply, and any such terms and conditions on any such document are objected to without need of further notice or objection.

3. Governing Law, Jurisdiction and Venue; No Waiver of Jury Trial: This Agreement will be governed by the laws of the State of Vermont without resort to conflict of laws principles. Any action or proceeding brought by either the State or the Party in connection with this Agreement shall be brought and enforced in the Superior Court of the State of Vermont, Civil Division, Washington Unit. The Party irrevocably submits to the jurisdiction of this court for any action or proceeding regarding this Agreement. The Party agrees that it must first exhaust any applicable administrative remedies with respect to any cause of action that it may have against the State regarding its performance under this Agreement. Party agrees that the State shall not be required to submit to binding arbitration or waive its right to a jury trial.

4. Sovereign Immunity: The State reserves all immunities, defenses, rights, or actions arising out of the State’s sovereign status or under the Eleventh Amendment to the United States Constitution. No waiver of the State’s immunities, defenses, rights, or actions shall be implied or otherwise deemed to exist by reason of the State’s entry into this Agreement.

5. No Employee Benefits For Party: The Party understands that the State will not provide any individual retirement benefits, group life insurance, group health and dental insurance, vacation or sick leave, workers compensation or other benefits or services available to State employees, nor will the State withhold any state or Federal taxes except as required under applicable tax laws, which shall be determined in advance of execution of the Agreement. The Party understands that all tax returns required by the Internal Revenue Code and the State of Vermont, including but not limited to income, withholding, sales and use, and rooms and meals, must be filed by the Party, and information as to Agreement income will be provided by the State of Vermont to the Internal Revenue Service and the Vermont Department of Taxes.

6. Independence: The Party will act in an independent capacity and not as officers or employees of the State.

7. Defense and Indemnity:

- A.** The Party shall defend the State and its officers and employees against all third-party claims or suits arising in whole or in part from any act or omission of the Party or of any agent of the Party in connection with the performance of this Agreement. The State shall notify the Party in the event of any such claim or suit, and the Party shall immediately retain counsel and otherwise provide a complete defense against the entire claim or suit. The State retains the right to participate at its own expense in the defense of any claim. The State shall have the right to approve all proposed settlements of such claims or suits.
- B.** After a final judgment or settlement, the Party may request recoupment of specific defense costs and may file suit in Washington Superior Court requesting recoupment. The Party shall be entitled to recoup costs only upon a showing that such costs were entirely unrelated to the defense of any claim arising from an act or omission of the Party in connection with the performance of this Agreement.
- C.** The Party shall indemnify the State and its officers and employees if the State, its officers, or employees become legally obligated to pay any damages or losses arising from any act or omission of the Party or an agent of the Party in connection with the performance of this Agreement.
- D.** Notwithstanding any contrary language anywhere, in no event shall the terms of this Agreement or any document furnished by the Party in connection with its performance under this Agreement obligate the State to (1) defend or indemnify the Party or any third party, or (2) otherwise be liable for the expenses or reimbursement, including attorneys’ fees, collection

costs or other costs of the Party or any third party.

8. Insurance: During the term of this Agreement, Party, at its expense, shall maintain in full force and effect the insurance coverages set forth in the Vermont State Insurance Specification in effect at the time of incorporation of this Attachment C into this Agreement. The terms of the Vermont State Insurance Specification are hereby incorporated by reference into this Attachment C as if fully set forth herein. A copy of the Vermont State Insurance Specification is available at: <https://aoa.vermont.gov/Risk-Claims-COI>.

9. Reliance by the State on Representations: All payments by the State under this Agreement will be made in reliance upon the accuracy of all representations made by the Party in accordance with this Agreement, including but not limited to bills, invoices, progress reports, and other proofs of work.

10. False Claims Act: Any liability to the State under the Vermont False Claims Act (32 V.S.A. § 630 et seq.) shall not be limited notwithstanding any agreement of the State to otherwise limit Party's liability.

11. Whistleblower Protections: The Party shall not discriminate or retaliate against one of its employees or agents for disclosing information concerning a violation of law, fraud, waste, abuse of authority, or acts threatening health or safety, including but not limited to allegations concerning the False Claims Act. Further, the Party shall not require such employees or agents to forego monetary awards as a result of such disclosures, nor should they be required to report misconduct to the Party or its agents prior to reporting to any governmental entity and/or the public.

12. Use and Protection of State Information:

- A. As between the State and Party, "State Data" includes all data received, obtained, or generated by the Party in connection with performance under this Agreement. Party acknowledges that certain State Data to which the Party may have access may contain information that is deemed confidential by the State, or which is otherwise confidential by law, rule, or practice, or otherwise exempt from disclosure under the State of Vermont Access to Public Records Act, 1 V.S.A. § 315 et seq. ("Confidential State Data").
- B. With respect to State Data, Party shall:
 - i. take reasonable precautions for its protection;
 - ii. not rent, sell, publish, share, or otherwise appropriate it; and
 - iii. upon termination of this Agreement for any reason, Party shall dispose of or retain State Data if and to the extent required by this Agreement, law, or regulation, or otherwise requested in writing by the State.
- C. With respect to Confidential State Data, Party shall:
 - i. strictly maintain its confidentiality;
 - ii. not collect, access, use, or disclose it except as necessary to provide services to the State under this Agreement;
 - iii. provide at a minimum the same care to avoid disclosure or unauthorized use as it provides to protect its own similar confidential and proprietary information;
 - iv. implement and maintain administrative, technical, and physical safeguards and controls to protect against any anticipated threats or hazards or unauthorized access or use;
 - v. promptly notify the State of any request or demand by any court, governmental agency or other person asserting a demand or request for Confidential State Data so that the State may seek an appropriate protective order; and
 - vi. upon termination of this Agreement for any reason, and except as necessary to comply with subsection B.iii above in this section, return or destroy all Confidential State Data remaining in its possession or control.
- D. If Party is provided or accesses, creates, collects, processes, receives, stores, or transmits Confidential State Data in any electronic form or media, Party shall utilize:
 - i. industry-standard firewall protection;
 - ii. multi-factor authentication controls;
 - iii. encryption of electronic Confidential State Data while in transit and at rest;
 - iv. measures to ensure that the State Data shall not be altered without the prior written consent of the State;
 - v. measures to protect against destruction, loss, or damage of State Data due to potential environmental hazards, such as fire and water damage;

- vi. training to implement the information security measures; and
 - vii. monitoring of the security of any portions of the Party's systems that are used in the provision of the services against intrusion.
- E. No Confidential State Data received, obtained, or generated by the Party in connection with performance under this Agreement shall be processed, transmitted, stored, or transferred by any means outside the United States, except with the express written permission of the State.
- F. Party shall notify the State within twenty-four hours after becoming aware of any unauthorized destruction, loss, alteration, disclosure of, or access to, any State Data.
- G. State of Vermont Cybersecurity Standard Update: Party confirms that all products and services provided to or for the use of the State under this Agreement shall be in compliance with State of Vermont Cybersecurity Standard Update in effect at the time of incorporation of this Attachment C into this Agreement. The State of Vermont Cybersecurity Standard Update prohibits the use of certain branded products in State information systems or any vendor system, and a copy is available at: <https://digitalservices.vermont.gov/cybersecurity/cybersecurity-standards-and-directives>
- H. In addition to the requirements of this Section 12, Party shall comply with any additional requirements regarding the protection of data that may be included in this Agreement or required by law or regulation.

13. Records Available for Audit: The Party shall maintain all records pertaining to performance under this Agreement. "Records" means any written or recorded information, regardless of physical form or characteristics, which is produced or acquired by the Party in the performance of this Agreement. Records produced or acquired in a machine-readable electronic format shall be maintained in that format. The records described shall be made available at reasonable times during the period of this Agreement and for three years thereafter or for any period required by law for inspection by any authorized representatives of the State or Federal Government. If any litigation, claim, or audit is started before the expiration of the three-year period, the records shall be retained until all litigation, claims, or audit findings involving the records have been resolved.

14. Fair Employment Practices and Americans with Disabilities Act: Party agrees to comply with the requirement of 21 V.S.A. Chapter 5, Subchapter 6, relating to fair employment practices, to the full extent applicable, and shall include this provision in all subcontracts for work performed in Vermont. Party shall also ensure, to the full extent required by the Americans with Disabilities Act of 1990, as amended, that qualified individuals with disabilities receive equitable access to the services, programs, and activities provided by the Party under this Agreement.

15. Offset: The State may offset any sums which the Party owes the State against any sums due the Party under this Agreement; provided, however, that any offset of amounts due the State of Vermont as taxes shall be in accordance with the procedures more specifically provided in 32 V.S.A. § 3113.

16. Taxes Due to the State: Party certifies under the pains and penalties of perjury that, as of the date this Agreement is signed, the Party is in good standing with respect to, or in full compliance with, a plan to pay any and all taxes due the State of Vermont.

17. Taxation of Purchases: All State purchases must be invoiced tax free. An exemption certificate will be furnished upon request with respect to otherwise taxable items.

18. Child Support: (Only applicable if the Party is a natural person, not a corporation or partnership.) Party states that, as of the date this Agreement is signed, Party is not under an obligation to pay child support or is in good standing with respect to or in full compliance with a plan to pay any and all child support payable under a support order. Party makes this statement with regard to support owed to any and all children residing in Vermont. In addition, if the Party is a resident of Vermont, Party makes this statement with regard to support owed to any and all children residing in any other state or territory of the United States.

19. Sub-Agreements: Party shall not assign, subcontract, or subgrant the performance of this Agreement or any portion thereof to any other Party without the prior written approval of the State. Party shall be responsible and liable to the State for all acts or omissions of subcontractors and any other person performing work under this Agreement pursuant to an agreement with Party or any subcontractor.

In the case this Agreement is a contract with a total cost in excess of \$250,000, the Party shall provide to the State a list of all proposed subcontractors and subcontractors' subcontractors, together with the identity of those subcontractors' workers compensation insurance providers, and additional required or requested information, as applicable, in accordance with Section 32 of The Vermont Recovery and Reinvestment Act of 2009 (Act No. 54), as amended by Section 17 of Act No. 142 (2010) and by

Section 6 of Act No. 50 (2011).

Party shall include the following provisions of this Attachment C in all subcontracts for work performed solely for the State of Vermont and subcontracts for work performed in the State of Vermont: Section 10 (“False Claims Act”); Section 11 (“Whistleblower Protections”); Section 12 (“Confidentiality and Protection of State Information”); Section 14 (“Fair Employment Practices and Americans with Disabilities Act”); Section 16 (“Taxes Due the State”); Section 18 (“Child Support”); Section 20 (“No Gifts or Gratuities”); Section 22 (“Certification Regarding Debarment”); Section 30 (“State Facilities”); and Section 32.A (“Certification Regarding Use of State Funds”).

20. No Gifts or Gratuities: Party shall not give title or possession of anything of substantial value (including property, currency, travel, and/or education programs) to any officer or employee of the State during the term of this Agreement.

21. Regulation of Hydrofluorocarbons: Party confirms that all products provided to or for the use of the State under this Agreement shall not contain hydrofluorocarbons, as prohibited under 10 V.S.A. § 586.

22. Certification Regarding Debarment: Party certifies under pains and penalties of perjury that, as of the date that this Agreement is signed, neither Party nor Party’s principals (officers, directors, owners, or partners) are presently debarred, suspended, proposed for debarment, declared ineligible, or excluded from participation in Federal programs, or programs supported in whole or in part by Federal funds. Party further certifies under pains and penalties of perjury that, as of the date that this Agreement is signed, Party is not presently debarred, suspended, nor named on the State’s debarment list at: <https://bgs.vermont.gov/purchasing-contracting/debarment>.

23. Conflict of Interest: Party shall fully disclose, in writing, any conflicts of interest or potential conflicts of interest.

24. Vermont Public Records Act: Party acknowledges and agrees that this Agreement, any and all information obtained by the State from the Party in connection with this Agreement, and any obligations of the State to maintain the confidentiality of information are subject to the State of Vermont Access to Public Records Act, 1 V.S.A. § 315 *et seq.*

25. Force Majeure: Neither the State nor the Party shall be liable to the other for any failure or delay of performance of any obligations under this Agreement to the extent such failure or delay shall have been wholly or principally caused by acts or events beyond its reasonable control rendering performance illegal or impossible (excluding strikes or lockouts) (“Force Majeure”). Where Force Majeure is asserted, the nonperforming party must prove that it made all reasonable efforts to remove, eliminate or minimize such cause of delay or damages, diligently pursued performance of its obligations under this Agreement, substantially fulfilled all non-excused obligations, and timely notified the other party of the likelihood or actual occurrence of an event described in this paragraph.

26. Marketing: Party shall not use the State’s logo or otherwise refer to the State in any publicity materials, information pamphlets, press releases, research reports, advertising, sales promotions, trade shows, or marketing materials or similar communications to third parties except with the prior written consent of the State.

27. Termination:

- A. Non-Appropriation:** If this Agreement extends into more than one fiscal year of the State (July 1 to June 30), and if appropriations are insufficient to support this Agreement, the State may cancel this Agreement at the end of the fiscal year, or otherwise upon the expiration of existing appropriation authority. In the case that this Agreement is funded in whole or in part by Federal funds, and in the event Federal funds become unavailable or reduced, the State may suspend or cancel this Agreement immediately, and the State shall have no obligation to pay Party from State revenues.
- B. Termination for Cause:** Either party may terminate this Agreement if a party materially breaches its obligations under this Agreement, and such breach is not cured within thirty (30) days after delivery of the non-breaching party’s notice or such longer time as the non-breaching party may specify in the notice.
- C. Termination Assistance:** Upon nearing the end of the final term or termination of this Agreement, without respect to cause, the Party shall take all reasonable and prudent measures to facilitate any transition required by the State. All State property, tangible and intangible, shall be returned to the State upon demand at no additional cost to the State in a format acceptable to the State.

28. Continuity of Performance: In the event of a dispute between the Party and the State, each party will continue to perform its obligations under this Agreement during the resolution of the dispute until this Agreement is terminated in accordance with its terms.

29. No Implied Waiver of Remedies: Either party's delay or failure to exercise any right, power, or remedy under this Agreement shall not impair any such right, power, or remedy, or be construed as a waiver of any such right, power, or remedy. All waivers must be in writing.

30. State Facilities: If the State makes space available to the Party in any State facility during the term of this Agreement for purposes of the Party's performance under this Agreement, the Party shall only use the space in accordance with all policies and procedures governing access to, and use of, State facilities, which shall be made available upon request. State facilities will be made available to Party on an "AS IS, WHERE IS" basis, with no warranties whatsoever.

31. Requirements Pertaining Only to Federal Grants and Subrecipient Agreements: If this Agreement is a grant that is funded in whole or in part by Federal funds:

- A. Requirement to Have a Single Audit:** The Subrecipient will complete the Subrecipient Annual Report annually within 45 days after its fiscal year end, informing the State of Vermont whether or not a Single Audit is required for the prior fiscal year. If a Single Audit is required, the Subrecipient will submit a copy of the audit report to the Federal Audit Clearinghouse within nine months. If a single audit is not required, only the Subrecipient Annual Report is required. A Single Audit is required if the subrecipient expends \$750,000 or more in Federal assistance during its fiscal year and must be conducted in accordance with 2 CFR Chapter I, Chapter II, Part 200, Subpart F. The Subrecipient Annual Report is required to be submitted within 45 days, whether or not a Single Audit is required.
- B. Internal Controls:** In accordance with 2 CFR Part II, §200.303, the Party must establish and maintain effective internal control over the Federal award to provide reasonable assurance that the Party is managing the Federal award in compliance with Federal statutes, regulations, and the terms and conditions of the award. These internal controls should be in compliance with guidance in "Standards for Internal Control in the Federal Government" issued by the Comptroller General of the United States and the "Internal Control Integrated Framework" issued by the Committee of Sponsoring Organizations of the Treadway Commission.
- C. Mandatory Disclosures:** In accordance with 2 CFR Part II, §200.113, Party must disclose, in a timely manner, in writing to the State, all violations of Federal criminal law involving fraud, bribery, or gratuity violations potentially affecting the Federal award. Failure to make required disclosures may result in the imposition of sanctions which may include disallowance of costs incurred, withholding of payments, termination of the Agreement, suspension/debarment, etc.

32. Requirements Pertaining Only to State-Funded Grants:

- A. Certification Regarding Use of State Funds:** If Party is an employer and this Agreement is a State-funded grant in excess of \$1,000, Party certifies that none of these State funds will be used to interfere with or restrain the exercise of Party's employee's rights with respect to unionization.
- B. Good Standing Certification (Act 154 of 2016):** If this Agreement is a State-funded grant, Party hereby represents: (i) that it has signed and provided to the State the form prescribed by the Secretary of Administration for purposes of certifying that it is in good standing (as provided in Section 13(a)(2) of Act 154) with the Agency of Natural Resources and the Agency of Agriculture, Food and Markets, or otherwise explaining the circumstances surrounding the inability to so certify; and (ii) that it will comply with the requirements stated therein.

(End of Standard Provisions)

Assurance Appendix A

During the performance of this contract, the contractor, for itself, its assignees, and successors in interest (hereinafter referred to as the "contractor") agrees as follows:

1. **Compliance with Regulations:** The contractor (hereinafter includes consultants) will comply with the Acts and the Regulations relative to Nondiscrimination in Federally-assisted programs of the U.S. Department of Transportation, Federal Highway Administration (FHWA), as they may be amended from time to time, which are herein incorporated by reference and made a part of this contract.
2. **Nondiscrimination:** The contractor, with regard to the work performed by it during the contract, will not discriminate on the grounds of race, color, national origin, sex, age, disability, income-level, or LEP in the selection and retention of subcontractors, including procurements of materials and leases of equipment. The contractor will not participate directly or indirectly in the discrimination prohibited by the Acts and the Regulations as set forth in Appendix E, including employment practices when the contract covers any activity, project, or program set forth in Appendix B of 49 CFR Part 21.
3. **Solicitations for Subcontracts, Including Procurements of Materials and Equipment:** In all solicitations, either by competitive bidding, or negotiation made by the contractor for work to be performed under a subcontract, including procurements of materials, or leases of equipment, each potential subcontractor or supplier will be notified by the contractor of the contractor's obligations under this contract and the Acts and the Regulations relative to Non-discrimination on the grounds of race, color, national origin, sex, age, disability, income-level, or LEP.
4. **Information and Reports:** The contractor will provide all information and reports required by the Acts, the Regulations and directives issued pursuant thereto and will permit access to its books, records, accounts, other sources of information, and its facilities as may be determined by the Recipient or the FHWA to be pertinent to ascertain compliance with such Acts, Regulations, and instructions. Where any information required of a contractor is in the exclusive possession of another who fails or refuses to furnish the information, the contractor will so certify to the Recipient or the FHWA, as appropriate, and will set forth what efforts it has made to obtain the information.
5. **Sanctions for Noncompliance:** In the event of a contractor's noncompliance with the Non-discrimination provisions of this contract, the Recipient will impose such contract sanctions as it or the FHWA may determine to be appropriate, including, but not limited to:
 - a. withholding payments to the contractor under the contract until the contractor complies; and/or
 - b. cancelling, terminating, or suspending a contract, in whole or in part.
6. **Incorporation of Provisions:** The contractor will include the provisions of paragraphs one through six in every subcontract, including procurements of materials and leases of equipment, unless exempt by the Acts, the Regulations and directives issued pursuant thereto. The contractor will take action with respect to any subcontract or procurement

as the Recipient or the FHWA may direct as a means of enforcing such provisions including sanctions for noncompliance. Provided, that if the contractor becomes involved in, or is threatened with litigation by a subcontractor, or supplier because of such direction, the contractor may request the Recipient to enter into any litigation to protect the interests of the Recipient. In addition, the contractor may request the United States to enter into the litigation to protect the interests of the United States.

Assurance Appendix E

During the performance of this contract, the contractor, for itself, its assignees, and successors in interest (hereinafter referred to as the “contractor”) agrees to comply with the following non-discrimination statutes and authorities; including but not limited to:

- Title VI of the Civil Rights Act of 1964 (42 U.S.C. § 2000d *et seq.*, 78 stat. 252), (prohibits discrimination on the basis of race, color, national origin), as implemented by 49 C.F.R. § 21.1 *et seq.* and 49 C.F.R. § 303;
- The Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, (42 U.S.C. § 4601), (prohibits unfair treatment of persons displaced or whose property has been acquired because of Federal or Federal-aid programs and projects);
- Federal-Aid Highway Act of 1973, (23 U.S.C. § 324 *et seq.*), (prohibits discrimination on the basis of sex);
- Section 504 of the Rehabilitation Act of 1973, (29 U.S.C. § 794 *et seq.*), as amended, (prohibits discrimination on the basis of disability); and 49 CFR Part 27;
- The Age Discrimination Act of 1975, as amended, (42 U.S.C. § 6101 *et seq.*), (prohibits discrimination on the basis of age);
- Airport and Airway Improvement Act of 1982, (49 USC § 471, Section 47123), as amended, (prohibits discrimination based on race, creed, color, national origin, or sex);
- The Civil Rights Restoration Act of 1987, (102 Stat. 28.), (“...*which restore[d] the broad scope of coverage and to clarify the application of title IX of the Education Amendments of 1972, section 504 of the Rehabilitation Act of 1973, the Age Discrimination Act of 1975, and title VI of the Civil Rights Act of 1964.*”);
- Titles II and III of the Americans with Disabilities Act, which prohibit discrimination on the basis of disability in the operation of public entities, public and private transportation systems, places of public accommodation, and certain testing entities (42 U.S.C. §§ 12131 – 12189) as implemented by Department of Justice regulations at 28 C.F.R. parts 35 and 36, and Department of Transportation regulations at 49 C.F.R. parts 37 and 38;
- The Federal Aviation Administration’s Non-discrimination statute (49 U.S.C. § 47123) (prohibits discrimination on the basis of race, color, national origin, and sex);
- Executive Order 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations, which ensures non-discrimination against minority populations by discouraging programs, policies, and activities with disproportionately high and adverse human health or environmental effects on minority and low-income populations;
- Executive Order 13166, Improving Access to Services for Persons with Limited English Proficiency, and resulting agency guidance, national origin discrimination includes discrimination because of limited English proficiency (LEP). To ensure compliance with Title VI, you must take reasonable steps to ensure that LEP persons have meaningful access to your programs (70 Fed. Reg. at 74087 to 74100);
- Title IX of the Education Amendments of 1972, as amended, which prohibits you from discriminating because of sex in education programs or activities (20 U.S.C. 1681 *et seq.*), as implemented by 49 C.F.R. § 25.1 *et seq.*

STANDARD FEDERAL EQUAL EMPLOYMENT OPPORTUNITY
CONSTRUCTION CONTRACT SPECIFICATIONS
(EXECUTIVE ORDER 11246)

1. As used in these specifications:

- a. "Covered Area" means the geographical area described in the solicitation from which this contract resulted.
- b. "Director" means Director, Office of Federal Contract Compliance Programs, United States Department of Labor, or any person to whom the Director delegates authority.
- c. "Employer Identification Number" means the Federal Social Security Number used on the Employer's Quarterly Federal Tax Return, U.S. Treasury Department Form 941.

A Minority Group Member is:

...American Indian or Alaskan Native

consisting of all persons having origins in any of the original people of North American and who maintain cultural identification through tribal affiliations or community recognition.

...Black

consisting of all persons having origins in any of the Black racial groups of Africa.

...Asian or Pacific Islander

consisting of all persons having origins in any of the original people of the Far East, Southeast Asia, the Indian Sub-Continent or the Pacific Islands. This area includes China, India, Japan, Korea, the Philippines and Samoa.

...Hispanic

consisting of all persons of Mexican, Puerto Rican, Cuban, Central or South American or other Spanish culture or origin.

...Cape Verde an

consisting of all persons having origins in the Cape Verde Islands.

...Portuguese

consisting of all persons of Portuguese, Brazilian or other Portuguese culture or origin.

2. Whenever the Contractor, or any Subcontractor at any tier, subcontracts a portion of the work involving any construction trade, it shall physically include in each subcontract in excess of \$10,000.00 the provisions of these specifications and the notice which contains the applicable goals for minority and female participation and which is set forth in the solicitations from which this contract resulted.

3. If the Contractor is participating (pursuant to 41 CFR 60-4.5) in the Hometown Plan approved by the U.S. Department of Labor in the covered area either individually or through an association, its affirmative action obligations on all work in the Plan area (including goals and timetables) shall be in accordance with that Plan for those trades which have unions participating in the Plan. Contractors must be able to demonstrate their participation in and compliance with the provisions of any such Hometown Plan. Each Contractor or subcontract participating in an approved Plan is individually required to comply with its obligations under the EEO clause, and to make a good faith effort to achieve each goal under the Plan in each trade in which it has employees. the overall good faith performance by other Contractors or subcontractors toward a goal in an approved Plan does not excuse any covered Contractor's or subcontractor's failure to make good faith efforts to achieve the Plan goals and timetables.
4. The Contractor shall implement the specific affirmative action standards provided in Paragraphs 7a through p of these specifications. The goals set for the Contractor in the solicitation from which this contract resulted are expressed as percentages in the total hours of employment and training of minority and female utilization the Contractor should reasonably be able to achieve in each construction trade in which it has employees in the covered area. The Contractor is expected to make substantially uniform progress toward its goals in each craft during the period specified.
5. Neither the provisions of any collective bargaining agreement nor the failure by a union with whom the Contractor has a collective bargaining agreement to refer either minority or women shall excuse the Contractor's obligations under these specifications, Executive Order 11246, or the regulations promulgated pursuant thereto.
6. In order for the non-working training hours of apprentices and trainees to be counted in meeting the goals, such apprentices and trainees must be employed by the Contractor during the training period, and the Contractor must have made a commitment to employ the apprentices and trainees at the completion of their training, subject to the availability of employment opportunities. Trainees must be trained pursuant to training programs approved by the U.S. Department of Labor.
7. The Contractor shall take specific affirmative actions to ensure equal employment opportunity . The evaluation of the Contractor's compliance with these specifications shall be based upon its effort to achieve maximum results from its actions. The Contractor shall document these efforts fully and shall implement affirmative action steps at least as extensive as the following:
 - a. Ensure and maintain a working environment free of harassment, intimidation and coercion at all sites, and in all facilities at which the Contractor's employees are assigned to work. The Contractor, where possible, will assign two or more women to each construction project. The Contractor shall specifically ensure that all foremen, superintendents, and other on-site supervisory personnel are aware of and carry out the Contractor's obligation to maintain such a working environment with specific attention to minority or female individuals working at such sites or in such facilities.
 - b. Establish and maintain a current list of minority and female recruitment sources, provide written notification to minority and female recruitment sources and to community organizations when the Contractor or its unions have employment opportunities available and maintain a record of the organizations' responses.

- c. Maintain a current file of the names, addresses and telephone numbers of each minority and female off-the-street applicant and minority or female referral from a union, a recruitment source or community organization and of what action was taken with respect to each such individual. If such individual was sent to the union hiring hall for referral and was not referred back to the Contractor by the union or, if referred, not employed by the Contractor, this shall be documented in the file with the reason therefor, along with whatever additional actions the Contractor may have taken.
- d. Provide immediate written notifications to the Regional Director when the union or unions, with which the Contractor has a collective bargaining agreement, have not referred to the Contractor a minority person or woman sent by the Contractor or when the Contractor has other information that the union referral process has impeded the Contractor's efforts to meet its obligations.
- e. Develop on-the-job training opportunities and/or participate in training programs for the area which expressly include minorities and women, including upgrading programs and apprenticeship and trainee programs relevant to the Contractor's employment needs, especially those programs funded or approved by the Department of Labor. The Contractor shall provide notice of these programs to the sources compiled under Paragraph 7b above.
- f. Disseminate the Contractor's EEO policy by providing notice of the policy to unions and training programs and requesting their cooperation in assisting the Contractor in meeting its EEO obligations; by including it in any policy manual and collective bargaining agreement; by publicizing it in the company newspaper, annual report, etc.; by specific review of the policy with all management personnel and with all minority and female employees at least once a year; and by posting the company EEO policy on bulletin boards accessible to all employees at each location where construction is performed.
- g. Review, at least annually, the company's EEO policy and affirmative action obligations under these specifications with all employees having any responsibility for hiring, assignment, layoff, termination or other employment decisions including specific review of these items with on-site supervisory personnel such as Superintendents, Supervisors etc., prior to the initiation of construction work at any job site. A written record shall be made and maintained identifying the time and place of these meetings, persons attending, subject matter discussed, and disposition of the subject matter.
- h. Disseminate the Contractor's EEO policy externally by including it in any advertising in the news media, and providing written notification to, and discussing the Contractor's EEO policy with, other Contractors and subcontractors with whom the Contractor anticipates doing business.
- i. Direct its recruitment efforts, both oral and written, to minority, female and community organizations, to schools with minority and female students and to minority and female recruitment and training organizations serving the Contractor's recruitment area and employment needs. Not later than one month prior to the date for the acceptance of applications for apprenticeship or other training by any recruitment source, the Contractor shall send written notifications to organizations such as the above, describing the openings, screening procedures, and tests to be used in the selection process.

- j. Encourage present minority and female employees to recruit other minority persons and women and, where reasonable, provide after school, summer and vacation employment to minority and female youth both on the site and in other areas of a Contractor's workforce.
 - k. Validate all tests and other selection requirements where there is an obligation to do so under 41 CFR Part 60-3.
 - l. Conduct, at least annually, an inventory and evaluation of all minority and female personnel for promotional opportunities and encourage these employees to seek or to prepare for, through appropriate training, etc., such opportunities.
 - m. Ensure that seniority practices, job classifications, work assignments and other personnel practices, do not have a discriminatory effect by continually monitoring all personnel and employment-related activities to ensure that the EEO policy and Contractor's obligations under these specifications are being carried out.
 - n. Ensure that all facilities and company activities are non-segregated except that separate or single-user toilet and necessary changing facilities shall be provided to assure privacy between the sexes.
 - o. Document and maintain a record of all solicitations of offers for subcontracts from minority and female construction contractors and suppliers, including circulation of solicitations to minority and female contractor associations and other business associations.
 - p. Conduct a review, at least annually, of all supervisors' adherence to and performance under the Contractor's EEO policies and affirmative action obligations.
8. Contractors are encouraged to participate in voluntary associations which assist in fulfilling one or more of their affirmative action obligations (Paragraph 7a through p). The efforts of a contractor association, joint contractor-union, contractor-community, or other similar group of which the Contractor is a member and participant, may be asserted as fulfilling any one or more of its obligations under Paragraph 7a through p of these Specifications provided that the Contractor actively participates in the group, makes every effort to assure that the group has a positive impact on the employment of minorities and women in the industry, reflected in the Contractor's minority and female workforce participation, makes a good faith effort to meet its individual goals and timetables, and can provide access to documentation which demonstrates the effectiveness of actions taken on behalf of the Contractor. The obligation to comply, however, is the Contractor's, and failure of such a group to fulfill an obligation shall not be a defense for the Contractor's non-compliance.
9. A single goal for minorities and a separate single goal for women have been established. The Contractor, however, is required to provide equal employment opportunity and to take affirmative action for all minority groups, both male and female, and all women, both minority and non-minority. Consequently, the Contractor may be in violation of the Executive Order if a particular group is employed in a substantially disparate manner (for example, even though the Contractor has achieved its goals for women generally, the Contractor may be in violation of the Executive Order if a specific minority group of women is under-utilized).

10. The Contractor shall not use the goals and timetables or affirmative action standards to discriminate against any person because of race, color, religion, sex or national origin.
11. The Contractor shall not enter into any subcontract with any person for firm debarred from Government contracts pursuant to Executive Order 11246.
12. The Contractor shall carry out such sanctions and penalties for violation of these specifications and of the Equal Opportunity Clause, including suspension, terminations and cancellation of existing subcontracts as may be imposed or ordered pursuant to Executive Order 11246, as amended, and its implementing regulations, by the Office of Federal Contract Compliance Programs. Any Contractor who fails to carry out such sanctions and penalties shall be in violation of these specifications and Executive Order 11246, as amended.
13. The Contractor, in fulfilling its obligations under these specifications, shall implement specific affirmative action steps, at least as extensive as those standards prescribed in Paragraph 7 of these specifications, so as to achieve maximum results from its efforts to ensure equal employment opportunity. If the Contractor fails to comply with the requirements of the Executive Order, the implementing regulations or these specifications, the Director shall proceed in accordance with 41 CFR 60-4.8.
14. The Contractor shall designate a responsible official to monitor all employment-related activity to ensure that the company EEO policy is being carried out, to submit reports relating to the provisions hereof as may be required by the Government and to keep records. Records shall at least include for each employee the name, address, telephone numbers, construction trade union affiliation if any, employee identification number when assigned, social security number, race, sex, status (e.g., mechanic, apprentice, trainee, helper or laborer), dates of changes in status, hours worked per week in the indicated trade, rate of pay, and locations at which the work was performed. Records shall be maintained in an easily understandable and retrievable form; however, to the degree that existing records satisfy this requirement, contractors shall not be required to maintain separate records.
15. Nothing herein provided shall be construed as a limitation upon the application of other laws which establish different standards of compliance or upon the application or requirements for the hiring of local or other area residents (e.g., those under the Public Works Employment Act of 1977 and the Community Development Block Grant Program).

**NOTICE OF REQUIREMENTS FOR AFFIRMATIVE ACTION TO ENSURE EQUAL
EMPLOYMENT OPPORTUNITY (EXECUTIVE ORDER 11246)**

1. The Offeror's or Bidder's attention is called to the "Equal Opportunity Clause" and the "Standard Federal Equal Employment Specifications" set forth herein.
2. The goals and timetables for minority and female participation, expressed in percentage terms for the Contractor's aggregate workforce in each trade on all construction work in the covered area, are as follows:

Economic Areas	Timetables	Goals for Minority participation for each trade (%)	Goals for Female Participation in each trade (%)
Entire State of Vermont:			
<u>Vermont</u> 003 Burlington, VT Non-SMSA Counties NH Coos; NH Grafton; NH Sullivan; VT Addison; VT Caledonia; VT Chittenden; VT Essex; VT Franklin; VT Grand Isle; VT Lamoille; VT Orange; VT Orleans; VT Rutland; VT Washington; VT Windsor	Indefinite	0.8	6.9
<u>Connecticut (Mass)</u> 006 Hartford - New Haven Springfield, CT-MA Non-SMSA Counties CT Litchfield; CT Windham; MA Franklin; NH Cheshire; VT Windham	Indefinite	5.9	
<u>New York</u> 007 Albany - Schenectady - Troy, NY Non-SMSA Counties NY Clinton; NY Columbia; NY Essex; NY Fulton; NY Greene; NY Hamilton; NY Schoharie; NY Warren; NY Washington; VT Bennington	Indefinite	2.6	

These goals are applicable to all the Contractor's construction work (whether or not it is Federal or federally assisted) performed in the covered area. If the Contractor performs construction work in a geographical area located outside of the covered area, it shall apply the goals established for such geographical area where the work is actually performed. With regard to this second area, the Contractor also is subject to the goals for both its federally involved and non-federally involved construction.

The Contractor's compliance with the Executive Order and the regulation in CFR Part 60-4 shall be based on its implementation of the Equal Opportunity Clause, specific affirmative action obligations required by the specifications set forth in 41 CFR 60-4.3 (a), and its efforts to meet the goals. The hours of minority and female employment and training must be substantially uniform throughout the length of the contract and in each trade, and the Contractor shall make a good faith effort to employ minorities and women evenly on each of its projects. The transfer of minority or female employees or trainees from Contractor to Contractor or from project to project for the sole purpose of meeting the Contractor's goals shall be a violation of the contract, the Executive Order and the regulations in 41 CFR Part 60-4. Compliance with the goals will be measured against the total work hours performed.

3. The Contractor shall provide written notification to the Director of the Office of Federal Contract Compliance Programs within ten working days of award of any construction subcontract in excess of \$10,000.00 at any tier for construction work under the contract resulting from this solicitation. The notifications shall list the name, address and telephone number of the subcontractor; employer identification number of the subcontractor; estimated dollar amount of the subcontract; and the geographical area in which the subcontract is to be performed.
4. As used in this Notice, and in the contract resulting from this solicitation, the "covered area" is (insert description of the geographical areas where the contract is to be performed giving the state, county and city, if any)

State of Vermont
Agency of Transportation
CONTRACTOR EEO CERTIFICATION FORM

Certification with regard to the Performance of Previous Contracts of Subcontractors subject to the Equal Employment Opportunity Clause and the filing of Required Reports.

The Kubricky-Jointa Lime LLC, hereby certifies that if it has participated in a previous contract or subcontract subject to the equal opportunity clause, as required by Executive Orders 10925, 11114, 11246, as amended, Bidder filed with the Joint Reporting Committee, the Director of the Office of Federal Contract Compliance, a Federal Government contracting or administering agency, or the Presidents committee on Equal Employment Opportunity, all reports due under the applicable filing requirements.

Kubricky-Jointa Lime LLC

Brooke Bottum

Estimating Coordinator

NOTE: The above certification is required by the Equal Employment Opportunity regulations of the Secretary of Labor (41 CFR 60-1.7(b)(1)), and must be submitted by bidders and proposed subcontractors only in connection with contracts and subcontracts which are subject to the equal opportunity clause. Contracts and subcontracts which are exempt from the equal opportunity clause are set forth in 41 CFR 60-1.5 (Generally only contracts or subcontracts of \$10,000 or under are exempt). Currently, Standard Form 100 (EEO-1) is the only report required by the Executive Orders of their implementing regulations.

Proposed prime contractors and subcontractors who have participated in a previous contract or subcontract subject to the Executive Orders and have not filed the required reports should note that 41 CFR 602-1.7(b)(1) prevents the award of contracts and subcontracts unless such contractor submits a report covering the delinquent period or such other period specified by the Federal Highway Administration, or by the Director, Office of Federal Contract Compliance, U.S. Department of Labor.

Minimum Labor and Truck Rates
Under Title 19, Vermont Statutes
Annotated Section 18, as amended

April 3, 1997
Sheet 1 of 1

**STATE OF VERMONT
AGENCY OF TRANSPORTATION
MONTPELIER**

FOR OTHER THAN FEDERAL-AID. In accordance with the provisions of Title 19, VSA, Section 18, the following minimum rate for labor shall apply to this project:

The minimum wage for common labor will not be less than the State or Federal minimum wage, whichever is higher.

ON FEDERAL-AID PROJECTS ONLY.

The minimum rates for labor for Federal-Aid Projects shall be those set in the Wage Determination Decision of the U.S. Secretary of Labor for each project in accordance with the Federal-Aid Highway Act of 1956. When such wage rates are required they shall be included in the proposal. In the event these rates are lower than the Vermont rates, the Vermont rates shall prevail.

TRUCK RATES. In accordance with the provisions of Title 19, VSA, Section 18, the following minimum rates for trucks shall apply to this project:

<u>Trucks, not Including Driver</u> <u>Water Level Body Capacity</u>	<u>Minimum Rates</u> <u>Per YD per Hr.</u>
Trucks, Equipment Loaded	\$1.65

STATE OF VERMONT
AGENCY OF TRANSPORTATION
MONTPELIER

COMMODITY INDEX PRICES.

- (a) Price Adjustment, Asphalt Cement. When Item 406.50 is included in the Contract, asphalt cement price adjustment will be performed according to the requirements of Section 406 for all asphalt cement and emulsified asphalt incorporated into the work, including that incorporated under Project Special Provision pay items.
- (b) Price Adjustment, Fuel. When Item 690.50 is included in the Contract, fuel price adjustment will be performed according to the requirements of Section 690 for the pay items specified therein, and for any pay items identified in the Project Special Provisions as being eligible for fuel price adjustment.
- (c) Commodity Index Prices. The Index Prices for asphalt and fuel for this Contract are specified in Table 1.

TABLE 1 – COMMODITY INDEX PRICES FOR THIS CONTRACT

	Asphalt (dollars/ton)	Fuel (dollars/gallon)
Index Price	\$615.00	\$4.43

**VERMONT AGENCY OF TRANSPORTATION
CONTRACT SCHEDULE OF PAY ITEMS**

CONTRACT NUMBER:C03169

CONTRACT NAME:COLCHESTER NH 028-1(31)

Pay Item #	Pay Item Description	Quantity	Units	Unit Price	Amount
201.10	CLEARING AND GRUBBING, INCLUDING INDIVIDUAL TREES AND STUMPS	1.000	LS	\$86,000.000	\$86,000.00
203.15	COMMON EXCAVATION	59,760.000	CY	\$14.500	\$866,520.00
203.16	SOLID ROCK EXCAVATION	220.000	CY	\$275.000	\$60,500.00
203.30	EARTH BORROW	21,030.000	CY	\$1.200	\$25,236.00
203.31	SAND BORROW	25,280.000	CY	\$23.000	\$581,440.00
203.32	GRANULAR BORROW	8,140.000	CY	\$52.500	\$427,350.00
204.20	TRENCH EXCAVATION OF EARTH	3,500.000	CY	\$52.500	\$183,750.00
204.21	TRENCH EXCAVATION OF ROCK	350.000	CY	\$210.000	\$73,500.00
204.22	TRENCH EXCAVATION OF EARTH, EXPLORATORY (N.A.B.I.)	1.000	CY	\$75.000	\$75.00
204.25	STRUCTURE EXCAVATION	1,870.000	CY	\$18.000	\$33,660.00
204.30	GRANULAR BACKFILL FOR STRUCTURES	2,530.000	CY	\$44.500	\$112,585.00
210.10	COARSE-MILLING, BITUMINOUS PAVEMENT	25,740.000	SY	\$3.200	\$82,368.00
213.10	MILLED RUMBLE STRIPS (SHOULDER)	750.000	LF	\$2.100	\$1,575.00
213.10	MILLED RUMBLE STRIPS (SINUSOIDAL CENTERLINE)	4,130.000	LF	\$2.100	\$8,673.00
301.35	SUBBASE OF DENSE GRADED CRUSHED STONE	30,500.000	CY	\$43.000	\$1,311,500.00
402.13	AGGREGATE SHOULDERS, RAP	2,260.000	TON	\$32.000	\$72,320.00
404.65	EMULSIFIED ASPHALT	635.000	CWT	\$52.500	\$33,337.50
406.28	AIR VOIDS PAY ADJUSTMENT (N.A.B.I.)	1.000	LU	\$1.000	\$1.00
406.29	MAT DENSITY PAY ADJUSTMENT (N.A.B.I.)	1.000	LU	\$1.000	\$1.00
406.35	SUPERPAVE BITUMINOUS CONCRETE PAVEMENT	21,000.000	TON	\$140.000	\$2,940,000.00
406.38	HAND-PLACED BITUMINOUS CONCRETE MATERIAL, DRIVES	500.000	SY	\$50.000	\$25,000.00
406.50	PRICE ADJUSTMENT, ASPHALT CEMENT (N.A.B.I.)	1.000	LU	\$1.000	\$1.00
504.10	FURNISHING EQUIPMENT FOR DRIVING PILING	1.000	LS	\$260,000.000	\$260,000.00
505.18	STEEL PILING, HP 14 X 89	990.000	LF	\$110.000	\$108,900.00
505.19	STEEL PILING, HP 14 X 102	980.000	LF	\$115.000	\$112,700.00
505.45	DYNAMIC PILE LOADING TEST	3.000	EACH	\$3,450.000	\$10,350.00
506.55	STRUCTURAL STEEL, PLATE GIRDER (WEATHERING) (FPQ)	412,300.000	LB	\$4.250	\$1,752,275.00
507.11	REINFORCING STEEL, LEVEL I	20,870.000	LB	\$2.650	\$55,305.50
507.11	REINFORCING STEEL, LEVEL I (EPOXY COATED)	13,050.000	LB	\$1.950	\$25,447.50
507.12	REINFORCING STEEL, LEVEL II	153,600.000	LB	\$2.350	\$360,960.00
508.15	SHEAR CONNECTORS (3780 - 7/8 INCH X 7 INCH)	1.000	LS	\$28,500.000	\$28,500.00
514.10	WATER REPELLENT, SILANE	160.000	GAL	\$220.000	\$35,200.00
516.10	BRIDGE EXPANSION JOINT, ASPHALTIC PLUG	255.000	LF	\$210.000	\$53,550.00
524.11	JOINT SEALER, HOT POURED	130.000	LF	\$40.500	\$5,265.00
529.15	REMOVAL OF STRUCTURE (11020 SF - EST)	1.000	EACH	\$364,000.000	\$364,000.00
531.18	BEARING DEVICE ASSEMBLY, ELASTOMERIC PAD W/ EXT. LOAD PLATES	7.000	EACH	\$5,000.000	\$35,000.00
541.21	CONCRETE, CLASS AA	19.000	CY	\$905.000	\$17,195.00
541.25	CONCRETE, CLASS B	5.000	CY	\$2,200.000	\$11,000.00
541.45	CONTROLLED DENSITY (FLOWABLE) FILL	50.000	CY	\$285.000	\$14,250.00
601.0810	15" RCP CLASS III	10.000	LF	\$400.000	\$4,000.00
601.0825	24" RCP CLASS III	100.000	LF	\$445.000	\$44,500.00
601.0835	30" RCP CLASS III	85.000	LF	\$150.000	\$12,750.00
601.2615	18" CPEP(SL)	1,645.000	LF	\$71.500	\$117,617.50
601.2620	24" CPEP(SL)	1,050.000	LF	\$50.000	\$52,500.00

**VERMONT AGENCY OF TRANSPORTATION
CONTRACT SCHEDULE OF PAY ITEMS**

CONTRACT NUMBER:C03169

CONTRACT NAME:COLCHESTER NH 028-1(31)

Pay Item #	Pay Item Description	Quantity	Units	Unit Price	Amount
601.2625	30" CPEP(SL)	470.000	LF	\$115.000	\$54,050.00
601.2630	36" CPEP(SL)	65.000	LF	\$140.000	\$9,100.00
601.7015	18" CPEPES	8.000	EACH	\$930.000	\$7,440.00
601.7020	24" CPEPES	9.000	EACH	\$1,000.000	\$9,000.00
601.7025	30" CPEPES	3.000	EACH	\$1,750.000	\$5,250.00
601.7030	36" CPEPES	2.000	EACH	\$2,050.000	\$4,100.00
604.20	PRECAST REINFORCED CONCRETE CATCH BASIN WITH CAST IRON GRATE (4' DIA.)	18.000	EACH	\$5,400.000	\$97,200.00
604.20	PRECAST REINFORCED CONCRETE CATCH BASIN WITH CAST IRON GRATE (5' DIA.)	5.000	EACH	\$7,900.000	\$39,500.00
604.40	CHANGING ELEVATION OF DROP INLETS, CATCH BASINS, OR MANHOLES	3.000	EACH	\$1,450.000	\$4,350.00
605.20	UNDERDRAIN CARRIER PIPE, 6 INCHES	180.000	LF	\$17.000	\$3,060.00
609.10	DUST CONTROL WITH WATER	1,000.000	MGAL	\$55.000	\$55,000.00
613.10	STONE FILL, TYPE I	275.000	CY	\$120.000	\$33,000.00
613.11	STONE FILL, TYPE II	1,570.000	CY	\$87.500	\$137,375.00
616.28	CAST-IN-PLACE CONCRETE CURB, TYPE B	62.000	LF	\$71.000	\$4,402.00
616.305	BITUMINOUS CONCRETE CURB, TYPE A	1,610.000	LF	\$11.500	\$18,515.00
616.41	REMOVAL OF EXISTING CURB	1,930.000	LF	\$3.950	\$7,623.50
617.12	REMOVE AND RESET MAILBOX, MULTIPLE SUPPORT	1.000	EACH	\$295.000	\$295.00
619.17	YIELDING MARKER POSTS	57.000	EACH	\$84.500	\$4,816.50
620.25	WOVEN WIRE FENCE WITH STEEL POSTS	975.000	LF	\$11.500	\$11,212.50
620.40	STEEL BRACE FOR WOVEN WIRE FENCE	4.000	EACH	\$475.000	\$1,900.00
620.55	REMOVAL OF EXISTING FENCE	1,860.000	LF	\$1.600	\$2,976.00
621.20	STEEL BEAM GUARDRAIL, GALVANIZED	5,240.000	LF	\$28.500	\$149,340.00
621.50	MANUFACTURED TERMINAL SECTION, FLARED	7.000	EACH	\$3,050.000	\$21,350.00
621.51	MANUFACTURED TERMINAL SECTION, TANGENT	6.000	EACH	\$2,900.000	\$17,400.00
621.747	GUARDRAIL APPROACH SECTION TO CONCRETE BRIDGE RAILING, TL-3	4.000	EACH	\$5,700.000	\$22,800.00
621.80	REMOVAL AND DISPOSAL OF GUARDRAIL	2,815.000	LF	\$1.600	\$4,504.00
625.10	SLEEVES FOR UTILITIES (1 X 18")	135.000	LF	\$110.000	\$14,850.00
629.54	CRUSHED STONE BEDDING	720.000	TON	\$51.500	\$37,080.00
630.10	UNIFORMED TRAFFIC OFFICERS	12,000.000	HR	\$1.000	\$12,000.00
630.15	FLAGGERS	12,000.000	HR	\$40.000	\$480,000.00
631.10	FIELD OFFICE, ENGINEERS	1.000	LS	\$95,000.000	\$95,000.00
631.16	TESTING EQUIPMENT, CONCRETE	1.000	LS	\$1,950.000	\$1,950.00
631.17	TESTING EQUIPMENT, BITUMINOUS	1.000	LS	\$610.000	\$610.00
631.19	TESTING EQUIPMENT, GROUT	1.000	LS	\$610.000	\$610.00
631.26	FIELD OFFICE COMMUNICATIONS (N.A.B.I.)	9,000.000	DL	\$1.000	\$9,000.00
633.10	CPM SCHEDULE	24.000	EACH	\$800.000	\$19,200.00
634.10	EMPLOYEE TRAINEESHIP	1,040.000	HR	\$96.000	\$99,840.00
635.11	MOBILIZATION/DEMOBILIZATION	1.000	LS	\$2,400,000.000	\$2,400,000.00
641.11	TRAFFIC CONTROL, ALL-INCLUSIVE	1.000	LS	\$1,742,900.000	\$1,742,900.00
641.15	PORTABLE CHANGEABLE MESSAGE SIGN	6.000	EACH	\$14,200.000	\$85,200.00
646.404	DURABLE 4 INCH WHITE LINE, POLYUREA	14,450.000	LF	\$1.600	\$23,120.00
646.414	DURABLE 4 INCH YELLOW LINE, POLYUREA	14,650.000	LF	\$1.600	\$23,440.00
646.426	DURABLE 6 INCH WHITE LINE, RECESSED POLYUREA	9,650.000	LF	\$3.150	\$30,397.50
646.436	DURABLE 6 INCH YELLOW LINE, RECESSED POLYUREA	4,100.000	LF	\$3.150	\$12,915.00

**VERMONT AGENCY OF TRANSPORTATION
CONTRACT SCHEDULE OF PAY ITEMS**

CONTRACT NUMBER:C03169

CONTRACT NAME:COLCHESTER NH 028-1(31)

Pay Item #	Pay Item Description	Quantity	Units	Unit Price	Amount
646.444	DURABLE 8 INCH WHITE LINE, POLYUREA	700.000	LF	\$6.350	\$4,445.00
646.454	DURABLE 8 INCH YELLOW LINE, POLYUREA	2,000.000	LF	\$6.350	\$12,700.00
646.466	DURABLE 12 INCH WHITE LINE, RECESSED POLYUREA	1,300.000	LF	\$10.500	\$13,650.00
646.484	DURABLE 24 INCH STOP BAR, POLYUREA	280.000	LF	\$16.000	\$4,480.00
646.494	DURABLE LETTER OR SYMBOL, POLYUREA	242.000	EACH	\$150.000	\$36,300.00
646.600	TEMPORARY 4 INCH WHITE LINE	72,100.000	LF	\$0.190	\$13,699.00
646.610	TEMPORARY 4 INCH YELLOW LINE	73,050.000	LF	\$0.190	\$13,879.50
646.620	TEMPORARY 6 INCH WHITE LINE	48,100.000	LF	\$0.230	\$11,063.00
646.630	TEMPORARY 6 INCH YELLOW LINE	20,450.000	LF	\$0.230	\$4,703.50
646.640	TEMPORARY 8 INCH WHITE LINE	3,300.000	LF	\$2.650	\$8,745.00
646.650	TEMPORARY 8 INCH YELLOW LINE	9,800.000	LF	\$2.650	\$25,970.00
646.660	TEMPORARY 12 INCH WHITE LINE	6,300.000	LF	\$4.200	\$26,460.00
646.680	TEMPORARY 24 INCH STOP BAR	1,400.000	LF	\$5.250	\$7,350.00
646.690	TEMPORARY LETTER OR SYMBOL	1,250.000	EACH	\$42.000	\$52,500.00
649.11	GEOTEXTILE FOR ROADBED SEPARATOR	6,360.000	SY	\$2.000	\$12,720.00
649.31	GEOTEXTILE UNDER STONE FILL	12,680.000	SY	\$2.600	\$32,968.00
651.15	SEED	3,690.000	LB	\$12.500	\$46,125.00
651.18	FERTILIZER	7,540.000	LB	\$7.400	\$55,796.00
651.20	AGRICULTURAL LIMESTONE	31.000	TON	\$1,050.000	\$32,550.00
651.35	TOPSOIL	8,110.000	CY	\$43.500	\$352,785.00
651.40	GRUBBING MATERIAL (12 INCH)	2,600.000	SY	\$11.000	\$28,600.00
653.01	EPSC PLAN	1.000	LS	\$7,900.000	\$7,900.00
653.02	MONITORING EPSC PLAN	500.000	HR	\$83.500	\$41,750.00
653.03	MAINTENANCE OF EPSC PLAN (N.A.B.I.)	1.000	LU	\$10,000.000	\$10,000.00
653.10	HAY MULCH	31.000	TON	\$1,050.000	\$32,550.00
653.12	STRAW MULCH	1.000	TON	\$1,350.000	\$1,350.00
653.20	ROLLED EROSION CONTROL PRODUCT, TYPE I	16,490.000	SY	\$3.700	\$61,013.00
653.25	CHECK DAM, TYPE I	10.000	CY	\$145.000	\$1,450.00
653.35	STABILIZED CONSTRUCTION ENTRANCE	90.000	CY	\$95.500	\$8,595.00
653.40	INLET PROTECTION DEVICE, TYPE I	9.000	EACH	\$160.000	\$1,440.00
653.41	INLET PROTECTION DEVICE, TYPE II	25.000	EACH	\$210.000	\$5,250.00
653.42	INLET PROTECTION DEVICE, TYPE III	20.000	CY	\$105.000	\$2,100.00
653.45	FILTER BAG	10.000	EACH	\$245.000	\$2,450.00
653.475	SILT FENCE, TYPE I	3,100.000	LF	\$5.250	\$16,275.00
653.476	SILT FENCE, TYPE II	10,000.000	LF	\$6.350	\$63,500.00
653.50	BARRIER FENCE	10,600.000	LF	\$3.150	\$33,390.00
653.55	PROJECT DEMARCATION FENCE	5,760.000	LF	\$2.100	\$12,096.00
675.20	TRAFFIC SIGN, TYPE A	1,275.560	SF	\$17.000	\$21,684.52
675.21	TRAFFIC SIGN, TYPE B	887.550	SF	\$26.500	\$23,520.08
675.31	W-SHAPE STEEL SIGN POST	5,768.000	LB	\$5.250	\$30,282.00
675.33	TUBULAR STEEL SIGN POST	2,736.000	LB	\$7.150	\$19,562.40
675.341	SQUARE TUBE SIGN POST AND ANCHOR	2,085.000	LF	\$18.500	\$38,572.50
675.41	FOUNDATION FOR W-SHAPE STEEL POST, 24 INCH DIAMETER	9.000	EACH	\$3,650.000	\$32,850.00
675.43	FOUNDATION FOR TUBULAR STEEL POST	12.000	EACH	\$2,450.000	\$29,400.00
675.50	REMOVING SIGNS	222.000	EACH	\$42.000	\$9,324.00

**VERMONT AGENCY OF TRANSPORTATION
CONTRACT SCHEDULE OF PAY ITEMS**

CONTRACT NUMBER:C03169

CONTRACT NAME:COLCHESTER NH 028-1(31)

Pay Item #	Pay Item Description	Quantity	Units	Unit Price	Amount
675.60	RESETTING SIGNS	46.000	EACH	\$63.500	\$2,921.00
676.10	DELINEATOR WITH STEEL POST	170.000	EACH	\$125.000	\$21,250.00
676.12	REMOVAL OF EXISTING DELINEATOR AND POST	100.000	EACH	\$1.050	\$105.00
677.13	OVERHEAD TRAFFIC SIGN SUPPORT, MULTI-SUPPORT (I-89 NB OFF-RAMP D, STA 510+27)	1.000	EACH	\$273,000.000	\$273,000.00
677.13	OVERHEAD TRAFFIC SIGN SUPPORT, MULTI-SUPPORT (US-7, STA 340+90)	1.000	EACH	\$278,000.000	\$278,000.00
678.15	TRAFFIC CONTROL SIGNAL SYSTEM, INTERSECTION (US ROUTE 2 @ I-89 NB RAMPS)	1.000	EACH	\$248,000.000	\$248,000.00
678.15	TRAFFIC CONTROL SIGNAL SYSTEM, INTERSECTION (US ROUTE 2 @ I-89 SB RAMPS)	1.000	EACH	\$246,000.000	\$246,000.00
678.15	TRAFFIC CONTROL SIGNAL SYSTEM, INTERSECTION (US ROUTE 2 @ US ROUTE 7)	1.000	EACH	\$234,000.000	\$234,000.00
678.21	ELECTRICAL CONDUIT	25.000	LF	\$28.500	\$712.50
678.23	WIRED CONDUIT (2 INCH) (PVC)(SCHED80)	4,185.000	LF	\$24.500	\$102,532.50
678.23	WIRED CONDUIT (3 INCH) (PVC)(SCHED80)	1,770.000	LF	\$28.500	\$50,445.00
678.30	ELECTRICAL CONDUIT SLEEVE (12 IN)(HDPE)	1,060.000	LF	\$98.000	\$103,880.00
678.40	TEMPORARY TRAFFIC SIGNAL SYSTEM (US ROUTE 2 @ I-89 NB RAMPS)	1.000	EACH	\$66,400.000	\$66,400.00
678.40	TEMPORARY TRAFFIC SIGNAL SYSTEM (US ROUTE 2 @ I-89 SB RAMPS)	1.000	EACH	\$66,400.000	\$66,400.00
678.40	TEMPORARY TRAFFIC SIGNAL SYSTEM (US ROUTE 2 @ US ROUTE 7)	1.000	EACH	\$66,400.000	\$66,400.00
678.45	REMOVAL OF EXISTING TRAFFIC CONTROL SIGNAL SYSTEM	3.000	EACH	\$6,850.000	\$20,550.00
679.24	REMOVE STREET LIGHT ASSEMBLY	23.000	EACH	\$740.000	\$17,020.00
679.46	STREET LIGHT ASSEMBLY	26.000	EACH	\$9,900.000	\$257,400.00
679.47	BRACKET ARM	6.000	EACH	\$525.000	\$3,150.00
679.50	LUMINAIRE	6.000	EACH	\$1,150.000	\$6,900.00
679.54	STREET LIGHTING CONTROL DEVICE	2.000	EACH	\$5,250.000	\$10,500.00
679.55	POWER DROP STANCHION, STREET LIGHTING	2.000	EACH	\$7,400.000	\$14,800.00
690.50	PRICE ADJUSTMENT, FUEL (N.A.B.I.)	1.000	LU	\$1.000	\$1.00
900.608	SPECIAL PROVISION (FOAMED GLASS AGGREGATE)	10,600.000	CY	\$178.700	\$1,894,220.00
900.608	SPECIAL PROVISION (PERFORMANCE-BASED CONCRETE, CLASS PCD) (FPQ)	495.000	CY	\$1,700.000	\$841,500.00
900.608	SPECIAL PROVISION (PERFORMANCE-BASED CONCRETE, CLASS PCS) (FPQ)	428.000	CY	\$1,050.000	\$449,400.00
900.615	SPECIAL PROVISION (INCENTIVE/DISINCENTIVE) (N.A.B.I.)	50,000.000	DL	\$1.000	\$50,000.00
900.620	SPECIAL PROVISION (GNSS CONSTRUCTION INSPECTION EQUIPMENT)	2.000	EACH	\$46,300.000	\$92,600.00
900.620	SPECIAL PROVISION (INCLINOMETER SYSTEM)	1.000	EACH	\$15,000.000	\$15,000.00
900.620	SPECIAL PROVISION (JUNCTION BOX, HEAVY DUTY)	25.000	EACH	\$1,600.000	\$40,000.00
900.620	SPECIAL PROVISION (PIEZOMETER, VIBRATING WIRE)	4.000	EACH	\$8,600.000	\$34,400.00
900.620	SPECIAL PROVISION (PRECAST CONTROL STRUCTURE WITH WEIR WALL)	1.000	EACH	\$16,200.000	\$16,200.00
900.620	SPECIAL PROVISION (PRECAST CONTROL STRUCTURE, GRAVEL WETLAND)	1.000	EACH	\$8,250.000	\$8,250.00
900.620	SPECIAL PROVISION (SETTLEMENT PLATFORM, TYPE IV)	3.000	EACH	\$8,550.000	\$25,650.00
900.635	SPECIAL PROVISION (WET AREA SEED)	12.000	LB	\$315.000	\$3,780.00
900.640	SPECIAL PROVISION (BRIDGE RAILING, SINGLE SLOPE CONC., 42 INCH)	635.000	LF	\$335.000	\$212,725.00
900.640	SPECIAL PROVISION (CONCRETE BACKED GRANITE SLOPE EDGING)	2,770.000	LF	\$73.500	\$203,595.00
900.640	SPECIAL PROVISION (CURED-IN-PLACE PIPE (CIPP) LINER, ULTRAVIOLET, 30 INCH)	150.000	LF	\$315.000	\$47,250.00
900.640	SPECIAL PROVISION (CURED-IN-PLACE PIPE (CIPP) LINER, ULTRAVIOLET, 36 INCH)	260.000	LF	\$330.000	\$85,800.00
900.640	SPECIAL PROVISION (DRY SWALE WITH UNDERDRAIN)	590.000	LF	\$27.000	\$15,930.00

**VERMONT AGENCY OF TRANSPORTATION
CONTRACT SCHEDULE OF PAY ITEMS**

CONTRACT NUMBER:C03169

CONTRACT NAME:COLCHESTER NH 028-1(31)

Pay Item #	Pay Item Description	Quantity	Units	Unit Price	Amount
900.640	SPECIAL PROVISION (INCLINOMETER CASING)	512.000	LF	\$210.000	\$107,520.00
900.640	SPECIAL PROVISION (INTERCONNECTING FIBER OPTIC CABLE)	1,640.000	LF	\$9.500	\$15,580.00
900.640	SPECIAL PROVISION (MEDIA FILTER DRAIN)	1,010.000	LF	\$15.000	\$15,150.00
900.645	SPECIAL PROVISION (GNSS CONSTRUCTION INSPECTION SURFACE MODELS)	1.000	LS	\$14,900.000	\$14,900.00
900.645	SPECIAL PROVISION (GNSS MACHINE CONTROL GRADING)	1.000	LS	\$172,000.000	\$172,000.00
900.645	SPECIAL PROVISION (MECHANICALLY STABILIZED EARTH RETAINING WALL)	1.000	LS	\$421,000.000	\$421,000.00
900.645	SPECIAL PROVISION (MECHANICALLY STABILIZED EARTH RETAINING WALL, FGA)	1.000	LS	\$1,034,000.000	\$1,034,000.00
900.645	SPECIAL PROVISION (PUBLIC PROTECTION FOR BRIDGE PROJECTS)	1.000	LS	\$27,900.000	\$27,900.00
900.645	SPECIAL PROVISION (SMART WORK ZONE, EXIT 17)	1.000	LS	\$332,000.000	\$332,000.00
900.650	SPECIAL PROVISION (MAINTENANCE OF STRUCTURES AND APPROACHES) (N.A.B.I.)	1.000	LU	\$100,000.000	\$100,000.00
900.670	SPECIAL PROVISION (CONCRETE BRIDGE DECK SURFACE PREPARATION)	13,510.000	SF	\$1.200	\$16,212.00
900.670	SPECIAL PROVISION (PRECAST PRESTRESSED CONCRETE DECK PANEL (3 1/2 INCH))	10,090.000	SF	\$21.000	\$211,890.00
900.675	SPECIAL PROVISION (GRAVEL WETLAND)	2,550.000	SY	\$30.000	\$76,500.00
900.675	SPECIAL PROVISION (GREEN PAVEMENT MARKINGS)	200.000	SY	\$125.000	\$25,000.00
900.680	SPECIAL PROVISION (TEMPORARY PAVEMENT)	2,000.000	TON	\$170.000	\$340,000.00

TOTAL: \$26,560,442.50

CONSTRUCTION CONTRACT

1. Parties. This is a construction contract made between the State of Vermont, by its Agency of Transportation (hereafter called "State" or "Agency"), and **Kubricky-Jointa Lime LLC of 269 Ballard Road, Wilton, NY, 12831** a corporation, incorporated under the laws of the State of **NEW YORK**, its successors and assigns, (hereafter call "Contractor").

Subject Matter: The Contractor, in consideration of the payment or payments specified in this Contract and agreed to by State, hereby agrees to furnish all the materials and to perform all the work and labor in the improvement of a certain project in the Town(s) of COLCHESTER, County(ies) of CHITTENDEN, at the unit prices bid by Contractor for the respective estimated quantities, aggregating approximately the sum of **Twenty-Six Million, Five Hundred and Sixty Thousand, Four Hundred and Forty-Two Dollars and Fifty Cents (\$26,560,442.50)**, and such other items, as are mentioned in the original Proposal. The original Proposal and prices named, together with the Standard Specifications for Construction ("Specifications") as are listed in the Schedule of Prices, are made a part of this Contract. Also, the plans prepared by the Agency, as verified by the Agency, are made a part this Contract. The project is situated as follows:

COLCHESTER NH 028-1(31)

COLCHESTER NH 028-1(31) - BEGINNING AT A POINT IN THE TOWN OF COLCHESTER, 0.461 MILES WEST OF THE INTERSECTION OF U.S. ROUTE 2 AND U.S. ROUTE 7, AND EXTENDING EASTERLY ALONG U.S. ROUTE 2 TO THE INTERSECTION WITH U.S. ROUTE 7 IN COLCHESTER. ALSO INCLUDED IS 0.511 MILES OF U.S. ROUTE 7 CENTERED ABOUT THE INTERSECTION OF U.S. ROUTE 7 AND U.S. ROUTE 2, AND INTERSTATE RAMPS AT EXIT 17.

WORK TO BE PERFORMED UNDER THIS PROJECT INCLUDES THE REALIGNMENT OF U.S. ROUTE 2 INCLUDING A NEW BRIDGE OVER INTERSTATE 89, REALIGNMENT OF INTERSTATE RAMPS AT EXIT 17, RESURFACING OF U.S. ROUTE 7 WITH THE ADDITION OF STRIPING, GUARDRAIL IMPROVEMENTS, SIGNAGE, BIKE CORRIDOR IMPROVEMENTS, AND OTHER HIGHWAY RELATED ITEMS.

2. Labor and Material; Specifications. The Contractor shall perform all the work and labor in the best and most workmanlike manner. The materials and labor shall be in strict and entire conformity, in every respect, with the Specifications and drawings and shall be subject to the inspection and approval of the Agency. If any of the material or labor shall be rejected by the Agency as defective or unsuitable, then the Contractor shall remove and replace the defective or unsuitable materials with other approved materials and do the labor anew, to the satisfaction and approval of the Agency, at the cost and expense of the Contractor. The 2018 Standard Specifications for Construction, approved and adopted by the Agency, are incorporated herein, and made a part of this Contract.

3. Time for Performance; Liquidated Damages. The Contractor shall furnish the materials and perform the labor in every respect to the satisfaction and approval of the Agency, on or before the project completion date as specified in the Contract Special Provisions, after written notice has been given by the Engineer to begin work. In case of the failure on the part of the Contractor, for any reason, except as provided in this Contract, to complete the furnishing of the materials and performing the work on or before the project completion date as specified in the Contract Special Provisions, the State shall deduct from any moneys due or which may become due the Contractor, or if no moneys shall be due, the State shall have the right to recover the amount of liquidated damages as provided in the Specifications for each and every day elapsing between the time stipulated for the completion and the actual date of completion, in accordance with the terms of the Contract. Any such deductions or sums to be recovered are not penalties but liquidated damages. However, the Agency at its discretion, shall make allowance over the period

specified for the completion of the work, for causes over which the Contractor has no control, and which must delay the completion of the work, in such case, the Contractor shall become liable for liquidated damages for delays beginning from the date on which the extended period shall expire.

4. Extra Work or Materials; Claims. The Contractor understands and agrees that the Agency will not allow any claim for extra work or materials, not specifically provided in this Contract. The Contractor shall not do any work or furnish any materials not covered by these Specifications and Contract unless such work is ordered in writing by the Agency. In no event shall the Contractor incur any liability by reason of any verbal directions or instructions that he may be given by the Agency. The State will not be liable for any materials furnished or used or for any work or labor done, unless the materials, work or labor are required of the Contractor on written order furnished by the Agency. Any such work or material which may be done or furnished by the Contractor without such written order first being given by the Agency shall be at the Contractor's own risk, cost, and expense. The Contractor agrees that without such written order the Contractor shall make no claim for compensation for work or materials so done or furnished.

5. Assignment; Subcontracting. The Contractor shall not assign this Contract or any part of this Contract, or any right to any moneys to be paid the Contractor under this Contract, without the prior written approval of the Agency. The Contractor shall not subcontract any part of the work to be done or materials furnished under the Contract without the written approval of the Agency.

6. Acceptance of Final Payment; Release. The Contractor's acceptance of the final payment shall be considered as a release in full of all claims against the State of Vermont arising out of, or by reason of the work done and materials furnished under this Contract.

7. Bonds. The Bonds given by the Contractor, a Compliance Bond in a sum equal to one hundred (100) per centum, and a Labor and Materials Bond in the sum equal to one hundred (100) per centum of the total contract price of the work to be done, to secure a proper compliance with the terms and provisions of this Contract, are attached to and made a part of this Contract.

8. Dispute Resolution; Exclusivity of Administrative Remedies. All questions or disputes arising between the parties hereto respecting any matter pertaining to this Contract or any part of this Contract, or any breach of this Contract shall be referred to the Secretary of Transportation, whose decision and award shall be final, binding, and conclusive upon all parties, subject to the right of appeal to the Transportation Board under 19 V.S.A. § 5(d) (4). All other rights or rights of action at law or in equity under and by virtue of this Contract and all matters connected with and relating to this Contract are hereby expressly waived.

9. Compensation for Contract Work. The Contractor agrees to receive the prices set forth in the following Schedule of Prices as full compensation for furnishing all the materials and labor which may be required in the prosecution and completion of the whole of the work to be done under this Contract and in all respects to complete this Contract to the satisfaction of the Agency.

Contract Number: C03169
Contract Name: COLCHESTER NH 028-1(31)

WE, THE UNDERSIGNED PARTIES, AGREE TO BE BOUND BY THIS CONTRACT

BY: STATE OF VERMONT
Agency of Transportation

Signature: *Joseph Flynn*

Name: Joe Flynn

Title: Secretary of Transportation
Duly Authorized Signer

BY: CONTRACTOR
Kubricky-Jointa Lime LLC

Signature: *Thomas Garrett*

Name: Thomas Garrett

Title: _____
Duly Authorized Signer

Signature Certificate

Reference number: FIEYB-VEUOA-DNMSP-7ZZK8

Signer

Timestamp

Signature

Thomas Garrett

Email: tgarrett@dacollins.com

Sent:

21 Feb 2024 20:29:47 UTC

Viewed:

21 Feb 2024 20:49:22 UTC

Signed:

21 Feb 2024 20:49:49 UTC

Thomas Garrett

Recipient Verification:

✓ Email verified

21 Feb 2024 20:49:22 UTC

IP address: 208.125.154.186

Location: Gansevoort, United States

Joseph Flynn

Email: joe.flynn@vermont.gov

Sent:

21 Feb 2024 20:29:47 UTC

Viewed:

21 Feb 2024 20:51:27 UTC

Signed:

21 Feb 2024 20:51:49 UTC

Joseph Flynn

Recipient Verification:

✓ Email verified

21 Feb 2024 20:51:27 UTC

IP address: 73.38.169.15

Location: South Hero, United States

Document completed by all parties on:

21 Feb 2024 20:51:49 UTC

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