

Town of Hartford
STP 0113 (59) S & STP EH09 (15)
Invitations to Bidder

February 28, 2020

Contract Documents for Hartford Roundabouts

The construction of two roundabouts and approaches, removal and replacement of curb, new drainage, traffic signs, pavement markings, and incidental items at the intersections of U.S. Route 5/Sykes Mountain Avenue and Sykes Mountain Avenue/Ralph Lehman Drive. – Hartford STP 0113 (59) S & STP EH09 (15)
Town of Hartford, VT

VT Agency of Transportation 2018 Standard Specifications for Construction shall apply to this contract.

Owner:
Town of Hartford
Hartford Town Office
171 Bridge Street
White River Junction, VT 05001

February 28, 2020

Table of Contents

Invitation for Bids
Instructions to Bidders
Bid Form
Special Provisions

Appendices

- A. Contractors EEO Certification Form CA-109
- B. Debarment & Non-Collusion Affidavit CA-91
- C. Worker Classification Compliance Requirement Form (*Prime Contractor*)
- D. Required Contract Provisions for Federal-Aid Construction, FHWA Form 1273
- E. Standard Federal EEO Specifications, EO 11246
- F. Certification of Federal Aid Contracts, CA-163
- G. Vermont Minimum Labor & Truck Rates
- H. Disadvantaged Business Enterprise (DBE) Policy Contract Requirements, CR-110
- I. General Special Provisions for All Projects dated *11-13-19*
- J. Example Compliance Bond Form
- K. Example Labor & Materials Bond Form
- L. Project Change Order Form
- M. Standard Title VI/Non-Discrimination Assurances Appendices A and E
- N. Certificate of Workers' Compensation Coverage (*Prime Contractor*)
- O. Work Zone Safety and Mobility Guidance Document
- P. Permits
- Q. Geotechnical Report
- R. Traffic Management Plan

Project Specific Attachments

- US Department of Labor Davis-Bacon Rates
- *Materials Record & Certification Package (Provided by VTrans Project Supervisor)*
- Project Permits
- Right of Way and Utility Clearance

The following documents are available at:

<https://outside.vermont.gov/agency/VTRANS/external/MAB-LP> (under Federal Aid Projects - Construction Phase)

- Notice of Award
- Sample Construction Agreement
- Notice to Proceed
- Release of Waiver & Lien

INVITATION TO BID
Town of Hartford STP 0113 (59) S

Sealed bids from pre-qualified contractors shall be accepted until **2 PM**, prevailing time on **Wednesday, March 11, 2020** at Hartford Town Offices, 171 Bridge Street, White River Junction, VT 05001 for construction of the project hereinafter described. Bid opening will occur immediately after the bid submittal deadline. The time of receiving and opening bids may be postponed due to emergencies or unforeseen conditions.

Sealed BIDS shall be marked in the lower left-hand corner: Bid Documents: Town of Hartford STP 0113 (59) S & STP EH09 (15)

Each BID must be accompanied by a certified check payable to the Town of Hartford for five percent (5%) of the total amount of the BID. A BID bond may be used in lieu of a certified check.

PREQUALIFICATION OF CONTRACTORS: All bidders on this project shall be on the Agency of Transportation's prequalified list under the category listed below or shall have submitted a complete prequalification application to the Agency of Transportation, Contract Administration, a minimum of 10 working days prior to the bid opening. For information contact Jon Winter at (802) 622-1267.

All bidders shall be on the current VTRANS Contract Administration pre-qualified list "Contractors List of Roads and Highway Construction Category". All bidders on this project must also obtain unconditioned project-specific approval through the "Standard Form - Request for Proposal" CA-82 form. This form must be submitted to the Agency of Transportation, Contract Administration, by noon on the 7th working day prior to the bid opening. These documents are available at:
<http://vtranscontracts.vermont.gov/prequalification>.

Bids submitted by bidders that exceed their Maximum Dollar Capacity Rating (MDCR) as determined by the Vermont Agency of Transportation on an annual basis will be considered non-responsive.

LOCATION: This project is located in the Town of Hartford at the intersections of U.S. Route 5/Sykes Mountain Avenue and Sykes Mountain Avenue/Ralph Lehman Drive and along Sykes Mountain Avenue from U.S. Route 5 to Lily Pond Road.

TYPE OF CONSTRUCTION: Work to be performed under this project includes: The construction of two roundabouts and approaches, removal and replacement of curb, new drainage, traffic signs, pavement markings, sidewalk and incidental items.

CONTRACT COMPLETION DATE: The Contract shall be completed on or before **October 29, 2021**.

OBTAINING PLANS: Plans may be obtained from the following website:
<https://bidportal.mjinc.com/bidportal/index>. Plans are not returnable.

ENGINEERS ESTIMATE: For this Proposal the Engineers Estimate falls between **\$5,000,000 and \$10,000,000**.

PLANS, SPECIFICATIONS AND PROPOSAL MAY BE SEEN AT THE OFFICE OF:

1. Town of Hartford Public Works, 173 Airport Road, White River Junction, VT 05001.
2. <https://bidportal.mjinc.com/bidportal/index>

STANDARD SPECIFICATIONS: This contract is governed by the Vermont Agency of Transportation ("VTrans") 2018 Standard Specifications for Construction.

QUESTIONS: During the advertisement phase of this project all questions shall be addressed solely to Municipal Project Manager, Kenneth A. Robie, PE, 6 Green Tree Drive, (802) 728-7238.

EQUAL EMPLOYMENT OPPORTUNITY (EEO) CERTIFICATION: 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. Generally only contracts and subcontracts of \$10,000 or under are exempt as set forth in 41 CFR 60-1.5. See Appendix A for Contractors EEO Certification Form (CA-109). **This certification form must be submitted with the bid.**

NON-COLLUSION AFFIDAVIT: All bidders are required to execute a sworn statement, certifying that the bidder 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 such contract. See Appendix B for Debarment and Non-Collusion Affidavit (CA-91). **This affidavit must be submitted with the bid.**

DEBARMENT AFFIDAVIT: All bidders are required to execute a sworn statement, certifying that the bidder has not within the last three (3) years been, suspended, debarred, voluntarily excluded or determined ineligible by any Federal or State Agency; does not have a proposed suspension, debarment, voluntary exclusion or ineligibility determination pending; and has not been indicted, convicted or had civil judgment rendered against (it, him, her, them) by a court having jurisdiction in any matter involving fraud or official misconduct within the past three (3) years. See Appendix B for

Town of Hartford
STP 0113 (59) S & STP EH09 (15)
Invitations to Bidder

February 28, 2020

Debarment and Non-Collusion Affidavit (CA-91). **This affidavit must be submitted with the bid.**

WORKER CLASSIFICATION COMPLIANCE REQUIREMENT FORM (*Prime Contractor*): All bidders are required to complete this self-reporting form in its entirety and **submit with the bid.**

NON-DISCRIMINATION IN FEDERALLY ASSISTED CONTRACTS: The Town of Hartford hereby notifies all bidders that it will ensure that any contract entered into pursuant to this advertisement, disadvantaged business enterprises will be afforded full opportunity to submit bids in response to this invitation and will not be discriminated against on the basis of race, color, religion, sex or national origin for an award. This is consistent with the Town's requirement to comply with provisions of Title VI.

DAVIS BACON WAGE REQUIREMENTS: Bidders agree to abide by the Davis Bacon Wage Rate Schedule, which are appended to these Contract Documents.

BUY AMERICA REQUIREMENTS: Buy America requirements of 23 CFR 635.410 are applicable to all Federal-aid construction projects. All steel or iron products permanently incorporated into Federal-aid projects, shall be products that have been entirely manufactured within the United States. All manufacturing processes of the steel or iron material, in a product, must occur within the United States to be considered of domestic origin. This includes process such as rolling, extruding, machining, bending, grinding, and drilling. The action of applying a coating to a material is deemed a manufacturing process subject to Buy America. Coating includes epoxy coating, galvanizing, painting, and any other coating that protects or enhances the value of the material.

INSTRUCTIONS TO BIDDERS
Town of Hartford STP 0113 (59) S & STP EH09 (15)

1. Bid Preparation and Submission

- a. Bidders are expected to examine the specifications, drawings, all instructions and, the construction site. Failure to do so will be at the bidders' risk.
- b. All bids must be submitted on the forms provided by the municipality. Bidders shall furnish all the information required by the solicitation. Bids must be signed and the bidders name typed or printed on the bid sheet and each continuation sheet which requires the entry of information by the bidder. Erasures or other changes must be initialed by the person signing the bid. Bids signed by an agent shall be accompanied by evidence of the agent's authority. (Bidders should retain a copy of their bid for their own records.)
- c. All bids shall be sealed in an envelope which shall be clearly marked with the words "Bid Document," the Invitation to Bid number, any project or other identifying number, the bidder's name, and the date and time for receipt of bids.
- d. This solicitation requires bidding on all items, failure to do so will disqualify the bid.
- e. Unless expressly authorized elsewhere in this solicitation, alternate bids will not be considered.
- f. Unless expressly authorized elsewhere in this solicitation, bids submitted by telegraph, facsimile (fax) machines, or electronically via the internet or email will not be considered.
- g. All blank spaces under the page(s) headed "Bid Form" must be filled in with ink or typewriter in both words and figures indicating the unit price for each respective bid item. The bid total shall also be entered in words and figures.
- h. In case of a discrepancy between a unit price written in words and one entered in figures, the price written in words shall govern.
- i. In case of a discrepancy between the bid total written in words and that entered as a figure, the adjusted figure shall govern.
- j. The estimated quantities are not guaranteed and can be adjusted as needed during the project, but are given as a basis for the comparison of bids.

2. Explanation and Interpretation to Prospective Bidders

- a. Any prospective bidder desiring an explanation or interpretation of the solicitation, specification, drawings, etc., must request it at least 10 days before the scheduled time for bid opening. Requests may be oral or written. Oral requests must be confirmed in writing. The only oral clarifications that will be provided will be those clearly related to solicitation procedures, i.e., not substantive technical information. No other oral explanation or interpretation will be provided. Any information given to a prospective bidder concerning this solicitation will be furnished promptly to all other prospective bidders as a written addendum to the solicitation, if that information is necessary in submitting bids, or if lack of it would be prejudicial to other prospective bidders.
- b. Any information obtained by, or provided to, a bidder other than by formal addendum to the solicitation shall not constitute a change to the solicitation.

3. Addendum to Invitation for Bids

- a. If this solicitation is amended, then all terms and conditions which are not modified remain unchanged.
- b. Bidders shall acknowledge receipt of any addendum to this solicitation by identifying the addendum number and date on the bid form. Bids which fail to acknowledge the bidders receipt of any addendum will result in the rejection of the bid if the addendum (addenda) contained information which substantively changed the municipality's requirements.
- c. Addenda will be on file in the offices of the Municipality at least 5 days before the bid opening.

4. Responsibility of Prospective Contractor

- a. All prospective contractors shall be pre-qualified under the appropriate work category by the Vermont Agency of Transportation, Contract Administration. For this project a current annual prequalification is necessary. The contact for pre-qualification is Jon Winter, Tel: (802) 622-1267. Please note that applications for pre-qualification must be made at least 10 working days prior to the bid opening. Bids submitted by bidders that exceed their Maximum

- Dollar Capacity Rating (MDCR) as determined by the Vermont Agency of Transportation on an annual basis will be considered non-responsive.
- b. The VERMONT AGENCY OF TRANSPORTATION "POLICIES AND PROCEDURES FOR PREQUALIFICATION, BIDDING, AND AWARD OF CONTRACTS", latest edition, Sections 1-6 and 9 are hereby incorporated in these specifications and the contract by reference. Sections 1 through 6 shall not be subject to the changes to the definitions in the Special Provisions.
 - c. The Method of Measurement and Basis of Payment for all contract items shall follow the Vermont Agency of Transportation's ("VTrans") 2018 Standard Specification for Construction, unless modified in these Contract Documents.
 - d. If a bidder submits a unit bid price of zero for a contract bid item, the bid will be declared informal.
 - e. A bidder may submit a unit bid price that is obviously below the cost of the item. If the Municipality awards and enters into a contract with a Bidder that has submitted a unit bid price that is obviously below cost, the contractor shall be obligated to perform the work under such item as indicated in the contract documents and/or as directed by the Engineer.
 - f. When "Optional Bid Items" are indicated in the proposal bidders shall bid on only one pay item in each group of options, leaving the other pay items in the group without a bid price. If a bidder enters more than one unit price bid in a group of options, only the lowest total price will be considered as the basis of calculation for determining the low bidder and used in the contract.
 - g. When "Alternate Bid Items" are indicated in the Proposal bidders must bid on all pay items in each set of "Alternate Bid Items". Failure to bid on all of the "Alternate Bid Items" in the proposal may result in rejection of the bid.
 - h. When the Bid Form for a contract contains pay item(s) which have a quantity of one (1) and a unit price and total price entered, the work will be performed by the contractor according to the contract documents at the unit price listed if such item is determined to be needed by the Engineer.
 - i. When it is indicated in the contract documents that payment or costs of work and/or materials are incidental to one or more other contract items (but not to specific other items), such costs shall be included by the bidder in the price bid for all other contract items.

5. Errors and/or Inconsistencies in Contract Documents

- a. By submitting a bid, a prospective bidder/contractor certifies that it shall assert no claim, cause of action, litigation, or defense against the Municipality unless notice was provided to the Municipality in writing of any error or inconsistency discovered in the plans, specifications, and/or contract documents immediately upon discovery of such error or inconsistency.

6. Availability of Lands for Work, Etc.

- a. The lands upon which the Work is to be performed, rights of way and easement for access thereto and other lands designated for use by the contractor in performing the Work are identified in the contract documents. All additional lands and access thereto required for temporary construction facilities, construction equipment or storage of materials and equipment to be incorporated in the work are to be obtained and paid for by the Contractor. Easements for permanent structures or permanent changes in the existing facilities are to be obtained and paid for by the Municipality unless otherwise provided for in the contract documents.

7. Familiarity with Laws, Ordinances and Regulations

- a. By submitting a bid an entity certifies that it is familiar with all Federal, State and local laws, ordinances and regulations which affect in any way the materials, equipment, haul roads used in or upon the work, the conduct of the work, and the persons engaged or employed in the performance of the work to be performed pursuant to the contract.
- b. By submitting a bid an entity certifies that it shall forthwith report in writing to the Municipality any provision in the plans, specifications or proposed contract that the bidder/contractor believes is in conflict with or inconsistent with any Federal, State or local law, ordinance, or regulation.
- c. By submitting a bid a prospective Bidder certifies that if, during its investigation of the work in the process of preparing its bid, it discovers or encounters subsurface or latent physical conditions at a project site differing materially from those ordinarily encountered and generally recognized as inherent in the work provided for in the contract, it shall notify in writing the Municipality of the specific differing conditions immediately upon discovering or encountering the differing site conditions.

- d. An entity further certifies that if it fails to notify the Municipality of any differing site conditions as described above, it shall waive any and all rights that it might have to additional compensation from the Municipality for additional work as a result of the differing site conditions and that it shall not bring a claim for additional compensation because of differing site conditions.
- e. By submitting a bid a prospective bidder/contractor certifies that no claim or defense of ignorance or misunderstanding concerning Federal, State or local laws, ordinances and/or regulations will be employed by a bidder/contractor or considered by the Municipality in claims, litigation, alternative dispute resolution procedures, or other matters concerning the contract for which the bid is submitted.

8. Late Submissions, Modifications, and Withdrawal of Bids

- a. Any bid received at the place designated in the solicitation after the exact time specified for receipt will not be considered.
- b. Any modification or withdrawal of a bid is subject to the same conditions as in paragraph (a.) of this provision.
- c. The only acceptable evidence to establish the time of receipt at the Municipality is the time/date stamp of the Municipality on the bid wrapper, or other documentary evidence of receipt maintained by the municipality.
- d. Bids may be withdrawn by written notice, or if authorized by this solicitation, by telegram (including mailgram) or facsimile machine transmission received at any time before the exact time set for opening of bids: provided that written confirmation of telegraphic or facsimile withdrawals over the signature of the bidder is mailed and postmarked prior to the specified bid opening time. A bid may be withdrawn in person by a bidder or its authorized agent if , before the exact time set for opening of bids, the identity of the person requesting withdrawal is established and the person signs a receipt for the bid.

9. Bid Opening

- a. All bids received by the date and time specified in the solicitation will be publicly opened and total bid amounts read aloud. The time and place of opening will be as specified in the solicitation. Bidders and other interested persons may be present. In the event of unforeseen circumstances (severe weather, etc.) the Municipality reserves the right to postpone the reading of

the bids for that contract. All bids for a contract will be opened at the same time and location at a later date.

10. Protests

- a. This Section sets forth the exclusive protest remedies available with respect to this solicitation. Each Bidder, by submitting its bid, expressly recognizes the limitation on its rights to protest contained herein, expressly waives all other rights and remedies and agrees that the decision on any protest, as provided herein, shall be final and conclusive unless wholly arbitrary. These provisions are included in this solicitation expressly in consideration for such waiver and agreement by the Bidders. Such waiver and agreement by each Bidder are also consideration to each other Bidder for making the same waiver and agreement.
- b. A Bidder may protest any determination regarding the proposed award of a Contract by filing a notice of protest by hand delivery or courier to the Town of Hartford Selectboard. Such notice shall be provided: (a) no earlier than the day of Town of Hartford issuance of the Notice of Award; and (b) no later than five (5) business days after Town of Hartford issuance of the Notice of Award. The notice of protest shall specifically state the grounds of the protest.
- c. Within seven (7) calendar days of the notice of protest the protesting Bidder must file with the Municipality a detailed statement of the grounds, legal authorities and facts, including all documents and evidentiary statements, in support of the protest. Evidentiary statements, if any, shall be submitted under penalty of perjury. The protesting Bidder shall have the burden of proving its protest by clear and convincing evidence.
- d. Failure to file a notice of protest or a detailed statement within the applicable period shall constitute an unconditional waiver of the right to protest the evaluation or qualified process and decisions there under.
- e. Unless otherwise required by law, no evidentiary hearing or oral argument shall be provided, except the Town of Hartford Selectboard, in its sole discretion, may decide to permit a hearing or argument if it determines that such hearing or argument is necessary for the protection of the public interest. The Town of Hartford Selectboard shall issue a written decision regarding the protest within thirty (30) calendar days after it receives the detailed statement of protest. Such decision shall be final and conclusive.
- f. If the Town of Hartford Selectboard concludes that the Bidder submitting the protest has established a basis for protest, the Town of Hartford Selectboard

will determine what remedial steps, if any, are necessary or appropriate to address the issues raised in the protest. Such steps may include, without limitation, withdrawing or revising the decisions, issuing a new solicitation or taking other appropriate actions.

11. Rejection of Bids

- a. The Municipality may declare a Bid “Informal” and hence rejected if the bid shows any alteration of form, omissions or additions not called for in the bid, lacks proper signatures, is a conditional bid, has alternate bids unless required in the bid, has irregularities of any kind, has changes to the printed content, is submitted on a form not furnished by the Municipality, is incomplete, fails to acknowledge receipt of one or more addendums, or includes a clause in which the bidder reserves a right to accept or reject the contract award.
- b. The Municipality may reject a bid at the time of bid opening or following analysis to confirm the proposal.
- c. The Municipality may reject any or all bids, waive any or all technicalities, and/or advertise for new bids if the municipality, in consultation with VTrans, determines that the best interests of the Municipality, or the awarding authority, will be served.
- d. The Municipality will reject a bid submitted without a completed Debarment and Non-Collusion Affidavit.
- e. The Municipality will reject a bid submitted without a signed Contractors Equal Employment Certification Form.
- f. The Municipality will reject a bid submitted without a Bid Bond.
- g. The Municipality will reject a bid submitted by a bidder that exceeds their Maximum Dollar Capacity Rating (MDCR) as determined by the Vermont Agency of Transportation on an annual basis.
- h. The Municipality will reject bids which fail to acknowledge the bidder’s receipt of any addendum if the addendum (addenda) contained information which substantively changed the municipality’s requirements.
- i. The Municipality will decide whether any bid prices are unbalanced above or below a reasonable cost analysis value as determined by its Municipal Project

Manager. Bids in which bid prices are unbalanced, mathematically and/or materially, may be rejected at the sole discretion of the Municipality. For purposes of this subsection “mathematically unbalanced bid” and “materially unbalanced bid” shall have the same meaning as in 23 CFR Part 635 – Construction and Maintenance.

- j. Prospective bidders may be disqualified for various reasons including (a) Submission of more than one proposal for the same work by an entity under the same or different names, (b) Evidence of collusion among bidders, or (c) Any other cause for suspension or debarment as detailed in the Agency’s policy and Procedures on Debarment, Code of Vermont Rules (CVR), Volume 8A, 14 010 004, pages 1-10.

12. Contract Award

- a. The municipality will evaluate bids in response to this solicitation without discussions and will award a contract to the lowest responsive and responsible bidder whose bid, conforming to the solicitation, will be most advantageous to the municipality considering only price and any price related factors specified in the solicitation.
- b. Opened bids will be considered and submitted bids confirmed on the basis of the summation of the products of the quantities shown in each bid’s Schedule of Items multiplied by the unit prices bid. In the event of a discrepancy between the written bid amount and the alpha numeric figure, the written amount shall govern. In the event of a discrepancy between a unit price and the calculated extension, the product based on the unit price bid and the mathematically correct summation of the products shall govern.
- c. The municipality may reject any and all bids, waive any or all technicalities, and/or advertise for new bids if the municipality, in consultation with VTrans, determines that the best interests of the municipality will be served.
- d. The municipality may reject any bid as nonresponsive if it is materially unbalanced as to the prices for the various items of work to be performed. A bid is materially unbalanced when it is based on prices significantly less than cost for some work and prices which are significantly overstated for other work.
- e. A written award shall be furnished to the successful bidder within the period for acceptance specified in the bid and shall result in a binding contract without further action by either party.

- f. Prior to signing a construction contract, the successful bidder must submit a current Certificate of Good Standing from the Vermont Secretary of State's office.

13. Bid Guarantee

- a. All bids must be accompanied by a negotiable bid guarantee which shall not be less than five percent (5%) of the amount of the bid. The bid guarantee may be a certified check, bank draft, U.S. Government Bonds at par value, or a bid bond secured by a surety company acceptable to the U.S. Government and authorized to do business in the State of Vermont. Certified checks and bank drafts must be made payable to the order of the municipality. The bid guarantee shall insure the execution of the contract and the furnishing of a method of assurance of completion by the successful bidder as required by the solicitation. **Failure to submit a bid guarantee with the bid shall result in rejection of the bid.** Bid guarantees of the two lowest bidders that have submitted bids that comply with all the provisions required to render them formal will be retained until the contract and bonds have been signed by all parties. Bid guarantees submitted by the remaining unsuccessful bidders will be returned as soon as practicable after bid opening. Should no award be made within thirty-one calendar days following the opening of bids, thirty-two if the thirty-first day is a state holiday, all bids may be rejected and all guarantees may be returned.

14. Contract Bonds

- a. A successful bidder entering into a contract for any portion of the work included in a bid shall provide the Town sufficient surety in the form of; 1) a labor and materials bond, and 2) a compliance bond, both as required by 19 V.S.A. Section 10(8) and (9).
- b. Each bond shall be in a sum equal to one hundred percent (100%) of the contract awarded.
- c. The labor and materials bond shall guarantee the payment in full of all bills and accounts for materials and labor used in the work as well as other obligations incurred in carrying out the terms of the contract.
- d. The compliance bond shall guarantee the faithful performance and completion of the work to be done under the contract as well as compliance with all provisions of the contract.
- e. The form of the bond shall be that provided by the Municipality, and the surety shall be acceptable to the State. The bonds shall be procured from an

insurance company registered and licensed to do business in the State of Vermont.

15. Signing the Contract

- a. The entity to which the Contract has been awarded shall sign the contract documents and return them to the Municipality within thirty (30) calendar days from the date of the Notice of Award. No contract shall be considered effective until it has been fully executed by all parties.
- b. Failure to comply with any of the requirements of these provisions relative to signing the contract or failure to furnish the required surety within fifteen (15) calendar days after notice of award shall be just cause for the annulment of the award or of the contract and/or forfeiture of the bid guarantee/bid bond. Further, if the award or the contract is annulled, or if the contract is not awarded due to in(action) of the lowest responsible bidder that has submitted a bid that complies with all the provisions required to make it formal, the bid guarantee accompanying the bid shall become the property of the Municipality, not as a penalty but as liquidated damages.
- c. If the award or the contract is annulled, the Municipality may award the contract to the next lowest responsible bidder that has submitted a bid that complies with all the provisions required to make it formal or advertise a new request for bids for the contract(s).
- d. Failure by the contractor to sign the contract within the time provided by this Subsection shall not be reason for an extension of the contract completion date.

16. Taxes and Insurance Requirements

Taxes and insurance for this project shall be in conformance with Section 103 of the VTrans 2018 Standard Specifications for Construction.

17. Prompt Pay Compliance

- a. Vermont's Prompt Pay Statute requires payment from primes to subs within 7 days of primes receiving payment. Vermont State Statutes Annotated, Title 9, §4003 provides: "Notwithstanding any contrary agreement, when a subcontractor has performed in accordance with the provisions of its contract, a contractor shall pay a subcontractor, and each subcontractor shall in turn pay its subcontractors, the full or proportional amount received for each such

subcontractor's work and materials based on work completed or service provided under the subcontractor, seven days after receipt of each progress or final payment or seven days after receipt of the subcontractor's invoice, whichever is later."

18. Preconstruction Conference

- a. After award of a contract under this solicitation and prior to the start of work, the successful bidder will be required to attend a preconstruction conference with representatives of the Municipality, Design and/or Resident Engineer, Municipal Project Manager (MPM), and the VTrans Project Supervisor, and other interested parties convened by the Municipality's engineer/representative. The conference will serve to acquaint the participants with the general plan of the construction operation and all other requirements of the contract. The municipality will provide the successful bidder with the date, time and place of the conference. **Note:** If the specific material testing and certification requirements are not included elsewhere in the contract documents, they will be provided by the Municipality to the contractor at the preconstruction conference.

19. Waste Borrow and Staging Areas

- a. The opening and use of offsite waste, borrow and staging areas shall follow the provisions of Section 105.25 of the VTrans Standard Specifications for Construction, 2018 Edition.
- b. The Contractor and/or property owner shall obtain all necessary permits and clearances prior to using off site waste, borrow or staging areas. In addition all off site waste borrow and staging areas must be reviewed and approved by the VTrans Environmental Section prior to use. Application should be made at least 21 calendar days prior to planned utilization. No work will be performed at offsite waste borrow or staging areas without written approval of the VTrans Environmental Section. The forms for either documenting an exempt site or applying for review of a site may be found on the VTrans web site at: <http://vtrans.vermont.gov/working/offsite-activity>

20. DBE Requirements

There are to be no mandatory Contract goals for DBE compliance on this project.

21. Contaminated Soils

If contaminated soils or groundwater are encountered during the course of construction, the Contractor is directed to contact: Mr. Andy Shively, Hazardous Material and Waste Coordinator, of the Vermont Agency of Transportation at andy.shively@vermont.gov or by phone at . (802) 229-8740 or by pager at (802) 250-4666.

22. Contract Documents

See Sample Construction Contract below for contract documents to be included.

<https://outside.vermont.gov/agency/VTRANS/external/MAB-LP/SitePages/FinalPlans,SpecificationsAndEstimate.aspx>

In the event that a bidder suspects or determines the proposal is incomplete, notify Kenneth A. Robie, PE, (802) 728-7238

BID FORM
Hartford Roundabouts and Sidewalks
Town of Hartford STP 0113 (59) S & STP EH09 (15)

Proposal of _____
(hereinafter called Bidder), organized and existing under the laws of the State of _____ doing business as _____
(a corporation, a partnership, of an individual)

To the Town of Hartford, Vermont (hereinafter called Owner)

The Bidder represents that this bid is genuine and not made in the interest of or on behalf of any undisclosed person, firm or corporation and is not submitted in conformity with any agreement or rules of any group, association, organization or corporation. The bidder has not directly or indirectly induced or solicited any other bidder to submit a false bid. Bidder has not solicited or induced any person, firm or corporation to refrain from bidding and the bidder has not sought by collusion to obtain for himself any advantage over any other bidder or Owner.

It is essential that all forms that require signature as part of the final Bid Submission be filled out and signed or the Bid itself will be invalid:

- Contractors EEO Certification Form CA-109 – Appendix A
- Debarment & Non-Collusion Affidavit CA-91 – Appendix B
- Worker Classification Compliance Requirement (Prime Contractor) – Appendix C

The undersigned bidder proposed and agrees, if this bid is accepted, to enter into an agreement with Owner to furnish all materials and to complete all work as specified or indicated in the Contract Documents for the contract price and within the contract time indicated in this bid and in accordance with the Contract Documents.

The undersigned bidder, by submission of this bid, certifies that the total base bid does not exceed their total Maximum Dollar Capacity Rating (MDCR) as determined by the Vermont Agency of Transportation on an annual basis.

Bidder hereby agrees to commence Work under this contract on the date of issuance of the Notice to Proceed and that the Final Completion date for this contract is **October 29, 2021**.

Town of Hartford
 STP 0113 (59) S & STP EH09 (15)
 Bid Form

February 28, 2020

Bidder acknowledges receipt of the following Addenda:

Bidder agrees to perform all the Work described in the Contract Documents for the following schedule of prices. Unqualified bids will not be accepted.

VTrans ITEM #	ITEM	UNIT	QUANTITY	UNIT PRICE	TOTAL PRICE
201.10	Clearing and Grubbing, Including Individual Trees and Stumps	LS	1	\$ _____	\$ _____
	Unit Price in Words _____				
201.31	Thinning and Trimming for Signs	EACH	3	\$ _____	\$ _____
	Unit Price in Words _____				
203.15	Common Excavation	CY	14,800	\$ _____	\$ _____
	Unit Price in Words _____				
203.28	Excavation of Surfaces and Pavements	CY	400	\$ _____	\$ _____
	Unit Price in Words _____				
203.30	Earth Borrow	CY	1,350	\$ _____	\$ _____
	Unit Price in Words _____				
204.20	Trench Excavation of Earth	CY	3,700	\$ _____	\$ _____
	Unit Price in Words _____				
204.21	Trench Excavation of Rock	CY	10	\$ _____	\$ _____
	Unit Price in Words _____				

Town of Hartford
STP 0113 (59) S & STP EH09 (15)
Bid Form

February 28, 2020

204.22 Trench Excavation of Earth, Exploratory (N.A.B.I.)
CY 61 \$ _____ \$ _____

Unit Price in Words _____

204.30 Granular Backfill for Structures
CY 5 \$ _____ \$ _____

Unit Price in Words _____

210.10 Coarse-Milling, Bituminous Pavement
SY 1,340 \$ _____ \$ _____

Unit Price in Words _____

301.35 Subbase of Dense Graded Crushed Stone
CY 18,050 \$ _____ \$ _____

Unit Price in Words _____

404.65 Emulsified Asphalt CWT 169 \$ _____ \$ _____

Unit Price in Words _____

406.35 Superpave Bituminous Concrete Pavement
TON 4,960 \$ _____ \$ _____

Unit Price in Words _____

406.38 Hand-Placed Bituminous Concrete Material, Drives
SY 950 \$ _____ \$ _____

Unit Price in Words _____

406.50 Price Adjustment, Asphalt Cement (N.A.B.I.)
LU 1 \$ _____ \$ _____

Unit Price in Words _____

501.37 High Performance Concrete, Class PCD
CY 170 \$ _____ \$ _____

Unit Price in Words _____

507.12 Reinforcing Steel, Level II
LB 36,100 \$ _____ \$ _____

Unit Price in Words _____

Town of Hartford
STP 0113 (59) S & STP EH09 (15)
Bid Form

February 28, 2020

601.0005 12" CSP .064 (2-2/3 X 1/2)	LF	12	\$ _____	\$ _____
Unit Price in Words _____				
601.0015 18" CSP .064 (2-2/3 X 1/2)	LF	4	\$ _____	\$ _____
Unit Price in Words _____				
601.0905 12" CPEP	LF	60	\$ _____	\$ _____
Unit Price in Words _____				
601.0910 15" CPEP	LF	190	\$ _____	\$ _____
Unit Price in Words _____				
601.0915 18" CPEP	LF	93	\$ _____	\$ _____
Unit Price in Words _____				
601.2605 12" CPEP(SL)	LF	70	\$ _____	\$ _____
Unit Price in Words _____				
601.2610 15" CPEP(SL)	LF	320	\$ _____	\$ _____
Unit Price in Words _____				
601.2615 18" CPEP(SL)	LF	1,640	\$ _____	\$ _____
Unit Price in Words _____				
601.2620 24" CPEP(SL)	LF	970	\$ _____	\$ _____
Unit Price in Words _____				
601.2630 36" CPEP(SL)	LF	20	\$ _____	\$ _____
Unit Price in Words _____				
601.7005 12" CPEPES	EACH	1	\$ _____	\$ _____
Unit Price in Words _____				
601.7010 15" CPEPES	EACH	2	\$ _____	\$ _____
Unit Price in Words _____				
601.7015 18" CPEPES	EACH	1	\$ _____	\$ _____
Unit Price in Words _____				

Town of Hartford
STP 0113 (59) S & STP EH09 (15)
Bid Form

February 28, 2020

601.7020 24" CPEPES EACH 3 \$_____ \$_____

Unit Price in Words _____

604.18 Precast Reinforced Concrete Drop Inlet with Cast Iron Grate
EACH 11 \$_____ \$_____

Unit Price in Words _____

604.20 Precast Reinforced Concrete Catch Basin with Cast Iron Grate
EACH 44 \$_____ \$_____

Unit Price in Words _____

604.21 Precast Reinforced Concrete Manhole with Cast Iron Cover
EACH 5 \$_____ \$_____

Unit Price in Words _____

604.22 Sanitary Sewer Manhole
EACH 1 \$_____ \$_____

Unit Price in Words _____

604.40 Changing Elevation of Drop Inlets, Catch Basins, or Manholes
EACH 3 \$_____ \$_____

Unit Price in Words _____

604.415 Rehab. Drop Inlets, Catch Basins, or Manholes, Class II
EACH 1 \$_____ \$_____

Unit Price in Words _____

604.42 Changing Elevation of Sewer Manholes
EACH 15 \$_____ \$_____

Unit Price in Words _____

604.55 Cast Iron Cover with Frame
EACH 2 \$_____ \$_____

Unit Price in Words _____

609.10 Dust Control with Water
MGAL 500 \$_____ \$_____

Unit Price in Words _____

Town of Hartford
STP 0113 (59) S & STP EH09 (15)
Bid Form

February 28, 2020

609.15	Dust and Ice Control with Calcium Chloride	TON	10	\$ _____	\$ _____
	Unit Price in Words	_____			
613.10	Stone Fill, Type I	CY	250	\$ _____	\$ _____
	Unit Price in Words	_____			
613.11	Stone Fill, Type II	CY	10	\$ _____	\$ _____
	Unit Price in Words	_____			
616.20	Granite Slope Edging	LF	2,410	\$ _____	\$ _____
	Unit Price in Words	_____			
616.21	Vertical Granite Curb	LF	4,420	\$ _____	\$ _____
	Unit Price in Words	_____			
616.215	Vertical Granite Curb, Mountable	LF	500	\$ _____	\$ _____
	Unit Price in Words	_____			
616.40	Removing and Resetting Curb	LF	185	\$ _____	\$ _____
616.41	Removal of Existing Curb	LF	15	\$ _____	\$ _____
	Unit Price in Words	_____			
618.10	Portland Cement Concrete Sidewalk, 5 Inch	SY	1,375	\$ _____	\$ _____
	Unit Price in Words	_____			
618.11	Portland Cement Concrete Sidewalk, 8 Inch	SY	2,380	\$ _____	\$ _____
	Unit Price in Words	_____			
618.30	Detectable Warning Surface	SF	800	\$ _____	\$ _____
	Unit Price in Words	_____			
619.17	Yielding Marker Posts	EACH	7	\$ _____	\$ _____
	Unit Price in Words	_____			

Town of Hartford
STP 0113 (59) S & STP EH09 (15)
Bid Form

February 28, 2020

621.20 Steel Beam Guardrail, Galvanized
LF 420 \$ _____ \$ _____

Unit Price in Words _____

621.51 Manufactured Terminal Section, Tangent
EACH 2 \$ _____ \$ _____

Unit Price in Words _____

621.56 Energy Absorption Attenuator, Temporary
EACH 8 \$ _____ \$ _____

Unit Price in Words _____

621.575 Energy Absorption Attenuator, Permanent
EACH 2 \$ _____ \$ _____

Unit Price in Words _____

621.90 Temporary Traffic Barrier
LF 1,765 \$ _____ \$ _____

Unit Price in Words _____

628.35 PVC SEWER PIPE (6" SDR 35)
LF 300 \$ _____ \$ _____

Unit Price in Words _____

628.42 Transfer to New System, Sanitary Sewer
LS 1 \$ _____ \$ _____

Unit Price in Words _____

629.20 Adjust Elevation of Valve Box
EACH 27 \$ _____ \$ _____

Unit Price in Words _____

629.23 Seamless Copper Water Tube (1")
LF 20 \$ _____ \$ _____

Unit Price in Words _____

629.23 Seamless Copper Water Tube (2")
LF 200 \$ _____ \$ _____

Unit Price in Words _____

Town of Hartford
STP 0113 (59) S & STP EH09 (15)
Bid Form

February 28, 2020

629.24 Ductile Iron Water Pipe, Cement-Lined (8")
LF 330 \$ _____ \$ _____

Unit Price in Words _____

629.24 Ductile Iron Water Pipe, Cement-Lined (12")
LF 400 \$ _____ \$ _____

Unit Price in Words _____

629.27 Gate Valve with Valve Box (8")
EACH 5 \$ _____ \$ _____

Unit Price in Words _____

629.27 Gate Valve with Valve Box (12")
EACH 3 \$ _____ \$ _____

Unit Price in Words _____

629.28 Hydrant EACH 2 \$ _____ \$ _____

Unit Price in Words _____

629.29 Relocate Hydrant EACH 6 \$ _____ \$ _____

Unit Price in Words _____

629.39 Corporation Stop (1") EACH 3 \$ _____ \$ _____

Unit Price in Words _____

629.39 Corporation Stop (2") EACH 4 \$ _____ \$ _____

Unit Price in Words _____

629.42 Transfer to New System, Water System
LS 1 \$ _____ \$ _____

Unit Price in Words _____

630.10 Uniformed Traffic Officers
HR 5,420 \$ _____ \$ _____

Unit Price in Words _____

630.15 Flaggers HR 19,400 \$ _____ \$ _____

Unit Price in Words _____

631.10 Field Office, Engineers LS 1 \$ _____ \$ _____

Unit Price in Words _____

Town of Hartford
STP 0113 (59) S & STP EH09 (15)
Bid Form

February 28, 2020

631.16 Testing Equipment, Concrete
LS 1 \$ _____ \$ _____

Unit Price in Words _____

631.17 Testing Equipment, Bituminous
LS 1 \$ _____ \$ _____

Unit Price in Words _____

631.26 Field Office Communications (N.A.B.I)
DL 7,000 \$ _____ \$ _____

Unit Price in Words _____

635.11 Mobilization/Demobilization
LS 1 \$ _____ \$ _____

Unit Price in Words _____

641.11 Traffic Control, All-Inclusive
LS 1 \$ _____ \$ _____

Unit Price in Words _____

641.15 Portable Changeable Message Sign
EACH 8 \$ _____ \$ _____

Unit Price in Words _____

646.201 4 Inch White Line, Waterborne Paint
LF 2,850 \$ _____ \$ _____

Unit Price in Words _____

646.2111 4 Inch Yellow Line, Waterborne Paint
LF 2,500 \$ _____ \$ _____

Unit Price in Words _____

646.261 24 Inch Stop Bar, Waterborne Paint
LF 60 \$ _____ \$ _____

Unit Price in Words _____

646.311 Crosswalk Marking, Waterborne Paint
LF 130 \$ _____ \$ _____

Unit Price in Words _____

Town of Hartford
STP 0113 (59) S & STP EH09 (15)
Bid Form

February 28, 2020

646.402 Durable 4 Inch White Line, Thermoplastic
LF 1,000 \$ _____ \$ _____

Unit Price in Words _____

646.422 Durable 6 Inch White Line, Thermoplastic
LF 100 \$ _____ \$ _____

Unit Price in Words _____

646.442 Durable 8 Inch White Line, Thermoplastic
LF 100 \$ _____ \$ _____

Unit Price in Words _____

646.482 Durable 24 Inch Stop Bar, Thermoplastic
LF 30 \$ _____ \$ _____

Unit Price in Words _____

646.492 Durable Letter or Symbol, Thermoplastic
EACH 102 \$ _____ \$ _____

Unit Price in Words _____

646.502 Durable Crosswalk Marking, Thermoplastic
LF 370 \$ _____ \$ _____

Unit Price in Words _____

646.602 Temporary 4 Inch White Line, Paint
LF 14,530 \$ _____ \$ _____

Unit Price in Words _____

646.612 Temporary 4 Inch Yellow Line, Paint
LF 9,350 \$ _____ \$ _____

Unit Price in Words _____

646.682 Temporary 24 Inch Stop Bar, Paint
LF 80 \$ _____ \$ _____

Unit Price in Words _____

646.692 Temporary Letter or Symbol, Paint
EACH 45 \$ _____ \$ _____

Unit Price in Words _____

Town of Hartford
STP 0113 (59) S & STP EH09 (15)
Bid Form

February 28, 2020

646.702 Temporary Crosswalk Marking, Paint
LF 230 \$ _____ \$ _____

Unit Price in Words _____

646.85 Removal of Existing Pavement Markings
SF 5,675 \$ _____ \$ _____

Unit Price in Words _____

649.31 Geotextile Under Stone Fill
SY 750 \$ _____ \$ _____

Unit Price in Words _____

651.15 Seed
LB 190 \$ _____ \$ _____

Unit Price in Words _____

651.18 Fertilizer
LB 1,260 \$ _____ \$ _____

Unit Price in Words _____

651.20 Agricultural Limestone TON 6 \$ _____ \$ _____

Unit Price in Words _____

651.35 Topsoil
CY 1,155 \$ _____ \$ _____

Unit Price in Words _____

653.01 EPSC Plan
LS 1 \$ _____ \$ _____

Unit Price in Words _____

653.02 Monitoring EPSC Plan HR 100 \$ _____ \$ _____

Unit Price in Words _____

653.03 Maintenance of EPSC Plan (N.A.B.I.)
LU 1 \$ _____ \$ _____

Unit Price in Words _____

653.10 Hay Mulch
TON 5 \$ _____ \$ _____

Unit Price in Words _____

653.20 Rolled Erosion Control Product, Type I
SY 3,950 \$ _____ \$ _____

Unit Price in Words _____

Town of Hartford
STP 0113 (59) S & STP EH09 (15)
Bid Form

February 28, 2020

653.25 Check Dam, Type I CY 50 \$ _____ \$ _____
Unit Price in Words _____

653.35 Stabilized Construction Entrance
CY 126 \$ _____ \$ _____
Unit Price in Words _____

653.40 Inlet Protection Device, Type I
EACH 26 \$ _____ \$ _____
Unit Price in Words _____

653.41 Inlet Protection Device, Type II
EACH 51 \$ _____ \$ _____
Unit Price in Words _____

653.476 Silt Fence, Type II LF 50 \$ _____ \$ _____
Unit Price in Words _____

653.50 Barrier Fence LF 745 \$ _____ \$ _____
Unit Price in Words _____

653.55 Project Demarcation Fence
LF 4,050 \$ _____ \$ _____
Unit Price in Words _____

653.60 Erosion Log LF 2,010 \$ _____ \$ _____
Unit Price in Words _____

656.20 Evergreen Trees (Dark Green American Arborvitae)
EACH 5 \$ _____ \$ _____
Unit Price in Words _____

656.25 Evergreen Shrubs (Sea Green Pfitzer Juniper)
EACH 10 \$ _____ \$ _____
Unit Price in Words _____

656.25 Evergreen Shrubs (Dwarf Green Juniper)
EACH 27 \$ _____ \$ _____
Unit Price in Words _____

Town of Hartford
STP 0113 (59) S & STP EH09 (15)
Bid Form

February 28, 2020

656.30 Deciduous Trees (Honey Locust)
EACH 2 \$ _____ \$ _____

Unit Price in Words _____

656.30 Deciduous Trees (Honey Locust Streetkeeper)
EACH 2 \$ _____ \$ _____

Unit Price in Words _____

656.30 Deciduous Trees (Princeton Elm)
EACH 3 \$ _____ \$ _____

Unit Price in Words _____

656.30 Deciduous Trees (Adirondack Crabapple)
EACH 2 \$ _____ \$ _____

Unit Price in Words _____

656.30 Deciduous Trees (Harvest Gold Crab)
EACH 1 \$ _____ \$ _____

Unit Price in Words _____

656.30 Deciduous Trees (Red Oak)
EACH 2 \$ _____ \$ _____

Unit Price in Words _____

656.30 Deciduous Trees (Ivory Silk Japanese Tree Lilac)
EACH 10 \$ _____ \$ _____

Unit Price in Words _____

656.35 Deciduous Shrubs (Muskingum Dogwood)
EACH 19 \$ _____ \$ _____

Unit Price in Words _____

656.35 Deciduous Shrubs (Annabelle Hydrangea)
EACH 46 \$ _____ \$ _____

Unit Price in Words _____

656.35 Deciduous Shrubs (Jim Dandy Winterberry Holly)
EACH 2 \$ _____ \$ _____

Unit Price in Words _____

Town of Hartford
STP 0113 (59) S & STP EH09 (15)
Bid Form

February 28, 2020

656.35 Deciduous Shrubs ("Afterglow" Winterberry Holly)
EACH 8 \$ _____ \$ _____

Unit Price in Words _____

656.35 Deciduous Shrubs (Birchleaf Spirea)
EACH 11 \$ _____ \$ _____

Unit Price in Words _____

656.35 Deciduous Shrubs (Common Lilac)
EACH 9 \$ _____ \$ _____

Unit Price in Words _____

656.45 Transplanting Trees EACH 4 \$ _____ \$ _____

Unit Price in Words _____

656.50 Transplanting Shrubs EACH 1 \$ _____ \$ _____

Unit Price in Words _____

656.80 Landscape Backfill, Truck Measurement
CY 400 \$ _____ \$ _____

Unit Price in Words _____

656.85 Tree Protection LS 1 \$ _____ \$ _____

Unit Price in Words _____

675.20 Traffic Sign, Type A SF 453 \$ _____ \$ _____

Unit Price in Words _____

675.21 Traffic Sign, Type B SF 128 \$ _____ \$ _____

Unit Price in Words _____

675.31 W-Shape Steel Sign Post
LB 960 \$ _____ \$ _____

Unit Price in Words _____

675.341 Square Tube Sign Post and Anchor
LF 1,130 \$ _____ \$ _____

Unit Price in Words _____

675.50 Removing Signs EACH 48 \$ _____ \$ _____

Unit Price in Words _____

Town of Hartford
STP 0113 (59) S & STP EH09 (15)
Bid Form

February 28, 2020

675.60	Resetting Signs	EACH	26	\$ _____	\$ _____
	Unit Price in Words _____				
675.61	Setting Salvaged Posts	EACH	3	\$ _____	\$ _____
	Unit Price in Words _____				
678.21	Electrical Conduit (4" PVC Schedule 80)				
		LF	2,300	\$ _____	\$ _____
	Unit Price in Words _____				
678.26	Junction Box	EACH	20	\$ _____	\$ _____
	Unit Price in Words _____				
678.40	Temporary Traffic Signal System				
		EACH	2	\$ _____	\$ _____
	Unit Price in Words _____				
678.45	Removal of Existing Traffic Control Signal System				
		EACH	1	\$ _____	\$ _____
	Unit Price in Words _____				
679.54	Street Lighting Control Device				
		EACH	2	\$ _____	\$ _____
	Unit Price in Words _____				
679.55	Power Drop Stanchion, Street Lighting				
		EACH	2	\$ _____	\$ _____
	Unit Price in Words _____				
690.50	Price Adjustment, Fuel (N.A.B.I.)				
		LU	1	\$ _____	\$ _____
	Unit Price in Words _____				
900.608	Special Provision (Excavation of Petroleum Contaminated Soils, Class I)				
		CY	50	\$ _____	\$ _____
	Unit Price in Words _____				

Town of Hartford
STP 0113 (59) S & STP EH09 (15)
Bid Form

February 28, 2020

900.620 Special Provision (Precast Concrete Outlet Structure with Cast Iron Grate)

EACH 1 \$ _____ \$ _____

Unit Price in Words _____

900.620 Special Provision (Move Private Sign Outside Taking)

EACH 2 \$ _____ \$ _____

Unit Price in Words _____

900.620 Special Provision (Street Light Assembly)

EACH 13 \$ _____ \$ _____

Unit Price in Words _____

900.620 Special Provision (Rectangular Rapid Flashing Beacon)

EACH 12 \$ _____ \$ _____

Unit Price in Words _____

900.620 Special Provision (Dry Well)

EACH 1 \$ _____ \$ _____

Unit Price in Words _____

900.620 Special Provision (GNNS Construction Inspection Equipment)

EACH 1 \$ _____ \$ _____

Unit Price in Words _____

900.645 Special Provision (Gravel Wetland, All Inclusive)

LS 1 \$ _____ \$ _____

Unit Price in Words _____

900.650 Special Provision (Mixture Pay Adjustment)

LU 1 \$ _____ \$ _____

Unit Price in Words _____

900.675 Special Provision (Stamped Concrete Island, 8 Inch)

SY 749 \$ _____ \$ _____

Unit Price in Words _____

Town of Hartford
STP 0113 (59) S & STP EH09 (15)
Bid Form

February 28, 2020

900.680 Special Provision (Bituminous Concrete Pavement, Small Quantity)

TON 300 \$ _____ \$ _____

Unit Price in Words _____

Total Base Bid \$ _____

Total Base Bid Written _____

Town of Hartford
STP 0113 (59) S & STP EH09 (15)
Bid Form

February 28, 2020

The lowest responsive and responsible bidder will be determined by the **Total Base Bid.**

The above unit prices shall include all labor, materials, removal, overhead, profit, insurance, etc. to cover the finished work as specified within the Contract Documents.

By submitting this bid, a bidder certifies that it shall report in writing to the municipality any errors or inconsistency discovered in the plans, proposal, specifications, or proposal documents immediately upon discovery.

THE ABOVE PROPOSAL IS HEREBY RESPECTFULLY SUBMITTED BY:

Contractor

By

Title

Business Address

City

State

Date

ATTEST _____

LS = lump sum

EA = each

SY = square yard

SF = square feet

CWT = hundredweight

GAL = gallon

HR = hour

LU = lump unit

CY = cubic yard

LF = linear foot

TON = ton

MGAL = thousand gallons

LB = pound

DL = dollar

PROJECT SPECIAL PROVISIONS

In case of discrepancy, precedence of the Contract Documents will follow be determined by Section 105.05 of the VTrans Standard Specifications for Construction dated 2018.

NOTICE TO BIDDERS – UTILITIES. The Contractor is advised to use caution when working around aerial or underground utilities to protect the facilities from damage.

Existing underground and aerial facilities are located throughout the entire project area. Ownership of these facilities includes operational utility companies, municipalities and individual property owners. One (1) pole will be reset and three (3) poles will be removed with associated underground and aerial facilities requiring adjustment during construction. All remaining underground and aerial facilities are not anticipated to require adjustment during the construction of this project. The Contractor is cautioned to protect these facilities from damage.

The Contractor is advised that many towns are not members of Dig Safe. It is the Contractor's responsibility to check with the towns prior to excavation and it shall protect and restore any utilities damaged within the project limits as set forth in Subsection 107.13 PROTECTION AND RESTORATION OF UTILITIES AND SERVICES.

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.

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

There will be no extra compensation paid to the Contractor for any inconvenience caused by working around and with utilities.

Act No. 86 of 1987 (30 VSA Chapter 86) ("Dig Safe") requires that notice be given prior to making an excavation. It is suggested that the Permit Holder or his/her

contractor telephone 1-888-344-7233 at least 48 hours before, and not more than 30 days before, beginning any excavation at any location.

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.

NOTICE TO BIDDERS – TEMPORARY CONSTRUCTION SIGNS. All temporary construction signs shall meet the following requirements:

(a) Where sign installations are not protected by guardrail or other approved traffic barriers, all sign stands and post installations shall meet National Cooperative Highway Research Program (NCHRP) Report 350 or the AASHTO Manual for Assessing Safety Hardware (MASH). The appropriate resource shall be determined as described in the MASH publication.

(b) As a minimum, roll up sign material shall have ASTM D 4956 Type VI fluorescent orange retroreflective sheeting.

(c) All post-mounted signs and solid substrate portable signs shall have ASTM D 4956 Type VII, Type VIII, or Type IX fluorescent orange retroreflective sheeting.

(d) All retroreflective sheeting on traffic cones, barricades, and drums shall be at a minimum ASTM D 4956 Type III sheeting.

(e) All stationary signs shall be mounted on two 3 lb/ft flanged channel posts or 2 inch square steel inserted in 2-1/4" galvanized square steel anchors. No sign posts shall extend over the top edge of sign installed on said posts.

(f) Construction signs shall be installed so as to not interfere with nor obstruct the view of existing traffic control devices, stopping sight distance, and corner sight distance from drives and town highways.

(g) Speed zones, if used, should be a maximum of 10 mph below existing posted speeds. Temporary speed limit certificates must be approved by the Chief Engineer on State highways and can be approved by the governing municipality on local roads.

NOTICE TO BIDDERS. All retroreflective sheeting on permanent signs (signs to remain after the project is completed) shall be at a minimum ASTM Type III sheeting, unless otherwise shown on the Plans.

NOTICE TO BIDDERS – GENDER-FREE SINGLE OCCUPANCY

RESTROOMS. The Contractor shall comply with all of the requirements of Vermont Act 127 (H.333) relating to the designation and signage of single-user toilet facilities in public buildings or places of public accommodation. Any such facilities may be identified by a sign, provided that the sign marks the facility as a restroom and does not indicate any specific gender.

NOTICE TO BIDDERS – CONTAMINATED SHARPS (HYPODERMIC NEEDLES).

The Contractor is hereby notified that there are an increasing number of hypodermic needles (also known as contaminated sharps) being found throughout Vermont, and there is the potential to find them along any project. In accordance with Section 107.05, Sanitary Provisions, the Contractor is required to provide a neat and sanitary working environment for each of its employees and workers at no additional cost to the Agency.

The Contractor may reach out to local Police, the Town Health Officer or the Vermont Department of Health at <https://dec.vermont.gov/content/safe-disposal-sharps> for guidance.

If the sharps are located in an area where work is required, the Contractor shall dispose of the sharps in accordance with OSHA Standard 1910.1030 for blood borne pathogens. OSHA has an e-tool for disposal of sharps on their website as well. The standard can be found at the following link:
https://www.osha.gov/pls/oshaweb/owadisp.show_document?p_table=STANDARDS&p_id=10051.

If the sharps are not in an area where the Contractor or workers will come into contact with them, it is best practice to avoid them altogether. The area can be marked and workers should be notified to stay out of the area.

NOTICE TO BIDDERS: As of 2018, emerald ash borer (EAB), *Agrilus planipennis*, has been confirmed within Vermont's borders.

To provide an assurance of compliance with state and federal EAB laws the contractor shall adhere to the following:

Known EAB infestation areas are changing rapidly. Therefore the Contractor shall consult the online version of the EAB Infested Area Map (Located here: www.vtinvasives.org/land/emerald-ash-borer-vermont) on the same day cutting is to occur. If the project is located with an EAB infested area, ALL tree material, regardless of species, within the project area shall be handled in accordance with a document developed by the Vermont Department of Forests, Parks and Recreation and the Vermont Agency of Agriculture titled "Recommendations to SLOW THE SPREAD of Emerald Ash Borer When Moving Ash from the Infested

Area”, (<https://vtinvasives.org/sites/default/files/images/SlowSpreadWoodVT.pdf>).
Tree material shall not be moved out of state.

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

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

NOTICE TO BIDDERS – ENVIRONMENTAL COMMITMENTS. Contract Commitments as written – found on permits in Appendix P.

This project shall be subject to Avoidance and Minimization Measures to protect the habitat and hibernacula of the northern long-eared bat. Measures applicable to this project include, Time-of-Year (TOY) restrictions for any potential impacts to suitable bat habitat, which include, but are not limited to trees ≥ 3 ” and/or habitat features on bridge structures.

It is anticipated that the Contractor will be required to cut trees ≥ 3 ” in diameter and/or conduct bridge related activities within the identified project limits as part of the work. An assessment of the project limits resulted in a finding of no suitable habitat. Therefore, tree cutting, and bridge related activities, within the project limits may occur without any TOY restrictions.

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

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
HARTFORD, STP EH10(18)	TBD	TBD
LEBANON-HARTFORD, 16148	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.

NOTICE TO BIDDERS – SALVAGED MATERIALS. The Contractor is Hereby notified that the signal cabinet, controller, Grdismart video detection hardware, all signal heads, signs, anchors, and posts removed and not re-used on the project shall remain the property of the State or Town when specified in the plans.

The Contractor shall load all of the salvaged signal equipment to VTrans onto suitable transport and deliver them to the VTrans District maintenance corresponding to the Town in which the signal equipment was removed. The Contractor shall work with the Resident Engineer to notify the appropriate VTrans Maintenance Area Supervisor listed below, at least two weeks prior to beginning delivery of the salvaged materials to the designated location.

The Contractor shall load all of the salvaged signs designated for salvage to VTrans onto suitable transport and deliver them to the VTrans District maintenance corresponding to the Town in which the signs were removed. The Contractor shall load all of the salvaged signs designated for salvage to Town onto suitable transport and deliver them to the Town Highway Departments Garage in the Town where the signs were removed. The Contractor shall work with the Resident Engineer to notify the appropriate VTrans Maintenance Area Supervisor or Town Department listed below, depending on the location of the

Town of Hartford
STP 0113 (59) S & STP EH09 (15)
Special Provisions

February 28, 2020

signs, at least two weeks prior to beginning delivery of the salvaged materials to the designated location.

All costs for loading and delivering these salvaged materials will be incidental to Contact items 678.45, Removal of Existing Traffic Control Signal System and 675.50, Removing Signs.

VTrans Salvage Locations

Contact:

Trevor Starr

District 4 – District Transportation Administrator
22 Beswick Drive
White River Junction, Vermont 05001
Phone: (802) 295-8888
Fax: (802) 295-8882
E-Mail: Trevor.Starr@vermont.gov

District 4 Maintenance Garage Location:

Hartford
Beswick Drive

NOTICE TO BIDDERS - AFAD. The Contractor is hereby notified that Automated Flagger Assistance Devices (AFADs) 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 be controlled by a flagger meeting the requirements of Section 630.
- (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 shall 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.

NOTICE TO BIDDERS – COMMODITY PRICE ADJUSTMENTS.

- (a) Asphalt Price Adjustment. When Item 406.50 is included in the Contract, asphalt 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. The Index Price for asphalt cement for this Contract is \$555.00 per ton.
- (b) Fuel Price Adjustment. When Item 690.50 is included in the Contract, fuel price adjustment will be performed according to the requirements of Section 690 for the items specified therein. The Index Prices of fuel for this Contract are as follows:
 - (1) The Index Price (retail) for gasoline is \$2.57 per gallon.
 - (2) The Index Price (retail) for diesel fuel is \$3.13 per gallon.

NOTICE TO BIDDERS – CONTRACT COMPLETION DATE. This Contract shall be completed on or before October 29, 2021.

In accordance with this requirement, and with reference to Subsection 108.09(d), work will be allowed during the seasonal closure period from December 1, 2020 to April 16, 2021.

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 do not apply to this Contract.

NOTICE TO BIDDERS – NO GEOTECHNICAL DATA REPORT. The Contractor is hereby notified that no geotechnical data report is available for this project.

NOTICE TO BIDDERS – NIGHT WORK ALLOWED. The Contractor is hereby notified that night work will be allowed when approved in advance by the Engineer and is encouraged during the construction of the final wearing course of pavement. 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, as defined by the U.S. Naval Observatory for the location of the Project. A table of sunrise and sunset times for the entire year for any location can be created using the following link: https://aa.usno.navy.mil/data/docs/RS_OneYear.php.

NOTICE TO BIDDERS – NIGHTTIME NOISE MITIGATION CONSIDERATIONS. The Contractor is hereby notified that night work near the Hotel at Ralph Lehman Drive is discouraged. The Contractor shall take measures to control the noise caused by its nighttime (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.

- (a) **Overview of Noise Measurement.** The decibel (dB) is the universal unit of sound measurement and is measured with an 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.

NOTICE TO BIDDERS – SPECIAL CONSTRUCTION REQUIREMENTS.

- (a) Monitoring the performance of the TMP during the construction phase is important to establish whether the predicted impacts closely resemble the actual conditions in the field, whether the TMP strategies are effective in managing the impacts. TMP monitoring is needed for both oversight and evaluation purposes, such as:
- Monitoring and documenting TMP changes during construction.
 - Including signal timing adjustments for improved queue length control
 - Preparing an evaluation of the TMP, including lessons learned.
 - Refining work zone impact analysis processes and models based on outcomes.

TMP monitoring includes details of any specific observational, logging, and/or recording activities conducted during the project for work zone performance measurement purposes. The Contractor shall collect data as needed to effectively manage and monitor the performance of the TMP. Examples of possible performance measures (data collection) for TMP monitoring include:

- Traffic Volume
- Queue lengths
- Delay time
- Travel time
- Number of crashes/incidents
- Incident response and clearance times
- Type and frequency of legitimate complaints received

The Contractor shall meet with the TMP Implementation Task leaders on a regular basis to discuss and assess the safety and mobility impacts of the project work zone to date. Data collected by the Contractor shall be provided to help assess how well the TMP is managing the project impacts and to identify and address issues before they become problems. It also provides the opportunity to verify that all key stakeholders and project officials have been receiving timely notifications where required.

- (b) A second underground electrical conduit run has been shown with the streetlighting conduit around the US 5 roundabout to connect RRFB's for potential future power. The RRFB's are solar powered and no power is expected to be run in the conduit connecting to the RRFB's.
- (c) Pedestrian accommodations along the project are important to the community. Permanent pedestrian accommodations are to be constructed as early as practicable. Both temporary and permanent pedestrian accommodations shall be clearly indicated in the Contractor's site specific traffic control for each phase of the project.
- (d) All underground water service work shall be completed first, prior to major construction activities.
- (e) Contractor shall coordinate the removal of three (3) utility poles in front of McDonalds with Green Mountain Power. Kevin Matte 802-748-1082 kevin.matte@greenmountainpower.com shall be contacted a minimum of four (4) weeks in advance of desired removal date.
- (f) The sign marquee in front of McDonalds shall be removed and properly disposed of by the Contractor. Payment for the sign removal shall be considered incidental to common excavation in the area.

- (g) The Contractors attention is directed to the Right-Of-Way (ROW) agreements with regards to relocating existing business signs outside of the ROW. The signs to be relocated are located in front of the bank and the hotel. Payment for the sign relocation shall be included in item 900.620 Special Provision (Move Private Sign Outside Taking).
- (h) Prior to final acceptance of the project, all drop inlets, catch basins and manholes within the project limits shall be cleaned and all material within the structures 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.

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

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

NOTICE TO BIDDERS – PCMS SECURITY SYSTEM. In order to prevent unauthorized access, any Portable Changeable Message Signs used on this Project shall be tamper-resistant. The control cabinet shall be locked when not in use. Each PCMS shall also have a security system that will only allow access if a code or password is entered. The default code or password shall be changed upon deployment of the PCMS by the Contractor. If the PCMS can be remotely accessed by telephone, the call shall be terminated if the correct code or password is not entered within 60 seconds of initial contact.

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

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

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

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

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

NOTICE TO BIDDERS – OTHER SPECIFICATIONS AND CONTRACT REQUIREMENTS.

The Contractor's attention is directed to the following specifications and contract requirements included in the Proposal form and effective for this Contract:

Contractor's EEO Certification Form
Debarment & Non-Collusion Affidavit
Required Contract Provisions for Federal-Aid Construction
Standard Federal EEO Specifications
Certification for Federal-Aid Contracts
Vermont Minimum Labor & Truck Rates
Disadvantaged Business Enterprise (DBE) Policy Contract Requirements
General Special Provisions dated January 28, 2020
Workers' Compensation; State Contracts Compliance Requirement
US DOT Standard Title VI/Non-Discrimination Assurances DOT Order No.
1050.2A and Appendices A and E
Bulletin 3.5 Attachment C: Standard State Provisions for Contracts and Grants
U.S. Department of Labor Davis-Bacon Wage Rates
Right-Of-Way Clearance
Construction Stormwater Permit
Section 1111 permit Letter-of-Intent
Stormwater Authorization to Discharge permit 7824-9015
PACE Re-Evaluation
Traffic Management Plan

SECTION 101 – DEFINITIONS

101.02, DEFINITIONS, are hereby modified by deleting the existing following definitions and replacing as follows:

AGENCY – Wherever the word Agency appears on the plans, in any specification, or in the contract, it shall be read as, and shall mean; the **Town of Hartford**, except when referenced to documents or publications.

BOARD – Wherever the term Board or Transportation Board appears on the plans, in any specification, or in the contract, it shall be read as, and shall mean; the Transportation Board of the State of Vermont or its successor.

CALENDAR DAY – Any day shown on the calendar, beginning and ending at midnight.

CHANGE ORDER – A document recommended by the Engineer, signed by the Contractor and the Municipality, and approved by the Agency of Transportation authorizing changes in the plans or quantities or both, establishing the basis of payment and time adjustments for the Work affected by the changes.

CONSTRUCTION ENGINEER – Wherever the term Construction Engineer appears on the plans, in any specification, or in the contract, it shall be read as, and shall mean; the Municipal Project Manager and/or Full Time Employee in Responsible Charge.

CONTRACT COMPLETION DATE - The calendar date specified in the Contract and as adjusted by Change Order when applicable, by which the Contractor shall achieve Substantial Completion.

CONTRACT –

The written agreement between the Municipality and the Contractor setting forth the obligations of the parties relative to the performance of the work. The Contract includes the Contract agreement, Contract Bonds, Project permits, Project Special Provisions, Contract Plans, General Special Provisions, Standard Drawings, Supplemental Specifications, the Standard Specifications for Construction, and any Supplemental Agreements or supporting documents that are required to complete the work in an acceptable manner.

CONTRACT BOND(S) –

The approved forms of security, signed, notarized and furnished by the Contractor and the Contractor's Surety or Sureties, guaranteeing complete performance of the Contract, compliance with the Contract, and the payment of all legal debts pertaining to the construction of the Project or work.

CONTRACTOR(S) –

The individual, partnership, firm, corporation, any acceptable combination thereof, or a joint venture which is a party to the Contract with the Agency which is undertaking the performance of the work under the terms of the Contract and acting directly or through its agent(s) or employee(s). The term “Contractor” means the prime Contractor as differentiated from a Subcontractor. All Contractors must be registered with the Vermont Secretary of State. The Contractor will act in an independent capacity and not as officers or employees of the State.

ENGINEER – Wherever the term Engineer appears on the plans, in any specification, or in the contract, it shall be read as, and shall mean; the Resident Engineer (RE).

GENERAL SPECIAL PROVISIONS – Approved additions and revisions to the Standard Specifications for Construction approved pursuant to the Specification approval process.

MATERIALS MANAGER – Whenever the term Materials Manager appears on the plans, in any specification, or in the Contract, it shall be read as, and shall mean; **the Resident Engineer.**

PROPOSAL FORM – Whenever the term Proposal Form appears on the plans, in any specification, or in the Contract it shall be read as, and shall mean; the BID FORM unless specifically referenced otherwise in these Special Provisions.

REGIONAL CONSTRUCTION ENGINEER – Whenever the term Regional Construction Engineer appears on the plans, in any specification, or in the contract, it shall be read as, and shall mean; **the Director of Public Works or other municipally appointed representative who is acting on behalf of the municipality responsible for administering and overseeing the construction contract.**

RESIDENT ENGINEER – An entity employed by the Municipality to perform supervisory duties including the oversight of testing services on the project.

SECRETARY – Wherever the term Secretary appears on the plans, in any specification, or in the contract it shall be read as, and shall mean; **the Town of Hartford Selectboard.**

PROJECT SPECIAL PROVISIONS – Additions and revisions to the Standard Specifications for Construction, Supplemental Specifications, General Special Provisions applicable to the Contract, as well as other provisions specific to the Contract. Also referred to as Special Provisions.

SPECIFICATIONS – The compilation of provisions and requirements for the performance of prescribed work including the Standard Specifications for Construction, Supplemental Specifications, General Special Provisions, Project Special Provisions, and other requirements included in the contract.

STANDARD SPECIFICATIONS or STANDARD SPECIFICATIONS FOR CONSTRUCTION – The Vermont Agency of Transportation book entitled Standard Specifications For Construction and the specifications included therein, as approved for general and repetitive use and application in Agency/Municipal projects.

STATE – Wherever the term State appears on the plans, in any specification, or in the contract, it shall be read as, and shall mean; the **Town of Hartford Selectboard**.

SURETY – An individual or legal entity acceptable to the Town executing the bond or bonds furnished by the bidder or contractor.

WORK – The furnishing of all labor, materials, equipment, and incidentals necessary or convenient to the successful completion of a project and the carrying out of all duties and obligations imposed by a contract.

WORKING DAY –

Weekdays during the Construction Season during which construction operations may proceed. If the Contractor works on Saturdays, Sundays, holidays, or during the Seasonal Closure Period, those days will be considered Working Days.

ADD TO DEFINITION LIST IN 101.02, DEFINITIONS, the following definitions:

ADDENDUM (addenda) – Contract revisions developed after advertisement and before opening bids.

ADVERTISEMENT – A public announcement, inviting bids for work to be performed or materials to be furnished.

AGREEMENT – The written instrument which is evidence of the agreement between the Municipality and the Contractor.

AWARD – The formal acceptance by the Municipality of a bid.

BID – The offer of a Bidder submitted on the prescribed form setting forth the prices for the Work to be performed.

BID BOND – A bid guarantee as outlined in the Instructions to Bidders for Contracts.

BIDDER – The individual, partnership, firm, corporation, or any combination thereof, or joint venture, submitting a Bid in accordance with the bidding requirements.

CONTRACT TIME – The time allowed for completion of the contract including authorized time extensions.

INCIDENTAL AND INCIDENTAL ITEM – These terms are used to indicate work for which no direct payment will be made. Such work is considered to be incidental to items having contract prices, and the bid prices submitted by the contractor shall be sufficient to absorb the cost of all work designated as incidental or as incidental items.

INVITATION FOR BIDS – An advertisement for receiving bids for all work and/or materials on which bids are invited from prospective contractors.

MUNICIPAL PROJECT MANAGER – A person or firm employed or appointed by the Municipality to provide administrative services for the project.

NOTICE OF AWARD – The written notice of the acceptance of the Bid from the Owner to the successful Bidder.

OWNER – Town of Hartford.

PREQUALIFICATION:

Annual Prequalification – The Agency of Transportation process by which an entity is generally approved to bid on contracts advertised by the Local Project Sponsor. Depending on the project size annual prequalification may be the only prequalification necessary.

Contract Specific Prequalification – The process by which an entity is approved to bid on a specific contract determined by the Municipality to be of a size or scope to warrant more than an Annual Prequalification.

PREQUALIFICATION ADMINISTRATOR – An Agency of Transportation employee charged with administration of the prequalification process for the Prequalification Committee.

PROPOSAL – The offer of a bidder, on the prescribed form, to perform work and/or provide materials at the price quoted in the offer.

PROPOSAL FORM – The prescribed form on which the Municipality requires the Bid be submitted.

PROPOSAL GUARANTEE – The security furnished with a bid to ensure that the bidder will enter into a contract if the bidder's proposal is accepted by the Municipality.

SUBCONTRACTOR – An individual or legal entity to which the contractor sublets a part of the work included in the contract.

TESTING FIRM – An independent firm employed by the Municipality or Resident Engineer to perform all sampling and testing of materials as specified in the Contract Documents and as defined in the VTrans Qualified Laboratory Program.

SECTION 105 CONTROL OF THE WORK

105.09 CONSTRUCTION STAKES, Part (a) Initial Layout, (b) Layout of Subgrade and (c) Permanent Marking Layout delete these paragraphs in their entirety and replace with the following:

Horizontal and vertical control information for the project is shown on the project plans or shall be based on existing conditions. The information is sufficient to enable the Contractor to stake the project. The Contractor shall perform all staking requirements for the proposed work. The Contractor will be responsible for the accuracy and preservation of the staking.

105.20 CLAIMS FOR ADJUSTMENT , (c) **Claims Procedure**; Delete the second, third and fourth sentence and replace with the following:

Claims must be evaluated first by the Engineer and then by the Municipal Project Manager. Should a claim be ruled in favor of the Contractor, it will be allowed, in whole or in part, and paid as provided in the Contract. Should a claim be denied in whole or in part by the Municipal Project Manager the Contractor may appeal to the governing body of the project sponsor. Should a claim be denied in whole or in part by the governing body of the project sponsor, the Contractor may appeal to the Chief Engineer.

(d) Claims Documentation Requirements; In the first sentence, replace Construction Engineer with Municipal Project Manager.

SECTION 106 – CONTROL OF MATERIAL

106.03 SAMPLES AND TESTS. Add the following two paragraphs to the beginning:

An independent firm employed by the Municipality or Resident Engineer to perform all sampling and testing of materials as specified in the Contract Documents and as defined in the VTrans Qualified Laboratory Program, shall be responsible for all acceptance sampling and testing of materials and completed work.

The Contractor shall be responsible for their Quality Control. The cost of their Quality Control shall be considered incidental to the payment items in the bid. Any sampling, testing, retesting, and submission of reports and certifications by the Contractor as required by the contract documents and plans shall be considered incidental to the payment items in the bid.

Change the last word in the first paragraph from Agency to Municipality.

Delete the first sentence of the second paragraph and replace with the following:

Samples will be taken and testing performed by certified personnel of the testing firm in accordance with the requirements of the latest edition of the Vermont Agency of Transportation's Quality Assurance Program and Material Sampling Manual.

Modify the last sentence of the third paragraph to read as follows:

Copies of all test results shall be forwarded directly to the Resident Engineer and the Contractor by the testing firm.

APPENDIX A

STATE OF VERMONT
AGENCY OF TRANSPORTATION

November, 1985
CA-109

CONTRACTOR'S EEO CERTIFICATION FORM

Certification with regard to the Performance of Previous Contracts of Subcontracts subject to the Equal Opportunity Clause and the filing of Required Reports.

The bidder _____, proposed subcontractor _____, hereby certifies that he/she has _____, has not _____, participated in a previous contract or subcontract subject to the equal opportunity clause, as required by Executive Orders 10925, 11114, or 11246 as amended, and that he/she has _____, has not _____, filed with the Joint Reporting Committee, the Director of the Office of Federal Contract Compliance, a Federal Government contracting or administering agency, or the President's Committee on Equal Employment Opportunity, all reports due under the applicable filing requirements.

Company	By	Title
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NOTE: The above certification is required by the Equal Employment Opportunity regulations of the Secretary of Labor (41 CFR 60-1.7(b) (1)), and must be submitted by bidders and proposed subcontractors only in connection with contracts and subcontracts which are subject to the equal opportunity clause. Contracts and subcontracts which are exempt from the equal opportunity clause are set forth in 41 CFR 60-1.5 (Generally only contracts or subcontracts of \$10,000 or under are exempt.) Currently, Standard Form 100 (EEO-1) is the only report required by the Executive Orders or their implementing regulations.

Proposed prime contractors and subcontractors who have participated in a previous contract or subcontract subject to the Executive Orders and have not filed the required reports should note that 41 CFR 60-1.7 (b) (1) prevents the award of contracts and subcontracts unless such contractor submits a report covering the delinquent period or such other period specified by the Federal Highway Administration, or by the Director, Office of Federal Contract Compliance, U.S. Department of Labor.

APPENDIX B

CA-91

STATE OF VERMONT
AGENCY OF TRANSPORTATION
DEBARMENT AND NON-COLLUSION AFFIDAVIT

I, _____, representing
(Official Authorized to Sign Contracts)
_____ of _____,
(Individual, Partnership or Corporation) (City or State)

being duly sworn, depose and certify under the penalties of perjury under the laws of the State of Vermont and the United States that on behalf of the person, firm, association, or corporation submitting the bid certifying that such person, firm, association, or corporation 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 for the Vermont project:

(Project Name)
_____ project located on _____,
(Project Number) (Route or Highway)
bids opened at _____,
(Town or City)

Vermont on _____, 20__.
(Date)

I further depose and certify under the penalties of perjury under the laws of the State of Vermont and the United States that except as noted below said individual, partnership or corporation or any person associated therewith in any capacity is not currently, and has not been within the past three (3) years, suspended, debarred, voluntarily excluded or determined ineligible by any Federal or State Agency; does not have a proposed suspension, debarment, voluntary exclusion or ineligibility determination pending; and has not been indicted, convicted, or had a civil judgement rendered against (it, him, her, them) by a court having jurisdiction in any matter involving fraud or official misconduct within the past three (3) years.

Exceptions: ____ No ____ Yes. (If yes complete back of this form.)

Sworn to before me this

____ day of _____, 20__

(Name of Individual, Partnership or Corporation) L.S.

(Signature of Official Authorized to Sign Contracts) L.S.

(Notary Public)

(Name of Individual Signing Affidavit) L.S.

(My commission expires _____)

(Title of Individual Signing Affidavit) L.S.

APPENDIX B

Exceptions will not necessarily result in denial of award, but will be considered in determining bidder responsibility. For any exception noted, indicate below to whom it applies, initiating agency, and dates of action. Providing false information may result in criminal prosecution or administration sanctions.

EXCEPTIONS:

APPENDIX C

**RFP/PROJECT NAME & NUMBER:
DATE:**

WORKER CLASSIFICATION COMPLIANCE REQUIREMENT

**Self Reporting
Form 1 of 2**

This form must be completed in its entirety and submitted as part of the response for the proposal to be considered valid.

The Vermont Agency of Transportation, in accordance with 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), and for total projects costs exceeding \$250,000.00, requires bidders comply with the following provisions and requirements.

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, so state.

Summary of Detailed Information	Date of Notification	Outcome

WORKER CLASSIFICATION COMPLIANCE REQUIREMENT: 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).

Date: _____

Name of Company: _____

Contact Name: _____

Address: _____

Title: _____

Phone Number: _____

E-mail: _____

Fax Number: _____

By: _____

Name: _____

Signature (Request/Report Not Valid Unless Signed) *

(Type or Print)

*Form must be signed by individual authorized to sign on the bidder's behalf.

DO NOT WRITE IN THIS SPACE – AGENCY USE ONLY	
VDOL CHECKED RE: ACT 54 2009, AND AMENDMENTS	<input type="checkbox"/>

**REQUIRED CONTRACT PROVISIONS
FEDERAL-AID CONSTRUCTION CONTRACTS**

- I. General
- II. Nondiscrimination
- III. Nonsegregated 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. Compliance with Governmentwide Suspension and Debarment Requirements
- XI. Certification Regarding Use of Contract Funds for Lobbying

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 (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).

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.

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). 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 bid proposal or request for proposal 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).

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.

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. The term Federal-aid highway does not include roadways functionally classified as local roads or rural minor collectors.

II. NONDISCRIMINATION

The provisions of this section related to 23 CFR Part 230 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 60, 29 CFR 1625-1627, Title 23 USC Section 140, the Rehabilitation Act of 1973, as amended (29 USC 794), Title VI of the Civil Rights Act of 1964, as amended, 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 60, and 29 CFR 1625-1627. The contracting agency and the FHWA have the authority and the responsibility to ensure compliance with Title 23 USC Section 140, the Rehabilitation Act of 1973, as amended (29 USC 794), and Title VI of the Civil Rights Act of 1964, as amended, 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 230, 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 (28 CFR 35, 29 CFR 1630, 29 CFR 1625-1627, 41 CFR 60 and 49 CFR 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

APPENDIX D

this contract. The provisions of the Americans with Disabilities Act of 1990 (42 U.S.C. 12101 et seq.) set forth under 28 CFR 35 and 29 CFR 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.

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, 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 who 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.

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, national origin, age or disability. The following procedures shall be followed:

a. The contractor will conduct periodic inspections of project sites to insure 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

APPENDIX D

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. 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, 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, 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 there under. 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, 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 and 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. Assurance Required by 49 CFR 26.13(b):

a. The requirements of 49 CFR Part 26 and the State DOT's U.S. DOT-approved DBE program are incorporated by reference.

b. The contractor 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 contracting agency deems appropriate.

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

APPENDIX D

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 \$10,000 or more.

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, 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). The requirements apply to all projects located within the right-of-way of a roadway that is functionally classified as Federal-aid highway. This excludes roadways functionally classified as local roads or rural minor collectors, which are exempt. Contracting agencies may elect to apply these requirements to other projects.

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

a. All laborers and mechanics employed or working upon the site of the work, 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 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.

Contributions made or costs reasonably anticipated for bona fide fringe benefits under section 1(b)(2) of the Davis-Bacon Act on behalf of laborers or mechanics are considered wages paid to such laborers or mechanics, subject to the provisions

of paragraph 1.d. 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 shall be paid the appropriate wage rate and fringe benefits on the wage determination for the classification of work actually performed, without regard to skill, except as provided in 29 CFR 5.5(a)(4). 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 classification and wage rates conformed under paragraph 1.b. of this section) and the Davis-Bacon poster (WH-1321) shall 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. (1) The contracting officer shall 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 shall be classified in conformance with the wage determination. The contracting officer shall approve an additional classification and wage rate and fringe benefits therefore 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 utilized 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) 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 shall be sent by the contracting officer to the Administrator of the Wage and Hour Division, Employment Standards Administration, U.S. Department of Labor, Washington, DC 20210. 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.

(3) 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 shall refer the questions, including the views of all interested parties and the recommendation of the contracting officer, to the Wage and Hour Administrator for determination. The Wage and Hour Administrator, or an authorized representative, will issue a determination within 30 days of receipt and so advise the contracting officer or

APPENDIX D

will notify the contracting officer within the 30-day period that additional time is necessary.

(4) The wage rate (including fringe benefits where appropriate) determined pursuant to paragraphs 1.b.(2) or 1.b.(3) of this section, shall 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.

c. 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 shall either pay the benefit as stated in the wage determination or shall pay another bona fide fringe benefit or an hourly cash equivalent thereof.

d. 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, 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.

2. Withholding

The contracting agency shall upon its own action or upon written request of an authorized representative of the Department of Labor, withhold or cause to be withheld from the contractor under this contract, or any other Federal contract with the same prime contractor, or any other federally-assisted contract subject to Davis-Bacon prevailing wage requirements, which is held by the same prime contractor, so much of the accrued payments or advances as may be considered necessary to pay laborers and mechanics, including apprentices, trainees, and helpers, employed by the contractor or any subcontractor the full amount of wages required by the contract. In the event of failure to pay any laborer or mechanic, including any apprentice, trainee, or helper, employed or working on the site of the work, all or part of the wages required by the contract, the contracting agency may, 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.

3. Payrolls and basic records

a. Payrolls and basic records relating thereto shall be maintained by the contractor during the course of the work and preserved for a period of three years thereafter for all laborers and mechanics working at the site of the work. Such records shall contain the name, address, and social security number of each such worker, his or her correct classification, 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 section 1(b)(2)(B) of the Davis-Bacon Act), daily and weekly number of hours worked, deductions made and actual wages paid. Whenever the Secretary of Labor has found under 29 CFR 5.5(a)(1)(iv) 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 section 1(b)(2)(B) of the Davis-

Bacon Act, the contractor shall 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. Contractors employing apprentices or trainees under approved programs shall maintain written evidence of the registration of apprenticeship programs and certification of trainee programs, the registration of the apprentices and trainees, and the ratios and wage rates prescribed in the applicable programs.

b.(1) The contractor shall submit weekly for each week in which any contract work is performed a copy of all payrolls to the contracting agency. The payrolls submitted shall set out accurately and completely all of the information required to be maintained under 29 CFR 5.5(a)(3)(i), except that full social security numbers and home addresses shall not be included on weekly transmittals. Instead the payrolls shall only need to include an individually identifying number for each employee (e.g., the last four digits of the employee's social security number). The required weekly payroll information may be submitted in any form desired. Optional Form WH-347 is available for this purpose from the Wage and Hour Division Web site at <http://www.dol.gov/esa/whd/forms/wh347instr.htm> or its successor site. The prime contractor is responsible for the submission of copies of payrolls by all subcontractors. Contractors and subcontractors shall maintain the full social security number and current address of each covered worker, and shall provide them upon request to the contracting agency for transmission to the State DOT, the FHWA or the Wage and Hour Division of the Department of Labor for purposes of an investigation or audit of compliance with prevailing wage requirements. It is not a violation of this section for a prime contractor to require a subcontractor to provide addresses and social security numbers to the prime contractor for its own records, without weekly submission to the contracting agency..

(2) Each payroll submitted shall be accompanied by a "Statement of Compliance," signed by the contractor or subcontractor or his or her agent who pays or supervises the payment of the persons employed under the contract and shall certify the following:

(i) That the payroll for the payroll period contains the information required to be provided under §5.5 (a)(3)(ii) of Regulations, 29 CFR part 5, the appropriate information is being maintained under §5.5 (a)(3)(i) of Regulations, 29 CFR part 5, and that such information is correct and complete;

(ii) That each laborer or mechanic (including each helper, apprentice, and trainee) employed 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 Regulations, 29 CFR part 3;

(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 of work performed, as specified in the applicable wage determination incorporated into the contract.

APPENDIX D

(3) The weekly submission of a properly executed certification set forth on the reverse side of Optional Form WH-347 shall satisfy the requirement for submission of the "Statement of Compliance" required by paragraph 3.b.(2) of this section.

(4) The falsification of any of the above certifications may subject the contractor or subcontractor to civil or criminal prosecution under section 1001 of title 18 and section 231 of title 31 of the United States Code.

c. The contractor or subcontractor shall make the records required under paragraph 3.a. of this section available for inspection, copying, or transcription by authorized representatives of the contracting agency, the State DOT, the FHWA, or the Department of Labor, and shall permit such representatives to interview employees during working hours on the job. If the contractor or subcontractor fails to submit the required records or to make them available, the FHWA may, after written notice to the contractor, the contracting agency or the State DOT, 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 may be grounds for debarment action pursuant to 29 CFR 5.12.

4. Apprentices and trainees

a. Apprentices (programs of the USDOL).

Apprentices will be permitted to work at less than the predetermined rate for the work they performed 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 Training, Employer and Labor Services, or with a State Apprenticeship Agency recognized by the Office, or if a person is employed in his or her first 90 days of probationary employment as an apprentice in such an apprenticeship program, who is not individually registered in the program, but who has been certified by the Office of Apprenticeship Training, Employer and Labor Services or a State Apprenticeship Agency (where appropriate) to be eligible for probationary employment as an apprentice.

The allowable ratio of apprentices to journeymen on the job site in any craft classification shall not be greater than the ratio permitted to the contractor as to the entire work force under the registered program. Any worker listed on a payroll at an apprentice wage rate, who is not registered or otherwise employed as stated above, shall 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 the registered program shall be paid not less than the applicable wage rate on the wage determination for the work actually performed. Where a contractor is performing construction on a project in a locality other than that in which its program is registered, the ratios and wage rates (expressed in percentages of the journeyman's hourly rate) specified in the contractor's or subcontractor's registered program shall be observed.

Every apprentice must be paid at not less than the rate specified in the registered program for the apprentice's level of progress, expressed as a percentage of the journeymen hourly

rate specified in the applicable wage determination. Apprentices shall 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, fringes shall be paid in accordance with that determination.

In the event the Office of Apprenticeship Training, Employer and Labor Services, or a State Apprenticeship Agency recognized by the Office, withdraws approval of an apprenticeship program, the contractor will no longer be permitted to utilize apprentices at less than the applicable predetermined rate for the work performed until an acceptable program is approved.

b. Trainees (programs of the USDOL).

Except as provided in 29 CFR 5.16, trainees will not be permitted to work at less than the predetermined rate for the work performed unless they are employed pursuant to and individually registered in a program which has received prior approval, evidenced by formal certification by the U.S. Department of Labor, Employment and Training Administration.

The ratio of trainees to journeymen on the job site shall not be greater than permitted under the plan approved by the Employment and Training Administration.

Every trainee must be paid at not less than the rate specified in the approved program for the trainee's level of progress, expressed as a percentage of the journeyman hourly rate specified in the applicable wage determination. Trainees shall be paid fringe benefits in accordance with the provisions of the trainee program. If the trainee program does not mention fringe benefits, trainees shall be paid the full amount of fringe benefits listed on the wage determination unless the Administrator of the Wage and Hour Division determines that there is an apprenticeship program associated with the corresponding journeyman wage rate on the wage determination which provides for less than full fringe benefits for apprentices. Any employee listed on the payroll at a trainee rate who is not registered and participating in a training plan approved by the Employment and Training Administration shall be paid not less than the applicable wage rate on the wage determination for the classification of work actually performed. In addition, any trainee performing work on the job site in excess of the ratio permitted under the registered program shall be paid not less than the applicable wage rate on the wage determination for the work actually performed.

In the event the Employment and Training Administration withdraws approval of a training program, the contractor will no longer be permitted to utilize trainees at less than the applicable predetermined rate for the work performed until an acceptable program is approved.

c. Equal employment opportunity. The utilization of apprentices, trainees and journeymen under this part shall be in conformity with the equal employment opportunity requirements of Executive Order 11246, as amended, and 29 CFR part 30.

APPENDIX D

d. 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. 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 journeymen 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.

6. Subcontracts. The contractor or subcontractor shall insert Form FHWA-1273 in any subcontracts and also require the subcontractors to include Form FHWA-1273 in any lower tier subcontracts. The prime contractor shall be responsible for the compliance by any subcontractor or lower tier subcontractor with all the contract clauses in 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.

9. Disputes concerning labor standards. 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 he or she) 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 section 3(a) of the Davis-Bacon Act or 29 CFR 5.12(a)(1).

b. No part of this contract shall be subcontracted to any person or firm ineligible for award of a Government contract by virtue of section 3(a) of the Davis-Bacon Act or 29 CFR 5.12(a)(1).

c. The penalty for making false statements is prescribed in the U.S. Criminal Code, 18 U.S.C. 1001.

V. CONTRACT WORK HOURS AND SAFETY STANDARDS ACT

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 watchmen 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.

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. 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 watchmen and guards, employed in violation of the clause set forth in paragraph (1.) of this section, in the sum of \$10 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.

3. Withholding for unpaid wages and liquidated damages. The FHWA or the contracting agency shall upon its own action or upon written request of an authorized representative of the Department of Labor withhold or cause to be withheld, from any moneys payable on account of work performed by the contractor or subcontractor under any such contract or 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, which is held by the same prime contractor, such sums as may be determined to be necessary to satisfy any liabilities of such contractor or subcontractor for unpaid wages and liquidated damages as provided in the clause set forth in paragraph (2.) of this section.

4. Subcontracts. The contractor or subcontractor shall insert in any subcontracts the clauses set forth in paragraph (1.) through (4.) of this section and also a clause requiring the subcontractors to include these clauses in any lower tier subcontracts. The prime contractor shall be responsible for compliance by any subcontractor or lower tier subcontractor with the clauses set forth in paragraphs (1.) through (4.) of this section.

APPENDIX D

VI. SUBLETTING OR ASSIGNING THE CONTRACT

This provision is applicable to all Federal-aid construction contracts on the National Highway System.

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" 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:

(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.

2. 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. 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.

5. The 30% self-performance requirement of paragraph (1) is not applicable to design-build contracts; however, contracting agencies may establish their own self-performance requirements.

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 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.

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 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).

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 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:

APPENDIX D

"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 1, 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

This provision is applicable to all Federal-aid construction contracts and to all related subcontracts.

By submission of this bid/proposal or the execution of this contract, or subcontract, as appropriate, the bidder, proposer, Federal-aid construction contractor, or subcontractor, as appropriate, will be deemed to have stipulated as follows:

1. That any person who is or will be utilized in the performance of this contract is not prohibited from receiving an award due to a violation of Section 508 of the Clean Water Act or Section 306 of the Clean Air Act.

2. That the contractor agrees to include or cause to be included the requirements of paragraph (1) of this Section X in every subcontract, and further agrees to take such action as the contracting agency may direct as a means of enforcing such requirements.

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.

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.

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.

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.

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 and 1200. "First Tier Covered Transactions" refers to any covered transaction between a grantee or subgrantee 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 grantee or subgrantee 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.

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.

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. 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 Excluded Parties List System website (<https://www.epls.gov/>), which is compiled by the General Services Administration.

APPENDIX D

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. 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) 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;

(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; 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.

b. 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 proposal.

2. 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)

a. By signing and submitting this proposal, the prospective lower tier 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.

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 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 grantee or subgrantee 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 grantee or subgrantee 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.

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.

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 Excluded Parties List System website (<https://www.epls.gov/>), which is compiled by the General Services Administration.

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

APPENDIX D

department or agency with which this transaction originated may pursue available remedies, including suspension and/or debarment.

* * * * *

Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion--Lower Tier Participants:

1. The prospective lower tier participant certifies, by submission of this proposal, that neither it nor its principals is presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from participating in covered transactions by any Federal department or agency.

2. Where the prospective lower tier participant is unable to certify to any of the statements in this certification, such prospective participant shall 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 20).

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.

APPENDIX D

ATTACHMENT A - EMPLOYMENT AND MATERIALS PREFERENCE FOR APPALACHIAN DEVELOPMENT HIGHWAY SYSTEM OR APPALACHIAN LOCAL ACCESS ROAD CONTRACTS

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.

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 (%)
<u>Entire State of Vermont:</u>			
<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 Soharie; 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)

CERTIFICATION FOR FEDERAL-AID CONTRACTS

The prospective bidder, by signing and submitting this bid proposal, certifies, to the best of his or her knowledge and belief, that:

- (1) No Federal appropriated funds have been paid or will be paid, by or on behalf of the undersigned, to any person or influencing or attempting to influence an officer or employee of any Federal agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with the awarding of any Federal contract, the making of any Federal grant, the making of any Federal loan, the entering into of any cooperative agreement, and the extension, continuation, renewal, amendment, or modification of any Federal contract, grant, loan, or cooperative agreement.
- (2) If any funds other than Federal appropriated funds have been paid or will be paid to any person for influencing or attempting to influence an officer or employee of any Federal agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with this Federal contract, grant, loan, or cooperative agreement, the undersigned shall complete and submit Standard Form-LLL, "Disclosure Form to Report Lobbying," in accordance with its instructions.

This certification is a material representation of fact upon which reliance was placed when this transaction was made or entered to. Submission of this certification is a prerequisite for making or entering into this transaction imposed by Section 1352, Title 31, U.S. Code. Any person who fails to file the required certification shall be subject to a civil penalty of not less than \$10,000 and not more than \$100,000 for each such failure.

The prospective participant also agrees by submitting his or her bid or proposal that he or she shall require that the language of this certification be included in all lower tier subcontracts, which exceed \$100,000 and that all such sub-recipients shall certify and disclose accordingly.

APPENDIX G

CA101

Minimum Labor and Truck Rates
Under Title 19, Vermont Statutes
Annotated Section 18, as amended

April 3, 1997
Sheet 1 of 1

STATE OF VERMONT AGENCY OF TRANSPORTATION MONTPELIER

FOR OTHER THAN FEDERAL-AID. In accordance with the provisions of Title 19, VSA, Section 18, the following minimum rate for labor shall apply to this project:

The minimum wage for common labor will not be less than the State or Federal minimum wage, whichever is higher.

ON FEDERAL-AID PROJECTS ONLY.

The minimum rates for labor for Federal-Aid Projects shall be those set in the Wage Determination Decision of the U.S. Secretary of Labor for each project in accordance with the Federal-Aid Highway Act of 1956. When such wage rates are required they shall be included in the proposal. In the event these rates are lower than the Vermont rates, the Vermont rates shall prevail.

TRUCK RATES. In accordance with the provisions of Title 19, VSA, Section 18, the following minimum rates for trucks shall apply to this project:

<u>Trucks, not Including Driver Water Level Body Capacity</u>	<u>Minimum Rates Per YD per Hr.</u>
Trucks, Equipment Loaded	\$1.65

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>

VTrans currently utilizes a race/gender neutral policy to fulfill its overall DBE goals, and relies on the voluntary participation of contractors to utilize certified DBEs on every project sufficient to obtain the Agency's overall DBE goal. In order for this practice to continue, contractors must 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. Otherwise, VTrans may have to implement specified contract goals on projects to ensure the overall DBE goals are met. VTrans may include specific DBE contract goals in certain cases to ensure DBE participation, if failure to obtain the project DBE goal would negatively impact the Agency's overall DBE goal because of the size of the contract.

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 DBE Program Manager at (802) 828-5858 for assistance.

Counting DBE Participation Towards Project Goals. In order 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 actually 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 VTrans DBE Program Manager or VTrans Chief of Civil Rights.

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.

APPENDIX I

VERMONT AGENCY OF TRANSPORTATION

GENERAL SPECIAL PROVISIONS

FOR ALL PROJECTS

(INSERT THE MOST RECENT VERSION OF THE GENERAL
SPECIAL PROVISIONS FOUND ON THE VTRANS WEBSITE
AT THIS LINK: [https://vtrans.vermont.gov/highway/construct-material/
construct-services/pre-contractspecifications](https://vtrans.vermont.gov/highway/construct-material/construct-services/pre-contractspecifications))

SUMMARY LIST OF GENERAL SPECIAL PROVISIONS

The following list is a summary of all approved General Special Provisions for the *2018 Standard Specifications for Construction*. This list is only intended to serve as a general guide to identify which subsections have been modified. The full text must be referenced to determine the details of the change.

The list is organized by subsection. Not all General Special Provisions are listed individually – modifications which were made to adjacent subsections for the same general reason may be combined within this list. Entries in bold text indicate the most recent changes, which were approved for projects advertising on or after the date given in the header of this document.

Subsections Changed	Broad Description of Changes	Date of GSP
Subsection 101.02	Replaced “Columbus Day” with “Indigenous Peoples’ Day” to reflect change in state law.	7-23-2019
Subsection 101.02	Deleted all references to Supplemental Specifications.	10-22-2019
Subsection 103.03	Legal reference to sales tax regulations corrected.	8-8-2018
Subsection 105.05(a)	Deleted all references to Supplemental Specifications and modified the Contract Document Precedence to reflect the elimination of Supplemental Specifications.	10-22-2019
Subsection 105.05(d)	Deleted all references to Supplemental Specifications.	10-22-2019
Subsection 105.14	Corrected double numbering by re-lettering list parts.	8-8-2018
Subsection 105.16	Corrected legal reference.	8-8-2018
Subsection 106.09(c)	Revised the stockpiling requirements for raw materials.	10-22-2019
Subsections 203.03 and 204.03	Added a requirement to submit construction drawings when required by OSHA or VOSHA.	7-23-2019
Subsection 210.03	Modified requirements for length of time milled surface can remain unpaved	7-23-2019
Subsection 406.03B	Added requirements for the contractor to provide Hamburg Wheel-Track and FIT testing data in mix designs.	7-23-2019
Subsection 406.03C (Table 406.031)	Corrected an outdated reference and slightly modified Note 4.	7-23-2019
Subsections 406.03C(e) and 406.19(c)	Changed names of subsections to better match their contents and the names of other subsections.	8-8-2018
Subsection 406.14	Added a requirement to use a self-propelled pneumatic tired roller for the levelling course of pavement.	10-22-2019
Subsection 407.03	Deleted and replaced several paragraphs to correct equations and the table.	7-23-2019
Section 418	Created a new section for Asphaltic Approach Material.	10-22-2019
Subsection 501.03	Deleted and replaced the entire subsection to update testing and mix design requirements.	10-22-2019

Subsections Changed	Broad Description of Changes	Date of GSP
Subsection 501.04	Deleted and replaced paragraphs 1 through 3 to update the batching requirements.	10-22-2019
Subsection 501.05(a)	Deleted and replaced parts (2) and (3) to update the mixing and delivery requirements.	10-22-2019
Subsection 506.02	Updated the name of the subsection for one of the materials and added a new material subsection to the list.	7-23-2019
Subsection 506.03	Deleted and replaced multiple paragraphs to clarify requirements for fabrication drawings, the use of subcontractors for fabrication, and the level of plant certification required.	7-23-2019
Subsection 506.03(c)(1)	Deleted and replaced the subsection to provide additional details about inspectors.	7-23-2019
Subsections 506.03(d)(3) and 506.03(e)	Minor wording changes.	7-23-2019
Subsection 506.04(c)	Deleted and replaced subsection to modify welding procedures.	7-23-2019
Subsection 506.05(b)	Deleted a sentence.	7-23-2019
Subsection 506.06(b)	Deleted and replaced subsection to modify inspector requirements.	7-23-2019
Subsection 506.10(d)	Minor wording changes.	7-23-2019
Subsection 506.10(e)(1)	Deleted two paragraphs.	7-23-2019
Subsection 506.12(d)	Minor wording changes.	7-23-2019
Subsection 506.14	Deleted and replaced subsection to clarify surface preparation requirements.	7-23-2019
Subsection 506.18(b)	Deleted and replaced parts (2) and (3) to clarify alignment, drilling and reaming requirements.	7-23-2019
Subsections 506.19(a) and 506.19(b)	Minor wording changes.	7-23-2019
Subsection 506.19(c)	Added a sentence stating that standard bolts are to be Grade A 325.	8-8-2018
Subsection 506.19	Relabeled existing part (d) as part (e) and broke the existing part (c) in half, creating a new part (d) in the process. Done to correct duplicate list numbering in part (c). Also corrected internal cross references.	8-8-2018
Subsections 506.19(d)(1) and 506.19(e)	Minor wording changes.	7-23-2019
Subsection 506.23	Deleted and replaced entire subsection to add additional coating requirements.	7-23-2019
Subsection 506.25	Deleted and replaced entire subsection.	7-23-2019
Subsections 510.12(b) and 540.11(b)	Corrected internal cross references.	8-8-2018
Subsection 516.02	Updated materials listing to reflect name change of Subsection 707.15	10-22-2019

Subsections Changed	Broad Description of Changes	Date of GSP
Subsection 519.02	Deleted and replaced subsection to reflect changes made in Subsection 726.11.	10-22-2019
Subsection 524.02	Updated materials listing to reflect name change of Subsection 707.15	10-22-2019
Subsection 540.02	Updated material listing to reflect changes made in Subsection 726.11.	10-22-2019
Subsection 540.10	Updated internal cross reference to reflect changes made in Subsection 726.11.	10-22-2019
Subsection 540.12	Corrected internal cross reference.	8-8-2018
Subsection 540.14(b)	Replaced the word “prestressed” with the word “precast”.	10-22-2019
Subsection 543.04	Deleted and replaced sentence to correct submittal requirements.	7-23-2019
Subsection 605.02	Updated materials listing to reflect name change of Subsection 707.15	10-22-2019
Subsection 605.02	Added a new material subsection to the list and deleted internal cross reference. Changes made to conform to new Section 720.	8-8-2018
Subsection 625.02	Deleted incorrect material reference.	1-18-2019
Subsection 630.01	Minor wording changes.	7-23-2019
Subsection 630.02(b)	Deleted and replaced subsection to modify flagger apparel requirements.	7-23-2019
Subsection 630.04(a)	Modified flagger training requirements.	1-18-2019
Subsection 631.06	Added additional required bituminous testing equipment.	1-28-2020
Subsection 631.08	Modified requirements for grout molds.	1-18-2019
Subsection 631.09	Deleted a sentence that dictated an Agency process.	10-22-2019
Subsection 641.02	Deleted and replaced several paragraphs in order to add new subparts and clarify the difference between the traffic control items.	7-23-2019
Subsection 641.03	Added paragraph requiring security system for PCMS.	1-18-2019
Subsection 641.07	Deleted and replaced entire subsection to clarify basis of payment.	7-23-2019
Subsection 646.02	Deleted and replaced multiple entries in the materials list.	7-23-2019
Subsection 646.04	Minor wording changes.	7-23-2019
Subsection 646.07	Deleted and replaced parts (a) and (b) to redefine marking tape types.	7-23-2019
Subsection 646.07	Deleted parts (c) and (d).	7-23-2019
Subsection 646.07	Relabeled parts (e) and (f) as the new parts (c) and (d).	7-23-2019
Subsection 646.07	Inserted a new part (e) for preformed thermoplastic and relabeled part (g) as part (f).	1-18-2019
Subsections 646.07(c)(1) and 646.07(f)(1)	Minor wording changes.	1-18-2019
Subsection 646.08	Changed the name of part (a) to reflect redefined marking tape types.	7-23-2019

Subsections Changed	Broad Description of Changes	Date of GSP
Subsection 646.09 (Table 646.09A)	Replaced the column headers of the table.	1-18-2019
Subsections 646.13 and 646.14	Deleted all references to “Raised Pavement Markers, Type II”, including the pay item.	7-23-2019
Subsection 649.02	Deleted and replaced existing subsection so it would conform with the new Section 720.	8-8-2018
Subsection 653.02	Added new material subsections to the list and deleted internal cross reference. Changes made to conform to new Section 720.	8-8-2018
Subsection 653.08(a)(1), 653.09(a), 653.09(b)(1) and 653.09(b)(3)	Corrected references to various geotextile requirements to conform to new Section 720.	8-8-2018
Subsection 675.02	Deleted internal cross reference.	1-18-2019
Subsection 675.07(b)(2)	Deleted and replaced subsection to modify the requirements.	7-23-2019
Subsection 675.07(d)	Added two new sentences to add additional requirements for fasteners.	7-23-2019
Subsection 677.03	Added a sentence removing the requirement for field verification of DTI’s.	8-8-2018
Subsection 679.02	Deleted one materials section listing and added two new ones to match changes in Subsection 753.04.	1-18-2019
Subsection 679.05	Deleted existing first sentence and added two new paragraphs	1-18-2019
Subsection 679.09	Added a sentence removing the requirement for field verification of DTI’s.	8-8-2018
Subsection 680.02	Deleted internal cross reference.	1-18-2019
Subsection 702.06 (Table 702.06A)	Deleted and replaced table to correct some temperatures and add a new row.	7-23-2019
Subsection 704.01(b)	Corrected ambiguity associated with organic impurities.	1-28-2020
Subsection 704.10(a)	Corrected AASHTO references.	7-23-2019
Subsection 706.06	Deleted and reserved entire subsection.	1-28-2020
Subsection 707.14 (Table 707.14A)	Corrected AASHTO references.	1-18-2019
Subsection 707.15	Deleted and replaced entire subsection to update requirements.	10-22-2019
Subsection 707.17	Added a new subsection to provide material requirements for the new Section 418.	10-22-2019
Subsection 708.03	Deleted and replaced entire subsection to provide new requirements.	7-23-2019
Subsection 708.06	Deleted and reserved entire subsection.	1-18-2019
Subsection 708.08 (Table 708.08C)	Added two rows to the table	7-23-2019
Subsection 708.11	Deleted and reserved entire subsection.	7-23-2019
Subsection 708.12	Deleted and replaced entire subsection to provide new requirements.	7-23-2019

GENERAL SPECIAL PROVISIONS FOR ALL PROJECTS
2018 STANDARD SPECIFICATIONS FOR CONSTRUCTION

SECTION 101 – DEFINITIONS AND TERMS

101.02 DEFINITIONS, the definition for “Holidays” is hereby modified by deleting the phrase “Columbus Day” from the first column and replacing it with the phrase “Indigenous Peoples’ Day”.

101.02 DEFINITIONS, is hereby modified by deleting the phrase “Supplemental Specifications,” from the definitions for “Contract”, “Project Special Provisions”, and “Specifications”.

101.02 DEFINITIONS, is hereby modified by deleting the entry for, and definition of, “Supplemental Specifications”.

SECTION 103 – TAXES AND INSURANCE

103.03 STATE SALES TAX is hereby modified by deleting the phrase “(see *Vermont Sales and Use Tax Regulations, No. 226-2 and 226-7 and 32 V.S.A. § 9743(4)*)” and the phrase “(see 32 V.S.A. § 9741(44)).” from the first paragraph.

103.03 STATE SALES TAX is hereby further modified by adding the following reference to the end of the first paragraph:

(see 32 V.S.A. § 9743(4), 32 V.S.A. § 9741(30), 32 V.S.A. § 9741(44), and the *Vermont Sales and Use Tax Regulations, Reg. § 1.9741(34)-5 and Reg. § 1.9743*).

SECTION 105 – CONTROL OF THE WORK

105.05 COORDINATION OF CONTRACT DOCUMENTS, part (a), is hereby modified by deleting the phrase “Supplemental Specifications,” from the first sentence.

105.05 COORDINATION OF CONTRACT DOCUMENTS, part (a)(1), is hereby modified by deleting subpart g. in its entirety, relabeling subpart h. as subpart g., and relabeling subpart i. as subpart h.

105.05 COORDINATION OF CONTRACT DOCUMENTS, part (d), is hereby modified by deleting the phrase “Supplemental Specifications,” from the last sentence.

105.14 SUNDAY, NIGHT, AND HOLIDAY WORK is hereby modified by relabeling part (c), “Application.”, as “(d) Application.” and part (d), “Other Provisions Not Affected.”, as “(e) Other Provisions Not Affected.”

105.16 LOAD RESTRICTIONS, part (c), Penalty and Reduction for Overweight Operation., is hereby modified by changing the phrase “23 V.S.A. § 1391(a)” to read “23 V.S.A. § 1391a”.

SECTION 106 – CONTROL OF MATERIALS

106.09 STOCKPILING, part (c), is hereby modified by being deleted in its entirety and replaced with the following:

- (c) Raw Materials. In addition to the criteria set out above for other materials, raw material stockpiles shall be approved by the Construction Engineer and meet the following additional criteria:
- (1) The various components of the finished product shall include all of the appropriate certifications, passing samples, passing tests, and any other documentation that may be required to certify that the materials are acceptable.
 - (2) For stockpiles of structural steel, invoices or quotes from the fabricator shall include supporting documentation such as mill invoices or quotes that show actual dimensions, quantities, and costs to the fabricator for the raw materials. The intent of this raw material payment is to reimburse the actual amount it cost the fabricator to purchase the raw materials for the specific Contract item. There will be no allowance for mark up of any type by the Contractor or fabricator. Stockpile payments will be limited to one payment per 6 months, per Contract item. There will be no raw material stockpile payment allowed for materials that do not meet the dimensions provided on the mill invoices.
 - (3) Any other criteria the Engineer deems necessary to allow for payment.

SECTION 203 – EXCAVATION AND EMBANKMENTS

203.03 GENERAL CONSTRUCTION REQUIREMENTS is hereby modified by adding the following as the last sentence of the ninth paragraph:

Construction Drawings shall be submitted in accordance with Section 105 whenever OSHA or VOSHA regulations require a design by a Professional Engineer.

SECTION 204 – EXCAVATION FOR STRUCTURES

204.03 GENERAL CONSTRUCTION REQUIREMENTS is hereby modified by adding the following as the last sentence of the third paragraph:

Construction Drawings shall be submitted in accordance with Section 105 whenever OSHA or VOSHA regulations require a design by a Professional Engineer.

SECTION 210 – COLD PLANING

210.03 GENERAL CONSTRUCTION REQUIREMENTS, part (b) is hereby modified by being deleted in its entirety and replaced with the following:

- (b) The Contractor shall repave any coarse-milled areas within 14 Calendar Days and any fine-milled areas within 28 Calendar Days of milling, or when directed by the Engineer. Should the area remain unpaved for a period longer than specified herein, without the approval of the Engineer, no payment whatsoever will be made for the milled areas left exposed in excess of the 14 or 28 Calendar Day periods. If the Contractor lays down temporary pavement to avoid the above non-payment for milling, temporary pavement and subsequent milling shall be at the Contractor's expense.

SECTION 406 – BITUMINOUS CONCRETE PAVEMENT

406.03B COMPOSITION OF MIXTURE – SUPERPAVE, part (c), is hereby modified by adding “, unless otherwise noted in this section.” to the end of the sentence which begins with “For Superpave bituminous concrete pavement mixes, *AASHTO R 35*...”.

406.03B COMPOSITION OF MIXTURE – SUPERPAVE, part (c), is hereby further modified by deleting the word “four” from the sentence which currently reads “The four principal parts of the Superpave Mix Design Method are:” and replacing it with the word “five”.

406.03B COMPOSITION OF MIXTURE – SUPERPAVE, part (c), is hereby further modified by deleting subpart (4) in its entirety and replacing it with the following:

- (4) Evaluate moisture sensitivity and rutting susceptibility using *AASHTO T 324*. Test specimens for Hamburg Wheel-Track (HWT) testing shall be 150 mm (6.0 inches) in diameter with a 60 ± 1 mm (2.36 ± 0.04 inch) thickness and shall be short term conditioned in accordance with Section 7.2 of *AASHTO R 30*. HWT specimens shall be tested at $45 \pm 1^\circ$ C ($113 \pm 1.8^\circ$ F), with the machine pre-set to end the test once a maximum rut depth of 12.5 mm (0.50 inches) is reached. If the difference in the rut depth between the two pairs of specimens is 6 mm (0.24 inches) or more, and/or only one pair of specimens has a final rut depth of 12.5 mm (0.50 inches), the test results will be deemed invalid and not acceptable for mix design qualification. Slab specimens shall not be used.
- (5) Determine cracking susceptibility using *AASHTO TP 124*. Test specimens for the FIT shall be fabricated in a Superpave Gyratory Compactor and short term conditioned in accordance with Section 7.2 of *AASHTO R 30*. Specimens that are fabricated to a height of 50 mm (2.0 inches), in lieu of fabricating 160 mm (6.30 inch) or 115 mm (4.50 inch) specimens as part of the test specimen preparation procedures outlined in *AASHTO TP 124*, will be allowed.

406.03C REQUIREMENTS FOR BOTH MARSHALL AND SUPERPAVE BITUMINOUS MIXTURES is hereby modified by changing the name of part (e) from “Pay Factor Determination.” to “Air Voids Pay Factor (PF_{AV}) Determination.”

406.03C REQUIREMENTS FOR BOTH MARSHALL AND SUPERPAVE BITUMINOUS MIXTURES, Table 406.03I, is hereby modified by deleting the phrase “*ASTM D 5821*” and replacing it with the phrase “*AASHTO T 335*” in the third column of the fifth row.

406.03C REQUIREMENTS FOR BOTH MARSHALL AND SUPERPAVE BITUMINOUS MIXTURES, Table 406.03I, Note 4, is hereby modified by deleting the word “more” and replacing it with the word “less”.

406.14 COMPACTION is hereby modified by adding “Leveling courses shall be compacted using a self-propelled pneumatic tired roller for intermediate rolling, unless otherwise permitted in writing by the Engineer.” as the second sentence.

406.19 METHOD OF MEASUREMENT is hereby modified by changing the name of part (c) from “Longitudinal Joint Pay Factor.” to “Longitudinal Joint Pay Adjustment.”

SECTION 407 – BONDED WEARING COURSE

407.03 COMPOSITION OF MIXTURE is hereby modified by deleting the portion of the Subsection beginning with “PG Binder percentage shall be based on a minimum film thickness of 10.0 microns...” and ending with Table 407.03B, and replacing the deleted text and table with the following:

The asphalt cement content shall be based on a minimum asphalt film thickness of 0.394 mils (10.0 microns). The minimum asphalt cement content shall be calculated according to the following formulas and the factors in Table 407.03B.

For English units: $W = 0.0052 \times A_s \times T \times G_b$

For metric units: $W = 0.001 \times A_s \times T \times G_b$

and, for consistent units: $P_{bmin} = \frac{W}{1+W} \times 100$

where:

W = Intermediate variable

A_s = Total aggregate surface area* (square feet per pound or square meters per kilogram of aggregate)

T = Minimum asphalt film thickness (mils or microns)

G_b = Specific gravity of asphalt cement

P_{bmin} = Minimum asphalt cement content (percent by mass)

* The total aggregate surface area is calculated by multiplying the percent passing each sieve (as a decimal, i.e. 30% = 0.30) in the JMF by the corresponding factor in Table 407.03B and summing the resultant values.

TABLE 407.03B – AGGREGATE SURFACE AREA FACTORS

Sieve Designation	Surface Area Factors					
	Type A		Type B		Type C	
	SF/lb	SM/kg	SF/lb	SM/kg	SF/lb	SM/kg
3/4 inch (19.0 mm)	--	--	--	--	2.0	0.41
1/2 inch (12.5 mm)	--	--	2.0	0.41	0	0
3/8 inch (9.50 mm)	2.0	0.41	0	0	0	0
No. 4 (4.75 mm)	2.0	0.41	2.0	0.41	2.0	0.41
No. 8 (2.36 mm)	4.0	0.82	4.0	0.82	4.0	0.82
No. 16 (1.18 mm)	8.00	1.64	8.00	1.64	8.00	1.64
No. 30 (0.600 mm)	14.0	2.87	14.0	2.87	14.0	2.87
No. 50 (0.300 mm)	30.0	6.14	30.0	6.14	30.0	6.14
No. 100 (0.150 mm)	60.00	12.29	60.00	12.29	60.00	12.29
No. 200 (0.075 mm)	160.0	32.77	160.0	32.77	160.0	32.77

SECTION 418 – ASPHALTIC APPROACH MATERIAL

SECTION 418 – ASPHALTIC APPROACH MATERIAL is hereby made a new section of the specifications as follows:

SECTION 418 – ASPHALTIC APPROACH MATERIAL

418.01 DESCRIPTION. This work shall consist of furnishing and installing asphaltic approach material at the transition between bituminous concrete pavement and Portland cement concrete, steel or other materials.

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

Asphalt Plug Joint Binder707.17

418.03 INSTALLATION. Asphaltic approach material shall be installed at the locations(s) and to the depth and configuration shown in the Plans and as directed by the Engineer.

418.04 METHOD OF MEASUREMENT. The quantity of Asphaltic Approach Material to be measured for payment will be the number of square feet used in the complete and accepted work.

418.05 BASIS OF PAYMENT. The accepted quantity of Asphaltic Approach Material will be paid for at the Contract unit price per square foot. Payment will be full compensation for detailing, furnishing, handling, transporting, and placing the material specified, including surface preparation, and for furnishing all labor, tools, equipment, and incidentals necessary to complete the work.

Tack, prime, or seal coats of bituminous material required for the installation of asphaltic approach material will not be paid for separately, but will be considered incidental to the Contract unit price for Asphaltic Approach Material.

Removal of any existing asphaltic, bituminous or Portland cement concrete materials to allow for the installation of asphaltic approach material will not be paid for separately, but will be considered incidental to the Contract unit price for Asphaltic Approach Material.

Payment will be made under:

<u>Pay Item</u>	<u>Pay Unit</u>
418.10 Asphaltic Approach Material.....	Square Foot

SECTION 501 – PERFORMANCE BASED STRUCTURAL CONCRETE

501.03 CLASSIFICATION AND PROPORTIONING is hereby modified by being deleted in its entirety and replaced with the following:

501.03 CLASSIFICATION AND PROPORTIONING. The following classes of concrete, shown in Table 501.03A, are included in these Specifications and shall be used as shown on the plans.

TABLE 501.03A – PERFORMANCE-BASED CONCRETE CLASSES AND PROPERTIES

Class of Concrete ¹	28-Day Compressive Strength (psi) ²	Target W/CM Ratio ³	VSI	Slump/Spread Target and Range (in.)	Max. Slump (in.)	Air Content Limits ⁴	Free Shrinkage ⁵	Max. 56-Day Surface Resistivity ⁶
PCD	4,000	TBD	--	TBD ± 1.5 ⁷	9	5.5% – 8.5%	0.032%	Low
PCS	3,500	TBD	--	TBD ± 2.5 ⁷	9	5.5% – 8.5%	0.042%	Low
SCC	4,000	TBD	≤ 1	TBD ⁸	--	6.5% – 8.5%	--	Low

¹ PCD = Performance Concrete, Deck

PCS = Performance Concrete, Substructure

SCC = Self Consolidating Concrete

² The listed 28-day compressive strength is the minimum strength required to meet the design intent.

³ The target W/CM ratio is to be determined by the contractor. During production the W/CM ratio shall be within + 0.05 of the target W/CM ratio. At no time may the W/CM ratio exceed 0.500, nor the total water content exceed 280 lbs/yd³. For Class SCC, the maximum W/CM ratio shall be determined by the Contractor.

⁴ See Subsection 501.03(b)(2).

⁵ The Contractor shall determine the free shrinkage in accordance with Subsection 501.03(c)(3).

⁶ The Contractor shall determine the surface resistivity in accordance with Subsection 501.03(c)(4).

⁷ The Contractor shall determine a slump target that will allow enough workability to be placed and finished per Contract requirements. The slump shall be maintained within the specified range for the placement. The mix shall not exhibit segregation. If the mix does exhibit segregation or exceeds the maximum slump, the load shall be rejected and subsequent loads shall be tested by the Contractor until the mix meets the allowable limits.

⁸ The Contractor shall determine the spread target and limits in accordance with Subsection 501.03(b)(1). 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.

If a nominal maximum aggregate size is not specified, the Contractor shall determine the nominal maximum aggregate size using guidance from *ACI 211.1* to do so. In no case will the maximum aggregate size exceed 1/5 of the narrowest dimension between sides of the forms, 1/3 the depth of slabs, nor 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 in order to create better optimized gradations 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 up to 30% by volume replacement for 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 it contains uniform moisture content 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 mix may contain a shrinkage compensating admixture conforming to the requirements of *AASHTO M 194 M/M 194* or *ASTM C 494/C 494 M*.

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 shall have air content by volume as specified. The entrained air shall be obtained using an approved admixture.

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.

A minimum of 30 Calendar Days prior to placement of the trial pour (or prior to the pre-placement meeting, if the trial pour is waived by the Engineer), the Contractor shall submit for approval the mix design 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. No class of concrete shall be placed on a project, including the trial pour, until the mix design is approved.

- (a) The mix design must contain the following information:
 - (1) Class of concrete.
 - (2) Type of mix, conventional or self-consolidating concrete (SCC).
 - (3) Specify if saturated surface dry or dry weights.
 - (4) Aggregates – Types, sources, specific gravities, and absorption values.
 - (5) Specified 28-day design compressive strength, psi.
 - (6) Cementitious content and the amount of each, pounds per cubic yard.
 - (7) Air content lower limit and upper limit, percent.

- (8) Specified surface resistivity value.
- (9) Slump range for conventional concrete, inches.
- (10) Determined spread lower limit and upper limit for SCC.
- (11) Water/cementitious materials (W/CM) ratio target value.
- (12) Volumetric quantities of each material in the mix design.
- (13) Design unit weight of the mix.
- (14) Chemical Admixtures – 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 an independent Laboratory that is accredited in the particular test method, or as allowed by the Engineer.

(b) The following preliminary mix qualification tests shall be performed:

- (1) 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.

- (2) The contractor shall provide test results that establish the quality of the entrained air void structure and the freeze-thaw durability of the concrete. Sampling shall be performed in accordance with *AASHTO R 60* on a trial batch of concrete that is a minimum of 3 cubic yards, and which meets the following requirements:
 - a. For all concrete, the air content shall be no more than 1.5% above the lower limit established in Table 501.03A.
 - b. For conventional concrete, the slump shall not exceed 5 inches.
 - c. For SCC concrete, the spread shall not be more than 5 inches greater than the minimum spread determined as specified in Subsection 501.03(b)(1), nor shall the spread exceed the maximum spread determined as specified in Subsection 501.03(b)(1).

Conventional concrete shall be tested for slump (*AASHTO T 119 M/T 119*), air content (*AASHTO T 152*), concrete temperature (*ASTM C 1064/C 1064 M*), and characterization of the air-void system of freshly mixed concrete by the sequential pressure method (*AASHTO TP 118*). The Contractor shall make a minimum of 2 concrete cylinders per *AASHTO T 23*.

SCC concrete shall be tested for spread (*ASTM C 1611/C 1611 M*, Procedure B), air content (*AASHTO T 152*), concrete temperature (*ASTM C 1064/C 1064 M*), and characterization of the air-void system of freshly mixed concrete by the sequential pressure method (*AASHTO TP 118*). The Contractor shall make a minimum of 2 concrete cylinders per *AASHTO T 23*.

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 wet test results shall be included with the *ASTM C 457* results.

The tests required in Subsection 501.03(b)(2) will be used by the Agency to evaluate the quality of the entrained air void structure of the concrete. These test results will be used for informational purposes only and will not be used to determine the acceptability of the mix design.

- (c) The additional mix qualification test results specified below shall accompany the mix design. Testing should be done on the same test batch where applicable.
- (1) The concrete used to determine the additional mix qualification properties shall meet the following requirements:
 - a. For all concrete, the air content shall be not be more than 1.5% above the lower limit.
 - b. For conventional concrete, the slump shall be between 5 inches and 9 inches, and the W/CM ratio shall be 0.05 above the target.
 - c. For SCC concrete, the spread shall be within 5 inches of the maximum spread limit, and the W/CM ratio shall be the maximum W/CM ratio, as determined by the contractor.
 - (2) The compressive strength of the concrete shall be measured based on the requirements of *AASHTO T 22* for 7, 14, and 28-Calendar Day standard cured cylinders.
 - (3) 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 an independent Laboratory accredited in the specific test method.

- (4) The surface resistivity of the test mix shall be measured at 28 and 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.
- (d) 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 an independent Laboratory accredited in the specific test method.

- (e) After the mix design furnished by the Contractor has been reviewed and approved by the Structural Concrete Engineer, no new materials shall be incorporated. 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.

Mix design approvals will be valid for a 12-month period. The approved mix design will be allowed a two consecutive year 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, unit weight, and absorption. The mix design shall be accompanied by the previously completed and accepted test mix data and any applicable updated test information.

501.04 BATCHING is hereby modified by deleting paragraphs one, two and three in their entirety and replacing them with the following:

501.04 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 mineral 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, report, and print batch weight tickets in English units the quantity of all aggregates, cementitious material, and the water incorporated into each batch and shall identify and record the addition of the required admixtures. All materials added to the concrete batch after initial batching shall be added to the printed batch weight ticket prior to delivery.

501.05 MIXING AND DELIVERY, parts (a)(2) and (a)(3), are hereby modified by being deleted in their entirety and replaced with the following:

- (2) Authorization by Field Inspection personnel must be obtained prior to the addition of water or admixtures at the project site. If water is added in excess of the specified maximum W/CM ratio, the concrete shall not be used.
- (3) Each load of concrete delivered at the job site shall be accompanied by a State of Vermont Batch Slip signed by the authorized Agency representative, if present, at the plant. If an Agency representative is not present at the time of batching, a batch weight ticket meeting the requirements of Subsection 501.04 shall accompany the delivery vehicle.

SECTION 506 – STRUCTURAL STEEL

506.02 MATERIALS is hereby modified by deleting the second entry in the Subsection listing and replacing it with the following:

Structural Steel Coating Systems.....708.03

506.02 MATERIALS is hereby modified by inserting the following as the third entry in the Subsection listing:

Grease Rustproofing Compound.....708.04

506.03 GENERAL FABRICATION REQUIREMENTS is hereby modified by deleting paragraphs three, four, five, and six in their entirety and replacing them with the following:

Prior to performing any work under this Section, the fabricator must have received approval for all Fabrication Drawings, welding procedures and any special Contract requirements and have notified the Agency’s Structural Steel Fabrication Engineer in writing at least 10 Working Days in advance of fabrication. The Contractor shall bear full responsibility and costs for all materials ordered, raw materials stockpiled, or for work performed prior to approval of the Fabrication Drawings or written authorization from the Structures Engineer.

Excepted as noted in this Subsection, all work shall be performed by the fabricator indicated on the approved Fabrication Drawings, unless otherwise authorized in writing by the Structural Steel Fabrication Engineer. For coatings, if the fabricator intends to use a Subcontractor, it shall be clearly outlined on the fabrication drawings to be submitted for review. At a minimum, the provided information shall include the Subcontractor's name and address; the name, phone number and e-mail address of the quality control (QC) contact; and an acknowledgement of the VTrans quality assurance (QA) inspection requirements which apply to the Subcontractor.

If the fabricator wishes to request the use of a Subcontractor for material processing (e.g. cutting, drilling, bending, rolling, punching, machining, etc.), they shall submit a set of the previously approved shop drawings to the Agency for review, with the requested changes and required information clearly marked and indicated (e.g. by making all additional notes red). At a minimum, the submittal shall include the Subcontractor's name and address; the name, phone number and e-mail address of the quality control (QC) contact; an acknowledgement of the VTrans quality assurance (QA) inspection requirements which apply to the Subcontractor; and clear information on the extent and limits of work to be performed by the Subcontractor

Requests will be evaluated on a case by case basis and may be rejected by the Agency for any reason. Use of a Subcontractor does not relieve the fabricator of any responsibilities or quality control requirements specified by the Contract.

Structural steel furnished under this Section shall be fabricated in a plant having an AISC Certified Bridge Fabricator – Advanced (ABR), or Intermediate (IBR) Certification, and in a plant approved by the Agency prior to Contract Execution. Structural steel components (such as bridge rail, bridge joints, and overhead sign structures) which are fabricated under this Section may be fabricated in a plant that does not have an ABR or IBR Certification, provided that the fabrication plant has either an AISC Certified Bridge Fabricator – Simple (SBR) Certification, or an AISC Bridge Component QMS Certification, and is approved by the Agency prior to Contract Execution.

Minor steel components, including, but not limited to, downspouts, scuppers, and pedestrian hand railings may be fabricated in a plant that does not have an ABR or IBR Certification, provided that the fabrication plant is approved in writing by the Structures Engineer prior to Contract Execution. All plants without certification shall have an organization, operation and equipment capable of producing a product equal to a certified plant.

Structural steel that is to be painted or metalized under this section shall be coated in a plant having an AISC Sophisticated Paint Endorsement – Enclosed, or SSPC-QP 3 – Enclosed Shop certification and which has been approved by the Agency prior to Contract Execution.

When certified fabrication or coating plants are required, the plant shall maintain certified status throughout the duration of the work under the Contract.

506.03 GENERAL FABRICATION REQUIREMENTS, part (c), is hereby modified by deleting subpart (1) in its entirety and replacing it with the following:

- (1) Inspectors. Quality control inspectors shall be onsite full time during any hot work (e.g. burning, heating, welding, etc.), as well during as any operations that may affect the quality of the coating system.
 - a. Fabrication Inspectors. The fabricator’s representative responsible for fabrication inspection, testing and quality matters shall be qualified and certified in accordance with the provisions of *AWS QC 1*.
 - b. Coating Inspectors. The fabricator’s coatings quality control manager shall possess a minimum classification as a NACE Coating Inspector Level 2 – Certified. The coatings quality control inspector shall possess a minimum classification as a NACE Coating Inspector Level 1 – Certified.

506.03 GENERAL FABRICATION REQUIREMENTS, part (d)(3), is hereby modified by deleting the last sentence, which begins with “The Engineer reserves the right...” and replacing it with “The Structural Steel Fabrication Engineer reserves the right to reject inadequate office facilities and require suitable alternatives.”

506.03 GENERAL FABRICATION REQUIREMENTS, part (e), is hereby modified by adding the word “Execution” as the last word of the subsection.

506.04 DRAWINGS AND PROCEDURES, part (c), is hereby modified by being deleted in its entirety and replaced it with the following:

- (c) Welding Procedures. Detailed welding procedures shall be prepared in accordance with the provisions of the applicable AWS/ANSI/AASHTO code revisions and submitted in accordance with the following:
 - (1) All procedures shall be prequalified. Procedure qualification test records shall be submitted along with each procedure. Heat input values during welding shall be shown for each procedure.
 - (2) Welding procedure Specifications shall be presented in a format similar to *Form O-2* of *AWS D1.5*, Annex O (See Annex M for *AWS D1.1*). Procedure qualification test records shall be presented in a format similar to *Form O-3* and *Form O-4* of *AWS D1.5*, Appendix O (See Annex M for *AWS D1.1*).
 - (3) Details of welded joints not prequalified under *AWS D1.5*, Section 2.7 shall be qualified.

506.05 QUALITY ACCEPTANCE, part (b), is hereby modified by deleting the sentence “The QAI will have the authority to reject any material or work that does not conform to the Contract requirements.” in its entirety.

506.06 QUALITY CONTROL, part (b), is hereby modified by being deleted in its entirety and replaced it with the following:

(b) Qualifications of Inspectors. Inspectors shall meet the requirements of Subsection 506.03(c).

506.10 WELDING, part (d), is hereby modified by adding the word “VTrans” immediately before the phrase “prequalified welder list.” in the first paragraph, and by adding the word “VTrans” immediately before the phrase “*Field Welding Manual*” in the second paragraph.

506.10 WELDING, part (e)(1), is hereby modified by deleting the third and fourth paragraphs in their entirety. The deleted text begins with “Process and procedure qualification record tests...” and ends with “... similar to those provided in *AWS D1.5*.”

506.12 ASSEMBLY, part (d), is hereby modified by adding “,” (a comma) immediately following the phrase “All sharp corners”.

506.12 ASSEMBLY, part (d), is hereby further modified by adding the word “minimum” immediately before the phrase “1/16 inch radius”.

506.14 SURFACE PREPARATION is hereby modified by being deleted in its entirety and replaced it with the following:

506.14 SURFACE PREPARATION. All materials shall be blast-cleaned to the specified grade as defined by the *SSPC Painting Manual* and supplemented by reference to *SSPC-VIS 1*. Further preparation shall conform to the following:

- (a) Surfaces to Remain Uncoated. Surfaces shall be blast-cleaned at least equivalent to Preparation Grade *SSPC-SP 10*. This work may be performed either before or after fabrication. The final surface appearance after fabrication shall be clean and free from any contaminants or blemishes so as to allow the metal to weather uniformly.
- (b) Surfaces to be Coated. Prior to application of any coating, all material to be coated shall be cleaned and prepared in accordance with the appropriate Contract Specifications.

506.18 ERECTION, part (b), is hereby modified by deleting subparts (2) and (3) in their entirety and replacing them with the following:

- (2) Drift pins shall be used to align and center the connections of main and secondary members. Only light drifting will be permitted. Any member subjected to drifting that results in distortion of the member or elongation of the holes will be rejected. Cylindrical erection pins, the same size as the hole, shall be used at least in the extreme corners of all main member connections.

Main members shall be match marked by the Fabricator and should fit together easily.

Main members shall not be reamed larger than the hole size indicated on the approved Fabrication Drawings without written authorization from the Project Manager. Secondary members may be subjected to limited field reaming with the written approval of the Engineer. Assembled parts that have been approved for field drilling or reaming shall be disassembled to remove any burrs, shavings, oils, or lubricants.

Pins used for hinged connections and bearings shall be inserted with care and aligned so the members take full and even bearing. Nuts shall be adequately tightened and locked in position either by upsetting the threads or tack welding the nut to the bolt.

- (3) Errors in shop fabrication that prevent proper assembly shall be reported immediately to the Engineer. The Engineer shall approve any corrective action prior to it occurring.

506.19 BOLTING AND CONNECTIONS, part (a), is hereby modified by adding the phrase “Structural Steel Fabrication” immediately before the word “Engineer” in the last sentence of part (a).

506.19 BOLTING AND CONNECTIONS, part (b), is hereby modified by deleting the sentence which reads “Faying surfaces of bolted connections shall meet the Class B slip coefficient value of not less than 0.50 as specified by AASHTO.” and replacing it with “Unless otherwise specified in the Contract Documents, faying surfaces of bolted connections shall have a Class B slip coefficient value of not less than 0.50 as specified by AASHTO.”

506.19 BOLTING AND CONNECTIONS, part (c), is hereby modified by adding the sentence “Unless otherwise indicated on the plans, *ASTM F 3125/F 3125 M* Grade A 325 hex head bolts shall be used.” immediately following the sentence “Bolts shall be tightened to develop a tension not less than 5% more than the minimum bolt tension specified in Table 506.19A.”

506.19 BOLTING AND CONNECTIONS is hereby modified by relabeling part (d), “Acceptance of Bolt Tensioning.” as “(e) Acceptance of Bolt Tensioning.”

506.19 BOLTING AND CONNECTIONS is hereby further modified by adding a new part “(d) Bolt Tensioning Methods.” The new part (d) will be composed of text that is currently located in part (c). The new part (d) will begin with the phrase “Bolts shall be tensioned by the Contractor in the presence of the Engineer...” and will contain all text and tables up to and including Note 4 of Table 506.19B.

All references to “Column 3 of Table 506.19B” within the text identified above shall be replaced with the phrase “Column 4 of Table 506.19B”.

506.19 BOLTING AND CONNECTIONS, part (d)(1), is hereby modified by adding the sentence “This method shall only be used when required by the Contract.” immediately following the sentence “This method shall be employed when installing button-headed or dome-headed high-strength bolts.”

506.19 BOLTING AND CONNECTIONS, part (e), is hereby modified by deleting the phrase “or stick out not more than three threads” from the last sentence of the ninth paragraph.

506.23 UNCOATED STEEL is hereby modified by being deleted in its entirety and replaced with the following:

506.23 STEEL SURFACES AND COATINGS.

- (a) Uncoated Steel. Care must be taken to keep chemicals and oils from contacting the exposed surfaces of unpainted steel during storage, erection, and construction of the deck.
 - (1) Staining of Masonry. The Contractor shall protect all concrete and masonry from staining due to oxide formation on the steel.
 - (2) Cleaning of Steel. After all concrete has been placed, the outside surface of the fascia beams and bottom surface of their lower flanges shall be cleaned of all foreign material to a uniform appearance. The Engineer may require the exposed surfaces to be blast cleaned to Preparation Grade *SSPC-SP 10*. The use of acids for cleaning is prohibited.
- (b) Galvanized Steel. All steel surfaces to be galvanized per Contract Plans shall be coated in accordance with Subsection 726.08. Certifications as described in *ASTM A 123*, Section 10 for the completed products shall be furnished to the QA Inspector (or the Structural Steel Fabrication Engineer, if there is no QA Inspector assigned to the project) prior to shipment from the galvanizer's plant. Certifications shall include a report of all test results.
- (c) Metalized Steel. All steel surfaces to be metalized per Contract Plans shall be metalized and seal coated in accordance with Subsection 726.09.
- (d) Painted Steel. When the Contract Plans specify shop painted structural steel, the work shall be performed in accordance with the requirements of this Subsection.
 - (1) Materials. The fabricator shall provide a three coat paint system meeting the requirements of Subsection 708.03.

Shop applied systems may have isolated areas where the coatings were damaged during shipping or erection and will have areas around faying surfaces that may need field applied primer, intermediate, and top coatings. Thus, any coating system that is used in the shop shall be acceptable for the field conditions that are expected to be encountered.

(2) Submittals. The fabricator shall submit a complete package, in accordance with Subsection 105.03 for Construction Drawings, which includes the following information. The submittals shall be made sufficiently in advance of coating work to allow for review, resubmittals, and approval.

a. Surface Preparation/Painting Plan. The surface preparation/painting plan shall include the specified methods of surface preparation and type(s) of equipment to be utilized for removal of rust, mill scale, or foreign matter. The plan shall identify the solvents proposed for solvent cleaning, together with the solvent Safety Data Sheets (SDS). If any detergents, additives, or inhibitors are incorporated into the water used for any coating work operations, the plan shall include the names of the materials and their SDS.

The plan shall also include the methods of coating application, including any required stripe coats, and all equipment to be utilized.

The plan shall also identify all applicable QC/QA Hold Points. Specific inspection items throughout these specifications are designated as Hold Points. These Hold Points are for the QA Inspector to perform inspections. QA inspections will be performed only after a proper QC inspection by the fabricator. Permission to proceed beyond a Hold Point without a QA inspection will be granted solely at the discretion of the Structural Steel Fabrication Engineer, and only on a case-by-case basis. If re-work is necessary, as determined by a QA inspection, it shall be accomplished and a new Hold Point for the re-work shall be observed as defined above.

b. Abrasives. The fabricator shall submit the type of abrasives to be used for abrasive blast cleaning and their SDS. For expendable abrasives, the Contractor shall provide certification from the abrasive supplier that the abrasive meets the requirements of *SSPC-AB 1*. For steel grit abrasives, the certification shall indicate that the abrasive meets the requirements of *SSPC-AB 3*.

- c. Coating System Information. The fabricator shall submit the latest version of the product manufacturer's application and thinning instructions, SDS, and product data sheets for each and every coating, thinner, sealer, and grease rustproofing compound. Specific attention shall be drawn to storage temperatures and the temperatures of the material, surface, and ambient air at the time of application. Recommended minimum ambient weather conditions during curing shall also be included. A letter or written instructions from the coating manufacturer shall be provided indicating the length of time that each coat must be protected from cold or inclement weather (e.g. exposure to rain) during the drying/curing period.

When the Agency accepts the submittals, the fabricator will receive written notification. The fabricator shall not construe Agency acceptance of the submittals to imply approval of any particular method or sequence for conducting the work, or for addressing health and safety concerns. Acceptance of the submittals does not relieve the fabricator from the responsibility to conduct the work according to the requirements of Federal, State, or local regulations, this Specification, or to adequately protect the health and safety of all workers involved in the project and any members of the public who may be affected by the project. The fabricator remains solely responsible for the adequacy and completeness of the programs and work practices, and adherence to them.

- (3) Quality Control (QC) Inspections. The fabricator shall perform first line, in progress QC inspections. The personnel performing any QC tests shall be trained in coatings inspection and the use of the testing instruments. Documentation of training shall be provided upon request. Painters shall perform wet film thickness measurements, with the Quality Control Inspector conducting random spot checks of the wet film. Reports for all quality control testing and observations shall be completed and provided to the QA Inspector on a daily basis.

- a. Fabricator QC inspections shall include, but are not limited to, the following:
1. Ambient conditions.
 2. Compressed air cleanliness.
 3. Surface preparation and surface profile (solvent cleaning, abrasive blast cleaning, etc.).
 4. Coating application (materials verification, mixing, thinning, induction/sweat-in time, and wet/dry film thickness).
 5. Recoat times and cleanliness between coats.

6. Coating continuity and coverage (freedom from runs, sags, overspray, dry spray, pinholes, shadow-through, skips, misses, etc.).
 7. Records of fabricator QC inspections shall document any applicable product batch numbers.
- b. The following equipment shall be provided by the fabricator as necessary to perform QC inspections:
1. Psychrometer or comparable equipment for the measurement of dew point and relative humidity, together with all necessary tables or psychrometric charts.
 2. Surface temperature Digital Spot Thermometer.
 3. *SSPC-VIS 1 - Guide and Reference Photographs for Steel Surfaces Prepared by Dry Abrasive Blast Cleaning* and *SSPC-VIS 3 - Visual Standard for Power and Hand-Tool Cleaned Steel*, as applicable.
 4. Commercially available putty knife of a minimum thickness of 40 mils and a width between 1 and 3 inches.
 5. Replica tape and spring micrometer.
 6. Wet film thickness gauge.
 7. Blotter paper for compressed air cleanliness checks.
 8. Type 2 electronic dry film thickness gauge per *SSPC-PA 2 Measurement of Dry Coating Thickness with Magnetic Gauges*.
 9. Calibration standards for dry film thickness gauge.
 10. Light meter for measuring light intensity during surface preparation, painting, and inspection activities.
 11. Printed copies of all applicable ASTM and SSPC Standards used for the work.
 12. *SSPC Manual of Good Painting Practice, Volume 1*.

The instruments shall be calibrated within 12 months of the date of Project usage or according to the equipment manufacturer's recommendations and the fabricator's QC Program if they require a shorter duration.

- (4) Quality Assurance (QA) Observations. The QA Inspector will conduct QA observations of any or all phases of the work. The presence or activity of QA Inspector observations in no way relieves the fabricator of the responsibility to provide all necessary daily QC inspections and to comply with all requirements of this specification.

The Structural Steel Fabrication Engineer has the right to reject any work that was performed without adequate provision for QA observations.

- (5) Inspection Access and Lighting. The fabricator shall provide artificial lighting in areas where natural light is inadequate, to allow proper cleaning, inspection, and painting. Illumination for inspection shall be at least 30 foot-candles.

- (6) Surface Preparation and Painting Equipment. All cleaning and painting equipment shall include gauges capable of accurately measuring fluid and air pressures and shall have valves capable of regulating the flow of air, water, or paint as recommended by the equipment manufacturer. The equipment shall be maintained in proper working order.

Hand tools, power tools, abrasive blast cleaning equipment, brushes, rollers, and spray equipment shall be of suitable size and capacity to perform the work required. All power tools shall be equipped with vacuums and High Efficiency Particulate Air (HEPA) filtration. Appropriate filters, traps, and dryers shall be provided for the compressed air used for abrasive blast cleaning and conventional spray application. Paint pots shall be equipped with air operated continuous agitation devices unless prohibited by the coating manufacturer. The air discharge from power tools and air motors shall be directed away from steel surfaces; if this is not possible a filtering device shall be appropriately placed.

- (7) Ambient Conditions. Surfaces to be painted after cleaning shall remain free of moisture and other contaminants. The fabricator shall control operations to ensure that dust, dirt, or moisture does not come in contact with surfaces cleaned or painted that day. The following ambient conditions shall be met:

- a. The surface and ambient temperatures shall be at least 5°F above the dew point during final surface preparation operations.
- b. The surface and ambient temperatures shall be a minimum of 40°F, at least 5°F above dew point, and the maximum relative humidity shall be less than or equal to 85% during the application and cure/dry time of each coat of the paint system. If the manufacturer's published literature is more restrictive it shall be followed for specific temperature, dew point, and humidity conditions during the application cure/dry of each coat. The cure/dry time shall be measured as the time following application when the ambient conditions are within the ranges above.

The fabricator shall monitor and document temperature, dew point, and relative humidity at the beginning of each Work Day and every 4 hours during surface preparation and coating application, in the specific areas where the work is being performed. The frequency of monitoring shall increase if weather conditions are changing. If the weather conditions are forecast to be borderline relative to the limits established by the manufacturer, monitoring shall continue at a minimum of 4 hour intervals throughout the curing/drying period. The Structural Steel Fabrication Engineer has the right to reject any work that was performed under unfavorable weather conditions. Rejected work shall be removed, re-cleaned, and repainted at the fabricator's expense.

- (8) Compressed Air Cleanliness. Prior to using compressed air for abrasive blast cleaning, blowing down the surfaces, and painting with conventional spray, the fabricator shall verify that the compressed air is free of moisture and oil contamination in accordance with the requirements of *ASTM D 4285*. The tests shall be conducted at least one time each shift for each compressor system in operation. If air contamination is evident, the fabricator shall change filters, clean traps, add moisture separators or filters, or make other adjustments as necessary to achieve clean, dry air. The fabricator shall also examine the work performed since the last acceptable test for evidence of defects or contamination caused by the compressed air. Affected work shall be repaired at the fabricator's expense.
- (9) Surface Preparation and Profile (Hold Point).
- a. Surface Preparation. All steel surfaces to be painted shall be prepared by dry abrasive blast cleaning to meet the requirements of *SSPC-SP 10*.
 - b. Abrasives. Abrasive blast cleaning shall be performed using either expendable abrasives (other than silica sand), or recyclable steel grit abrasives. Expendable abrasives shall be used one time and disposed of. The fabricator shall verify that recycled abrasives are free of oil contamination by conducting oil content tests in accordance with *SSPC-AB 2* on a daily basis.
 - c. Surface Profile. The abrasives used for blast cleaning shall have a gradation such that the abrasive will produce a uniform surface profile of 1.5 to 3.5 mils. If the profile requirements of the coating manufacturer are more restrictive, the fabricator shall advise the Structural Steel Fabrication Engineer and comply with the more restrictive requirements. For recycled abrasives, an appropriate operating mix shall be maintained in order to control the profile within these limits.

The surface profile produced by the fabricator's surface preparation procedures shall be determined by replica tape and spring micrometer at the beginning of the work, and each day that the surface preparation is performed. Areas having unacceptable measurements shall be further tested to determine the limits of the deficient area. The replica tape shall be attached to the daily report.

When unacceptable profiles are produced, work shall be suspended. The fabricator shall make the necessary adjustments to ensure that the correct surface profile is achieved on all surfaces. The fabricator shall not resume work until the new profile is verified by the QA observations and he/she confirms that the profile is acceptable.

- d. Surface Condition Prior To Painting. Prepared surfaces shall meet the specified degrees of cleaning immediately prior to painting, and shall be painted before rusting appears on the surface. If rust appears or bare steel remains unpainted for more than 8 hours, the affected area shall be prepared again at the expense of the fabricator.

All surface preparation cleaning residue on steel surfaces shall be removed prior to painting.

The quality of surface preparation and cleaning of surface dust and debris must be accepted by the QA Inspector prior to painting. The Structural Steel Fabrication Engineer has the right to reject any work that was performed without adequate provision for QA observations to accept the degree of cleaning. Rejected coating work shall be removed and replaced at the fabricator's expense.

- (10) General Paint Requirements. Paint storage, mixing, and application shall be accomplished according to these Specifications and as specified in the paint manufacturer's written instructions and product data sheets for the paint system used. In the event of a conflict between these specifications and the coating manufacturer's instructions and data sheets, the fabricator shall advise the Structural Steel Fabrication Engineer and comply with the most restrictive requirements.

- a. Paint Storage and Mixing. All paint shall be stored according to the manufacturer's published instructions, including handling, minimum and maximum temperatures, and warming as required prior to mixing. All coatings shall be supplied in sealed containers bearing the manufacturer's name, product designation, batch number, and mixing/thinning instructions. Leaking containers shall not be used. The paint shall be stored in a secure fireproof location.

Mixing shall be performed according to the manufacturer's instructions. Thinning shall be performed using thinner provided by the manufacturer, and only to the extent allowed by the manufacturer's written instructions. In no case shall thinning be permitted that would cause the coating to exceed the local Volatile Organic Compound (VOC) emission restrictions. For multiple component paints, only complete kits shall be mixed and used. Partial mixing is not allowed.

The ingredients in the containers of paint shall be thoroughly mixed by mechanical power mixers according to the manufacturer's instructions, in the original containers before use or mixing with other containers of paint. The paint shall be mixed in a manner that will break up all lumps, completely disperse pigment, and result in a uniform composition. Paint shall be carefully examined after mixing for uniformity and to verify that no unmixed pigment remains on the bottom of the container.

Excessive skinning or partial hardening due to improper or prolonged storage will be cause for rejection of the paint, even though it may have been previously inspected and accepted. Manufacturer recommended induction/sweat-in times and temperature of mixed coatings shall be observed.

Multiple component coatings shall be discarded after the expiration of the pot life. Single component paint shall not remain in spray pots, paint buckets, etc. overnight and shall be stored in a covered container and remixed before use.

- b. Paint Application. Unless prohibited by the coating manufacturer's written instructions, paint may be applied by spray methods, rollers, or brushes. If applied with conventional or airless spray methods, paint shall be applied in a uniform layer with overlapping at the edges of the spray pattern.

The painters shall monitor the wet film thickness of each coat during application. The wet film thickness shall be calculated based on the specified dry film thickness using the solids by volume of the material and the amount of thinner added.

When brushes or rollers are used to apply the coating, additional applications may be required to achieve the specified thickness per layer.

- c. Re-coating and Film Continuity (Hold Point for Each Coat). Paint shall be considered dry for re-coating according to the re-coat time/temperature/humidity criteria provided in the manufacturer's instructions and when an additional coat can be applied without the development of film irregularities such as lifting, wrinkling, or loss of adhesion of the under coat.

- d. Stripe Coats. Unless indicated otherwise in the Contract, the Contractor shall apply an additional stripe coat to edges, crevices, welds, and similar surface irregularities for the prime coat and intermediate coat. The stripe coat shall be applied by brush or roller, as per manufacturer's recommendations, such that the coating is thoroughly worked into or on the irregular surfaces, and shall extend onto the surrounding steel a minimum of 1 inch in all directions. The purpose of the stripe coat is to build additional thickness and to assure complete coverage of these areas.

The stripe coat shall not be applied as part of the application of the full coat. The stripe coat shall be applied and dried separately according to the manufacturer's recommended drying times. Also, the color of the stripe coat shall contrast with the colors used for the full coats immediately preceding and succeeding the stripe coat.

- e. Coating Sequence. For locations painted under this specification, coatings shall be applied as follows:
1. Prime Coat. The full prime coat shall be applied first to protect the steel. Once the full prime coat has dried, the prime stripe coat shall be applied.
 2. Intermediate Coat. After the prime stripe coat has dried, an intermediate stripe coat shall be applied and allowed to dry, followed by the full intermediate coat.
 3. Top Coat. After the full intermediate coat has dried, the full top coat shall be applied.

- (11) Coating Thickness. The dry film thicknesses of the full coats shall be as follows, as measured in accordance with *SSPC-PA 2*. If the manufacturer's upper or lower thickness limit is more restrictive, it shall be followed instead.

1. The prime coat of organic zinc-rich primer shall be between 3.5 and 5.0 mils dry film thickness.
2. The intermediate coat of epoxy or urethane shall be between 3.0 and 6.0 mils dry film thickness.
3. The finish coat of aliphatic urethane shall be between 2.5 and 4.0 mils dry film thickness. Finish coat color shall be according to Contract Documents.

- (12) Amine Blush. Amine blush is a residue that can form on newly applied epoxy coating films under certain conditions. Amine blush often appears as a yellowish milky and/or a blotchy residue on the coating surface and is a deterrent to the adhesion of subsequently applied coating layers. If amine blush is detected, the Contractor shall provide the Engineer with written procedures from the coating manufacturer for complete removal prior to the application of additional coating layers.

Painting shall be done in a neat and workmanlike manner. Each coat of paint shall be applied as a continuous film of uniform thickness free of defects including, but not limited to, runs, sags, overspray, dry spray, pinholes, voids, skips, misses, and shadow-through. Defects such as runs and sags shall be brushed out immediately during application.

- (13) Repair of Damage to New Coating System. The Contractor shall repair all damage to the newly installed coating system, at no cost to the Agency. If the damage extends to the substrate, the damaged areas shall be prepared to meet *SSPC-SP 3*.

The surrounding coating at each repair location shall be feathered for a minimum distance of 1-1/2 inches to achieve a smooth transition between the prepared areas and the existing coating.

If the bare steel is exposed, all coats shall be applied to the prepared area. If only the intermediate and finish coats are damaged, the intermediate and finish coats shall be applied. If only the finish coat is damaged, the finish coat shall be applied.

All Hold Points and specifications are applicable to the repair of damaged areas and areas concealed by containment.

- (e) Grease Coating. When the Contract Plans specify that any steel surfaces are to be grease coated, all work shall be performed in accordance with Subsection 708.04.

Grease rustproofing compound shall be uniformly applied in a single coat by brush or spray at an approximate rate of 20 ft²/gal to the steel as specified. This shall occur after all concrete form work has been removed, and after the final coat of paint, including repairs, has fully cured. A fully cured condition has occurred when a thumbnail driven into the coating surface does not leave an impression and when a thumb firmly pushed against the surface and twisted does not disturb the coating.

Surfaces adjacent to areas being grease coated shall be protected against over-spray. Non-metallic and stainless steel surfaces shall not be coated.

506.25 BASIS OF PAYMENT is hereby modified by being deleted in its entirety and replaced with the following:

506.25 BASIS OF PAYMENT. The accepted quantity of Structural Steel will be paid for at the Contract Unit Price per pound for the items specified in the Contract. Payment will be full compensation for furnishing, detailing, handling, transporting, and placing the materials specified, including nondestructive testing of welds; for preparing the surface of new steel to be painted, galvanized, metalized, or to remain unpainted; for necessary field cleaning; and for painting, metalizing, sealing, galvanizing, or grease coating of surfaces, unless otherwise paid for. Payment will also be full compensation for furnishing and implementing the erection plan, and for furnishing all labor, tools, equipment, and incidentals necessary to complete the work.

Payment for Structural Steel on a lump sum basis will be full compensation for performing all work specified and for furnishing all labor, materials, tools, equipment, erection plans, and incidentals necessary to complete the work.

The Engineer may authorize progress payments in the following manner:

- (a) A maximum of 15% of the estimated quantity may be paid when the Fabrication Drawings are approved for fabrication.
- (b) A maximum of 75% of the estimated quantity may be paid when the steel has been entirely completed and accepted per the approved Fabrication Drawings, stored in a location and manner accepted by the Structural Steel Fabrication Engineer, and all applicable material certifications have been approved.
- (c) A maximum of 90% of the estimated quantity may be paid when the steel has been erected, falsework removed, and painting of connections, and “touch-up” completed where required.
- (d) After completion and acceptance of all work under this Section, including extended weights being received and checked, 100% of the quantity will be paid.

All nondestructive testing and required quality control activities will be considered incidental to fabrication, and no separate payment will be made.

Payment will be made under:

<u>Pay Item</u>	<u>Pay Unit</u>
506.50 Structural Steel, Rolled Beam.....	Pound
506.55 Structural Steel, Plate Girder	Pound
506.56 Structural Steel, Curved Plate Girder.....	Pound
506.57 Structural Steel, Truss.....	Pound
506.60 Structural Steel.....	Pound
506.75 Structural Steel.....	Lump Sum

SECTION 510 – PRESTRESSED CONCRETE

510.12 GROUT, part (b), is hereby modified by deleting the phrase “requirements of Subsection 707.03(c)(1) and Subsection 707.03(c)(3).” from the fifth paragraph and replacing it with the phrase “requirements of Subsection 707.03(a)(1) and Subsection 707.03(a)(3).”

SECTION 516 – EXPANSION DEVICES

516.02 MATERIALS is hereby modified by deleting the fourth entry, “Asphalt Plug Bridge Joint.....707.15”, from the Subsection listing and replacing it with the following:

Asphaltic Plug Joints for Bridges707.15

SECTION 519 – SHEET MEMBRANE WATERPROOFING

519.02 MATERIALS is hereby modified by being deleted in its entirety and replaced with the following:

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

Waterproofing Membrane System, Type I726.11(a)

Waterproofing Membrane System, Type II726.11(b)

Spray applied membranes shall be a Waterproofing Membrane System, Type I, and torch applied membranes shall be a Waterproofing Membrane System, Type II.

SECTION 524 – JOINT SEALER

524.02 MATERIALS is hereby modified by deleting the sixth entry, “Asphalt Plug Bridge Joint.....707.15”, from the Subsection listing and replacing it with the following:

Asphaltic Plug Joints for Bridges707.15

SECTION 540 – PRECAST CONCRETE

540.02 MATERIALS is hereby modified by deleting the twenty eighth material entry, “Sheet Membrane Waterproofing, Preformed Sheet.....726.11”, from the Subsection listing and replacing it with the following:

Waterproofing Membrane System, Type III.....726.11(c)

540.10 INSTALLATION, part (c), is hereby modified by deleting the phrase “requirements of Subsection 726.11.” from the fifth paragraph and replacing it with the phrase “requirements of Subsection 726.11(c).”

540.11 GROUT, part (b), is hereby modified by deleting the phrase “requirements of Subsection 707.03(c)(1) and Subsection 707.03(c)(3).” from the fifth paragraph and replacing it with the phrase “requirements of Subsection 707.03(a)(1) and Subsection 707.03(a)(3).”

540.12 POST-TENSIONING is hereby modified by deleting the phrase “requirements of Subsection 510.12(b).” from the second paragraph and replacing it with the phrase “requirements of Subsection 540.11(b).”

540.14 BASIS OF PAYMENT, part (b), is hereby modified by deleting the word “prestressed” and replacing it with the word “precast”.

SECTION 543 – CONTRACTOR-FABRICATED PRECAST CONCRETE STRUCTURE

543.04 SUBMITTALS is hereby modified by deleting the first paragraph, which begins with “As soon as practical after award...” and ends with “...submitted as separate submittals”, in its entirety and replacing it with the following:

As soon as practical after award of the Contract, all required information shall be prepared and submitted. Fabrication Drawings and erection plans shall be submitted as separate submittals.

SECTION 605 – UNDERDRAINS

605.02 MATERIALS is hereby modified by adding the following as the eighth entry in the Subsection listing:

Geotextile for Underdrain Trench Lining.....720.05

605.02 MATERIALS is hereby further modified by deleting the sentence “Geotextile shall meet the requirements of Table 720.01A for Geotextile for Underdrain Trench Lining.”

SECTION 625 – SLEEVES FOR UTILITIES

625.02 MATERIALS is hereby modified by deleting the eighth entry, “Asphalt Plug Bridge Joint.....707.15”, from the Subsection listing and replacing it with the following:

Asphaltic Plug Joints for Bridges707.15

625.02 MATERIALS is hereby further modified by deleting the fifteenth entry, “Well Casing.....741.01”, from the Subsection listing.

SECTION 630 – UNIFORMED TRAFFIC OFFICERS AND FLAGGERS

630.01 DESCRIPTION is hereby modified by deleting the last sentence, which begins with “Flaggers and UTOs shall conform to...” and replacing it with “Flaggers and UTOs shall conform to the requirements of the Contract Documents and the current edition of the *MUTCD* and its latest revisions.”

630.02 GENERAL, part (b), is hereby modified by being deleted in its entirety and replaced with the following:

- (b) Safety Apparel. Traffic control personnel shall wear safety apparel in accordance with the most current edition of the *MUTCD* and its latest revisions. Traffic control personnel deemed to have unsuitable safety apparel by the Engineer shall be considered ineffective and shall be removed.

When operating during nighttime hours, between sunset and sunrise, traffic control personnel shall wear safety apparel meeting or exceeding performance Class 3 requirements of *ANSI/ISEA 107*, including Class E pants or gaiters.

630.04 FLAGGERS is hereby modified by deleting part (a) in its entirety and replacing it with the following:

- (a) Requirements. The Contractor shall verify that Flaggers meet the following requirements. Flaggers shall have successfully completed a 4-hour training course taught by a certified instructor within the last 24 months and shall carry proof of training at all times when on the Project. Certified instructors shall have successfully completed one of the following courses:
 - (1) Associated General Contractors of VT Traffic Control Technician/Flagger Trainer Course
 - (2) American Traffic Safety Services Association Flagger Instructor Training Course
 - (3) National Safety Council Flagger Instructor Course

SECTION 631 – FIELD OFFICE

631.06 TESTING EQUIPMENT, BITUMINOUS is hereby modified by adding the following as the fourth and fifth entries in the list of equipment, immediately following “1 Shovel, round-pointed with D-handle”:

- 1 Metal shovel, square-head, 5.5 inch minimum width, with long handle
- 1 Metal spatula, of an appropriate size to clean shovels.

631.06 TESTING EQUIPMENT, BITUMINOUS is hereby further modified by adding the following two paragraphs, immediately following “1 Relative humidity pen”:

The Contractor shall provide a non-petroleum asphalt release agent for cleaning the bituminous testing equipment.

The Contractor shall provide 7.5 inch x 7.5 inch x 7.5 inch sampling containers meeting the requirements of *AASHTO R 97*. The number of containers provided shall be sufficient for the quantity of bituminous concrete material installed and the sampling frequency identified in the *Materials Sampling Manual*.

631.08 TESTING EQUIPMENT, GROUT is hereby modified by deleting “1 Set of specimen molds meeting the requirements of *AASHTO T 106 M/T 106*” and replacing it with the following:

Specimen molds meeting the requirements of *AASHTO T 106 M/T 106*. The number of molds shall be sufficient to perform both the acceptance testing required for the contract item and any necessary control of work testing. Each specimen mold shall be capable of producing 3 individual cubes.

631.09 METHOD OF MEASUREMENT is hereby modified by deleting the sentence “Upon entering the cost of the submitted bill into the next biweekly estimate, the Engineer will forward the original paid bill to the Construction Office to be retained with the Project records and will place a copy of the paid bill into the field office records.” in its entirety.

SECTION 641 – TRAFFIC CONTROL

641.02 GENERAL CONSTRUCTION REQUIREMENTS is hereby modified by deleting paragraphs four, five, six and seven in their entirety and replacing them with the following:

- (a) Traffic Control. When the Contract includes the Traffic Control Pay Item, the Plans will contain an Agency-designed traffic control plan. The Contractor may implement the Agency-designed plan or submit an alternate traffic control plan for the Project. When the Contractor will implement an Agency-designed traffic control plan, written certification shall be submitted to the Engineer indicating that traffic control will be performed in accordance with the Agency design. An alternate plan may be for the entire traffic control plan of the Project or for revisions to various phases of the Agency’s design in the Plans, including the specific location of the lanes where the traffic will be maintained. Any alternate plan submitted shall conform to the latest edition of the *MUTCD*.

For an alternate traffic control plan, Construction Drawings shall be submitted in accordance with Section 105. The submitted alternative plan shall include complete construction details, including all aspects of traffic control, to the same extent provided in the Agency design. The Contractor shall allow the Agency 30 Calendar Days to Review the proposed plan for Conformance before it is to be implemented.

- (b) Traffic Control, All-Inclusive. When the Contract includes the Traffic Control, All-Inclusive Pay Item, the Contractor shall design and submit a site-specific traffic control plan in accordance with Section 105. The submitted site-specific plan shall include, for each phase of construction requiring a significant change in temporary traffic control, a narrative description of the proposed temporary traffic control for each phase, including pedestrian accommodations where appropriate, and the major work activities to be completed in each phase.

The submitted site-specific plan shall also include a layout for each phase of construction showing existing lane configurations, existing traffic control devices (signs, signals, and pavement markings), driveways, ramps, and highway intersections, and the location of all proposed temporary traffic control devices, Flaggers, and UTOs. All pertinent dimensions, such as taper lengths, sign spacing, temporary lane widths, and distances from existing traffic control devices shall be labeled.

641.03 TRAFFIC CONTROL DEVICES is hereby modified by adding the following as the thirteenth paragraph, immediately following the phrase “each consisting of a maximum of three lines of eight characters.”:

Each PCMS unit shall be tamper-resistant. The control cabinet shall be locked when not in use. Each PCMS shall also have a security system that will only allow access if a code or password is entered. The default code or password shall be changed upon deployment of the PCMS by the Contractor. PCMS boards featuring remote access shall also be password protected.

641.07 BASIS OF PAYMENT is hereby modified by being deleted in its entirety and replaced with the following:

641.07 BASIS OF PAYMENT.

- (a) Traffic Control and Traffic Control, All-Inclusive. The accepted quantity of Traffic Control and Traffic Control, All-Inclusive will be paid for at the Contract lump sum price. Payment will be full compensation for designing, preparing, implementing, inspecting, maintaining, and removing the applicable traffic control plan and specified traffic control devices, and for furnishing all labor (including traffic patrol vehicle operators, if used by the Contractor), tools, materials, equipment, and incidentals necessary to complete the work.

Partial payments for Traffic Control and Traffic Control, All-Inclusive will be made as follows:

- (1) The first 15% of the Contract lump sum price will be paid upon receipt of written certification from the Contractor that traffic control will be performed in accordance with the Agency-designed traffic control plan, or upon approval of the Contractor’s traffic control plan.

- (2) The remaining 85% of quantity payments will be paid on a prorated basis for the estimated duration of the Contract work remaining.

- (b) Portable Changeable Message Sign and Portable Arrow Board. The accepted quantities of Portable Changeable Message Sign and Portable Arrow Board will be paid for at the Contract Unit Price for each. There will be no payment for any spare units, as they shall be considered incidental to the unit(s) being utilized and paid for through the Contract.

Partial payment for Portable Changeable Message Sign and Portable Arrow Board will be made as follows:

- (1) The first 50% of quantity payments will be made upon the erection of complete Portable Changeable Message Sign(s) and Portable Arrow Board(s) as specified in Subsection 641.06.

- (2) The remaining 50% of quantity payments will be paid on a prorated basis for the estimated duration of the Contract work remaining.

The accepted quantities of Portable Changeable Message Sign Rental and Portable Arrow Board Rental will be paid for at the Contract Unit Price per day. The minimum quantity for payment shall be five days.

Payment for the accepted quantities of Portable Changeable Message Sign, Portable Arrow Board, Portable Changeable Message Sign Rental, and Portable Arrow Board Rental shall be full compensation for furnishing, operating, maintaining, transporting, and installing the unit specified, for removing the unit when it is no longer needed, and for furnishing all labor, tools, equipment, and incidentals necessary to complete the work.

When both Pay Items are in the Contract, a Portable Changeable Message Sign used as a Portable Arrow Board will be paid for at the Contract price for a Portable Arrow Board.

Payment will be made under:

<u>Pay Item</u>	<u>Pay Unit</u>
641.10 Traffic Control	Lump Sum
641.11 Traffic Control, All-Inclusive	Lump Sum
641.15 Portable Changeable Message Sign	Each
641.16 Portable Arrow Board	Each
641.17 Portable Changeable Message Sign Rental.....	Day
641.18 Portable Arrow Board Rental.....	Day

SECTION 646 – RETROREFLECTIVE PAVEMENT MARKINGS

646.02 MATERIALS is hereby modified by deleting the ninth through sixteenth entries in the Subsection listing and replacing them with the following:

Line Striping Targets	708.12(a)
Pavement Marking Mask	708.12(b)
Pavement Marking Tape, Type A.....	754.03(a)
Pavement Marking Tape, Type B.....	754.03(b)
Pavement Marking Tape, Type C	754.03(c)

646.04 APPLICATION OF MARKINGS, GENERAL, part (a), is hereby modified by deleting both instances of the phrase “cold planing” from the second sentence (which begins with “During paving and cold planing, work shall be...”) of the sixth paragraph, and replacing them with the word “milling”.

646.07 DURABLE PAVEMENT MARKINGS, parts (a) and (b), are hereby modified by being deleted in their entirety and replaced with the following:

- (a) Pavement Marking Tape, Type A. Pavement Marking Tape, Type A, when used as a final durable marking, shall be applied in a recess as defined in Subsection 646.09, and shall be applied in accordance with the manufacturer’s requirements.
- (b) Pavement Marking Tape, Type B. Pavement Marking Tape, Type B, when used as a final durable marking, shall be applied in a recess as defined in Subsection 646.09, and shall be applied in accordance with the manufacturer’s requirements.

646.07 DURABLE PAVEMENT MARKINGS, is hereby further modified by deleting part (c), “Pavement Marking Tape, Type C” and part (d), “Pavement Marking Tape, Type D”, in their entirety.

646.07 DURABLE PAVEMENT MARKINGS is hereby further modified by relabeling parts (e) and (f) as parts (c) and (d).

646.07 DURABLE PAVEMENT MARKINGS is hereby further modified by adding the following as the new part (e):

- (e) Preformed Thermoplastic. Preformed thermoplastic shall be one of the Thermoplastic Pavement Markings, Type B listed on the Agency’s *Approved Products List*.

646.07 DURABLE PAVEMENT MARKINGS is hereby further modified by relabeling part (g), “Polyurea Paint.” as “(f) Polyurea Paint.”

646.07 DURABLE PAVEMENT MARKINGS, parts (c)(1) and (f)(1), are both hereby modified by deleting the phrase “paver-placed pavement” from each part and replacing it with the phrase “bonded wearing course”.

646.08 TEMPORARY PAVEMENT MARKINGS is hereby modified by relabeling part (a), "Temporary Pavement Marking Tape." as "(a) Pavement Marking Tape, Type C."

646.09 OTHER RELATED MARKINGS, Table 646.09A, is hereby further modified by deleting the first row and replacing it with the following:

Marking Material	Recess Depth (mils)
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646.13 METHOD OF MEASUREMENT is hereby modified by deleting the seventh paragraph in its entirety. The deleted text begins with "The quantity of Raised Pavement Markers, Type II..." and ends with "... and removed when no longer needed."

646.14 BASIS OF PAYMENT is hereby modified by deleting the phrase "raised pavement markers," from the first sentence (which begins with "The Contract Unit Price for pavement marking items...") of the eleventh paragraph.

646.14 BASIS OF PAYMENT is hereby further modified by deleting the twelfth and thirteenth paragraphs in their entirety. The deleted text begins with "The accepted quantity of Raised Pavement Markers, Type II..." and ends with "... will be considered incidental to the Contract Item Raised Pavement Markers, Type II."

646.14 BASIS OF PAYMENT is hereby further modified by deleting the pay item "646.75 Raised Pavement Markers, Type II..... Each".

SECTION 649 – GEOTEXTILE FABRIC

649.02 MATERIALS is hereby modified by being deleted in its entirety and replaced with the following:

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

Geotextile for Roadbed Separator.....	720.02
Geotextile Under Railroad Ballast.....	720.03
Geotextile Under Stone Fill	720.04
Geotextile for Underdrain Trench Lining.....	720.05
Geotextile for Filter Curtain.....	720.06

Geotextiles shall conform to the following:

- (a) Where sewn seams are used, the Contractor shall furnish the manufacturer’s wide strip tensile test results as part of the certification. The results must verify that the seam meets or exceeds the specified average minimum roll values for the grab tensile strength of the geotextiles, or wide strip tensile strength for reinforcement applications.
- (b) Field seams, where used, shall be in accordance with the manufacturer’s recommendations.

SECTION 653 – EROSION PREVENTION AND SEDIMENT CONTROL

653.02 MATERIALS is hereby modified by inserting the following as the fourth and fifth entries in the Subsection listing:

Geotextile Under Stone Fill	720.04
Geotextile for Silt Fence	720.07

653.02 MATERIALS is hereby further modified by deleting the phrase “Geotextile Under Stone Fill shall be in accordance with Section 720 and Table 720.01A. Geotextile for Silt Fence shall be in accordance with Section 720 and Table 720.01A.”

653.08 RUNOFF CONTROL MEASURES is hereby modified by deleting the first paragraph of Subsection 653.08(a)(1) in its entirety and replacing it with the following:

- (1) Check Dam, Type I. Check Dam, Type I shall be placed in channels and on Geotextile Under Stone Fill meeting the requirements of Subsection 720.04.

653.08 RUNOFF CONTROL MEASURES is hereby further modified by deleting Subsection 653.08(b)(1) and Subsection 653.08(b)(2) in their entirety and replacing them with the following:

- (1) Silt Fence, Type I. Silt Fence, Type I shall be constructed of posts and Geotextile for Silt Fence meeting the requirements of Subsection 720.07.
- (2) Silt Fence, Type II. Silt Fence, Type II shall be constructed of posts, Geotextile for Silt Fence meeting the requirements of Subsection 720.07, and woven wire reinforcement.

653.09 TREATMENT MEASURES is hereby modified by deleting the second paragraph of Subsection 653.09(a), beginning with “Stabilized Construction Entrances shall be constructed of stone...”, in its entirety and replacing it with the following:

Stabilized Construction Entrances shall be constructed of stone meeting the requirements of Subsection 704.17 and shall be placed on top of Geotextile Under Stone Fill meeting the requirements of Subsection 720.04.

653.09 TREATMENT MEASURES is hereby further modified by deleting the third paragraph of Subsection 653.09(b)(1), beginning with “Stake and fabric devices...”, in its entirety and replacing it with the following:

Stake and fabric devices shall be constructed of Geotextile for Silt Fence meeting the requirements of Subsection 720.07 and stakes approved by the Engineer.

653.09 TREATMENT MEASURES is hereby further modified by deleting the second paragraph of Subsection 653.09(b)(3), beginning with “Inlet Protection Device, Type III shall be constructed of Aggregate...”, in its entirety and replacing it with the following:

Inlet Protection Device, Type III shall be constructed of Aggregate for Erosion Prevention and Sediment Control and shall be placed on top of Geotextile Under Stone Fill meeting the requirements of Subsection 720.04.

SECTION 675 – TRAFFIC SIGNS

675.02 MATERIALS is hereby modified by deleting the first entry, “Paint for Traffic Signs.....708.06”, from the Subsection listing.

675.07 TRAFFIC SIGNS is hereby modified by deleting part (b)(2) in its entirety and replacing it with the following:

- (2) Flat Sheet Aluminum. Fabrication of the flat aluminum sheets, including cutting to size, shall be completed prior to degreasing, etching, or treating, and application of the retroreflective sheeting. Flat sheet aluminum may be sheared, blanked, sawed, or milled. No flame cutting will be permitted. Field drilling or punching of holes will be allowed as needed.

675.07 TRAFFIC SIGNS is hereby further modified by adding the following as the second and third sentences of part (d), immediately after the sentence beginning “Signs shall be mounted as tightly to the posts, frame, or...”:

For permanent installations of Type A signs to frames or posts, a nylon-insert locking nut and two washers shall be used. For all sign types, if bolts are used for mounting, the installed bolt shall be at least flush with the nut.

SECTION 677 – OVERHEAD TRAFFIC SIGN SUPPORTS

677.03 GENERAL is hereby modified by adding the sentence “Field verification testing for Direct Tension Indicators is not required.” immediately following the sentence “High-Strength Bolts, Nuts, and Washers shall be tensioned in accordance with Subsection 506.19.”

SECTION 678 – TRAFFIC CONTROL SIGNALS

678.09 ERECTION OF POSTS AND POLES is hereby modified by adding the sentence “Field verification testing for Direct Tension Indicators is not required.” immediately following the sentence “High-Strength Bolts, Nuts, and Washers shall be tensioned in accordance with Subsection 506.19.”

SECTION 679 – STREET LIGHTING

679.02 MATERIALS is hereby modified by deleting the fifth material entry, “Bracket Arms.....753.04”, from the Subsection listing.

679.02 MATERIALS is hereby further modified by inserting the following as the fifth and sixth entries in the Subsection listing:

- Bracket Arms, Aluminum.....753.04(a)
- Bracket Arms, Steel753.04(b)

679.05 BRACKET ARMS is hereby modified by deleting the first sentence of the Subsection and replacing it with the following:

Bracket arms shall be free of defects and burrs. Bracket arms shall be able to withstand a vertical load of 100 pounds and a horizontal load of 50 pounds without fracture or permanent deformation and shall be installed as shown in the Contract Documents.

Bracket arms installed on aluminum posts shall be in accordance with Subsection 753.04(a). Bracket arms installed on steel or wood posts shall be in accordance with Subsection 753.04(b).

SECTION 680 – TRAVEL INFORMATION SIGNS

680.02 MATERIALS is hereby modified by deleting the second entry, “Paint for Traffic Signs.....708.06”, from the Subsection listing.

SECTION 702 – BITUMINOUS MATERIALS

702.06 APPLICATION TEMPERATURE RANGES, is hereby modified by deleting Table 702.06A in its entirety and replacing it with the following:

TABLE 702.06A – EMULSIFIED ASPHALT APPLICATION TEMPERATURE RANGES

Emulsified Asphalt Type	Temperature Range (°F)		Temperature Range (°C)	
	Spray	Mix	Spray	Mix
	Min. – Max.	Min. – Max.	Min. – Max.	Min. – Max.
RS-1	70 – 170	--	21 – 77	--
RS-2, CRS-1	120 – 160	--	49 – 71	--
CRS-2	140 – 175	--	60 – 79	--
RS-1h, CRS-1h	70 – 170	--	21 – 77	--
SS-1h, CSS-1h	75 – 130	50 – 130	24 – 54	10 – 54
MS-2h, CMS-2h	--	75 – 140	--	24 – 60

SECTION 704 – AGGREGATES

704.01 FINE AGGREGATE FOR CONCRETE, part (b), is hereby modified by being deleted in its entirety and replaced with the following:

- (b) Organic Impurities. Fine aggregate for concrete shall have an Organic Plate Number of two or less as determined in accordance with *AASHTO T 21*.

704.10 AGGREGATE FOR BITUMINOUS CONCRETE PAVEMENT, part (a), is hereby modified by deleting the reference to “*ASTM C 295/C 295 M (Modified)*” from the end of the sentence that begins with “Manufactured sand may be substituted for...” and replacing it with “*AASHTO T 304*”.

704.10 AGGREGATE FOR BITUMINOUS CONCRETE PAVEMENT, part (a)(3), is hereby modified by deleting the reference to “*ASTM D 5821*” from the end of the sentence that begins with “When crushed gravel is used as coarse aggregate in Marshall bituminous...” and replacing it with “*AASHTO T 335*”.

704.10 AGGREGATE FOR BITUMINOUS CONCRETE PAVEMENT, part (a)(3)a., is hereby modified by deleting “Measurement is made using test method *ASTM D 5821, Standard Test Method for Determining the Percentage of Fractured Particles in Coarse Aggregate.*” and replacing it with “Measurement is made using test method *AASHTO T 335.*”

SECTION 706 – STONE FOR MASONRY, RIPRAP, AND OTHER PURPOSES

706.06 ROCK FILL FOR GABIONS is hereby modified by being deleted in its entirety and replaced with the following:

706.06 THIS SUBSECTION RESERVED.

SECTION 707 – JOINT MATERIALS

707.14 PREFORMED JOINT FILLER, Table 707.14A, is hereby modified by deleting the reference to “*AASHTO T 42*” from the third column.

707.15 ASPHALTIC PLUG JOINTS FOR BRIDGES is hereby modified being deleted in its entirety and replaced with the following:

707.15 ASPHALTIC PLUG JOINTS FOR BRIDGES. Asphaltic Plug Joints for Bridges shall be single and/or multiple layer systems consisting of asphaltic binder, aggregate, closed cell foam expansion joint filler, and steel bridging plate, as applicable. Asphaltic Plug Joints shall be in accordance with *ASTM D 6297* and shall be one of the products listed on the Agency’s *Approved Products List*.

707.17 ASPHALTIC PLUG JOINT BINDER is hereby made a new subsection of the specifications as follows:

707.17 ASPHALTIC PLUG JOINT BINDER. Asphaltic Plug Joint Binder shall be a thermoplastic polymeric-modified asphalt in accordance with *ASTM D 6297* and shall be one of the products listed on the Agency’s *Approved Products List*.

SECTION 708 – PAINTS, STAINS, AND TRAFFIC MARKING MATERIALS

708.03 APPROVED STRUCTURAL COATING SYSTEMS is hereby modified by being deleted in its entirety and replaced with the following:

708.03 STRUCTURAL STEEL COATING SYSTEMS. Acceptable structural steel coating systems shall be one of the systems listed on the Agency’s *Approved Products List*, listed on the *NEPCOAT Qualified Products List B*, and shall meet the following requirements:

- (a) System. The structural steel coating system shall be a three-coat system with a prime, intermediate, and top coat. Components of different systems shall not be intermixed.
- (b) Color. Individual coats shall have contrasting colors. The finish color of the top coat shall be green, black, or brown as specified in the Contract Documents, and shall conform to *SAE AMS-STD 595* for the respective chip number as specified in Table 708.03A.

TABLE 708.03A – COLORS FOR STRUCTURAL COATING SYSTEMS

Color	Chip Number
Green	14062
Black	27038
Brown	20059

Damage to structural steel coating systems shall be repaired with a compatible structural steel coating system as specified herein.

708.06 PAINT FOR TRAFFIC SIGNS is hereby modified by being deleted in its entirety and replaced with the following:

708.06 THIS SUBSECTION RESERVED.

708.08 PAINT FOR PAVEMENT MARKINGS is hereby modified by adding the following two rows to Table 708.08C, immediately after the row for “Close cup flash point”.

Viscosity	<i>ASTM D 562</i>	78 Krebs min./ 95 Krebs max.	78 Krebs min./ 95 Krebs max.
Dry Time	<i>ASTM D 711</i>	10 minutes max	10 minutes max.

SUBSECTION 708.11 PAVEMENT MARKING TAPE is hereby modified by being deleted in its entirety and replaced with the following:

708.11 THIS SUBSECTION RESERVED

708.12 TEMPORARY DELINEATION SYSTEMS is hereby modified by being deleted in its entirety and replaced with the following:

708.12 TEMPORARY DELINEATION SYSTEMS.

- (a) Line Striping Targets. Acceptable Line Striping Targets shall be one of the Line Striping Targets on the Agency’s *Approved Products List*.
- (b) Pavement Marking Mask. Acceptable Pavement Marking Mask shall be one of the Masking Marking Tapes on the Agency’s *Approved Products List*.

SECTION 711 – CULVERTS, STORM DRAINS, AND SEWER PIPES, METAL

711.02 CORRUGATED ALUMINUM ALLOY PIPE, PIPE ARCHES, AND UNDERDRAINS, part (a)(2)c., is hereby modified by deleting the phrase “requirements of Subsection 711.01(a)(2)c.” and replacing it with the phrase “requirements of Subsection 711.01(a)(1)c.”

SECTION 712 – CRIBBING MATERIALS

712.04 GABION BASKETS is hereby modified by being deleted in its entirety and replaced with the following:

712.04 THIS SUBSECTION RESERVED.

SECTION 713 – REINFORCING STEEL, STRAND, AND WELDED WIRE REINFORCEMENT

713.04 COLD DRAWN STEEL WIRE is hereby modified by deleting the reference to “*AASHTO M 32 M/M 32*” and replacing it with “*AASHTO M 336 M/M 336*”.

713.05 WELDED WIRE REINFORCEMENT is hereby modified by deleting the phrase “*AASHTO M 55 M/M 55* or *AASHTO M 221 M/M 221*” and replacing it with “*AASHTO M 336 M/M 336*”.

SECTION 714 – STRUCTURAL STEEL

714.05 HIGH-STRENGTH BOLTS, NUTS, AND WASHERS is hereby modified by deleting the first sentence in its entirety and replacing it with the following:

High-strength bolts shall conform to the requirements of *ASTM F 3125/F 3125 M*, Grade A 325, including rotational capacity testing, for each lot of fasteners.

714.06 HEAT-TREATED STEEL STRUCTURAL BOLTS is hereby modified by deleting the first sentence in its entirety and replacing it with the following:

Heat-treated steel structural bolts shall conform to the requirements of *ASTM F 3125/F 3125 M*, Grade A 490, including rotational capacity testing, for each lot of fasteners.

SECTION 720 – GEOTEXTILES

SECTION 720 – GEOTEXTILES is hereby modified by being deleted in its entirety and replaced with the following:

SECTION 720 – GEOTEXTILES

720.01 GENERAL. Geotextiles shall be evaluated in accordance with the NTPEP geotextiles work plan and in compliance with the NTPEP audit program for geotextiles. Geotextiles shall be one of the products listed on the Agency’s *Approved Products List* for the respective material specification.

720.02 GEOTEXTILE FOR ROADBED SEPARATOR. Geotextile for Roadbed Separator shall conform to *AASHTO M 288*, Table 1, Class 1 for Geotextile Strength Property Requirements, and shall conform to *AASHTO M 288*, Table 3 for Separation Geotextile Property Requirements.

720.03 GEOTEXTILE UNDER RAILROAD BALLAST. Minimum Average Roll Values (MARV) for Geotextile Under Railroad Ballast shall be as required in Table 720.03A.

TABLE 720.03A – MARV FOR GEOTEXTILE UNDER RAILROAD BALLAST

Geotextile Property	Test Method	MARV
Elongation Criteria at Failure ¹	<i>ASTM D 4632/ D4632 M</i>	≥ 50%
Grab Strength (lbs)	<i>ASTM D 4632/ D4632 M</i>	225
Tear Strength (lbs)	<i>ASTM D 4533/ D 4533 M</i>	115
Puncture Strength (lbs)	<i>ASTM D 6241</i>	850
Permittivity (s ⁻¹)	<i>ASTM D 4491/ D 4491 M</i>	0.70
Apparent Opening Size (mm)	<i>ASTM D 4751</i>	0.212 max. (No. 70 Sieve)
UV Resistance (% Strength Retained)	<i>ASTM D 4355/ D 4355 M</i>	70% at 500 hours of exposure
Structure	--	Nonwoven only

¹ Elongation corresponds to Maximum Grab Tensile Strength as measured in accordance with the requirements of *ASTM D 4632/D 4632 M*.

720.04 GEOTEXTILE UNDER STONE FILL. Geotextile Under Stone Fill shall conform to *AASHTO M 288*, Table 1, Class 1 for Geotextile Strength Property Requirements, and shall conform to *AASHTO M 288*, Table 5 for Stabilization Geotextile Property Requirements. Geotextile structure shall not be slit film.

720.05 GEOTEXTILE FOR UNDERDRAIN TRENCH LINING. Geotextile for Underdrain Trench Lining shall conform to *AASHTO M 288*, Table 1, Class 3 for Geotextile Strength Property Requirements, with a minimum elongation of 20%. Geotextile for Underdrain Trench Lining shall conform to *AASHTO M 288*, Table 2 (> 50% of in situ soil passing the No. 200 (0.075 mm) sieve) for Subsurface Drainage Geotextile Requirements. Geotextile structure shall be nonwoven and shall not be slit film.

720.06 GEOTEXTILE FOR FILTER CURTAIN. Minimum Average Roll Values (MARV) for Geotextile for Filter Curtain shall be as required in Table 720.06A.

TABLE 720.06A – MARV FOR GEOTEXTILE FOR FILTER CURTAIN

Geotextile Property	Test Method	MARV
Elongation Criteria at Failure ¹	<i>ASTM D 4632/ D4632 M</i>	20% max.
Grab Strength (lbs)	<i>ASTM D 4632/ D4632 M</i>	200
Tear Strength (lbs)	<i>ASTM D 4533/ D 4533 M</i>	50
Puncture Strength (lbs)	<i>ASTM D 6241</i>	430
Permittivity (s ⁻¹)	<i>ASTM D 4491/ D 4491 M</i>	0.28
Apparent Opening Size (mm)	<i>ASTM D 4751</i>	0.212 max. (No. 70 Sieve)
UV Resistance (% Strength Retained)	<i>ASTM D 4355/ D 4355 M</i>	70% at 500 hours of exposure
Structure	--	Woven only

¹ Elongation corresponds to Maximum Grab Tensile Strength as measured in accordance with the requirements of *ASTM D 4632/D 4632 M*.

720.07 GEOTEXTILE FOR SILT FENCE. Geotextile for Silt Fence shall conform to *AASHTO M 288*, Table 8 for Temporary Silt Fence Property Requirements. Geotextile structure shall be woven.

SECTION 725 – CONCRETE CURING MATERIALS AND ADMIXTURES

725.01 CONCRETE CURING MATERIALS, part (d) is hereby modified by being deleted in its entirety and replaced with the following:

- (d) **Liquid Membrane-Forming Compounds.** Liquid membrane-forming compounds shall be one of the products listed on the Agency’s *Approved Products List* and shall meet the following requirements:
- (1) Liquid membrane-forming compounds shall be evaluated in accordance with the NTPEP concrete curing compounds work plan.
 - (2) Liquid membrane-forming compounds shall conform to the requirements of *ASTM C 309*, Type 1-D or Type 2, Class B.
 - (3) Liquid membrane-forming compounds shall not be allowed to freeze.

725.02 CHEMICAL ADMIXTURES, part (a) is hereby modified by being deleted in its entirety and replaced with the following:

- (a) General Requirements. Non-bulk quantities of chemical admixtures shall be delivered in the manufacturer's original containers marked with the manufacturer's name and product name. Bulk quantities shall be accompanied by a delivery slip indicating both the manufacturer's name and the product name. Chemical admixtures shall be one of the products listed on the Agency's *Approved Products List* for the respective material specification, shall be evaluated in accordance with the NTPEP concrete admixtures work plan, and shall meet the requirements of the respective material specification below.

SECTION 726 – PROTECTIVE COATINGS AND WATERPROOFING MATERIALS

726.09 METALIZING is hereby modified by being deleted in its entirety and replaced with the following:

726.09 METALIZING. Surfaces to be metalized shall be prepared and coated in accordance with the requirements of *AASHTO/NSBA S8.2/SSPC-PA 18, Specification for Application of Thermal Spray Coating Systems to Steel Bridges*, and the following:

- (a) The coating shall be zinc with a minimum purity of 99.9%.
- (b) All surfaces to be thermal sprayed shall be blast-cleaned to white metal immediately prior to metalizing. The final surface appearance shall be equivalent to Preparation Grade *SSPC-SP 5* supplemented by *SSPC VIS-1*. All surfaces shall also have a uniform surface profile of 3.5 to 5.5 mils. If the profile requirements of the coating manufacturer are more restrictive, the Fabricator shall advise the Structural Steel Fabrication Engineer and comply with the more restrictive requirements.

The surface profile produced by the Fabricator's surface preparation procedures shall be determined by replica tape and spring micrometer at the beginning of the work, and each day that the surface preparation is performed. The replica tape shall be attached to the daily inspection records. Areas having unacceptable measurements shall be further tested to determine the limits of the deficient area and subsequently corrected to meet specification requirements.

- (c) Thermal Spray Coating (TSC) shall be applied within six hours of completing blast cleaning. If this time is exceeded, or rust appears on the surface, the steel surface shall be properly prepared again. TSC shall be applied in the thickness range of 8 to 12 mils to all exterior surfaces. Internal surface (e.g. pot bearings) shall have a coating with a minimum thickness of 2 mils.

- (d) Exterior surfaces (except faying surfaces) shall be sealed with an approved sealant conforming to the sealant manufacturer's recommendations for the TSC applied. The sealant name, manufacturer, and product data sheets shall be included with the submittal for the metalizing procedure. Unless otherwise specified in the Contract, a top coat will not be applied over the seal coat, and therefore the seal coat shall be UV-resistant. The dry film thickness of the sealant shall be 1 to 2 mils. The sealant shall be applied within 8 hours of completing the TSC application.
- (e) In addition to the requirements above, the following shall also apply:
 - (1) QA witnessing of Job Reference Standard(s) is required, when applicable
 - (2) Companion coupons shall be used in lieu of destructive testing on the work piece, except when a test failure occurs.
 - (3) Bend tests shall be performed. The tests shall meet the requirements of *AWS C2.23*.
- (f) Metalizing that has been damaged shall be repaired in accordance with the requirements of Subsection 726.08.

726.11 WATERPROOFING MEMBRANE SYSTEMS is hereby modified by being deleted in its entirety and replaced with the following:

726.11 WATERPROOFING MEMBRANE SYSTEMS. Waterproofing Membrane Systems shall conform the requirements of *ASTM D 6153*, be one of the products listed on the Agency's *Approved Products List*, and meet the following requirements for the respective material specification.

- (a) Waterproofing Membrane System, Type I. Waterproofing Membrane System, Type I shall be a Type I cold applied elastomeric system in accordance with *ASTM D 6153*.
- (b) Waterproofing Membrane System, Type II. Waterproofing Membrane System, Type II shall be a Type II hot applied elastomeric system in accordance with *ASTM D 6153*.
- (c) Waterproofing Membrane System, Type III. Waterproofing Membrane System, Type III shall be a Type III preformed sheet membrane system in accordance with *ASTM D 6153*.

SECTION 753 – HIGHWAY ILLUMINATION

753.04 BRACKET ARMS is hereby modified by being deleted in its entirety and replaced with the following:

753.04 BRACKET ARMS.

- (a) Bracket Arms, Aluminum. Single member bracket arms and the main member of truss-type arms shall be fabricated from seamless aluminum tube conforming to the requirements of *ASTM B 221/B 221 M*, Alloy 6063-T6 or Alloy 6061-T6. Other members of truss-type arms shall conform to the requirements of *ASTM B 221/B 221 M*, Alloy 6063-T6. All screws, nuts, bolts and other hardware for mounting bracket arms to the light pole shall be stainless steel, unless otherwise specified.
- (b) Bracket Arms, Steel. Components of single member and truss-type bracket arms shall be fabricated from standard steel pipe meeting the requirements of *ASTM A 53/A 53 M* or *ASTM A 501/A 501 M*.

SECTION 754 – PAVEMENT MARKING MATERIALS

SECTION 754 – PAVEMENT MARKING MATERIALS is hereby made a new Section of the Specifications as follows:

SECTION 754 – PAVEMENT MARKING MATERIALS

754.01 THIS SUBSECTION RESERVED.

754.02 THIS SUBSECTION RESERVED.

754.03 PAVEMENT MARKING TAPE. Pavement marking tape is a white or yellow preformed retroreflective tape. Pavement marking tape shall be evaluated in accordance with the applicable NTPEP pavement marking materials work plan, with a minimum of one year of data for permanent tape and a full data set for temporary tape, listed on the Agency's *Approved Product List* for the respective material specification, and meet the following requirements.

- (a) Pavement Marking Tape, Type A. Pavement Marking Tape, Type A shall be a high performance and extended service life pavement marking tape in accordance with *ASTM D 4505*. The tape shall have continuous wetting properties and meet the following requirements.
 - (1) Skid Resistance. Skid resistance shall be Skid Resistance Level A in accordance with *ASTM D 4505*.
 - (2) Adhesive. Adhesive shall be Class I, II, or III in accordance with *ASTM D 4505*.

- (3) Durability. Initial durability shall be 10 and three-year durability shall be a minimum of 7 as determined in accordance with *ASTM D 913*.
- (4) Retroreflectivity.
 - a. Dry. Initial dry retroreflectivity shall be Reflectivity Level I in accordance with *ASTM D4505*. Three-year retroreflectivity shall be a minimum of 150 mcd/m²/lx for white and 100 mcd/m²/lx for yellow as determined in accordance with *ASTM E 1710*.
 - b. Wet. Initial wet retroreflectivity shall be a minimum of 250 mcd/m²/lx for white and 200 mcd/m²/lx for yellow. Three-year wetness retroreflectivity shall be a minimum of 150 mcd/m²/lx for white and 75 mcd/m²/lx for yellow as determined in accordance with *ASTM E 2177*.
 - c. Wet Continuous. Wet continuous retroreflectivity shall be a minimum of 150 mcd/m²/lx for white and 100 mcd/m²/lx for yellow in accordance with *ASTM E 2832*.
- (b) Pavement Marking Tape, Type B. Pavement Marking Tape, Type B shall be a standard performance pavement marking tape in accordance with *ASTM D 4505*.
 - (1) Skid Resistance. Skid resistance shall be Skid Resistance Level A in accordance with *ASTM D4505*.
 - (2) Adhesive. Adhesive shall be Class I, II, or III in accordance with *ASTM D 4505*.
 - (3) Durability. Initial durability shall be 10 and three-year durability shall be a minimum of 7 as determined in accordance with *ASTM D 913*.
 - (4) Retroreflectivity. Initial dry retroreflectivity shall be Level II in accordance with *ASTM D 4505*.
- (c) Pavement Marking Tape, Type C. Pavement Marking Tape, Type C shall be a temporary pavement marking tape in accordance with *ASTM D 4592* and the following requirements.
 - (1) Retroreflectivity. Initial wet retroreflectivity shall be a minimum of 250 mcd/m²/lx for white and 200 mcd/m²/lx for yellow.

ALPHABETICAL INDEX OF PAY ITEMS

The index entry “406.38 Hand-Placed Bituminous Concrete Pavement, Drives..... Square Yard” is hereby modified by deleting the word “Pavement” and replacing it with the word “Material”.

The index is hereby modified by adding an entry for “418.10
Material..... Square Foot”.

Asphaltic Approach

The index entry for “646.75 Raised Pavement Markers, Type II..... Each” is hereby
modified by being deleted in its entirety.

APPENDIX J

COMPLIANCE BOND

KNOW ALL MEN BY THESE PRESENTS: that

(Name of Contractor)

(Address of Contractor)

a _____, hereinafter called Principal,
(Corporation, Partnership or Individual)

and _____
(Name of Surety)

(Address of Surety)

hereinafter called Surety, are held and firmly bound unto

(Name of Owner)

(Address of Owner)

hereinafter called Owner, in the penal sum of _____ Dollars, \$(_____) in
lawful money of the United States, for the payment of which sum well and truly to be
made, we bind ourselves, successors, and assigns, jointly and severally, firmly by these
presents.

APPENDIX J

The condition of this obligation is such that whereas, the Principal entered into a certain contract with the Owner, dated the _____ day of _____, 20__, a copy of which is hereto attached and made a part hereof for the construction of:

Now, therefore, if the principal shall well, truly and faithfully perform its duties, all the undertakings, covenants, terms, conditions and agreements of said contract during the original term thereof, and any extensions thereof which may be granted by the Owner, with or without notice to the Surety, and if they shall satisfy all claims and demands incurred under such contract, and shall fully indemnify and save harmless the Owner from all costs and damages which it may suffer by reason of failure to do so, and shall reimburse and repay the Owner all outlay and expense which the Owner may incur in making good any default, then this obligation shall be void; otherwise to remain in full force and effect.

Provided, further, that the said Surety for value received hereby stipulates and agrees that no change, extension of time, alteration or addition to the terms of the contract or to the Work to be performed thereunder or the Specifications accompanying the same shall in any wise affect its obligation on this Bond, and it does hereby waive notice of any such change, extension of time, alteration or addition to the terms of the contract or to the Work or to the Specifications.

Provided, further, that no final settlement between the Owner and the Contractor shall abridge the right of any beneficiary hereunder, whose claim may be unsatisfied.

APPENDIX J

IN WITNESS WHEREOF, this instrument is executed in ____ counterparts, (No.)
each one of which shall be deemed an original, this the ____ day of
_____, 20__.

ATTEST:

Principal

(Principal Secretary)

(SEAL)

By: _____(s)

Address: _____

Witness as to Principal

Address

Surety

ATTEST:

By: _____

Attorney-in-Fact

Witness as to Surety

Address

APPENDIX J

Address

NOTE: Date of Bond must not be prior to date of Contract.

If Contractor is Partnership, all partners should execute Bond.

IMPORTANT: Surety companies executing Bonds must appear on the Treasury Department's most current list (Circular 570) as amended and be authorized to transact business in the State where the Project is located.

APPENDIX K

LABOR & MATERIAL BOND

KNOW ALL MEN BY THESE PRESENTS: that

(Name of Contractor)

(Address of Contractor)

a _____, hereinafter called Principal,
(Corporation, Partnership or Individual)

and

(Name of Surety)

(Address of Surety)

hereinafter called Surety, are held and firmly bound unto

(Name of Owner)

(Address of Owner)

Hereinafter called Owner, in the penal sum of _____ Dollars, \$(_____) in lawful money of the United States, for the payment of which sum well and truly to be made, we bind ourselves, successors, and assigns, jointly and severally, firmly by these presents.

APPENDIX K

The Condition of this obligation is such that whereas, the Principal entered into a certain contract with the Owner, dated the ____ day of _____, 20__, a copy of which is hereto attached and made a part hereof for the construction of:

Now, Therefore, if the Principal shall promptly make payment to all persons, firms, subcontractors, and corporations furnishing materials for or performing labor in the prosecution of the Work provided for in such contract, and any authorized extension or modification thereof, including all amounts due for materials, lubricants, oil, gasoline, coal and coke, repairs on machinery, equipment and tools, consumed or used in connection with the construction of such Work and all insurance premiums on said Work, and for all labor performed in such Work whether by subcontractor or otherwise, then this obligation shall be void; otherwise to remain in force and effect.

Provided, further, that the said Surety for value received hereby stipulates and agrees that no change, extension of time, alteration or addition to the terms of the contract or to the Work to be performed thereunder or the Specifications accompanying the same shall in any way affect its obligation on this Bond, and it does hereby waive notice of any such change, extension of time, alteration or addition to the terms of the contract or to the Work or to the Specifications.

Provided, further, that no final settlement between the Owner and the Contractor shall abridge the right of any beneficiary hereunder, whose claim may be unsatisfied.

APPENDIX K

In Witness Whereof, this instrument is executed in ____ count (No.)
each one of which shall be deemed an original, this the ____ day of
_____, 20__.

ATTEST:

Principal

(Principal Secretary)

By: _____(s)

(SEAL)

Address: _____

Witness as to Principal

Address

Surety

ATTEST: By: _____
Attorney-in-Fact

Witness as to Surety Address

Address

APPENDIX K

NOTE: Date of Bond must not be prior to date of Contract.
If Contractor is Partnership, all partners should execute Bond.

IMPORTANT: Surety companies executing Bond must appear on the Treasury Department's most current list (Circular 570) as amended and be authorized to transact business in the State where the Project is located.

APPENDIX L

CHANGE ORDER

Date: _____

Change Order No: _____

Name of Project: _____

Municipality: _____

Contractor: _____

The following changes are hereby made to the Contract:

Justifications:

Change to Contract Price: \$ _____

Original Contract Price: \$ _____

Current Contract Price adjusted by previous Change Order: \$ _____

The Contract Price due to this Change Order will be (increased) decreased by: \$ _____

New Adjusted Contract Price: \$ _____

Change to Contract Time: _____

The Contract Time will be (increased) decreased by _____ Calendar days

The date for completion of all work will be _____

APPROVALS

Contractor: _____

Construction Inspector: _____

Municipality: _____

VTrans Project Manager: _____

APPENDIX M

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

APPENDIX M

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.

APPENDIX M

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.*

APPENDIX L –

Work Zone Safety and Mobility

Guidance Document

August 2007

WORK ZONE SAFETY & MOBILITY GUIDANCE DOCUMENT

August 2007



Prepared by:

Vermont Agency of Transportation



The following document was drafted in response to updates made to the work zone regulations at 23 CFR 630 Subpart J, published by the Federal Highway Administration. This document applies to all federal aid projects that have a pre-final contract administration/step submittal date after January 1, 2008.

Work Zone Safety and Mobility Vision

Current and future work zone safety and mobility issues mean that transportation practitioners need to minimize and manage the work zone impacts of transportation projects. In order to meet safety and mobility needs during highway maintenance and construction, and to meet the expectations of the traveling public, it is important to systematically analyze and assess the work zone impacts of projects and take appropriate action to manage these impacts.

The following has been adopted as the Vermont Agency of Transportation's (VTrans) work zone safety and mobility vision statement: *To provide optimum safety for workers and the traveling public while maintaining acceptable levels of mobility in an efficient environment for the contractors to complete the project work in accordance with their contracts.*

Work Zone Safety and Mobility Goals and Strategies

Goal: To provide a safe work zone for motorists, pedestrians, bicyclists (the traveling public) and construction personnel.

Strategy: Development of site-specific traffic control plans, while ensuring compliance with the Manual on Uniform Traffic Control Devices (MUTCD) and state design standards and specifications.

Goal: To minimize construction-related delays.

Strategy: Construction-related delays will be monitored. A change to the traffic management plan will be considered for construction-related delays greater than ten minutes.

Goal: To gain further knowledge of work zone procedures applicable to the State of Vermont.

Strategy: Summarize the work zone field evaluations to identify the effectiveness of implemented safety measures and to improve future Transportation Management Plans (TMP).

Goal: To ensure that the appropriate personnel have the necessary knowledge, skills, and abilities to design and/or implement a TMP.

Strategy: Management will be responsible for ensuring that their personnel has been provided appropriate training in accordance with their defined roles. Training to include but not limited to: flagger certification, NHI courses, AGC training, and the Vermont Local Roads Program courses.

Project Classification

The purpose of the Work Zone Safety and Mobility Guidance document is to allow VTrans to better anticipate the impacts associated with individual projects. Examples of impacts include internal project coordination, project scheduling and overall cost. Every federally funded project will require a TMP. The classification of the project will determine the complexity of the TMP. All transportation projects must be classified into one of three types of projects: significant, moderate, or minor projects. To accurately classify a project, several design characteristics must be analyzed to provide **guidance** in determining the appropriate project classification. The following characteristics should be evaluated when determining any project classification. These characteristics include but are not limited to:

- Project Location (Urban/Rural Setting)
- Primary Network (Interstate, Interchanges, Major State Roads, Major Intersections, NHS, Truck Network)
- Construction Duration (Months, Years)
- Access Management Category (Driveway Density, Business/Industry Density)
- Traffic Volumes (Average Annual Daily Traffic, Peak Hour Traffic, Existing Crash Rates, Car-Truck-Pedestrian-Bicycle Volumes)
- Proximity To Other Construction Projects
- Available Detour Routes

A project classification should be identified by the appropriate Project Manager¹, and confirmed by their respective Program Manager as early as the scoping process. This classification should be analyzed periodically throughout the design process to ensure that any design changes or site characteristic changes will not require a classification modification. Project classification is used to help identify the impacts associated with different types of transportation projects. This classification is used to determine what TMP should be applied to the project. The following definitions closely follow FHWA's Work Zone Self Assessment, http://www.ops.fhwa.dot.gov/wz/docs/wz-sa-docs/sa_guide_s4.htm.

¹ Please note that the position titles used in this document are typical Program Development Division titles. Applicable Operations Division titles as well as alternate VTrans Division titles may be substituted as necessary.

Significant Projects: Significant projects have a high level of public interest and will likely impact a large number of travelers. This impact must be analyzed individually and also in combination with concurrent active projects. It will have moderate to high user-cost impacts and the duration is usually moderate to long. These characteristics create work zone impacts that fall outside of the typical work zone safety and mobility thresholds. Examples of this work type may include: major corridor reconstruction, high impact intersection reconstruction, full closures on high volume facilities, major bridge reconstruction or repair, repaving projects that require long term lane closures, etc (e.g. Shelburne-South Burlington US 7 Reconstruction Project). It is important to note that significant projects are unique in that they have considerable impacts to the project area as well as the surrounding community.

Moderate Projects: Moderate projects have the potential to affect the level of public interest and may impact a modest number of commuters. These projects would include typical roadway, bridge, and paving projects.

Minor Projects: Minor projects have a minimal impact to the traveling public and a short duration. Typical projects within this category include sign installation, bridge inspection, pavement marking, and various maintenance activities.

Transportation Management Plans (TMPs)

TMPs are strategies/methodologies that will be implemented to ensure safe and mobile work zones within transportation projects. The project classification will determine the detail level required for the TMP. There are three major components of a TMP;

Temporary Traffic Control Plan (TTC): A TTC plan describes temporary traffic control measures to be used for facilitating road users through a work zone or an incident area. The TTC plan plays a vital role in providing continuity of reasonably safe and efficient road user flow and highway worker safety when a work zone, incident, or other event temporarily disrupts normal road user flow. The TTC plan shall be consistent with the provisions of the MUTCD and AASHTO Roadside Design Guide.

Transportation Operations Component (TO): The TO component shall include the identification of strategies to mitigate impacts of the work zone on the operation of the transportation system within the work zone impact area. The work zone impact area consists of the immediate work zone as well as affects to the surrounding roadways and communities. Examples of practices that may be used to satisfy the TO component may be found at http://www.ops.fhwa.dot.gov/wz/rule_guide/sec6.htm#sec63.

Public Information Component (PI): The PI component shall include communication strategies that seek to inform the general public of work zone impacts and the changing condition of the project. The general public may

include road users, area residences and businesses, and other public entities. Examples of communications strategies that may be used to satisfy the PI component may be found at http://www.ops.fhwa.dot.gov/wz/rule_guide/sec6.htm#sec63.

Significant Projects: The TMP for significant projects shall consist of a TTC, a TO, and a PI.

Moderate/Minor Projects: The TMP for moderate and minor projects shall consist of a TTC. A TO and a PI are not required, but may be applicable to certain projects as determined by the Project Manager.

Design Strategies

The development of a TMP is an iterative process that may vary significantly between projects. Work on a TMP should begin early in the project development process. There are numerous resources available to the designer to assist in the development of this plan: several of these are listed in the reference section of this document. The following outlines the key components of the TMP development process.

Preliminary Data Collection: As early as scoping, the project design team collects, analyzes, and documents all applicable project data.

Determine Project Classification: A project classification is determined based on the initial data that was collected. The project classification defines what components are required in the TMP.

Develop TMP: Work zone management strategies should be identified based on the project characteristics and used to develop all necessary aspects of the TMP. Applicable resources should be contacted during this step to obtain their input. This may include utilization of previous work zone feedback provided by the Construction Section. Plans and contract documents shall be based on standard specifications and include necessary pay items.

Update/Revise TMP: As a project progresses through all of the design stages the TMP should be re-evaluated to ensure that any project changes do not affect the TMP. It is possible that the project classification could change during the project design stages.

Finalize TMP: Ensure that the contract plans, special provisions, and estimate include all of the applicable elements of the TMP and allow the flexibility to develop or modify a TMP.

Roles and Responsibilities

- Step 1: A preliminary analysis will be performed by the *Design Team* to determine project classification. This preliminary analysis will be documented in the project's design file.
- Step 2: The *Project Manager* will have the responsibility of monitoring the project and proposed classification and informing the respective *Program Manager*.
- Step 3: The *Design Team* will develop a transportation management plan. The *Project Manager* will monitor the classification status. If there are significant changes, the project classification may be modified.
- Step 4: The *Construction Resident Engineer* will be responsible for identifying and documenting deficiencies in the TMP that compromise the effectiveness of the work zone and coordinating any improvements with the Contractor/State safety representative. Examples of data that may be included in the work zone documentation includes; crashes or other traffic incidents, traffic delay, traffic conflicts, and public comments. The *Project Manager* may assist in addressing any proposed modifications to the TMP during the construction process.
- Step 5: The *Regional Construction Engineer* will complete a work zone summary of TMP effectiveness based on the work zone documentation and any applicable work zone reviews performed by Traffic Operations.
- Step 6: The *Work Zone Safety and Mobility Committee* will consist of representatives from multiple sections within VTrans. This committee will review the work zone summary and will be responsible for updating the Work Zone Safety and Mobility Guidance document based on feedback from the year's construction projects. This committee will be responsible for sharing all applicable information throughout the Agency as well as with additional working groups and committees.

Application/Feedback

The Construction Engineer will submit a summary of TMP effectiveness and recommendations for improvements at the end of the construction season based on the work zone documentation provided by the Regional Engineers. The Work Zone Safety and Mobility Committee will meet annually to discuss these summaries. These summaries will serve to identify common TMP practices that are not working effectively, and will also assist in identifying TMP practices that are successful. The Work Zone Safety and Mobility Guidance document and supporting documentation will be revised to reflect the field evaluation summaries.

References

A Policy on Geometric Design of Highways and Streets. American Association of State Highway and Transportation Officials, Current Edition.

Developing and Implementing Transportation Management Plans for Work Zones. U.S. Department of Transportation Federal Highway Administration, December 2005.

Engineering Operations Manual. Vermont Agency of Transportation, Current Edition.

Highway Capacity Manual. Transportation Research Board of the National Academies, Current Edition.

Implementing the Rule on Work Zone Safety and Mobility. U.S. Department of Transportation Federal Highway Administration, September 2005.

Manual on Uniform Traffic Control Devices for Streets and Highways. U.S. Department of Transportation Federal Highway Administration, Current Edition.

Road Design Manual. Vermont Agency of Transportation, Current Edition.

Roadside Design Guide. American Association of State Highway and Transportation Officials, Current Edition.

Standard Specifications for Construction. Vermont Agency of Transportation, Current Edition.

Structures Manual. Vermont Agency of Transportation, Current Edition.

The State of Vermont Agency of Transportation Safety Manual. Vermont Agency of Transportation, Current Edition.

Traffic Design Manual. Vermont Agency of Transportation, Current Edition.

“Vermont Agency of Transportation Standard Drawings.” Vermont Agency of Transportation, Current Edition.

Work Zone Impacts Assessment: An Approach to Assess and Manage Work Zone Safety and Mobility Impacts of Road Projects. U.S. Department of Transportation Federal Highway Administration, May 2006.

Work Zone Public Information and Outreach Strategies. U.S. Department of Transportation Federal Highway Administration, November 2005.

**The United States Department of Transportation (USDOT)
Standard Title VI/Non-Discrimination Assurances
DOT Order No. 1050.2A**

The _____ (herein referred to as the “Recipient”), **HEREBY AGREES THAT**, as a condition to receiving any Federal financial assistance from the U.S. Department of Transportation, through _____, is subject to and will comply with the following:

Statutory/Regulatory Authorities

- 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);
- 49 C.F.R. Part 21 (entitled Non-discrimination In Federally-Assisted Programs Of The Department Of Transportation—Effectuation Of Title VI Of The Civil Rights Act Of 1964);
- 28 C.F.R. section 50.3 (U.S. Department of Justice Guidelines for Enforcement of Title VI of the Civil Rights Act of 1964);

The preceding statutory and regulatory cites hereinafter are referred to as the “Acts” and “Regulations,” respectively.

General Assurances

In accordance with the Acts, the Regulations, and other pertinent directives, circulars, policy, memoranda, and/or guidance, the Recipient hereby gives assurance that it will promptly take any measures necessary to ensure that:

“No person in the United States shall, on the grounds of race, color, or national origin, be excluded from participation in, be denied the benefits of, or be otherwise subjected to discrimination under any program or activity,” for which the Recipient receives Federal financial assistance from U.S. Department of Transportation, including _____.”

The Civil Rights Restoration Act of 1987 clarified the original intent of Congress, with respect to Title VI and other Non-discrimination requirements (The Age Discrimination Act of 1975, and Section 504 of the Rehabilitation Act of 1973), by restoring the broad, institutional-wide scope and coverage of these non-discrimination statutes and requirements to include all programs and activities of the Recipient, so long as any portion of the program is Federally-assisted.

Specific Assurances

More specifically, and without limiting the above general Assurance, the Recipient agrees with and gives the following Assurances with respect to its Federally assisted _____ :

1. The Recipient agrees that each “activity,” “facility,” or “program,” as defined in §§ 21.23 (b) and 21.23 (e) of 49 C.F.R. § 21 will be (with regard to an “activity”) facilitated, or will be (with regard to a “facility”) operated, or will be (with regard to a “program”) conducted in compliance with all requirements imposed by, or pursuant to the Acts and the Regulations;

2. The Recipient will insert the following notification in all solicitations for bids, Requests For Proposals for work, or material subject to the Acts and the Regulations made in connection with all _____ and, in adapted form, in all proposals for negotiated agreements regardless of funding source:

“The _____, in accordance with the provisions of Title VI of the Civil Rights Act of 1964 (78 Stat. 252, 42 U.S.C. §§ 2000d to 2000d-4) and the Regulations, hereby notifies all bidders that it will affirmatively ensure that any contract entered into pursuant to this advertisement, disadvantaged business enterprises will be afforded full and fair opportunity to submit bids in response to this invitation and will not be discriminated against on the grounds of race, color, or national origin in consideration for an award.”

3. The Recipient will insert the clauses of Appendix A and E of this Assurance in every contract or agreement subject to the Acts and the Regulations;
4. The Recipient will insert the clauses of Appendix B of this Assurance, as a covenant running with the land, in any deed from the United States effecting or recording a transfer of real property, structures, use, or improvements thereon or interest therein to a Recipient;
5. That where the Recipient receives Federal financial assistance to construct a facility, or part of a facility, the Assurance will extend to the entire facility and facilities operated in connection therewith;
6. That where the Recipient receives Federal financial assistance in the form, or for the acquisition of real property or an interest in real property, the Assurance will extend to rights to space on, over, or under such property;
7. That the Recipient will include the clauses set forth in Appendix C and Appendix D of this Assurance, as a covenant running with the land, in any future deeds, leases, licenses, permits, or similar instruments entered into by the Recipient with other parties:
 - a. for the subsequent transfer of real property acquired or improved under the applicable activity, project, or program; and
 - b. for the construction or use of, or access to, space on, over, or under real property acquired or improved under the applicable activity, project, or program.
8. That this Assurance obligates the Recipient for the period during which Federal financial assistance is extended to the program, except where the Federal financial assistance is to provide, or is in the form of, personal property, or real property, or interest therein, or structures or improvements thereon, in which case the Assurance obligates the Recipient, or any transferee for the longer of the following periods:
 - a. the period during which the property is used for a purpose for which the Federal financial assistance is extended, or for another purpose involving the provision of similar services or benefits; or
 - b. the period during which the Recipient retains ownership or possession of the property.

9. The Recipient will provide for such methods of administration for the program as are found by the Secretary of Transportation or the official to whom he/she delegates specific authority to give reasonable guarantee that it, other recipients, sub-recipients, sub-grantees, contractors, subcontractors, consultants, transferees, successors in interest, and other participants of Federal financial assistance under such program will comply with all requirements imposed or pursuant to the Acts, the Regulations, and this Assurance.
10. The Recipient agrees that the United States has a right to seek judicial enforcement with regard to any matter arising under the Acts, the Regulations, and this Assurance.

By signing this ASSURANCE, _____ also agrees to comply (and require any sub-recipients, sub-grantees, contractors, successors, transferees, and/or assignees to comply) with all applicable provisions governing the _____ access to records, accounts, documents, information, facilities, and staff. You also recognize that you must comply with any program or compliance reviews, and/or complaint investigations conducted by the _____. You must keep records, reports, and submit the material for review upon request to _____, or its designee in a timely, complete, and accurate way. Additionally, you must comply with all other reporting, data collection, and evaluation requirements, as prescribed by law or detailed in program guidance.

_____ gives this ASSURANCE in consideration of and for obtaining any Federal grants, loans, contracts, agreements, property, and/or discounts, or other Federal-aid and Federal financial assistance extended after the date hereof to the recipients by the U.S. Department of Transportation under the _____. This ASSURANCE is binding on the State of Rhode Island, other recipients, sub-recipients, sub-grantees, contractors, subcontractors and their subcontractors', transferees, successors in interest, and any other participants in the _____. The person(s) signing below is authorized to sign this ASSURANCE on behalf of the Recipient.

Name of Recipient/Sub-Recipient

By _____
Signature of Authorized Official

Date

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 Non-discrimination in Federally-assisted programs of the U.S. Department of Transportation, _____, as they may be amended from time to time, which are herein incorporated by reference and made a part of this contract.
2. **Non-discrimination:** The contractor, with regard to the work performed by it during the contract, will not discriminate on the grounds of race, color, or national origin 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, 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, or national origin.
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 _____ 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 _____, 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 _____ 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 _____ 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.

APPENDIX B
CLAUSES FOR DEEDS TRANSFERRING UNITED STATES PROPERTY

The following clauses will be included in deeds effecting or recording the transfer of real property, structures, or improvements thereon, or granting interest therein from the United States pursuant to the provisions of Assurance 4:

NOW, THEREFORE, the U.S. Department of Transportation as authorized by law and upon the condition that the _____ will accept title to the lands and maintain the project constructed thereon in accordance with 23 U.S. Code § 107, the Regulations for the Administration of _____, and the policies and procedures prescribed by the _____ of the U.S. Department of Transportation in accordance and in compliance with all requirements imposed by Title 49, Code of Federal Regulations, U.S. Department of Transportation, Subtitle A, Office of the Secretary, Part 21, Non-discrimination in Federally-assisted programs of the U.S. Department of Transportation pertaining to and effectuating the provisions of Title VI of the Civil Rights Act of 1964 (78 Stat. 252; 42 U.S.C. § 2000d to 2000d-4), does hereby remise, release, quitclaim and convey unto the _____ all the right, title and interest of the U.S. Department of Transportation in and to said lands described in Appendix A attached hereto and made a part hereof.

(HABENDUM CLAUSE)

TO HAVE AND TO HOLD said lands and interests therein unto the _____ and its successors forever, subject, however, to the covenants, conditions, restrictions and reservations herein contained as follows, which will remain in effect for the period during which the real property or structures are used for a purpose for which Federal financial assistance is extended or for another purpose involving the provision of similar services or benefits and will be binding on the _____, its successors and assigns.

The _____, in consideration of the conveyance of said lands and interests in lands, does hereby covenant and agree as a covenant running with the land for itself, its successors and assigns, that (1) no person will on the grounds of race, color, or national origin, be excluded from participation in, be denied the benefits of, or be otherwise subjected to discrimination with regard to any facility located wholly or in part on, over, or under such lands hereby conveyed [,] [and]* (2) that the _____ will use the lands and interests in lands and interests in lands so conveyed, in compliance with all requirements imposed by or pursuant to Title 49, Code of Federal Regulations, U.S. Department of Transportation, Subtitle A, Office of the Secretary, Part 21, Non-discrimination in Federally-assisted programs of the U.S. Department of Transportation, Effectuation of Title VI of the Civil Rights Act of 1964, and as said Regulations and Acts may be amended [,] and (3) that in the event of breach of any of the above-mentioned non-discrimination conditions, the Department will have a right to enter or re-enter said lands and facilities on said land, and that above described land and facilities will thereon revert to and vest in and become the absolute property of the U.S. Department of Transportation and its assigns as such interest existed prior to this instruction].*

(*Reverter clause and related language to be used only when it is determined that such a clause is necessary in order to make clear the purpose of Title VI.)

APPENDIX C
CLAUSES FOR TRANSFER OF REAL PROPERTY ACQUIRED OR IMPROVED UNDER
THE ACTIVITY, FACILITY OR PROGRAM

The following clauses will be included in deeds, licenses, leases, permits, or similar instruments entered into by the _____ pursuant to the provisions of Assurance 7(a):

- A. The (grantee, lessee, permittee, etc. as appropriate) for himself/herself, his/her heirs, personal representatives, successors in interest, and assigns, as a part of the consideration hereof, does hereby covenant and agree [in the case of deeds and leases add “as a covenant running with the land”] that:
 - 1. In the event facilities are constructed, maintained, or otherwise operated on the property described in this (deed, license, lease, permit, etc.) for a purpose for which a U.S. Department of Transportation activity, facility, or program is extended or for another purpose involving the provision of similar services or benefits, the (grantee, licensee, lessee, permittee, etc.) will maintain and operate such facilities and services in compliance with all requirements imposed by the Acts and Regulations (as may be amended) such that no person on the grounds of race, color, or national origin, will be excluded from participation in, denied the benefits of, or be otherwise subjected to discrimination in the use of said facilities.

- B. With respect to licenses, leases, permits, etc., in the event of breach of any of the above Non-discrimination covenants, the _____ will have the right to terminate the (lease, license, permit, etc.) and to enter, re-enter, and repossess said lands and facilities thereon, and hold the same as if the (lease, license, permit, etc.) had never been made or issued.*

- C. With respect to a deed, in the event of breach of any of the above Non-discrimination covenants, the _____ will have the right to enter or re-enter the lands and facilities thereon, and the above described lands and facilities will there upon revert to and vest in and become the absolute property of the _____ and its assigns.*

(*Reverter clause and related language to be used only when it is determined that such a clause is necessary to make clear the purpose of Title VI.)

APPENDIX D
CLAUSES FOR CONSTRUCTION/USE/ACCESS TO REAL PROPERTY ACQUIRED
UNDER THE ACTIVITY, FACILITY OR PROGRAM

The following clauses will be included in deeds, licenses, permits, or similar instruments/ agreements entered into by _____ pursuant to the provisions of Assurance 7(b):

- A. The (grantee, licensee, permittee, etc., as appropriate) for himself/herself, his/her heirs, personal representatives, successors in interest, and assigns, as a part of the consideration hereof, does hereby covenant and agree (in the case of deeds and leases add, "as a covenant running with the land") that (1) no person on the ground of race, color, or national origin, will be excluded from participation in, denied the benefits of, or be otherwise subjected to discrimination in the use of said facilities, (2) that in the construction of any improvements on, over, or under such land, and the furnishing of services thereon, no person on the ground of race, color, or national origin, will be excluded from participation in, denied the benefits of, or otherwise be subjected to discrimination, (3) that the (grantee, licensee, lessee, permittee, etc.) will use the premises in compliance with all other requirements imposed by or pursuant to the Acts and Regulations, as amended, set forth in this Assurance.
- B. With respect to (licenses, leases, permits, etc.), in the event of breach of any of the above Non-discrimination covenants, the _____ will have the right to terminate the (license, permit, etc., as appropriate) and to enter or re-enter and repossess said land and the facilities thereon, and hold the same as if said (license, permit, etc., as appropriate) had never been made or issued.*
- C. With respect to deeds, in the event of breach of any of the above Non-discrimination covenants, the _____ will there upon revert to and vest in and become the absolute property of the _____ and its assigns.*

(*Reverter clause and related language to be used only when it is determined that such a clause is necessary to make clear the purpose of Title VI.)

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:

Pertinent Non-Discrimination Authorities:

- 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); and 49 CFR Part 21;
- 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, (PL 100-209), (Broadened the scope, coverage and applicability of Title VI of the Civil Rights Act of 1964, The Age Discrimination Act of 1975 and Section 504 of the Rehabilitation Act of 1973, by expanding the definition of the terms “programs or activities” to include all of the programs or activities of the Federal-aid recipients, sub-recipients and contractors, whether such programs or activities are Federally funded or not);
- 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 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.*).



STATE OF VERMONT

AGENCY OF ADMINISTRATION

BULLETIN NO. 3.5

PROCUREMENT AND CONTRACTING PROCEDURES

ISSUED BY: Susanne Young, Secretary of Administration

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Contents

I.	AUTHORITY	4
II.	PURPOSE AND POLICY	4
III.	DEFINITIONS.....	4
IV.	CONTRACTS FOR SERVICE: PERSONAL SERVICE; NON-PERSONAL SERVICE; INDEPENDENT CONTRACTORS AND PRIVATIZATION	9
A.	Contract for Services	9
B.	Personal Service Contract.....	10
C.	Non-Personal Service Contract	11
D.	Privatization Contract	11
E.	Contracts for Information Technology	12
F.	Commodity Contracts.....	12
V.	AGO CERTIFICATION FOR BARGAINING AGREEMENT(S) COMPLIANCE	13
VI.	ALTERNATIVES TO CONTRACTS FOR SERVICE AND SPECIAL AGREEMENT TYPES ...	15
A.	Memorandum of Understanding or Memorandum of Agreement.....	15
B.	Grants versus Contracts	15
C.	Capital Leases.....	16
D.	Agreements to Receive or Access Confidential Information	17
VII.	COMPETITIVE BIDDING AND THRESHOLDS	18
A.	Competitive Bidding.....	18
B.	Bidding Monetary Thresholds	18
VIII.	THE BIDDING PROCESS	19
A.	Simplified Bidding	19
B.	Standard Bidding (“Requests for Proposals” or “RFP”)	20
C.	Pre-Qualifying Vendors for Statewide or Retainer Contracts	25
D.	Exceptions and Waivers	26
IX.	CONTRACT DRAFTING.....	29
A.	Drafting the contract.....	29
B.	Obtaining a VISION Contract Number	36
X.	CONTRACT ROUTING AND APPROVALS	38
A.	Contract Package and Routing	38
B.	Approvals - Required Prior Approvals.....	39
XI.	CONTRACT EXECUTION AND CONTRACT FILE.....	43
A.	Execution.....	43
B.	Contract Administration and Contract File.....	43
C.	Conflict of Interest.....	44

D.	Statewide and Retainer Contracts	44
E.	Blanket Delegation of Authority (BDA)	45
XII.	SUBCONTRACTS	46
XIII.	CONTRACT AMENDMENTS, APPROVAL AND EXECUTION	46
A.	Contract Amendments:	46
B.	Amendment Approval and Execution:	48
C.	Execution of Amendments:	49
D.	Amendment Number and VISION Record:	49
XIV.	CONTRACTOR NAME CHANGE OR OTHER CHANGE IN CIRCUMSTANCES.....	49
XV.	ACCOUNTING FOR PAYMENTS TO CONTRACTORS	50
XVI.	COMPLIANCE REVIEWS.....	50
XVII.	FEDERAL FUNDING ACCOUNTABILITY & TRANSPARENCY ACT (FFATA)	50
XVIII.	PUBLIC RECORDS REQUESTS	50
XIX.	PUBLIC ENDORSEMENTS	51
XX.	APPENDICES	52
	Appendix I – Standard State Contract Templates, Forms and Other Links.....	52
	Appendix II: Attachment A – Statement of Work Guidelines.....	53
	Appendix III: Attachment B Payment Provision Guidelines.....	55
	Appendix IV: Attachment D – Examples of Common Additional Term & Conditions.....	57
	Appendix V: Acronyms Used in This Bulletin.....	60
	Appendix VI: Bulletin 3.5 Quick Reference Guide.....	62

I. AUTHORITY

In accordance with [3 V.S.A. § 2222\(a\)\(2\)](#), this Bulletin establishes the general policy and standards for soliciting, awarding, processing, executing and overseeing Contracts, as well as managing contract compliance.

[Executive Order #3-20](#) and this Bulletin further establish a statewide policy favoring an open and competitive bidding process for the selection of Vendors, in accordance with the policies described in this Bulletin. Executive Order #3-20 states:

“The State of Vermont recognizes the important contribution and vital impact that small businesses have on the state’s economy. In this regard, the state prescribes to a free and open bidding process that affords all businesses equal access and opportunity to compete for state contracts for goods and services. The state also recognizes the existence of businesses owned by minorities and women and directs all state agencies and departments to make a good faith effort to encourage these firms to compete for state contracts.”

The Office of Purchasing and Contracting (OPC) is responsible for making all purchases of goods/products, including fuel, supplies, materials and equipment for all Agencies. Further, OPC is responsible for administering solicitation, procurement and contracting, as set forth in this Bulletin.

The Secretary of Administration (Secretary or SOA) will update and reissue this Bulletin periodically. In lieu of an official re-issue, Addenda to this Bulletin may be issued and released, and shall have the same force and effect as an official issuance of the Bulletin. The current official issued version of this Bulletin, as posted on Agency of Administration’s website, along with any subsequently released Addenda to this Bulletin can be found at: <http://aoa.vermont.gov/bulletins/3point5>

II. PURPOSE AND POLICY

This Bulletin applies to the procurement of all goods and services and the required documentation of such procurements, regardless of dollar amount, for all Agencies/Department, as defined herein, of the State of Vermont (SOV) government.

This Bulletin provides guidelines for conducting procurements and establishes benchmarks and protocols to solicit and award contracts for services with an appropriate level of competition. The State is generally interested in obtaining optimal solutions at reasonable prices, through procurement efforts that: are efficient and cost effective; promote fair and open competition; guard against favoritism, fraud and corruption; and protect the interests of the State and its taxpayers. Each Agency may develop individual processes and policies applicable to its needs, in addition to the minimum stated requirements of this Bulletin.

This Bulletin and any associated Agency-specific process or policy do not create, and will not be construed to create, a private right of action to enforce their terms and do not affect private rights or procedures otherwise available to the public.

III. DEFINITIONS

In addition to the definitions set forth in this Section, please note the glossary of acronyms attached to this Bulletin – [Appendix V: Acronyms Used in This Bulletin](#).

Addendum: means an addition to or amendment of a bid solicitation (e.g., Request for Proposal (RFP) or other documents that formally solicit bids).

Agency: an Agency, department, commission, committee, authority, division, board, or other administrative unit of the Executive Branch, including the elected offices as well as those having express statutory authority to enter into contracts.

Agency-Wide Contract: a shared Contract used by departments or divisions within an Agency.

Appointing Authority: is an Agency head in accordance with AoA [Bulletin 3.3](#), including those officers occupying appointive positions defined in [32 V.S.A. 1003 \(b\)](#). “Appointing Authority” includes: (1) the exempt deputies of Agency secretaries and department commissioners; (2) elective officers and their deputies who head operating departments; and (3) exempt heads of divisions, boards, committees and commissions not reporting to a department commissioner or Agency secretary. The Appointing Authority has management and oversight responsibilities for the solicitation, procurement and contracting process for services and for the ongoing oversight and monitoring of contract compliance through contract expiration or termination. Appointing Authority shall be responsible for compliance with the policy and procedural directives of this Bulletin.

Best and Final Offer (BAFO): a BAFO process is an optional step in the evaluation phase of the RFP process in which offerors are requested to modify their proposals.

Bid Documents: “Requests for Proposals” (RFP) or other documents that formally solicit bids, whether cost-based or otherwise, for services or products for the State.

Bidding Integrity: refers to the policy and practice intended to prevent a conflict of interest in bidding when an Agency receives assistance with the preparation or planning of Bid Documents from Contractors or Vendors, who later intend to participate as a bidder. Refer to the Policy at:

<http://bgs.vermont.gov/commissioner/adminpolicies/0034>

Blanket Delegation of Authority (BDA): a formal document which delegates authority from the Office of Purchasing and Contracting to Appointing Authorities to make certain types of purchases directly. Agencies/ must follow the terms and conditions in their approved BDA. BDAs may be found at:

<http://bgs.vermont.gov/purchasing-contracting/forms/bda>

Capital Lease: See section [VI.CC](#).

Chief Information Officer (CIO): Secretary of the Agency of Digital Services; this refers to the State CIO, not an Agency CIO.

Commodity: Collective term given to tangible products purchased for the State.

Confidential Information: information deemed “confidential”, or otherwise protected from unauthorized disclosure, by State or Federal law, such as, but not limited to, Federal tax information, personal health information protected under the Health Insurance Portability and Accountability Act of 1996, Public Law [104-191](#) (HIPAA), “education records” as defined under the Family Education Rights and Privacy Act, [20 U.S.C. § 1232g](#) (FERPA), “personally identifiable information” as defined in [9 V.S.A. § 2430\(5\)\(A\)](#) and other information exempt from disclosure under [1 V.S.A. § 317\(c\)](#).

Conflict of Interest: a pecuniary interest of an employee or a Vendor, or the appearance thereof, in the award or performance of a contract, or such an interest, known to an employee, by a member of his /her current or former family or household, or a business associate.

Contract: any legally enforceable agreement by which the State purchases products or services needed to carry out a project or program. (The term Contract includes all such agreements whether or not characterized as a “contract,” “agreement,” “purchase order,” “procurement,” “license agreement,” “maintenance agreement,” “support agreement,” or other similar term, but, does not include a legal agreement where the substance of the agreement meets the definition of a Grant or sub-award as defined in AoA [Bulletin 5](#).)

Contract for Service: means an agreement or combination or series of agreements by which an entity or individual agrees with an Agency to provide services under Contract, rather than as an employee. This shall include all such agreements whether or not characterized as a “contract,” “agreement,” “purchase order,”

“procurement,” “license agreement,” “maintenance agreement,” “support agreement,” or other similar term.

Contract Monitoring: any planned, ongoing or periodic activity or process that measures and ensures Contractor compliance with the terms, conditions, and requirements of a contract.

Contracting Waiver Plan: a written waiver request document, signed by the Appointing Authority and approved by the Secretary of Administration (SOA), granting specific on-going waivers, exceptions and/or limits to certain sections, terms or elements of this Bulletin.

Contractor: any party with which the State has a signed Contract.

Deliverable: the contracted product or service desired and expected to be received.

Executed Contract: a Contract is considered executed when the Contract, including all attachments, has been signed and dated by each party to the agreement.

Financial Transaction Contract: a Contract with an outside Vendor providing service to manage financial transactions for the State – either on-line or in person. Vendors include web-portal organizations, banks and other financial institutions. The Vendors handling these financial transactions (license, permit, or registration fees, etc.) for the State may be compensated for this service with a share of the gross fee (revenue) charged in the transaction, via an additional “convenience fee” added to the cost of the transaction, or a combination of the two.

Grant: means a legally enforceable agreement between an Agency (grantor) and a recipient (grantee or subrecipient) to carry out a program as defined in a Grant agreement. It does not include payments to a Contractor or payments to an individual who is a beneficiary of a program. When the Grant is funded with Federal funds, the relationship between the State and the grantee must meet the definition of a subrecipient and the award is called a sub-award.

Independent Contractor: as a general rule, an individual under Contract with the State is an Independent Contractor if the State has the right to control or direct only the result of the work and not what will be done and how it will be done. People such as doctors, dentists, veterinarians, lawyers, accountants, construction Contractors and subcontractors, public stenographers, or auctioneers who are in an independent trade, business, or profession in which they offer their services to the general public are generally Independent Contractors. However, whether these people are Independent Contractors or Personal Services Contractors depends on the facts in each case, to be determined in accordance with [IV.B.2](#) of this Bulletin.

Information Security: protecting information and information systems from unauthorized access, use, disclosure, disruption, modification, or destruction in order to provide integrity, confidentiality, and availability of the information or systems (see [3 V.S.A. § 2222\(a\)\(9\)](#)).

Information Technology (IT) Activities: includes: (A) the creation, collection, processing, storage, management, transmission, or conversion of electronic data, documents, or records; and (B) the design, construction, purchase, installation, maintenance, or operation of systems, including hardware, software, and services which are performed, or are contracted under this Bulletin to perform, these activities (see [3 V.S.A. § 2222\(a\)\(10\)](#)).

Life Safety: means Contracts for abatement services of any kind; air quality testing; Contracts for elevator service; fire suppression system installation, service, or repair; Contracts for Services that could, directly or indirectly, pose a hazard to Contractors or employees of the State; or any other Contract for Service that could pose a significant increase to the SOV’s liability or the SOV’s ability to manage its risk.

No-Cost Contract: See Zero-Dollar Contract – section [IV.A.6](#).

Non-Personal Service Contract: means a Contract for Service with an Independent Contractor.

Order of Precedence: the sequential legal hierarchy of the contract attachments used to determine the order in which each attachment controls in the case of dispute. Order of Precedence is particularly relevant when an Agency is including terms which are intended to supersede standard State terms or Contractor template terms which may be attached to the agreement.

Performance-Based Contracting: best practice that focuses on the measurable outputs, quality, and outcomes/results of the service or goods provided by the Contractor. Performance Based Contracts are designed to ensure that contract deliverables are well defined and provide that contract payment, as well as any contract extension, renewal, or price increase, is tied to the successful completion of defined deliverables and accomplishment of desired performance (results). It may also include contract Retainage (as defined herein), which is held back until successful performance can be demonstrated.

Performance Management: a set of activities to ensure that outcomes are consistently being met and delivered in an effective and efficient manner; a methodology that should be employed to ensure the State receives the best contracted products, services and outcomes at a reasonable price.

Personal Service Contract: means a Contract for Service that is categorized as personal services consistent with [3 V.S.A. § 342](#) in accordance with procedures set forth in Section [IV.B](#) of this Bulletin 3.5. All other Contracts for Service are Non-Personal Service Contracts.

Prior: for purposes of this Bulletin, “prior” means “preceding in time or order,” or more succinctly, “before.” Thus, when an approval is required “prior” to the execution or commencement of a Contract, Agencies should construe this in all cases to mean the approval should be requested and received *before* the Contract is executed or work commenced.

Privatization Contract: means a Contract for Service valued at \$25,000 or more per year, which is the same or substantially similar to and in lieu of services previously provided, in whole or in part, by permanent, classified State employees, and which results in a reduction in force of at least one permanent, classified employee, the elimination of a vacant position of an employee covered by a collective bargaining agreement, as further described in Section [IV.D](#) of this Bulletin 3.5.

Products: this term should be broadly interpreted and includes equipment, goods, materials, information technology hardware or software, supplies, printing and other commodities.

Proprietary Information: information of the State or a Vendor which may include any formulae, plan, pattern, process, tool, mechanism, compound, procedure, production data, financial information or compilation of information which is not patented, which is known only to certain individuals within a commercial concern or the State, and which gives its user or owner an opportunity to obtain business advantage over competitors who do not know it or use it; also known as a trade secret. Proprietary information is exempt from disclosure under the State Public Records Act (see [1 V.S.A. §§ 315-320](#)).

Retainage: A portion of Contractor’s eligible payments withheld until the project is complete. The amount withheld strengthens the position of the State to enforce contract compliance and helps ensure that the work is completed without material error.

Retainer Contract (a.k.a. Blanket): a Contract which specifies the nature of the potential services to be rendered and the cost of the service. [Retainer Contracts](#) generally establish standard terms and conditions, set maximum not-to-exceed prices, and satisfy many legal requirements associated with State procurements, such as public notice of bid, and Vendor responsibility. Specific service requests are made through separate Statement of Work agreements written against this Contract. These are commonly used by the Agency of Digital Services (ADS) Department, Buildings and General Services (BGS), and the Chief Marketing Officer (CMO).

Secretary: means the Secretary of Administration (or SOA).

Services: this term should be broadly interpreted and includes Personal and Professional Services such as, but not limited to, construction, consulting, design and engineering, investment management, Information Technology activities, real estate services, and the maintenance of equipment.

Sole Source Contract: means a Contract procured without first undertaking a competitive process.

State of Vermont Employee: an individual employed by the State of Vermont and paid through the State of Vermont payroll system in an exempt, classified, limited service, temporary, elected, or appointed position,

excluding “Contractors paid on payroll”. Workers who provide attendant care, personal care, companion care, respite care, or support services to persons who receive financial assistance from the Agency of Human Services (AHS), and whose payroll service is provided directly by the State or by an intermediary payroll service organization acting under the authority of the State, shall not be considered State of Vermont employees except for the limited purposes of Workers' Compensation coverage and unemployment insurance. (See [33 V.S.A. § 6321](#).)

State of Vermont Retiree: an individual who has separated from State service and is eligible to participate in the State Defined Contribution Plan or Vermont State Employees’ Retirement System.

Statement of Work (SOW): means a written statement describing the work to be performed, specific need(s) to be addressed and/or products to be delivered (subject to BGS’s exclusive authority over commodities purchases), as described in this Bulletin.

Statewide Contract: a Contract negotiated by the Office of Purchasing and Contracting (OPC) and accessible to all Agencies of the State. To find out if a Contract exists that meets an Agency’s need, contact the OPC or refer to the web site at: <http://bgs.vermont.gov/purchasing-contracting/contract-info>

Uniform Guidance: means [2 CFR Chapter I, Chapter II, Part 200](#)-Uniform Administrative Requirements, Cost Principles, and Audit Requirements for Federal Awards.

Vendor: any party with which the State may sign a Contract.

Zero-Dollar Contract (a.k.a. No-Cost contract): means a Contract for Service in which a Vendor is willing to accept compensation for services other than direct payment by the State. For examples and further information refer to section [IV.A.6](#).

[END SECTIONS I-II-III]

IV. CONTRACTS FOR SERVICE: PERSONAL SERVICE; NON-PERSONAL SERVICE; INDEPENDENT CONTRACTORS AND PRIVATIZATION

A. Contract for Services

Generally, State of Vermont employees should be used to perform essential governmental functions. However, there are circumstances which justify the use of Contractors to complete certain tasks, rather than employees, which may be determined at the discretion of the Appointing Authority. Once the determination has been made to enter into a Contract for Service, applicable State law and the policies and procedures set forth in this Bulletin will apply, regardless of amount.

Contracts for Service are further categorized into Personal Service and Non-Personal Service (Independent Contractor). Both Contracts for Service and Non-Personal Service Contracts may be determined to be Privatization Contracts in accordance with [3 V.S.A. § 341\(3\)](#). The determination process as to whether a Contract for Service is to be categorized as Personal Service or Non-Personal Service and as Privatization is must be done in a specific order and must be in compliance with Federal and State laws.

There are various types of services which may be contracted, including the following examples:

1. **Professional Services Contracts:** Contracts with professionals such as physicians, nurses, lawyers, engineers, architects, certified public accountants, surveyors, mental health counselors, educators, consultants, investment managers and IT project managers. In addition to the State's standard insurance requirements, professionals must agree to carry professional liability insurance coverage in an amount not less than \$1 million per claim/\$1 million aggregate. Coverage limits will be subject to the approval of the Director of Risk Management (see Insurance Coverage Limit section [IX.A.6](#))
2. **Construction Contracts:** Contracts for infrastructure construction, renovation or rehabilitation projects, including such State facilities as State-owned or leased buildings, roads and bridges.
3. **Marketing Contracts:** Contracts for advertising (print, radio, television (TV), and web/internet, but not to include employee recruiting); collaterals (brochures, fact sheets, folders, etc.); website design (not to include technical components); trade shows and events; direct mail campaigns; and sponsorships.
4. **Financial Transaction Contracts:** Contract with a bank or other entity to handle in-bank or on-line financial transactions. The majority of Contracts previously and incorrectly referred to as "No-Cost" are in reality "Financial Transaction" Contracts, which may result in "no net-cost" to the State. These Contracts involve an outside Vendor providing a service to manage financial transactions for the State – either online or in person. Vendors include web-portal organizations, banks and other financial institutions. The Vendors handling these financial transactions (license, permit, registration fees, credit card transactions, etc.) on behalf of the State, may be compensated from: the gross fee (revenue) charged in the transaction; via an additional "convenience fee" added to the cost of the transaction; or a combination of the two. Depending on the terms of the Contract, the funds may be remitted to the State:
 - via a lock-box, under agreement with the State Treasurer's Office;

- by the Vendor, at the gross amount, followed by payment of the fee from the State to the Vendor; or;
- by the Vendor, at the net amount, where the Vendor retains their compensation prior to remittance.

In the second bullet above, Agencies/ must execute the Contract for a maximum amount based on the estimated value the Vendor will be paid during the term of the Contract. Agencies shall process payments using a purchase order(s) (P.O.) against the contract. In the third bullet above, where the Vendor retains an amount equal to the additional convenience fee ONLY, a P.O. is not necessary as the State is not issuing payment to the Vendor.

5. Zero-Dollar (or No-Cost) Contracts: are occasionally used when a Vendor performs services for compensation other than direct payment made by the State. Zero Dollar Contracts must use the standard State contract forms, including the standard attachment C. Agencies must understand that simply because compensation is not made by invoice and direct payment, Vendors will still have performance obligations and pose risks to the State. Agencies are also cautioned to be aware of potential conflict of interest issues. Examples of Zero -Dollar (or "No- Cost") Contracts include the following:

- the Vendor contracts with the State to perform services which benefit employees or consumers, and payment is derived from third party payers;
- the Vendor performs services for the State in exchange for the opportunity to utilize State facilities or other assets (excluding data; see [IV.A.4](#) above) such as Statehouse cafeteria food service; and
- Financial Transaction Contracts.

6. Information Technology Services Contracts: see special IT Contract [IV.E](#) below.

7. Other Contracts for Services: Contracts with persons or legal entities not included in subsections (1) through (7) above.

B. Personal Service Contract

1. Description.

A Contract for Service can be either Personal Service Contract or Non-Personal Service Contract (Independent Contractor). Personal Service Contracts have characteristics of an employment relationship not commonly found in Independent Contractor relationships, but they may trigger certain requirements under Federal and State taxation and labor laws, such as the requirement to withhold Federal Insurance Contributions Act (FICA), and provide unemployment and Workers' Compensation coverage. Agencies must appropriately classify whether each individual performing services for the State is either as an Independent Contractor or an employee-like Personal Services Contractor.

2. Determination Process.

The general rule is that an individual is an Independent Contractor if the Agency/Department for which the services are performed, has the right to control or direct only the result of the work and not the means and methods of accomplishing the result. Appointing Authorities must determine whether proposed Contracts for Service meet **ANY** of the criteria below:

- a. The Agency will supervise the daily activities or methods and means by which the Contractor provides services;
- b. The services provided are the same or substantially similar as those provided by classified State employees within the Agency;
- c. The Contractor does not customarily engage in an independently established trade, occupation, profession or business.

If a Contract for Service meets **ANY** one of these criteria Appointing Authorities should review Internal Revenue Service (IRS) Publication [15-A](#), attached to this Bulletin as Appendix I(f) which provides additional information on the differences between an Independent Contractor and an employee and gives examples from various types of occupations. If there is no reasonable basis to classify a Contractor as an Independent Contractor, Agencies must consider whether the services could be provided under an actual employment arrangement, such as permanent, temporary or limited service appointment. If employment is not feasible, then Agencies should consider restructuring the contractual relationship in a way that does not trigger Federal and State requirements applicable to employers. Personal Services Contracts (i.e., Contracts that do not pass the Independent Contractor test applied by the IRS) must be carefully structured to ensure compliance will all Federal and State requirements. Consult Appendix I(f) of this Bulletin and the Department of Human Resources (DHR) for guidance.

C. Non-Personal Service Contract

Non-Personal Service Contracts generally have the characteristics of Independent Contractor relationships, where the State has only the right to control or direct the result of the work and not the details of what and how the work will be done. For example, individuals such as (but not limited to) doctors, dentists, veterinarians, lawyers, accountants, construction contractors and subcontractors, public stenographers, or auctioneers who exercise a high degree of independence in performing services and are in an independent trade, business, or profession in which they offer their services to the public.

D. Privatization Contract

A Privatization Contract is a Contract for Service valued at \$25,000 or more per year that satisfies the criteria below:

(i) provides services which are the same, or substantially similar to, and in lieu of services provided, in whole or in part, by permanent, classified State employees;

AND

(ii) results in a reduction in force of at least one permanent, classified employee, or the elimination of a vacant position of an employee covered by a collective bargaining agreement.



NOTE: Unless otherwise permitted by applicable Agency statute, no Agency may enter into a Privatization Contract, unless the procedure set forth at [3 V.S.A. § 343](#) is followed.

E. Contracts for Information Technology

Information Technology (IT) Contracts can be Contracts for Service or Commodity Contracts. Contracts related to Information Security and Information Technology Activities can include the procurement of hardware and/or software (with or without a services component), system implementation, IT consulting services, license and other end user agreements, maintenance and support services, hosting services and Service Level Agreements (SLA). Further information specific to Information Technology contracting is located in the [IT Guideline](#), located both on the AoA and OPC websites.

The IT Guideline covers, among other things, best practices for IT procurements and terms and conditions which may be needed to address issues particular to IT Contracts, such as, licensing, intellectual property, data ownership, and security concerns.

IT Contract for Service: Generally speaking, an IT Contract will be considered a Contract for Service subject to this Bulletin - including the Contract for Service determination process and the AGO certification - when a Vendor is providing professional services such as implementation, configuration, data migration, consulting and/or training, either on-site or off-site. An IT Contract for Service may include maintenance and support services that are provided on-site or by virtual access to State IT systems.

IT Commodity Contract: Generally speaking, an IT Contract will be considered a Commodity when the product or service is provided “as-is” to all consumers equally either as a physical software, license and other end user agreements, or hardware or as a subscription software as a service, platform as a service or infrastructure as a service. The Vendor will not have virtual access to State systems for purposes of maintenance and support.

Please refer to the [IT Guideline](#) and consult with OPC, ADS or the AGO with questions about whether an IT contract is more appropriately a Contract for Service or a Commodity.

F. Commodity Contracts

For purposes of this Bulletin, Commodity is the collective term given to tangible products purchased for the State. These include, but are not limited to, materials, equipment, parts, supplies, fuel, and printing. Hardware and software (license and other end user agreements) are considered commodities and some web-based services may be considered commodities, as discussed above. Procurement authority for commodities rests with the OPC.

V. AGO CERTIFICATION FOR BARGAINING AGREEMENT(S) COMPLIANCE

Each Contract for Services valued at \$25,000 or more per year shall require certification by the AGO to the Secretary of Administration that such Contract is not contrary to the spirit and intent of the classification plan and merit system and standards under [3 V.S.A. § 342](#). A Contract for Services may be certified by the AGO if (a) all three of the provisions of Part 1 of this section are met; or (b) one or more of the exceptions described in Part 2 of this section apply.

Part 1 - AGO Certification

First, a Contract for Services valued at \$25,000 or more per year will be reviewed to determine if ALL of the following three requirements are met:

1. The Agency will not supervise the daily activities or methods and means by which the Contractor provides services, other than supervision necessary to ensure the Contractor meets contractual performance expectations and standards;
AND
2. The services provided are not the same as those provided by classified State employees within the Agency (*note: this factor is applied to the Agency only and not to the State as a whole*);
AND
3. The Contractor customarily engages in an independently established trade, occupation, profession or business.

[Continued next page.]

Part 2 - AGO Certification

*If the proposed Contract for Services does not meet **ALL THREE** of the above Part 1 criteria, then **YOUR** Agency must consider whether the Contract meets **ANY ONE** of the following exceptions:*

1. The services are not available within the Agency or are of such a highly specialized or technical nature that the necessary knowledge, skills or expertise is not available within the Agency.
2. The services are incidental to a Contract for purchase or lease of real or personal property.
3. There is a demonstrated need for an independent audit, review or investigation; or independent management of a facility is needed as a result of, or in response to, an emergency such as licensure loss or criminal activity.
4. The State is not able to provide equipment, materials, facilities or support services in the location where the services are to be performed in a cost-effective manner.
5. The Contract is for professional services, such as legal, engineering, or architectural services, that are typically rendered on a case-by-case or project-by-project basis, and the services are for a period limited to the duration of the project, normally not to exceed two years or provided on an intermittent basis for the duration of the Contract.
6. The need for services is urgent, temporary or occasional, such that the time necessary to hire and train employees would render obtaining the services from State employees imprudent. Such Contract shall be limited to 90 days' duration, with any extension subject to review and approval by the Secretary of Administration.
7. Contracts for the type of services covered by the Contract are specifically authorized by law.
8. Efforts to recruit State employees to perform work, authorized by law, have failed in that no applicant meeting the minimum qualifications has applied for the job.
9. The cost of obtaining the services by Contract is lower than the cost of obtaining the same services by utilizing State employees. When comparing costs, the provisions of section [3 V.S.A §343](#) shall apply.

[END SECTIONS IV-V]

VI. ALTERNATIVES TO CONTRACTS FOR SERVICE AND SPECIAL AGREEMENT TYPES

If contracting for services is not appropriate, an Agency should consider using temporary employees, limited service employees or permanent employees to do the work. The State Department of Human Resources Personnel Policy and Procedure, [Section 5.0](#) establishes the following guidelines:

- Permanent classified or exempt positions shall only be authorized by the Legislature.
- Limited service positions may be authorized by the Joint Fiscal Committee in connection with a Grant or by the Legislature itself.
- Temporary employees may only be hired with approval of the Commissioner of Human Resources in accordance with [3 V.S.A. § 331](#). Please consult with the Human Resources Representative for your Agency, to ensure hiring a temporary employee is in accordance with the statutory limitations.

A. Memorandum of Understanding or Memorandum of Agreement

A Memorandum of Understanding (MOU) or Memorandum of Agreement (MOA), is not a Contract and is generally not enforceable. An MOU or an MOA **may only** be used between State Agencies and units of the Executive, Legislative and Judicial branches of Vermont State government, as required by Federal Agencies, or with municipalities (for example: towns, cities, school districts, fire districts, county units, etc.), or political sub-divisions (such as regional planning commissions) of the State. An MOU or MOA permitted hereunder, does require approval by the Appointing Authority and review by the AGO or internal counsel. If an MOU is proposed and is intended to have the effect of a binding and enforceable contract, an Agency should be using a Contract. Use of an MOU or MOA to circumvent this Bulletin is prohibited.

B. Grants versus Contracts

Contracts are normally used to acquire specific, clearly defined services and/or products from entities or individuals other than State Agencies or employees of the State. This includes situations where the State is seeking a service or a product or is offered a service or product for which it will not pay and may even acquire revenues, for example, wireless internet access at State facilities.

Grants are commonly issued for the direct support of persons and are also issued to organizations that perform public benefit activities with a high degree of independence. Grantees often adhere to programmatic requirements of a State or Federal program under which the Grant is issued and may be required to submit financial and programmatic reports to the granting Agency.

A Grant should only be used in the following circumstances:

- a.** The principal purpose is to support or stimulate an activity that benefits an individual (or group) rather than the Agency itself (or wards of the State) and there will be no substantial direct State oversight of the funded activity, other than providing guidance upon request, accumulating information on progress/results achieved, and periodic financial, programmatic and performance monitoring of the program or activity.

AND

b. When the Grant contains Federal funds, it meets the definition of a subrecipient relationship as found in the Federal Uniform Guidance ([2 CFR Chapter I, Chapter II, Part 200](#) - Uniform Administrative Requirements, Cost Principles, and Audit Requirements for Federal Awards).

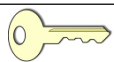
OR

c. Appropriated funds are characterized in the law or are designated in the Grant agreement as “grants,” or designated by a grantor/funding organization as “grants.”

Federal Uniform Guidance identifies the characteristics below to distinguish between a grantee (other than individuals who are eligible for this assistance) and Contractor relationships. These characteristics should be considered when determining whether to enter into a grant agreement or a Contract for goods and services:

Examples - Grantee (Subrecipient)	Examples - Contractor
Determines who is eligible to receive what Federal assistance	Provides the goods and services within normal business operations
Has its performance measured in relation to whether objectives of a Federal program are met	Provides similar goods or services to many different purchasers
Has responsibility for programmatic decision making	Normally operates in a competitive environment
Is responsible for adherence to applicable Federal program requirements specified in the Federal award	Provides goods or services that are ancillary to the operation of the Federal program
Uses the Federal funds to carry out a program for a public purpose specified in authorizing statute, as opposed to providing goods or services for the benefit of the pass-through entity	Is not subject to compliance requirements of the Federal program as a result of the agreement, though similar requirements may apply for other reasons

All of the characteristics listed above may not be present in all cases. Agencies must evaluate the features of each agreement individually to determine whether it appears more like a Contract or a sub-award. Refer to the subrecipient/Contractor determination tools and guidance provided on AoA [Bulletin 5](#) for further information.



NOTE: Use of a federally approved indirect cost rate, or the de minimus allowed indirect rate as per the Uniform Guidance, is NOT required for State Contracts.

C. Capital Leases

No Agency, department or unit of State government is authorized to enter into a Capital Lease without the approval of the Secretary of Administration and the Treasurer. A Contract shall be considered a Capital Lease if it meets *one or more* of the following four criteria: (1) the lease term is greater than 75% of the property’s estimated economic life; (2) the lease contains an option to purchase the property for less than fair market value; (3) ownership of the property is transferred to the lessee at the end of the lease term; (4) the present value of the lease payments equals or exceeds 90% of the fair market value of the property. Special accounting

rules apply to Capital Leases which require their value to be included in the State's total debt. Refer to AoA Bulletin 7.14, Equipment Revolving Fund as an alternative to a capital lease for equipment.



NOTE: Accounting rules require the value of Capital Leases be included in the State's debt total. As such, they are subject to the annual debt limit set by the General Assembly. Use of a Capital Lease in order to avoid the requirements of either Bulletin 3.5 or Bulletin 5, is EXPRESSLY PROHIBITED.

D. Agreements to Receive or Access Confidential Information

On occasion a party other than the State of Vermont will request a copy of or access to Confidential Information held or collected by the State in circumstances where it is appropriate for an Agency of the State to allow or facilitate such request. A written agreement between the State and such a party is required in such a case to address many of the issues and risks inherent in sharing or disclosing Confidential Information (see Section IX.A.8). The agreement will not be subject to the competitive procurement requirements of this Bulletin, unless either: (a) the Agency is obtaining services from the other party in connection with the disclosure of Confidential Information; or (b) the Agency is conveying to the other party an exclusive right to receive or access certain Confidential Information. However, before entering into such agreements, Agencies must obtain approvals from the ADS, the AGO, and the Secretary of Administration (see Section X.B.).

[END SECTION VI]

VII. COMPETITIVE BIDDING AND THRESHOLDS

A. Competitive Bidding

Competition in the procurement process serves both State Agencies/Departments and potential bidders by ensuring the procurement process produces an optimal solution at a reasonable price, and allowing qualified Vendors an opportunity to obtain State business. In addition to complying with existing statutory and regulatory requirements, State procurements shall comply with the following general principles:

- **Notice:** Provide appropriate notice of opportunities to compete for State business;
- **Predictability:** Provide a consistent process while conducting the procurement;
- **Transparency:** Document the procurement process clearly and consistently; and
- **Cost-effectiveness:** Ensure procurement processes are designed to secure optimal solutions at reasonable prices.

Although Vermont does not have a statute, rule or administrative requirement which mandates preference be given to State residents or products, all other considerations being equal, preference will be given to resident bidders of the State and/or products raised or manufactured in the State.

B. Bidding Monetary Thresholds

In some cases, State or Federal statutes or regulations require bidding at lower amounts. Such statutes shall take precedence over this Bulletin and shall be adhered to. Agencies/Department should consult with Agency counsel or the Office of the Attorney General if there is a question about the applicability of State or Federal law to Agency procurements.

1. Services Up To \$100,000 - Standard or Simplified Bid Process

For a Contract estimated to not exceed \$100,000, an Agency may choose to follow either a Simplified Bid (described herein at section [VIII.A](#)) or Standard Bid process (described herein at section [VIII.B](#)). If the Agency is unsure whether a Contract will exceed the \$100,000 threshold, to avoid rebidding the work, the use of a Standard Bid process is recommended.

2. Services Greater Than \$100,000 – Standard Bid Process

An Agency may enter into a Contract greater than \$100,000 only after adherence to a Standard Bid process (issuance of a formal Request for Proposals), as set forth herein (section [VIII.B](#)).

[END SECTION VII]

VIII. THE BIDDING PROCESS

A. Simplified Bidding

1. General.

A standard bidding process is always preferred. However, a “simplified bidding process” may be used when the anticipated Contract amount will not exceed \$100,000. A simplified bidding process requires an Agency to develop a Statement of Work that identifies work to be performed, specific need(s) to be addressed and/or product(s) to be delivered (subject to BGS’s exclusive authority over commodities purchases), and that solicits price quotations from at least three potential Vendors known to provide the specified services or products. However, the Simplified Bid process does not require a public bid posting nor a public bid opening.



NOTE: Contracts that result from the Simplified Bid process may not exceed \$100,000, without a written waiver from the Secretary.

2. Procedures for the Simplified Bid Process

- a. Prepare written specifications before soliciting bids. Elements that should be included are:
- i. Statement of Work
 - ii. Performance requirements;
 - iii. Expectations regarding service location, schedule, including deadlines for deliverables and/or milestones, if applicable;
 - iv. Other specific State requirements or conditions.
- b. Solicit price quotations from 3 or more qualified Vendors. Price quotations may be obtained through: telephone or verbal quotes, facsimile quotations, e-mail quotes or written bids. All communications with the Vendors to obtain price quotes must be documented (emails, fax, notes from phone calls, etc.);
- c. The Vendors solicited must understand they will be required to enter into a standard State Contract for Service, including Attachment C, should they be selected;
- d. All records relating to the Simplified Bid process, including proposals and a record of the selection process, shall be retained in the Contract file in accordance with the Agency’s records retention schedule;
- e. The quotation most responsive to the selection criteria should be selected;
- f. The Vendors solicited must understand that Vendor-required documentation, if any, must be made available at the time of bid and shall be subject to negotiation, should they be selected.



NOTE: If all price quotations received as a result of a Simplified Bid process exceed the \$100,000 threshold Agencies must then engage in a Standard Bid process.


B. Standard Bidding (“Requests for Proposals” or “RFP”)

1. General

A standard RFP is required for all services which are anticipated to exceed a maximum Contract amount of \$100,000. An RFP is also recommended for complex procurements, such as when the response requires the bidder to provide a solution or long term commitment. The RFP must contain all requirements and conditions of the particular procurement process. An RFP must contain a Statement of Work and describe the criteria the State is going to utilize to select the Vendor. Agencies must evaluate bids in accordance with the criteria set forth in the RFP. This Bulletin provides basic guidance relating to RFP documentation and process. Additional guidelines, including sample templates and the most current versions of all State procurement and Contract forms are available on the Office of Purchasing and Contracting website at: <http://bgs.vermont.gov/purchasing-contracting/forms>.

After an RFP or bid solicitation has been issued, and prior to the deadline for submission of bids, an Agency may issue an Addendum modifying any aspect of the RFP. Except as clarified or changed by an Addendum, the terms, conditions, specifications, and instructions of the solicitation and any previous solicitation Addenda, remain as originally written. Such Addenda shall be publicly posted where the RFP is displayed and/or in accordance with instructions indicated in the RFP. Best practice is to have all Addenda acknowledged and/or signed and returned by all bidders with their proposals. Any deadline extension granted to any bidder must be granted to all of the bidders. The State does not accept late proposals.

An Addendum should be reasonably specific, noting the document, the project, the change and where the changes can be found. Addenda should be published with reasonably sufficient time prior to the submission of bids for prospective bidders to consider prior to preparing proposals.

 **NOTE: An RFP may only be amended by issuing a written Addendum prior to the submission of bids, and within a reasonable time period, except as may be necessary to exercise rights specifically reserved in the RFP.**

Disclosures for the purposes of bidding integrity are critical to bidding transparency. Refer to policy on-line at: <http://bgs.vermont.gov/commissioner/adminpolicies/0034>.

2. RFP Components

All State Agency RFPs must include the following components:

a. Cover Page: Includes: (1) Name and address of State contact person; (2) Due date, time, and location of responses; (3) Notification of the time and location for any scheduled bidders’ conference, including a statement as to whether attendance is a condition of selection; and any other special requirements of the RFP process

b. Introduction: Explains the purpose and the nature of the services being sought, for example: “The purpose of this RFP is to obtain proposals from independent management consulting firms to perform a management study of the Division of Bulletin Creation.”

c. Brief description of the Agency: Provide necessary general information about the Agency, if appropriate, such as: the type of government unit; the Agency's statutory authority; number of employees; population served; and mission or purpose.

d. Statement of Work to be performed: A Statement of Work (SOW) is intended to provide potential bidders with a description of the service, solution and/or product being sought by the State (subject to BGS's exclusive authority over commodities purchases) and can take various forms. At a minimum, the SOW should include the following: (1) a description of the work to be performed, product(s) to be provided and/or the specific need(s) to be addressed; (2) a schedule (including when the work is to be completed, any interim completion dates and/or deliverables); (3) the expected outcomes and/or products, and related performance and/or quality standards. The State's requirements in a SOW may also, for example, include:

- Details of what is sought by the State from which the bidders may not vary;
- An opportunity for the bidders to provide alternatives and/or options, if appropriate to the bid process; and/or
- A description of a capability the State is looking for generally, which permits the bidders to provide their own solutions within certain parameters and/or to address a certain need.

Depending on the complexity of the work to be performed, an Agency may want to consider hiring an expert to assist with the development of an appropriate Statement of Work for inclusion in the RFP (subject to the State's Bidding Integrity policy). The appropriate investment of work at this stage of the contracting process will result in time savings and greater efficiency not only for the contracting process, but also the project ahead.

e. Purpose and management structure: Provide a brief overview of recent history leading to the decision to seek a Contractor. This overview will provide a better understanding of the purpose and context of the work. The bid document should include a statement about the contract management structure, with a description of how the Contract will be monitored by the contracting Agency. Bidders should understand the State is going to monitor their activities and performance in order to detect and prevent problems, and to ensure the contract terms are met and State expenditures are appropriate, effective, and efficient.

f. RFP Response Requirements: Clearly explain to bidders the procedural and substantive requirements of the bidding process. For example, the date, time, and address to which bids must be delivered must be explicitly stated. In addition, this section should include information regarding any on-location views of the work area, any pre-bid informational conferences, and any special requirements for submissions with the bid, such as bid bonds, qualification profiles, and resumes of key personnel performing the work, etc.

g. Bidder Confidentiality and Access to Public Records: All responses and other information disclosed in connection with an RFP become the property of the State and, once the resulting Contract is finalized, may be subject to disclosure under the State's Access to Public Records Law, [1 V.S.A. § 315](#) et seq. Accordingly, the RFP must instruct the bidder to identify any material included in the response that is considered by the bidder to be proprietary or otherwise exempt from public disclosure in the event of a Public Records request, pursuant to [1 V.S.A. § 317\(c\)](#). The bidder's response must include a written explanation for each marked section that would support a reasonable claim of exemption, such as, for example, a description of the proprietary nature of the information and the harm that would occur should the material be disclosed. Additionally, the RFP must instruct the bidder to include a redacted copy of its response. Redactions must be limited so that the reviewer may understand the nature of the information being withheld. It is typically inappropriate to redact entire pages, or to redact the titles/captions of tables and figures. Under no circumstances can the entire response or price information be marked confidential. Should the Agency have concerns about the submitted redactions/explanations or lack

thereof, the Agency may invite the bidder to provide sufficient explanation and/or appropriate redaction rights:

h. Reservation of State's Rights: Each RFP must reserve the following State

- to accept or reject any and all bids, in whole or in part, with or without cause in the best interest of the State;
- to waive technicalities in submissions; (A technicality is a minor deviation from the requirements of an RFP that does not impact the substantive terms of the bid/RFP and can be considered without a material impact on the RFP process, etc.). If uncertain of whether a condition qualifies as a technicality, consult with the OPC or AGO for clarification. For example, a late bid is NOT considered a technicality;
- to conform the selection process, award and/or proposed contract language, at any time during the procurement, to comply with state or federal statute, regulation or grant requirements;
- to make purchases outside of the awarded Contracts where it is deemed in the best interest of the State; and
- to obtain clarification or additional information.

i. Contract Elements: The RFP should describe the key elements to be included in the Contract, and a copy of the Contract documents. At a minimum, the RFP shall include standard State Attachment C, Attachment D (if necessary) and any other applicable Attachments.

Any other Contract terms or conditions which may be applicable to the particular service to be procured must be set out in the RFP. For example, with respect to contracts for IT services, the State requires language relating to: Information Security; Intellectual Property Ownership; Confidential Information; access to data; and cyber liability insurance. Agency counsel or the AGO should be consulted for advice on these additional contract terms.

For IT procurements, Risk Management shall be consulted prior to RFP issuance to determine cyber liability and breach notification amounts. Risk Management's determination regarding cyber liability and breach notification amounts, and Terms and Conditions must be identified in the RFP.

j. Price quotation or bid proposal form: The RFP, except for those using a Pre-Qualification selection process (section [VIII.C](#)), should include a price quotation form. The form should explicitly include the price components for the core services and/or products requested (subject to BGS's exclusive authority over commodities purchases), and for each incremental phase of a project, if relevant. If contract extensions are contemplated, the quotation form should explicitly provide a detailed price quotation for each such extension. The form should allow for separate price quotations for optional services and/or products that an Agency may request (subject to BGS's exclusive authority over commodities purchases).

k. Worker's Classification; State Contract Compliance Requirement: For all Contracts for Services, as well as all State construction and transportation projects, with a total project cost exceeding \$250,000, the RFP must include language mandating the bidders comply with provisions and requirements of [2009 Act 54, Section 32](#): (1) for the Self-Reporting of 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 requested by the applicable Agency; and (2) subcontractor reporting requirements. Requirements and forms are identified online and/or directly in RFP templates located on the Office of Purchasing and Contracting website at: <http://bgs.vermont.gov/purchasing-contracting/forms>.

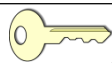
l. Construction and Transportation Projects: For all State construction and transportation projects with a total project cost exceeding \$250,000, the RFP must include language mandating the Contractor record a pay period census of workers onsite each day and upon request submit this record to authorized State Agencies and shall become public information. “Total project cost” is defined as the cumulative direct and indirect cost incurred to complete the stated project goal, including planning, design and engineering services, materials procurements, construction services, and construction management and oversight.

m. Basis for selection: The RFP shall explain the selection criteria to be used. If certain factors are more important than others, the degree of such relative importance should be clearly stated and, if possible, quantitatively profiled. Unless otherwise provided by law or authorized in this Bulletin, price must always be a factor considered in the selection process. Price, however, need not be the only or even primary consideration. An Agency should establish selection criteria that provide for the overall best interests of the State, including that the State secures an optimal solution at a reasonable price. Consequently, in addition to price, selection criteria may also include factors such as qualifications, experience, quality of past work, references and timeliness, and the ability of a specific proposal, approach or technical solution to achieve State objectives, among other factor(s) relevant to the Agency’s program goals. An Agency may set the relative importance of price, and all other factors, as it deems appropriate within its selection criteria. When assessing whether an offered price is reasonable, an Agency may consider not only the costs of goods and/or services to be provided but also other price-related factors such as potential cost savings or avoidance, anticipated revenues and/or added value to the Agency. The RFP shall reasonably identify all price and non-price factors, and their relative weights, for an Agency to best consider them in the selection process.

If the Agency establishes selection criteria that assign numerical scores to proposals, the total points available must be expressly stated in the RFP. An Agency shall not establish selection criteria that provide for an unlimited number of total points available.

3. Request for Information (RFI)

If an Agency does not have sufficient information from which to develop an effective RFP describing the work to be performed, specific need(s) to be addressed and/or product(s) to be delivered (subject to BGS’s exclusive authority over commodities purchases), the Agency may issue an RFI to obtain information on the subject matter of the eventual contract, such as capabilities, practices, systems, licenses, standards, etc. An RFI may be solicited, following the requirements in the section below “Public Notice Regarding the Standard Bid” or individual RFI requests may be sent directly to a representative number of organizations for information. With the information gained, the Agency should then be able to develop an effective RFP resulting in a number of valid competitive RFP responses.



NOTE: An Agency shall not negotiate a Contract directly with RFI respondents. Subsequent to issuance of an RFI, a Contract may only be developed in response to a separate RFP or a Simplified Bid, to ensure the integrity of the competitive process.

4. Request for Comment

A Request for Comment (RFC) is the process whereby the State issues a future/proposed RFP to the Vendor community in order to solicit input about all or a portion of the RFP structure, language, methodology (or any other aspect of the future/proposed RFP). The use of an RFC allows the Agency to gather information (comments or responses) and to revise the planned RFP if necessary and appropriate, in an effort to

create an RFP that will yield the highest number of bidders and a successful outcome for the State.

5. Public Notice Regarding the Standard Bid

At minimum, all RFPs, RFIs and RFCs shall include posting on the Electronic Bulletin Board (EBB), operated by the Agency of Commerce and Community Development (ACCD) as part of the Business to Business registry. Instructions for posting to the EBB are available at: <http://www.vermontbidsystem.com>. However, all IT related RFPs, RFIs and RFCs will be posted by OPC (see [IT Guideline](#)).

The opportunity to bid for the proposed work must be broadly publicized. Other methods of solicitation include: advertising in newspapers; direct mailings to potential Vendors; direct mailings to Vendors on a prequalified list (section [VIII.C](#)); and/or publication in trade journals. It is important for an Agency to maintain a list of those entities or individuals requesting bid documents.

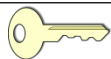
The time between the initial public notice on the EBB (and other methods of solicitation) and the opening of bids must be at least five business days. For RFPs with a relatively complex Statement of Work, allowing potential Vendors a longer response time is highly recommended, to ensure well-constructed bid responses.

6. Pre-Bid (Bidders') Conferences and Adjustments to Bid Documents

RFPs for large or complex projects shall require a pre-bid meeting (conference). The purpose of the pre-bid meeting (conference) is for the State to have an opportunity to review the Statement of Work and other RFP documents with bidders to ensure the State and the Vendors fully understand the requirements of the RFP. If a pre-bid meeting (conference) is required it must be identified in the RFP and describe the form and format the meeting shall take (i.e. in person, conference call, etc.). During the meeting, Agencies may provide an overview of the requirements, opportunity for Agencies/Departments and Vendors to pose questions, and hear responses to questions related to the RFP. All information exchanged at the meeting, answers to questions and clarifications given must be documented, and posted to the EBB and/or as indicated in the RFP. The documentation must include a statement that bidders may not rely on any verbal responses. Similarly, a written question and answer period is recommended for each standard bidding process, with answers posted to the EBB and/or as indicated in the RFP.

7. The Bid Opening

A public bid opening and reading of bids should be the norm and is required for Contracts over \$100,000. Two staff members from the Agency administering the bid process should attend the bid opening. Bids received after the established submission deadline shall be returned unopened to the bidder. The Agency administering the bid process may waive technical non-compliance when doing so is in the best interest of the State, and with the approval of the AGO. Such waivers must be fully documented and included in the Contract file.



NOTE: A late bid may NOT be waived as technical non-compliance.

8. Contractor Selection, Documentation and Apparent Conflict of Interest

a. Selection:

- i. The bid most responsive to the selection criteria established in the RFP should be accepted. Agency staff with the relevant subject matter expertise should

review each proposal for responsiveness in accordance with the requirements outlined in the RFP. When appropriate, an Appointing Authority (Agency) may establish a contract selection committee to review bids.

- ii. If it is determined by the Agency that an on-site interview is required prior to a final selection, the sole point of contact as stated in the RFP should contact finalist(s) to schedule interviews and to provide an agenda for the interviews.
- iii. An Agency is not required to request or accept a Best and Final Offer (**BAFO**) from any bidder. However, an Agency may request a BAFO from any bidder or several bidders in an effort to award a Contract in the best interest of the State, particularly to ensure the State secures the optimal solution at a reasonable price. The Agency may consider requesting a BAFO when:
 - no single proposal addresses all the specifications;
 - all or a significant number of the proposals received are unclear and the evaluation committee requires further clarification;
 - additional information is needed in order for the evaluation committee to make a decision;
 - differences between proposals are too slight to distinguish; all cost proposals are too high or over the budget;
 - multiple Contract awards are necessary to achieve regional or Statewide coverage for an RFP and there are insufficient cost proposals within the budget to award the number of contracts needed.
- iv. Agencies shall post public notification on the EBB, of the Contract award after the Contract has been fully executed.

b. **Documentation:** A complete copy of the RFP, Vendors solicited, price quotations, bids received, and written selection justifications must be placed in the contract file. When other than the lowest cost responsible bid is selected, for instance where the RFP includes a specific selection criterion that assigns price a lower degree of importance relative to other selection criteria, the file must include written documentation consistent with the RFP selection criteria demonstrating how the selection is in the best interests of the State, particularly how the selected bid provides for the optimal solution at a reasonable price. Please reference the [Contract File Checklist](#) for a complete list of documents required to be retained.

c. **Apparent conflict of interest:** If a reasonable person might conclude a Contractor was selected for improper reasons, the Appointing Authority should disclose this fact in writing to the AGO and the Secretary and document the reasons why selecting the desired Contractor is still in the best interests of the State.

C. Pre-Qualifying Vendors for Statewide or Retainer Contracts

To streamline procurement for work routinely bid out, an Agency may employ prequalification procedures as a means of predetermining eligible Vendors from which an Agency may accept bids and proposals. Depending on the type of procurement and contract, prequalification may vary in formality and complexity. Prequalification may be determined through a structured process supported by approved specifications.

Pre-qualified Vendors must be identified through a standard solicitation process through which the

Agency publicly solicits Vendors seeking the opportunity to be prequalified. This may take the form of placement on a pre-qualified list or award of a retainer-type contract, customarily with a maximum dollar amount, set duration, and providing no guaranteed assignment of work for the contract term. The Agency should establish clear criteria necessary for potential Vendors to be included on the pre-qualification list. Additionally, during the period between formal list revisions, the Agency must maintain an ongoing process that allows additional Vendors to request review and inclusion on the pre-qualification list at least every two years. All Vendors determined qualified by the Agency, and who so request it, should be included on the pre-qualified list.

An Agency's internal procedures and this Bulletin should be consulted prior to utilizing pre-qualification to determine if established or recommended procedures exist. An Agency shall document their pre-qualification procedure in writing and in accordance with this Bulletin.

D. Exceptions and Waivers

1. Sole Source Contracts

Use of "Sole Source" or "no-bid" Contracts is contrary to the competitive process supported by the State. Sole Source Contracts will be avoided except when no available alternative exists. A clear and convincing link must exist between the service requirements sought and the reasons why the Agency deems the Sole Source Vendor or Contractor "the only one capable" of meeting the requirements. Possible Sole Source uses might include:

- an unusual and compelling urgency, such as when health, public safety, or the conservation of public resources is at stake;
- situations posing extreme financial consequences to the State;
- legislatively mandated situations; and,
- when required by a warranty or proprietary license agreement.

a. Sole Source Contract \$10,000 or Less

The Appointing Authority may enter into a Sole Source Contract for \$10,000 or less providing sole source justification exists and is documented in the contract file, and the Contract process complies with all other aspects of this Bulletin.

b. Sole Source Contract Greater than \$10,000 (non-emergency)

In other than an emergency situation, an Appointing Authority desiring to enter into a Sole Source Contract having a value greater than \$10,000 must obtain approval to Sole Source from the Secretary of Administration. Secretary approval may be requested by submitting a proposed Sole Source justification memo to the Department of Finance and Management (F & M) at least two weeks before circulation of the Form AA-14 and contract package for required approvals. If the Sole Source request involves Information Security or Information Technology, the justification memo must be approved by the CIO before it is approved by the Secretary of Administration. A copy of the approved Sole Source justification must be retained in the contract file.

Approval to Sole Source, when required by this section, must be obtained from the Secretary before a proposed Sole Source Contract is circulated for additional approvals as may be required under this Bulletin. A copy of the approved Sole Source justification must accompany the proposed Contract when circulating for approvals.

c. Sole Source Contracts in Verifiable Emergency Situations

In an emergency situation, a Sole Source Contract may be executed in accordance with Agency protocols and applicable law, **but** the Contract and the justification **must** be forwarded to the Secretary and the AGO within 10 business days of the contract execution. It is recommended the Agency notify the assigned Finance and Management Budget Analyst as soon as the emergency is known.

It is insufficient to justify a Sole Source agreement by stating that “this is the only Vendor/Contractor/party” qualified, or able to do the work. Such assertions must be verifiably documented.

Acceptable examples may include: the single authorized agent for warranty work; the only entity or individual properly licensed within the 4-hour response time area; a legislatively-determined party; or a federally-mandated party.

d. Mandatory Language for All Sole Source Contracts

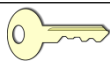
As directed by 3 V.S.A. § 374, all Sole Source Contracts executed on or after December 16, 2018, shall include a certification by the Contractor as to its compliance with the campaign contribution restrictions set forth in 17 V.S.A. § 2950. To implement this requirement, a Contract procured as a Sole Source, and every amendment to the Contract, must include language that identifies the contract as a sole source, along with the requisite Contractor certification. Therefore, all Sole Source Contracts, regardless of dollar amount, and any amendment to the Contract, shall include the following language:

“This Contract results from a “sole source” procurement under State of Vermont Administrative Bulletin 3.5 process and Contractor hereby certifies that it is and will remain in compliance with the campaign contribution restrictions under 17 V.S.A. § 2950.”

To facilitate compliance with this requirement, it is incumbent upon the contracting Agency to ensure that the above language is included whenever executing or amending a Contract that has been procured as a Sole Source.



NOTE: A Sole Source Contract greater than \$10,000 may not be circulated for other required approvals (e.g., AGO, CIO), unless and until a Sole Source justification has been approved by the Secretary (and CIO if Sole Source for IT), and a copy of the approved justification must accompany the proposed Contract.



NOTE: Failure to allow sufficient time to follow the bidding and procurement process is not considered an emergency, and is not a justification for the use of a Sole Source Contract.

2. One-Time Waivers (Other than Sole Source)

The Secretary may waive provisions of this Bulletin on a case-by-case basis pursuant to a written request from an Appointing Authority. Any request must specify the basis for the request and reference the Bulletin section(s) and language or variations from the standard State contract provisions for which the waiver is sought. Waiver approval must be granted by the Secretary prior to other required approvals and the signing of the

contract by either the State or the Contractor. Copies of all waiver requests granted by the Secretary must be retained in the Contract file.

3. Agency/Department Contracting Waiver Plan

Agencies/Department may develop a written Contracting Waiver Plan (Plan) which shall propose acceptable alternatives to non-statutory requirements of this Bulletin. The Plan must be submitted to the Secretary for approval. Development of a Plan provides a process to request modifications for certain classes of Contracts or requirements that cannot reasonably be accommodated within the policies of this Bulletin, or which will allow for more efficient operations without an undue increase in risk to the State.

Plans must: a) be submitted on the [Bulletin 3.5 Contracting Waiver Plan](#) template; b) detail the referenced section(s) and Bulletin language for which a waiver(s) or modification(s) is requested, (c) provide detail of an acceptable alternative (if appropriate), and (d) be signed by the Appointing Authority. A Plan must clearly delineate any proposed deviations from this Bulletin and include written justification for each change requested. The Secretary may approve or reject the Plan, in part or in whole.

Approved Contracting Waiver Plans expire 90 days after re-issuance of this Bulletin, or upon a request from the Secretary, and must be resubmitted for the Secretary's approval within those 90 days.

A Plan must be one unified form detailing all waiver elements, and must be updated to include additional waiver items as they are requested. The Secretary will indicate approval or disallowance by individual change and return an executed copy of the Plan to the requesting Agency/Department.



NOTE: Approved Contracting Waiver Plans expire 90 days after re-issuance of this Bulletin, or upon a request from the Secretary, and must be resubmitted for the Secretary's approval within those 90 days.

[END SECTION VIII]

IX. CONTRACT DRAFTING

A. Drafting the contract

All Contracts, regardless of dollar amount, must comply with the drafting standards below:

1. General Contract Restrictions

A Contract shall not:

- a. require the State to indemnify a Contractor;
- b. require the State to submit to binding arbitration or otherwise waive the State's right to a jury trial;
- c. establish jurisdiction in any venue other than the Superior Court of the State of Vermont, Civil Division, Washington Unit;
- d. waive the certifications regarding tax status, child support, use of State funds, or equal opportunity clauses, as are required by State law;
- e. restrict the ability of the Contractor to hire State employees without the prior written permission of the Department of Human Resources (DHR);
- f. designate a governing law other than the laws of the State of Vermont;
- g. constitute an implied or deemed waiver of the immunities, defenses, rights or actions arising out of the State's sovereign status or under the Eleventh Amendment to the United States Constitution;
- h. limit the time within which a legal action may be brought;
- i. include a provision for automatic renewal ("evergreen" clause); or
- j. include a copy of the RFP or RFP response.

2. Standard State Forms (Contract Templates and Attachments)



NOTE: *Standard State Forms and Templates are routinely updated. Agencies/Departments are responsible to ensure the use of the most current form/template at all times. The current in-force versions are maintained by OPC at: <http://bgs.vermont.gov/purchasing-contracting/forms>. Use of outdated forms/templates may result in delays in obtaining required approvals or rejection.*

a. Short Form Contract may be used for certain services below \$25,000

While use of the standard Contract form and full Attachment C is preferred, the Appointing Authority may authorize the use of the standard Short Form Contract and Short Form Attachment C ("Short Form") for limited purchases of service not exceeding 12 months and \$24,999.99. Amendment(s) to contracts that either increase the maximum price to \$25,000 or more, or extend the term of the Contract beyond 12 months, must be executed using the Standard Contract for Service template and shall be subject to the applicable review and approval process.

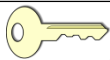
The Short Form shall not be used for services related to life safety, transport of persons, hazardous materials, construction, data usage or sharing, access to confidential information, services of licensed professionals, a Zero-Dollar Contract, and/or a Financial Transaction Contract. As with all Contracts, a current Certificate of Insurance (COI) for the Contractor is required on file, including professional liability insurance, if

applicable. Multiple “one-time” purchases entered into within the same 12-month period, and done intentionally, in order to avoid the requirements of this Bulletin are expressly prohibited.

The Short-Form is designed to expedite Contract drafting for low risk, small dollar procurements, and should be completed according to the instructions included within the form. The Short Form may not be used when additional Attachment(s) or terms and conditions are required. Any questions about whether or not a contract is eligible for the use of the Short Form should be directed to Risk Management at: SOV.riskhelp@vermont.gov.



NOTE: *The Short Form Contract may only be used for one time services below \$25,000 that do not exceed 12 months’ duration. If the maximum amount exceeds \$25,000 the State requires the use of the standard Contract for Service and the full Attachment C, etc. (see Appendix I for Short Form Contract and Short Form Attachment C).*



NOTE: *Regardless of the contract amount, the Short Form Contract may not be used when contracting for life safety, transport of persons, hazardous materials, construction, data usage or sharing, and/or access to Confidential Information.*

b. Standard State Contract Forms (Templates and Attachments)

All Contracts not eligible to use the Short Form Contract, must use one of the current standard Contract templates (“shell”) and adhere to the Attachment “letter” assignments for the standard Contract Attachments as follows:

- **Attachment A** – Statement of Work ([Appendix II](#));
- **Attachment B** – Payment Provisions ([Appendix III](#));
- **Attachment C** – Standard State Provisions for Contracts and Grants (“terms and conditions”);
- **Attachment D** – Approved Modifications to Attachment C, modifications to a Contractor document or other required terms and conditions (if necessary) ([Appendix IV](#));
- Additional Attachments may be lettered as necessary.

All modifications to Attachment C’s standard provisions shall be included in Attachment D which is to be referenced under the standard Contract shell “Order of Precedence”. All such modifications require pre-approval by the AGO before the Contract is executed by the Appointing Authority. Modifications to the insurance or audit provisions in Attachment C must be approved by the Director of Risk Management or the Auditor of Accounts, respectively, in advance of contract execution.



NOTE: *Under no circumstances may the actual Attachment C document itself, be modified. When changes or modifications are necessary, Agencies shall use Attachment D.*

Additional terms and conditions deemed necessary to the Contract shall be included in Attachment D. All requests and approvals for such modifications must be documented and retained in the contract file. For examples of common additional terms and conditions refer to [Appendix IV](#).

3. Standard Contract Elements

a. Parties to the Contract

The Parties to a Contract are: 1) the person(s) or legal entity responsible for performing the work, and 2) the State Agency or department responsible for Contract compliance, monitoring and payment. The legal information (name or business name from [IRS Form W-9](#)) must be the same as the party in the Contract. A valid W-9 must be dated within six months prior to the Contract effective date. Agency staff should work with their business office to review the W-9 and determine if the Vendor is active in Vermont Integrated Solution for Information and Organizational Needs (VISION), the Statewide financial system, with the correct legal name and remittance address. The guides for the New Supplier Request Forms and the link to the IRS website (where forms W-8 & W-9 are located) are located on the VISION Forms page at [VISION](#). The Supplier FAQ's can be found on Department of Finance and Management website, Supplier FAQ page at [VISION Supplier FAQ](#).



NOTE: If the Contract includes work being assigned to a sub-contractor, see section XII sub-contracts of this Bulletin.

b. Contract Duration (Term)

Contracts must have a specific start and end date (term), defining the legal period in which the Contractor is authorized to perform the work, and for which the State will be obligated. The use of “Upon Execution” is not allowed. Including language that automatically renews or extends the Contract beyond the stated end Date (“evergreen clause”) is strictly prohibited.

An Agency should carefully consider what period of time is appropriate for contract performance. Considerations should include the nature of the services and the status of any particular industry or market involved.

The base Contract term is a period of up to two years. In certain situations, such as when purchasing services for which there is an ongoing need, the State may want to extend the Contract beyond a base two-year period. Language may be added to preserve the option(s) to extend for two additional one-year periods, for a total maximum of four years.

For IT Implementation contracts (as defined in the IT Guideline) the base contract term may include the period of implementation services, plus up to five years for annual operating costs (maintenance and service). Any request for a waiver of this provision for a longer period of time must be approved by the CIO before it is approved by the Secretary of Administration.

Agencies must plan accordingly to allow sufficient time for all required approvals and final contract execution BEFORE a Contractor begins work. Agencies must monitor contract end dates well in advance to allow sufficient time to prepare and process the required re-bidding. This re-bidding and resulting award constitutes a new Contract (even if the re-bid award goes to the same Vendor) and must have a new VISION contract number. Failure to allow sufficient time to re-bid a Contract is not an acceptable justification to request a Sole Source waiver.



NOTE: *In certain instances, Amendment(s) to exercise pre-defined option language (extension of duration and related price increase) may not require review and approval by the AGO and Secretary (see section [XIII.B](#)).*



NOTE: *Under no circumstances may any Contract be amended to extend beyond four years, in total, without a specific waiver approved by the Secretary.*

c. Maximum Amount

All Contracts must clearly disclose the maximum dollar amount for services, supplies, commodities and expenses on a “fixed price” basis or a “not to exceed” maximum dollar amount.

d. Total Number of Pages

The Contract and Attachments shall be sequentially numbered within the total pagination, for example, “Page 1 of 10”, with the total number of pages (in this example, 10), stated in the Contract.

For long, complex contracts requiring numerous Attachments, such as construction and transportation contracts, Agencies may choose to number the contract and each Attachment, within the pagination for each. For example, Contract pages 1-2, Attachment A, pages 1-1500; Attachment B, pages 1-2; Attachment C, pages 1-4; Attachment D, pages 1-2; Attachment E, pages 1-51; resulting in a total of 1,561 pages. However, the total number of pages shall be stated in the Contract.

4. Description of the Work and Compliance (Attachment A)

a. Statement of Work

All State Contracts must describe the work to be performed in clear, concise and complete statements. Attachment A of the standard State Contract should be used to detail the work to be performed or products to be delivered by the Contractor. A well written description will include the schedule for performance, identification of project deliverables, deliverable milestones, and standards by which the Contractor’s performance will be measured. This description of the work may also be referred to as the Statement of Work, Specifications of Work, Scope of Work or Subject Matter. Please refer to [Appendix II](#) for further guidance. The deliverables and milestones should be used to inform the payment terms in Attachment B. Attaching RFPs and RFP responses to contracts is not permitted. RFP responses can be long and complicated and may include both unnecessary information and introduce internally inconsistent terms within the Contract.

b) Contract Compliance Monitoring

The level of required contract compliance monitoring, if applicable, should be based on the assessment of the risk for delay or failure to deliver the services. In assessing the risk, Agencies should consider factors such as: amount of funds involved; contract duration; contract complexity; history of the Contractor with State government; amount of subcontracting involved; and other relevant issues. Whether or not

liquidated damages, service credits and/or Retainage are part of the Contract, the document should include a section that describes specifically how the Agency will monitor the contract for compliance.

Types of compliance monitoring processes and steps may include: (i) periodic Contractor reports; (ii) invoice reviews; (iii) on-site visits; (iv) scheduled meetings; (v) audits; (vi) independent performance reviews; (vii) surveys of users/clients; and (viii) post-contract audit or review. This section may also describe a process for identification, discussion, and resolution of disputes between the Contractor and the State, both during the Contract duration and after expiration.



NOTE: Additional guidance on Statement of Work is available in this Bulletin as [Appendix II: Attachment A – Statement of Work Guidelines](#).

5. Payment Provisions (Attachment B)

a. Payment Amounts and Frequency:

All State Contracts must describe how, when and under what circumstances Contractors submit invoices to the State. Attachment B of the standard State Contract should detail:

- Requirements and schedule for the submission of Contractor invoices;
- Whether payment will be made based upon: rates; hours worked; delivery of a service, or State acceptance of a deliverable;
- Whether payment or any portion thereof will be tied to the achievement of performance outcomes and/or measures;
- What documentation (bills, invoices or other proof of work) the Contractor must provide when invoicing the State;
- When and how much the Contractor will be paid, and what deductions, if any, will be made from payments; and
- The payment terms of Net 30 days, from the receipt of a complete and error free invoice, are the generally accepted payment term standard, in accordance with [Finance and Management Policy #5 ~ Payment Terms](#).



NOTE: Additional guidance on payments is available in this Bulletin as [Appendix III: Attachment B Payment Provision Guidelines](#).



NOTE: Contractor shall be paid based on documentation and itemization of work performed and included in invoicing, as required by [32 V.S.A. §463](#). If based on hourly prices, invoicing must contain a summary of the work performed and details, including dates and hours of work performed, and rates of pay for individuals.



NOTE: Advance payments are strongly discouraged. First, advanced payment for work that is not performed or not satisfactory may not be recoverable without filing a lawsuit. Second, in the case of Contractor default and insolvency, the advanced payment may be subject to bankruptcy proceedings and may not be recoverable.

b. Performance Measures and Accountability

In accordance with [3 V.S.A. § 2313](#), State Contracts and Grants should include performance measures which enable the contracting Agency/Department to hold the Contractor/grantee accountable and assess the performance of their services and deliverables under the terms of the Statement of Work.

Contracts should include provisions, which link specific performance measures to the outputs, quality, and outcomes of the services provided. Contract payment should be expressly contingent upon State review, approval and acceptance of contract deliverables. In very specific language, the Contract should detail how the Contractor is accountable for the work or product. These specific performance measures provide objective standards for determining if the Contractor has successfully completed the contractual obligations and if the delivered services or products meet such standards.

The contract's Statement of Work to be performed (Attachment A), as noted in Appendix II, must specify the time line for the deliverables, including interim steps, and measurable standards to be maintained during the contract performance period.

c. Retainage

The purpose of Retainage is to ensure the State retains sufficient funds in the event a Contractor does not perform in accordance with the specific requirements in the Contract. Retainage should be considered for all Contracts. When Retainage is utilized, the Contract sets an amount of funds to be withheld from each payment to the Contractor. The terms under which Retainage is paid must be detailed in the Contract. Retainage should generally be withheld at a minimum of 10% of the Contractor's invoice amount. The Retainage language in the Contract must specify any additional conditions and requirements that must be met prior to the release (payment) of the Retainage, in whole or in part. Such conditions might include contract close-out, final State acceptance and the submission of a separate Retainage invoice.

d. Liquidated Damages

The term "Liquidated Damages" refers to an amount of money the parties agree, at the time of contract formation, shall be payable by the Contractor to the State as compensation for delay or failure to meet particular performance standards. Liquidated damages operate as an agreed-upon substitute for any actual damages suffered as a result of a breach, thereby enabling the parties to avoid litigation, and to continue performance under the Contract.

An amount fixed as liquidated damages must reflect a reasonable approximation of probable damages resulting from a particular breach and shall not operate as a penalty to punish the Contractor for late or substandard performance.

Liquidated damages are not appropriate for every Contract. Agencies considering whether to include liquidated damages provisions in a Contract shall consult with Agency counsel or the AGO.

e. Reimbursable Travel Expenses

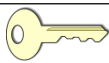
The State strongly prefers Contractors include reimbursable travel expenses (mileage, airfare, lodging, meals, etc.) as part of their fixed or hourly rate(s), or include a fixed travel allowance amount. Reimbursing detailed invoices for travel expenses is administratively burdensome, requiring additional documentation, review, and accounting transactions in VISION. However, the amount the Contractor includes in the rate or as an allowance, must be determined to be reasonable. Reasonableness should be based on: 1) the agreed Statement of Work specifications for number of on-site days, weekly/monthly trips, over-night stays, mileage, etc.; and 2) standard travel costs, with consideration for Federal funding requirements, any limits that may apply, or per diems, such as Federal General Services Administration (GSA) rates for meals and lodging.

In cases where the reimbursement of detailed travel expenses cannot be avoided, such as when required by certain industries or professions, Agencies must obtain a waiver from the Secretary, or have such waiver in their approved Contracting Waiver Plan, prior to including reimbursable travel expenses in any Contract.

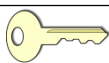
6. Insurance Coverage Limits

Appropriate insurance coverage limits are required in a Contract to protect the State’s interests. Standard Insurance Coverage provisions are included in Attachment C and are deemed appropriate to cover most contractual situations. However, Professional Service Contracts may require additional types of insurance such as professional liability or IT professional liability. Higher insurance limits may be required, such as when relatively dangerous or hazardous activities are contemplated. Conversely, reduced limits or decreases in coverage may be appropriate. Agencies/Department shall consult with the Director of Risk Management for guidance and approval, when considering the appropriateness of insurance requirements. All changes to the Standard Insurance Coverage limits in Attachment C require the prior approval of the Director of Risk Management. Such approval must be documented and retained in the contract file along with a current Certificate of Insurance (COI).

Special care should be paid to Workers’ Compensation coverage for Contracts with out-of-state Vendors. Vermont statute requires insurance carriers be specifically licensed to write Workers’ Compensation coverage in Vermont. Out-of-state Vendors may have Workers’ Compensation coverage valid in their home State, but their carrier may not be licensed to cover Workers’ Compensation for work actually performed by their employees in Vermont. Agencies may verify whether an out-of-state Vendor’s Workers’ Compensation carrier listed on the Certificate of Insurance is licensed in Vermont on the Department of Financial Regulations website by clicking [\[here\]](#).



NOTE: Changes to insurance limits approved by the Director of Risk Management shall be documented in Attachment D, referencing the Attachment C Insurance section, to which the changes apply.



NOTE: Under no circumstances may the actual Attachment C document itself, be modified. When changes or modifications are necessary, Agencies shall use Attachment D.



NOTE: In the case of out-of-state Vendors, the Vendor's Workers' Compensation insurance carrier must be licensed to write Workers' Compensation for all work that will be conducted within Vermont.

7. Intellectual Property Ownership

[3 V.S.A. §346](#) allows the State to grant permission to Contractors the right to use or own intellectual property developed for the State, for the Contractor's commercial purposes. Refer to the [IT Guideline](#) for additional information.

8. Confidential Information

When drafting an RFP or Contract that contemplates Contractor goods or services that will involve using, accessing, storing, processing and/or generating Confidential Information, Agencies will have the following additional considerations, such as: how the data will be used by the Contractor; security of the data; protection for Confidential Information; access to the data; ownership of the data; and return or destruction of data. Agencies must seek the advice of ADS Security and/or the AGO when preparing such RFPs or Contracts.

9. Change Order Process

Most changes to a Contract will require a Contract Amendment and must adhere to the Contract Amendments, Approval and Execution process required in this Bulletin (section [XIII](#)). However, construction and IT implementation service providers typically utilize a formal Change Order process in order to implement minor scope changes without undue delay in a project. An Agency may choose to include a Change Order process in its construction and IT implementation Contracts using the standard Change Order process language from an approved template maintained by OPC. Any changes to the standard Change Order process will require Secretary and AGO approval, regardless of the Contract amount. Change Orders may also be referred to as "task orders," "change requests," and the like. In all instances, the Change Order process must include:

- Inclusion of the original Contract number and a sequential Change Order number, and describe which parts of the Contract are changed and which parts are added;
- Inclusion of the Contractor certifications required under Section [XIII.A.1. d](#) of this Bulletin;
- State approval of all Change Orders, as per the applicable template;
- Execution by both the State and the Contractor; and

All Change Orders executed during the Contract term shall be consolidated into executable Contract Amendments any such time as an amendment would otherwise be required, pursuant to the Contract Amendments, Approval and Execution process required in this Bulletin (section [XIII](#)). The executable Amendment will then be routed for the applicable Contract Amendment approvals as required by this Bulletin.

B. Obtaining a VISION Contract Number

Regardless of dollar amount, Agencies must enter all Contracts, including Commodity Contracts into the VISION system to obtain a Contract number, record and track the Contract (see [VISION Procedure #3 – Purchase Order Procedure](#)). In addition, [3 V.S.A. § 344 \(a\)](#) requires: The Secretary of Administration shall maintain a database with information about Contracts for Services, including approved Privatization Contracts and approved Personal Services Contracts; this database is maintained in the VISION system.

Each VISION Contract record shall include a representative “long description” accurately describing the Contract subject matter; descriptions such as “Personal Services” or the name of the issuing Agency are not acceptable. For all Contracts of \$10,000 or greater (or for lesser amounts if required by your Agency procedures) [Form AA-14](#) (Contract Summary and Certification Form) must be completed. It is the responsibility of the Agency to obtain any required signatures on Form AA-14 before approving the contract in the VISION finance system.

Prior to entering the Contract into the VISION system, Agencies must verify all existing Vendor information in the VISION system is correct and a current (within 6 months) Form W-9 is on file. If the form W-9 is out of date and/or a new Vendor record must be established, refer to the [VISION Vendor Request Form](#), [Form W-9](#) and Vendor [FAQs](#).

[END SECTION IX]

X. CONTRACT ROUTING AND APPROVALS

A. Contract Package and Routing

1. Contract Package

A Contract or Contract Amendment requiring one or more prior approvals beyond that of the Appointing Authority shall be circulated with the relevant supporting documentation required herein (“Contract Package”) to enable timely and accurate consideration of the requested approval(s). Only one Contract package shall be circulated for approval.

Contract Packages may be circulated electronically, but only in accordance with a ADS-approved electronic signature system. However, Agencies wishing to begin electronic submission to F&M after July 1, 2016, must first receive the permission of the Commission of Finance and Management, or designee.

Sending separate copies to the prior-approval parties or circulating electronically to all prior approval parties at the same time is not acceptable. All approvals required must be obtained sequentially, in the order shown on Form AA-14.

The Department of Finance and Management acts as the clearinghouse for Contract packages requiring approval by the Secretary that include a pre-approved Sole Source request and/or one-time waiver request. In such cases, F&M must receive the Contract Package, with all prior approval signatures necessary, at least two weeks before the planned execution date. If less time is available, a letter of explanation should be attached. However, for Contracts taking effect on July 1, Contracts should be submitted no later than June 1. F&M will forward the Contract package and its own recommendation to the Secretary for final approval. If approved, the Secretary will return the package to F&M where a copy of the signed Form AA-14 will be retained; the remaining documents will be returned to the Agency.

2. Content and Order of Package Documents

To expedite the review and approval process, any request for approval of a Contract or Contract Amendment must consist of the following documentation, and the Contract Package, whether circulated in hard copy or via a ADS-approved electronic signature system, must be assembled in the following order:

- a.** Form AA-14;
- b.** Internal review or routing document, if used by the requesting Agency (for example, BGS issues a Request for Review (RFR) document provides a quick summary of the contract, term, amount, and signatures);
- c.** ADS Review Verification Sheet (if applicable) (see [IT Guideline](#) for additional information);
- d.** Cover memo or other document summarizing and/or justifying the requested Contract or Contract Amendment (for example, as applicable and appropriate, this document may be a Recommendation for Award, Sole Source Request, One-Time Waiver, or a Note to File);
- e.** Proposed Contract or Contract Amendment, including all Attachments (in alpha-numeric order);
- f.** For any Contract Amendment, include the original Contract, all prior Amendments, and the corresponding AA-14s in appropriate order.

3. Document Naming Convention for ADS-approved electronic signature system:

Agencies circulating Contract Packages electronically for review and approvals should consider utilizing a standard naming convention, for example:

- Standard Contract Package (requiring signature on AA-14 only):
“CONTRACT # AND AMEND# (IF APPLICABLE) VENDOR NAME AA-14 SIGN”
- If Contract Package includes Sole Source Request (requiring signature on AA-14 and Sole Source Memo) add “and Sole Source” to end of Standard Contract Package title:
“CONTRACT # VENDOR NAME AA-14 AND SOLE SOURCE SIGN”
- If Contract Package includes One-Time Waiver Request (requiring signature on AA-14 and Waiver Memo), add “and Waiver for XXX” to end of Standard Contract Package title: “CONTRACT # AND AMEND# (IF APPLICABLE) VENDOR NAME AA14 and Waiver for XXXX SIGN”
- For a One-Time Waiver made prior to RFP or Contract: “WAIVER for XXXX Sign”
- For Expedited Requests, begin title with the word “Expedite”. ONLY Contracts, Amendments, Sole Source requests and waivers that have urgency may be named using “Expedite” as the first word in the title. For example, a Standard Contract Package would be titled as follows:
“EXPEDITE CONTRACT # AND AMEND (IF APPLICABLE) VENDOR NAME AA14 SIGN”

B. Approvals - Required Prior Approvals



NOTE: The State shall not execute a Contract requiring prior approvals until all such required approvals have been obtained.

An Agency may be required to obtain prior approval of a Contract from the Secretary, the Office of the Attorney General (AGO) (which includes in-house assistant attorney general), Chief Information Officer (CIO), Chief Marketing Officer (CMO), or Commissioner of Human Resources.

If documentation other than the Standard State documentation is used, Appointing Authorities should consult with Agency general counselor the AGO to confirm contract terms, particularly those in “small print” Vendor documents, are consistent with State law and policy. In the case of Contracts in an amount less than \$25,000 (\$0 - \$24,999) which may pose substantial risk to the State, Agency general counsel or the AGO should be consulted to determine if modifications to Contractor forms are required.

1. Attorney General

The Attorney General, or his/her designee, must give prior approval as follows:

- a. A Contract for Service valued at \$25,000 or more must be certified by the AGO, as detailed in section [V](#) of this Bulletin and [3 V.S.A. §342](#).
- b. A Contract for Service valued at \$25,000 or more must be reviewed and approved “As to Form” to ensure that the agreement: (a) complies with all applicable statutory requirements and State policy; (b) generally could be interpreted to be legal, valid, binding and enforceable; and (c) appropriately protects the interests of the State.

- c. Regardless of dollar amount, a Contract for Service must be reviewed and approved “As to Form” in any of the following circumstances:
 - Vendor-required forms (for example, “small print” terms and conditions);
 - Privatization Contracts;
 - Contracts including a Change Order process (a.k.a. task orders, change requests, see section [IX.A.8](#));
 - Financial Transaction Contracts;
 - Zero-Dollar contracts.
- d. Agreements to Receive or Access Confidential Information described in Section VI.D
- e. Contracts for the retention of legal services must be approved by the AGO pursuant to the process set forth in AoA [Bulletin 17.10](#).

Upon request, the AGO will review contracts “As to Form” where such approval is not otherwise required, as above. Reviewing “As to Form” can help ensure project scope, project roles and responsibilities of the parties and payment provisions are clear and enforceable. This review “As to Form” is highly recommended for complex Contracts.

The AGO may decline to approve Contracts “As to Form” when a Contract is not consistent with State law and policy or discretionary choices made by the Agency pose risk concerns unacceptable to the AGO or the Director of Risk Management. Should the AGO decline to approve a contract “As to Form,” the Agency may still request approval to enter into the Contract from the Secretary, in accordance with section VIII.D.2.

2. Secretary of Administration

The Secretary, or his/her designee, must give prior approval to:

- a. Contracts with maximum amounts over \$500,000;
- b. Sole Source Contracts greater than \$10,000;
- c. Privatization Contracts;
- d. Contracts which include a Change Order process (a.k.a. task orders, change requests, see section [IX.A.8](#));
- e. Financial Transaction contracts;
- f. Agreements to Receive or Access Confidential Information described in Section VI.D;
- g. Zero-Dollar contracts;
- h. Waiver requests other than Sole Source;
- i. All Contracts which the AGO has declined to approve "As to Form".
- j. All Contracts with Internet service providers.

3. Commissioner of Human Resources

a. Privatization Contracts

Special and stringent requirements apply to Privatization Contracts. Any Contract that would result in the reduction in force of at least one permanent, classified State employee, or the elimination

of a vacant position of an employee covered by a collective bargaining agreement is likely to fall within the definition of “Privatization Contract” (see [3 V.S.A. § 341](#) for complete definition). No Agency may enter into a Privatization Contract unless it has first notified the Commissioner of Human Resources and subsequently worked with the DHR to follow the procedure specified in [3 V.S.A. § 343](#). The Agency shall be required to notify the Vermont State Employees Association (VSEA) of its intent to enter into a Privatization Contract 35 days prior to the beginning of any open bidding process, including an informal bidding process. Additionally, the Agency must demonstrate, by use of an accounting process specified in [3 V.S.A. § 343](#), that the proposed Contract will result in cost savings to the State of at least 10% compared to the cost of having the service provided by classified State employees. DHR approval is required in addition to the normal approval(s) required based on the contract amount and/or waiver requested.

b. Contracts with State of Vermont Employees and/or Retirees

State Personnel [Policy 5.1](#) (Simultaneous Employment) prohibits employees from entering into a Contract agreement or other employment which will result in concurrent payments from the State of Vermont under more than one employment category, unless approved by the Commissioner of Human Resources.

The Commissioner of Human Resources (DHR) must also review and approve any contract with a former State of Vermont employee or retiree executed within one (1) year of the employee’s date of separation or official retirement date. DHR approval is required in addition to the normal approval(s) required based on the Contract amount and/or waiver requested. The Commissioner of DHR shall maintain a list of all Contracts, approved or rejected, with former State of Vermont employees.

4. State Chief Information Officer

The State Chief Information Officer (CIO), or his/her designee, must give prior approval to:

- a.** All RFPs for Information Technology and Information Security contracts, regardless of dollar value, prior to posting;
- b.** Agreements to Receive or Access Confidential Information described in Section VI.D:
- c.** Contracts for cloud services (SaaS, PaaS and IaaS) regardless of dollar value (see [IT Guideline](#) for more information);
- d.** Contracts which will involve the electronic processing, storing, or transmission of Confidential Information;
- e.** Sole Source Contracts for Information Technology Activities and Information Security; and
- f.** Information Technology and Information Security Contracts over \$500,000.

Agencies must follow CIO/ADS standards for the management, organization and tracking of Information Technology activities. These standards may be obtained from the Agency of Digital Services (ADS) or found at <http://digitalservices.vermont.gov/>.

Certain IT Activities may require an Independent Review (IR) in accordance with [3 V.S.A. § 2222\(a\)\(9\) and \(10\)](#). Refer to the IT Guideline for additional information about Information Technology requirements and duties of ADS/the State CIO.

5. Marketing Service Contracts

Any Contract for Service relating to marketing with a value greater than \$25,000 requires the prior approval of the Chief Marketing Officer (CMO). Vendors of marketing services must be on the CMO's list of pre-qualified Vendors. For marketing Contracts valued at \$25,000 or less, Agencies must refer to and comply with applicable Statewide marketing guidelines, policies, and standards issued by the CMO and available at: <http://cmo.vermont.gov/>.

[END SECTION X]

XI. CONTRACT EXECUTION AND CONTRACT FILE

A. Execution

A Contract must be signed ⁽¹⁾ by the appropriate Appointing Authority or his/her designee, consistent with AoA [Bulletin 3.3](#), *Delegation of Authority for Signing Documents*, and a fully executed copy maintained in the Contract File. The Agency/Department Agency must provide a copy of the entire Contract, as executed, to the Contractor.

⁽¹⁾ Signatures may be affixed on the signature page in writing, or through a ADS authorized e-signature system. Faxed or scanned copies of hand written signatures are also valid. Counterparts: In situations where signature pages are executed separately by the parties, each signature page shall be deemed an original.

B. Contract Administration and Contract File

Once a Contract has been executed, Agencies must properly administer Contractor performance to ensure compliance with the contract terms. A successful Contract is equally dependent on post-award administration as it is on a well-written Statement of Work (SOW) and thoughtful payment terms. The process of contract administration begins with the solicitation documentation and continues through from the time of contract award until the work has been completed and accepted, any disputes or adjustments have been resolved, final payment has been made and the Contract is formally closed out.

The individual administering the Contract for the Agency (Contract Administrator) must read and become familiar with the Contract and contract requirements in order to establish a schedule of activities for ensuring compliance by both the Contractor and the Agency. Contract compliance monitoring will include:

- Ensuring that all required certificates and reports are delivered;
- Monitoring and coordinating subcontractor approval, if any;
- Monitoring Contractor performance and coordinating any State review and approvals of deliverables;
- Monitoring invoicing and payments;
- Amendment processing and administration; and
- Conducting contract closeout, including ensuring all final Contractor reporting and deliverables have been received an accepted prior to final payment.

The Contractor's performance must be measured by all performance elements and criteria established in the Contract. While the reporting, collection, monitoring and evaluation of Contractor performance data may be a collective effort by other contract stakeholders, the contract administration function should act as a repository for all performance data and act as overseer to ensure that contractual performance requirements are monitored and reported.

The Contract Administrator will need to be aware of all Agency-Contractor activities, communications and status surrounding any and all deliverables in the event of a situation affecting any area of the contractual relationship and/or status. For example, if a deliverable is late, unacceptable or there is some other dispute, the Contract Administrator may be responsible for coordinating the required communication and resolution. Therefore, the Contract Administrator should obtain copies of the relevant paper trail, as the contract file must include complete supporting data regarding such a situation.

The Contract Administrator will process any termination documentation - for breach, default, non-appropriation of funds or if the Agency terminates for convenience. When termination occurs for any reason except the end of the contract term, notices must be given to the Contractor in accordance with the contractual requirements.

An Agency must maintain an up-to-date contract file. Agencies must keep all Contracts and the required documents on file as Public Records for at least three years after the Contract's term expires. A Contract File Check List, detailing all required documentation for the official contract File, is provided in [Appendix I](#). An official Contract file is required for all Requests for Information (RFI), Requests for Proposal (RFP) and all Contracts awarded regardless of type of bid or waiver involved. Agencies must download the Contract File Check List and use it as a tool to ensure compliance with the documentation standard for public records and audits.

C. Conflict of Interest

Employees with a conflict of interest or appearance thereof, shall not participate in, control or influence the bidding process, the awarding of Contracts, or the approval of payments against said Contracts. Department of Human Resources (DHR) [Employee Policy 5.6](#) and the Executive Code of Ethics (Executive Order #09-11, codified as [3 V.S.A. § E03-53](#)) set standards that shall be used as the primary guide. Additionally, every effort shall be made to avoid even the appearance of a conflict of interest in the contracting process (see Section [III](#) for definitions). Further, every Contractor shall be required to disclose in writing any actual or potential conflict of interest.

D. Statewide and Retainer Contracts

1. Statewide Contracts

To simplify the acquisition process, the OPC maintains numerous Statewide Contracts for supplies, which include materials, equipment, parts, and commodities. Unless otherwise approved in advance, **these Statewide Contracts must be used by all Executive Branch entities.** To find out if a Statewide Contract exists that meets an Agency's need, contact the Office of Purchasing and Contracting or refer to the web site at <http://bgs.vermont.gov/purchasing-contracting/contract-info>.

Other Agencies may create Statewide Contracts, such as Statewide Marketing Contracts, **only when authority is expressly granted by the Secretary or applicable law.**

2. Marketing Master Contracts

The Chief Marketing Officer (CMO) shall be the only named State party on, and point of initiation for, all Marketing Master Contracts. The CMO requires a process similar to the approach to IT Retainer Contracts described below when establishing Master Marketing Contracts as well as the subsequent agreements executed pursuant to them (SOWs). Agencies should access policies and services through Master Marketing Contracts including: a) Media Buying, b) Creative Services, and c) Photography here: <http://cmo.vermont.gov/document/pre-qualified-marketing-vendors-list>.

3. IT Retainer Contracts

OPC maintains a number of Vendors pre-qualified to allow Agencies to quickly and efficiently obtain certain IT consulting and technical services. These pre-qualified Vendors provide services in

many functional areas or categories ranging from strategy and analysis services to Information System Security and Systems Engineering. The Vendors have agreed to the Standard State Terms and Conditions.

This results in a two-step approach to procurement. The first step is qualifying a group of Vendors under a set of requirements or functional areas. The second step allows State Agencies/Departments to solicit responses from those pre-qualified Vendors for a business need defined in a Statement of Work-Request for Proposals (SOW-RFP), and come to agreement by signing a Statement of Work (SOW) Agreement. The appropriate process and all forms to be used are set forth in each “retainer” agreement for the information of both the Vendors and the Agencies. Once an Agency has elected a Vendor using this process, it should obtain a copy of the applicable Retainer Contract for purposes of the complete contract file and contract compliance monitoring.

This SOW-RFP process is not intended for projects that would result in Contracts of more than \$500,000. These larger projects require the formal Request for Proposals process. The limit per Agency SOW Agreement to be entered into using the SOW-RFP process is \$500,000. Limits may be waived by the Chief Information Officer. Retainer Contracts are subject to dollar limits as well, requiring that Agencies verify the Retainer Contract balance remaining before obligating additional SOW-RFP Agreements against the Retainer Contract.

Additional information and the procedures required to access these Retainer Contracts is located at: <http://bgs.vermont.gov/purchasing%20and%20contracting/current%20contrats/information-technology>.

E. Blanket Delegation of Authority (BDA)

OPC may delegate authority to Appointing Authorities to make certain types of purchases directly. A BDA enables Agencies to maintain the continuity of everyday operations. The purchases made under a BDA, however, are still subject to the underlying requirements of competitive bidding as stated in this Bulletin.

BDA#1 authorizes Appointing Authorities to make any single purchase up to \$3,500 provided the item being purchased is not available through an existing State Contract, is not otherwise restricted by statute or Administrative Bulletin, and is not an ongoing need of the department. ***BDA #1 may not be used to purchase services, IT purchases, and print procurement (in accordance with the Print Procurement directive issued by the Secretary of Administration dated February 13, 2012). All IT purchases shall be made under an existing Statewide Contract, IT Retainer Contract or in accordance with the IT Guidelines.***

For items needed on an ongoing basis, Agencies are expected to work with the OPC to establish a Contract. Specific authority covering certain classes of items for example, fresh produce purchased from local farmers at market prices can be requested through the OPC. All BDAs, including BDA#1, are subject to the ongoing approval of the OPC and can be revoked or modified at any time. All purchases made under a BDA may be subject to audit to determine compliance with this Bulletin and with the applicable BDA.

If the needed item(s) are not available under an existing Contract and is are not covered by an existing BDA, the Agency must prepare a requisition through the VISION system in accordance with the [VISION Requisitions Manual](#) and have the requisition budget checked for sufficient funding by the VISION system.

[END SECTION XI]

XII. SUBCONTRACTS

The Contractor may not assign, subcontract or sub-grant the performance of a Contract or any portion thereof to any other subcontractor without the prior written approval of the State. If subcontracting is approved by the State, the Contractor remains responsible and liable to the State for all acts or omissions of subcontractors and any other person performing work under the Contract. When a contract involves subcontracting (sub-agreement), the State should encourage the Contractor to follow a fair and open award process and create clear and thorough subcontracts to enable the Contractor to properly monitor the performance and compliance of the subcontractor(s). Contractors shall include the following provisions of Attachment C in Contractor's subcontracts for work that is to be performed solely for the State of Vermont or performed in the State of Vermont: (i) Fair Employment Practices and Americans with Disabilities Act, (ii) False Claims Act, (iii) Whistleblower Protections, (iv) Taxes Due the State, (v) Child Support, (vi) No Gifts or Gratuities, (vii) Certification Regarding Debarment, (viii) Certification Regarding Use of State Funds, (ix) State Facilities and (x) Location of State Data.

Standard State terms and conditions (Attachment C, "Sub-Agreements") clearly require prior notice to and the written approval of the State before a Contractor may assign or subcontract the performance of any Contract, in whole or in part.

XIII. CONTRACT AMENDMENTS, APPROVAL AND EXECUTION

One purpose of this Bulletin is to minimize Contract Amendments, especially as they relate to significant unanticipated changes in the Statement of Work, contract duration and/or the contract maximum amount. It is generally desirable to avoid Contract Amendments because they may diminish the advantages of the competitive bidding process. Extensive Contract Amendments may indicate an Agency did not define and develop a thorough Statement of Work to be performed.

Agreements such as Letters or Memoranda of Understanding (MOU), designed to amend a Contract are unacceptable.

A. Contract Amendments:


1. Amendment Requirements:


- a.** Contract Amendments shall be required for any change that alters the essential terms of the original Contract, including but not limited to the following examples:
 - a change to the Contract that expands or decreases the Statement of Work and/or Deliverables;
 - a change to the Contract that expands or decreases the payment amount beyond what is defined in the original Contract;
 - a change to the payment provisions beyond those defined in the original Contract;
 - a change to extend the contract duration beyond the original duration defined in the original Contract; and,
 - any other change to an Attachment, for which the Contractor is to be held accountable or which would increase risks to the State.

- b. All Contract Amendments must include the original contract number and a sequential Amendment number. An Amendment should describe, with specific reference to the applicable sections of the Contract, what is being added, deleted or otherwise modified. A new Form AA-14 must show the original contract number and the Amendment number.
- c. When issuing a Contract Amendment, Agencies/Departments shall ensure that the Contract is updated to include the current version of Attachment C in effect at the time of the Amendment.
- d. All Contract Amendments and Change Orders must include the following certifications:
 - i. **Taxes Due to the State.** Contractor certifies under the pains and penalties of perjury that, as of the date this Contract Amendment is signed, the Contractor 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.
 - ii. **Certification Regarding Suspension or Debarment:**
 Contractor certifies under the pains and penalties of perjury, as of the date this Contract Amendment is signed, neither Contractor nor Contractor’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.

 Contractor further certifies under pains and penalties of perjury that, as of the date that this Contract Amendment is signed, Contractor is not presently debarred, suspended, nor named on the State’s debarment list at:
<http://bgs.vermont.gov/purchasing-contracting/debarment>.
 - iii. **Child Support** (Applicable to natural persons only; not applicable to corporations, partnerships or LLCs):

 Contractor is under no 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 as of the date of this Amendment.
- e. All Contract Amendments and Change Orders to a Contract originally procured as a Sole Source must include the mandatory certification language set forth under Section VIII(D)(1)(d) of this Bulletin.

 ***NOTE: The issuance of a revised Attachment C does not necessitate a Contract Amendment, in and of itself. However, Agencies shall include the most current Attachment C when issuing an Amendment to an existing executed Contract, replacing the Attachment C in effect at the time of the original contract execution.***

 ***NOTE: Agencies must not use multiple Contracts to procure goods and/or services which can reasonably be procured through one Contract, nor use the Contract Amendment process to avoid the requirements in this Bulletin, relating to competitive solicitation and approvals.***



NOTE: *Contract extension, renewal, or increases should be contingent upon prior satisfactory contractor performance, as determined by the Agency’s evaluation process.*

B. Amendment Approval and Execution:

1. Contract Amendment Package:

For Amendments requiring approval by the AGO, the Secretary and, in certain cases, the Chief Information Officer, a complete “Contract Amendment Package” (Package) will be sent to the Department of Finance and Management for handling. The “package” must include:

- a copy of the original executed Contract, including all Attachments and the initial Form AA-14;
- a copy of all previously executed Amendments, including all related Attachments and Forms AA-14; and
- the current proposed Amendment, including all Attachments and the new Form AA-14.

2. Appointing Authority Approval Required:

The Appointing Authority must approve all Contract Amendments.

3. Attorney General’s Office and Secretary of Administration Approvals Required:

In addition to the approval of the Appointing Authority, approval by the **AGO and the Secretary** prior to execution of an Amendment is required in any of the following circumstances:

a) for any Amendment to a Contract originally procured as a Sole Source, except that prior approvals of the AGO and the Secretary shall not be required where the amendment is only to extend duration and increase the maximum amount as expressly contemplated under the terms of the original Contract, and the maximum amount of the Contract remains under \$100,000 (with no change to Statement of Work or other Contract terms); or

b) any Amendment to a competitively sourced Contract originally procured using a simplified bid or RFP, if the cumulative effect of the Amendment and all prior Amendments increases the Contract price by 25% or more, except that prior approvals of the AGO and the Secretary shall not be required where the Amendment is only to extend duration and increase the maximum amount as expressly contemplated under the terms of the original Contract (with no change to scope of work or other Contract terms).

4. Chief Information Officer (CIO) Approval Required:

The CIO’s approval is required for any and all Contract Amendments concerning a Contract for an Information Technology Activity and Information Security, as follows:

- a. All Contracts originally for cloud services (SaaS, PaaS and IaaS) regardless of dollar value (refer to the [IT Guideline](#) for more information);

- b. All Information Technology and Information Security Contracts which originally involved the processing, storing, or transmission of information protected by State or Federal law, including protected health information, personally identifiable information, Federal tax information and education information;
- c. The original Contract was less than \$500,000, plus the cumulative effect of all Amendments increases the Contract price above \$500,000; or
- d. The original contract was \$500,000 or more, and the cumulative effect of all Amendments has increased the contract price by 25% or more.

C. Execution of Amendments:

Only an Appointing Authority may execute a Contract Amendment. Prior to executing an Amendment, it is the **responsibility of the Appointing Authority to ensure** the Amendment:

- is warranted;
- has obtained all required prior approvals; *and*
- is not being employed to significantly expand and/or change the Statement of Work, thereby jeopardizing the integrity of the competitive process.

D. Amendment Number and VISION Record:

As with the original Contract, each Contract Amendment must have a sequential Amendment number appended to the original VISION Contract number. All Amendments which change the duration, end date or maximum amount must be entered into the VISION system to update the existing Contract record (see [VISION Procedure #3 – Purchase Order Procedure](#)). Maintaining the correct Contract information for payment and reporting purposes is also required by [3 V.S.A. § 344 \(a\)](#).

XIV. CONTRACTOR NAME CHANGE OR OTHER CHANGE IN CIRCUMSTANCES

If a Contractor’s name should change during the term of a contract, Agencies should consult with counsel or the Office of the Attorney General about whether and how to properly document the change in the contract. In certain circumstances, Finance and Management will require a new Contract number in VISION with a revised Contract amount that appropriately accounts for any amounts already paid under the Contract.

There may further be circumstances in which there is such a change in the Contractor’s identity, organization or capital structure, such as may occur with a merger or acquisition involving the Contractor, or other reason why it may be appropriate to agree to a novation of a Contract. Agencies should obtain specific advice and appropriate forms from counsel or the Attorney General’s Office when considering this approach.

Note that Standard State Contracting forms do not allow assignment of a Contract by a Contractor without the State’s written agreement. Agencies should obtain specific advice from counsel or the Attorney General’s Office when a Contractor attempts to make an assignment or requests the State’s agreement to do so.

[END SECTION XII - XIV]

XV. ACCOUNTING FOR PAYMENTS TO CONTRACTORS

All contractual payments shall be made through and tracked in the VISION System, in accordance with [VISION Procedure #3 – Purchase Order Procedure](#). Contracts for Service will be coded to the appropriate expenditure account, per the Chart of Accounts, and will no longer default to #507XXX series of accounts. Only those Contract for Service which are definitively categorized as Personal Service or Privatization Contracts, as detailed in Section [IV.B](#) and [IV.D](#), respectively, of this Bulletin will be coded to the #507XXX series of Third Party Personal Service accounts.

In the case of Financial Transaction contracts, including certain “Zero-Dollar” Contracts (see section [III](#) Definition) and regardless of whether the State receives the Gross or Net amount, accounting for the transaction must be done in accordance with Generally Accepted Accounting Principles (GAAP).

XVI. COMPLIANCE REVIEWS

In order to promote compliance with the provisions of this Bulletin, the Department of Finance and Management, the Office of Purchasing and Contracting and the Chief Performance Officer may conduct management reviews relative to this Bulletin, as deemed necessary.

XVII. FEDERAL FUNDING ACCOUNTABILITY & TRANSPARENCY ACT (FFATA)

For some contracts funded through Federal awards, the requirements of the Federal Funding Accountability and Transparency Act (FFATA) may apply. Contracting Agencies are responsible for determining if a Contract meets the requirements of FFATA, including: Contractors have a valid DUNS number; are active Federal System for Awards (SAM) registrants; and reporting of all sub-awards (Contracts) in the FFATA Sub-award Reporting System (FSRS). For additional information about these requirements, refer to Finance and Management [Policy No. 8 ~ Federal Funds Accountability and Transparency Act Compliance](#) and the federal [Uniform Guidance \(2 CFR Part 200](#) - Uniform Administrative Requirements, Cost Principles, and Audit Requirements for Federal Awards).

XVIII. PUBLIC RECORDS REQUESTS

Agencies/Departments should work closely with the AGO, embedded AAG or Agency counsel on Public Records requests involving contracts and bid documents. Contracts and all documents sent to the State in response to an RFP/RFI are public records which are exempt from disclosure to the public until a Contract is awarded and fully executed. Once the Contract has been fully executed, or the State has decided not to execute a Contract and will not pursue a new or related RFP/RFI process, all documents associated with the bid, including all Vendor proposals and evaluation notes, are then considered available for review by the public and subject to disclosure in accordance with the State’s Public Records Act, [1 V.S.A. § 315](#), et seq..

If an Agency receives a Public Records request and the response to the request includes materials marked or identified by the bidder as proprietary and confidential according to [1 V.S.A. Chapter 5](#), the Agency shall immediately contact the AGO, embedded AAG or Agency counsel.

XIX. PUBLIC ENDORSEMENTS

Writing a recommendation or giving a recommendation to any Vendor or to any person for their general use, is prohibited. The State cannot give the appearance of “endorsing” a person, product, or company. If one of the bidders produces a written recommendation from the State, it would appear as if the entire process of providing for an “open and fair” bidding process is suspect. It could be interpreted that the State had already “recommended” or endorsed a particular Vendor. Even the appearance of a pre-determined “recommendation” is strictly prohibited. An Agency may respond to a specific inquiry about a specific Vendor or project, but all responses shall be limited to factual statements.

When issuing an RFP, basing an award of a Contract on prior work history and experience is only acceptable if the selection criteria specified prior history and experience.

- A. Selection.** Basing an award on prior work history means that the State will take into consideration the Vendor’s prior work for / with the State - good or bad. It also means that the State will weigh work history for all Vendors. For example, if 2 of 3 bidders worked for the State previously and performed well, it is reasonable to assume both would see a positive impact of their work history on their overall scoring under the selection criteria. Every Vendor must have an equal opportunity to win the award based on the selection criteria.
- B. Vendor References.** A Vendor should list prior State work experience and non-State work experience in their RFP response. As part of the RFP review process, both the State and non-State entities listed must be contacted to verify whether the prior work experience was or was not satisfactory. When contact with another unit of State occurs in this fashion, it is considered reference verification and not a “recommendation” or endorsement.

[END SECTIONS XV - XIX]

XX. APPENDICES

Appendix I – Standard State Contract Templates, Forms and Other Links

a. **Standard State Contract Templates**

i. ***Contract Amendment Template***

ii. ***Information Technology (IT) Contract Template***

iii. ***Short-Form Contract for Service Template s/Term & Conditions***
[restricted use to some Contracts under \$25,000 – see section [V.B.1.](#)]

b. **Contract Amendment Template**

c. **Form AA-14 – Contract Summary and Certification Form**

d. **Contract File Check List**

e. **Bulletin 3.5 Contracting Waiver Plan form**

f. **IRS Publication 15-A**

[Note: Refer to §2 for IRS rules determining Contractor vs. Employee.]

Appendix II: Attachment A – Statement of Work Guidelines

The Statement of Work (SOW) is the area in a Contract where the work to be performed is described. The SOW will contain reference to any milestones, reports, deliverables, and services expected to be provided by the Contractor, as well as outline any obligations of the State. The SOW should also contain a timeline for all deliverables.

The problem most often seen with SOWs is a lack of specificity. A well-written SOW is a clearly descriptive scope which identifies the responsibilities of both parties and avoids any ambiguity.

A well-written SOW consists of a highly tailored series of carefully worded statements that answer the following questions:

- What work is to be done?
- What are the deliverables?
- Who is going to do the work?
- When is the work going to be done?
- How will the work be performed?
- How can you tell when the work is completed?
- How will you measure the performance of the work: How Much Did We Do? How Well Did We Do It? Is Anyone Better Off?

A Statement of Work should include the following components:

1. **Need Statement** - Succinctly describe the State need that the work of this Contractor will address.
2. **Goals of the Agreement** - At the beginning of this section, complete the following sentence (please be succinct): The goal of this project is to... Complete the sentence with a brief description of the goal(s) and how the goal(s) shall be met. Goals can be technical, economic or social. Please be brief, two to three sentences maximum.
3. **Objective of the Agreement/Deliverables** - Complete this section with the affirmative obligations of the contractor, the objectives of the contract/project or goals to be achieved and the deliverables. Objectives and goals should be measurable.

X Poor Example: Task: Assess class needs for public health awareness.
Deliverable: Write curriculum to address needs.

The problem with the above example is that nothing is specified. The task should be measurable, and the deliverable must be quantifiable.



Good Example: Task: Survey 4 classes of 20 students in asthma awareness. Each class will answer a 25-question survey that assesses their general knowledge of asthma issues as they relate to public health. One reviewer should take up to 1 hour with each class to take the survey and another 2 hours per class to assess the data.

Deliverable: A 10 - hour curriculum for graduate student classes of up to 20 students that addresses issues of deficiencies in public health awareness in asthma prevention and care.

By reading the tasks and deliverables, the associated costs should be easily constructed, aiding in the construction of a detailed Attachment B, Payment Provisions. More importantly, in reviewing the deliverables, there should be no question about what is expected of the performing party. A SOW may contain many deliverables, but each should be broken down into tasks and products to specify what is expected.

- 4. Administration** - If there are meetings, calls, conferences, or other “soft” deliverables, they should be outlined in the administration portion of the SOW. Any requirement that is not an end product of a specific task, but is required of the performing party, needs to be described in the administration section of the SOW.

X Poor Example: The Contractor will be required to give periodic reports of progress during the soybean season with more frequent reports during the height of the season.

The problem with the above example is it does not specify what needs to be in the reports, what “periodic” or “more frequent” means, and when the “height of the season” is.



Good Example: The Contractor *shall* be required to give weekly reports consisting of: wind pattern analysis, fungi spore distribution, and potential risk areas. During the height of the season, May 15 - July 15, the Contractor may be required to give twice - weekly reports.

- 5. Timeline** - This section lays out all dates for the project tasks and deliverables. Also included are the dates for the administration portion of the SOW.
- 6. Key Elements** - Between the Needs Statement, Goals of the Agreement, Objectives/Deliverables, Administration, and Timeline components of the SOW, there should be no ambiguity as to what is expected of the performing party. Together, these elements should paint a thorough picture of what is expected, when, and in what form, while noting any special requirements.

Appendix III: Attachment B Payment Provision Guidelines

The main body of the Standard State Contract only states the maximum amount to be paid. Attachment B describes how and when payments will be made. Although the Payment Provisions (Attachment B) need not be long in the case of simple contracts, a well-written Attachment B is vital to eliminating payment problems during the contract term.

The language below may be used as the standard opening paragraph for Attachment B:

“The maximum dollar amount payable under this agreement is not intended as any form of a guaranteed amount. The Contractor will be paid for products or services actually performed, as specified in Attachment A, up to the maximum allowable amount specified on page 1 of this Agreement, item 3. State of Vermont payment terms are Net 30 days from date of invoice; payments against this contract shall comply with the State’s payment terms. The payment schedule for delivered products, or rates for services performed, and any additional reimbursements, are included in this Attachment. The following provisions specifying payments are as follows:”

The following requirements and/or areas to consider may assist Agencies/Departments in developing well-written payment terms:

1. **PRICING: What is the price based on and does it relate to Attachment A?**

- Units of work measures, such as hourly rates, hourly rates by specified position(s) or equipment;
- Specific and measurable deliverables, tasks or benchmarks;
- Progress payments based on days/weeks/months;
- Achievement of outcomes and/or performance measures toward the final result, as outlined in Statement of Work-Attachment A;
- Quality standards;
- Formal acceptance process for deliverables;
- Additional items included in the price, such as fuel surcharges, environmental fees, etc.;
- Retainage provisions.

2. **INVOICE SUBMISSION, APPROVAL AND ACCEPTANCE: What is the invoice and payment process?**

- Detailed invoices are required, per [32 V.S.A. §463](#). A detailed invoice must include the following details;
 - The name and address of the Contractor (letterhead or signed by Contractor);
 - Specific language itemizing the deliverables, units of measure, steps achieved, or progress made;
 - Dates of service or specific dates worked;
 - The Contract number and the name of the project;
 - Delivery tickets (proof of purchases), receipts or other documents to be attachments to substantiate the invoice;
- Other invoice review and approval considerations may include:
 - To whom and where the Contractor remits the invoice for pre-payment review and approval;
 - The invoicing schedule, preferably on a monthly basis.
 - How will you know when the work being billed is acceptable – who decides?

- Who is(are) authorized approvers for the invoice?
- Address the process for invoices not approved due to: unacceptable work; missing a deadline; incomplete work; etc.
- Address the process for handling and resolving payment disputes.
- Address any funding contingencies upon which this contract is based that could affect payment to the Vendor (i.e., Federal Grant Awards, Legislative Appropriation, etc.).

3. CONTRACTOR PAYMENTS: What can the Contractor expect?

- Standard State payment policy is Net 30 days, from date of error free invoice receipt;
- The preferred method of payment is by ACH (**A**utomated **C**learing **H**ouse is a secure payment transfer system that connects all U.S. financial institutions. The *ACH* network acts as the central clearing facility for all Electronic Fund Transfer (EFT) transactions that occur nationwide.);
- To provide a current IRS Form W-9, signed within the last 6 months.
- Retainage provisions.

- **PAYMENT QUESTIONS: Whom should the contractor communicate with if they have a question about their payment or method of payment (check, ACH Transfer, etc.)?** In addition, the State Treasurer's Office maintains a Vendor Portal on which Vendors may access any payment made electronically, by ACH or wire:
<http://www.vermonttreasurer.gov/content/accounting/vendor-login>.

Appendix IV: Attachment D – Examples of Common Additional Term & Conditions

Many contracts can be fully described using the Contract and standard Attachments A, B and C. In some cases, however, agencies will want to add additional provisions tailored to a specific need or their Contracting Waiver Plan, not available in the Standard Contract and Attachments.

In addition, when contracting for professional services, agencies will be required (absent an appropriate waiver) to include a professional liability insurance provision. Attachment D of the Contract “Approved Modifications to Attachment C” should be used for these modifications, as necessary. Consult with the AGO or the Director of Risk Management to ensure you are selecting the correct language.

Below are examples of the more common modifications, including explanatory guidance where necessary.

Owner’s protective liability insurance: The Contractor shall carry liability insurance protecting the State and the Contractor from all claims because of bodily injury or death and property damage, arising out of the work performed under the Contract. The liability insurance shall be in an amount not less than \$1,000,000 and a Certificate of Insurance shall be furnished to the State before commencement of work.

Guidance: *Owners Protective Liability Insurance should be utilized when a Contractor’s business involves work at multiple job sites (not necessarily all for the State) and it is unclear whether the Contractor would have adequate insurance coverage in the event of multiple occurrences at different sites. For example, Contracts with large construction companies should include such a clause.*

Professional liability insurance: Before commencing work on this Contract and throughout the term of this Contract, Contractor shall procure and maintain professional liability insurance for any and all services performed under this Contract, with minimum coverage of \$_____per claim.

Guidance: *Licensed Professionals with whom the State contracts, such as lawyers, architects, engineers, health care providers, etc. must be required to maintain professional liability insurance in sufficient amounts to protect the State’s interest from the consequences of negligence. It is important to note that “professional liability” is a generic category of coverage including types such as: Physician’s medical malpractice; architect’s errors & omissions; etc. The Director of Risk Management will determine the minimum amount appropriate for different classes of professionals.*

Availability of federal funds: This contract is funded in whole or in part by Federal funds. In the event the Federal funds supporting this contract become unavailable or are reduced, the State may cancel this contract immediately, and the State shall have no obligation to pay Contractor from State revenues.

Guidance: *Use this clause when the State Agency is not willing or able to compensate for the loss of Federal funds on short notice. Agency fiscal officers should closely monitor funding availability and performance under these Contracts, as the State may remain liable for expenditures made in good faith by the Contractor prior to notice of cancellation.*

Compliance with other laws: The Contractor agrees to comply with the requirements of [*list specific applicable Federal or state statutory or regulatory provisions*], and agrees further to include a similar provision in any and all subcontracts.

Guidance: Use this clause to refer to any statutory or regulatory provisions that must by law, grant condition or otherwise, be included in the wording of the Contract. This may include in particular cases the provisions of the Federal Rehabilitation Act of 1973 (Sec. 504), as amended; the Age Discrimination Act of 1975; and the Civil Rights Act of 1964.

Confidentiality: Sometimes agencies have legitimate needs to protect Confidential Information. The RFP can require Contractors to maintain confidentiality, although the contract ultimately should duplicate this requirement. Conversely, bidders sometimes want to know how the State will treat the bidder's proprietary information. The RFP should state whether such information will be returned, retained or destroyed by the Agency.

Contractors' liens: Contractor will discharge any and all Contractors' or mechanics' liens imposed on property of the State through the actions of subcontractors.

Guidance: On occasion a subcontractor may do some work to State property that could be construed by the subcontractor to give rise to a lien against the property. While artisans' (mechanics') liens cannot be enforced against State property (See [12 V.S.A. § 5601\(a\)](#)), it is nevertheless best practice to require the Contractor to correct the matter and thereby avoid litigation.

Cost of materials: Contractor will not buy materials and resell to the State at a profit.

Identity of workers: The Contractor will assign the following individuals [*list individuals*] to the services to be performed under the provisions of this contract, and these individuals shall be considered essential to performance. Should any of the individuals become unavailable during the period of performance, the State shall have the right to approve any proposed successors, or, at its option, to cancel the remainder of the Contract.

Individually identifying information: Contractor must not use or disclose any individually identifying information that pursuant to this contract is disclosed by the State to the Contractor, created by the contractor on behalf of the State, or used by the Contractor for any purpose other than to complete the work specifications of this contract unless such use or disclosure is required by law, or when Contractor obtains permission in writing from the State to use or disclose the information and this written permission is in accordance with Federal and State law.

Information Technology Terms & Conditions: See IT Guideline for specific Attachment D terms & requirements related IT Activities.

Legal services: Contractor will be providing legal services under this Contract. Contractor agrees that during the term of the Contract he or she will not represent anyone in a matter, proceeding, or lawsuit against the State of Vermont or any of its Agencies or instrumentalities. After termination of this contract,

Contractor also agrees that he or she will not represent anyone in a matter, proceeding, or lawsuit substantially related to this Contract.

Ownership of equipment: Any equipment purchased by or furnished to the Contractor by the State under this contract is provided on a loan basis only and remains the property of the State.

Performance bond: The Contractor shall, prior to commencing work under this Contract, furnish to the State a payment and performance bond from a reputable insurance company licensed to do business in the State of Vermont, guaranteeing the satisfactory completion of the Contract by the Contractor and payment of all subcontractors, suppliers and employees.

Guidance: *Performance Bonds have limited application in Contracts for Services. This clause provides protection against failure of the Contractor to perform adequately under the Contract or distribute funds to subcontractors or suppliers. Since the cost of the bond will increase the State's cost, the clause should only be used on larger contracts or where there are significant concerns about a Contractor's financial or other abilities. If a Contractor is expected to handle large sums of money as agent for the State, the term "surety bond" should be substituted for "payment and performance bond."*

Prior approval/review of releases: Any notices, information pamphlets, press releases, research reports, or similar other publications prepared and released in written or oral form by the Contractor under this contract shall be approved/reviewed by the State prior to release.

Guidance: *All material published in connection with activities performed under State Contract should be reviewed and approved by the appropriate official before release. When academic freedom becomes an issue, Agency review but not Agency approval may be appropriate.*

Progress reports: The Contractor shall submit progress reports to the State according to the following schedule. [*insert schedule*] Each report shall describe the status of the Contractor's performance since the preceding report and the progress expected to be made in the next successive period. Each report shall describe Contractor activities by reference to the work specifications contained in Attachment A of this contract and shall include a Statement of Work hours expended, expenses incurred, bills submitted, and payments made.

Guidance: *This clause may be used either in Attachment A (Specifications of Work to be Performed) or Attachment B. It provides information for interim evaluation of the Contractor's work and assists in detecting difficulties that may lead to necessary modification or cancellation of the Contract. If payments are to be conditioned on receipt of progress reports, this should be clearly set forth in Attachment B: Payment Provisions.*

Work product ownership: Upon full payment by the State, all products of the Contractor's work, including outlines, reports, charts, sketches, drawings, art work, plans, photographs, specifications, estimates, computer programs, or similar documents, become the sole property of the State of Vermont and may not be copyrighted or resold by Contractor.

Appendix V: Acronyms Used in This Bulletin

AA-14: State of Vermont Contract Summary and Certification form

ACH: Automated Clearing House

AAG: Assistant Attorney General

ADS: Agency of Digital Services (formerly Department of Innovation and Information)

AG: Attorney General

AGO: Attorney General's Office

AoA: Agency of Administration

BAFO: Best and Final Offer

BDA: Blanket Delegation of Authority

BGS: Building and General Services

CFR: Code of Federal Regulations

CIO: Chief Information Officer, Agency of Administration

CMO: Chief Marketing Officer

CPO: Chief Performance Officer

DHR: Department of Human Resources

DUNS: Data Universal Numbering System

EBB: Electronic Bulletin Board

EFT: Electronic Fund Transfer

FAQ: Frequently Asked Questions

F&M: Department of Finance and Management

FERPA: Family Education Rights and Privacy Act

FFATA: Federal Funds Accountability and Transparency Act

FICA: Federal Insurance Contributions Act

FSRS: Federal Subaward Reporting System

GAAP: Generally Accepted Accounting Principles

GSA: Federal General Services Administration

HIPAA: Health Insurance Portability and Accountability Act

IaaS: Infrastructure as a Service

IRS: Federal Internal Revenue Service

IT: Information Technology

LLC: Limited Liability Company

MOA/MOU: Memorandum of Agreement; Memorandum of Understanding

OMB: Federal (White House) Office of Management and Budget

OPC: Office of Purchasing and Contracting

PaaS: Platform as a Service

P.O.: Purchase Order

RFP/RFI/RFC/RFQ: Request for Proposal; Request for Information; Request for Comment or Request for Quote

SaaS: Software as a Service

SAM: Federal System for Awards Management

SLA: Service Level Agreement

SOA: Secretary of Administration

SOV: State of Vermont

SOW: Statement of Work

V.S.A.: Vermont Statutes Annotated

VISION: Vermont Integrated Solution for Information and Organizational Needs

Appendix VI: Bulletin 3.5 Quick Reference Guide

[Continued on next page.]

BULLETIN 3.5 QUICK REFERENCE GUIDE				Competitive Process			Prior Approvals Required						
				Standard Bid	Simplified Bid	Pre-Qualified Vendors	Supervisor ¹ (Appointing Authority)	Attorney General	Finance & Management	Secretary of Admin. (SOA)	CIO	CMO	Comm DHR
Competitive Process, Waivers & Approvals	1. Original Contracts Awarded - by Competitive Process												
	\$1 to \$24,999.99 – Short-Form Contract and Short-Form Attachment C may be used, for one-time, annual services, except for life safety, hazardous materials, transport of persons and data usage/sharing. However, a current insurance certificate must be on file.					✓							
	\$25,000 up to \$100,000				✓	✓		✓	✓				
	Greater than \$100,000 up to \$500,000				✓			✓	✓				
	Greater than \$500,000				✓			✓	✓	✓			
	Zero-Dollar Contracts				✓			✓	✓	✓			
	2. Original Contract Awarded – No Competitive Process (“Sole Source”)												
	Sole Source Award \$10,000 or less				Direct Award, non-competitive process			✓					
	Sole Source Award greater than \$10,000				Direct Award, non-competitive process			✓		✓	✓		
	If applicable, IT Sole Source needs CIO approval prior to SOA				Direct Award, non-competitive process			✓			✓		
3. Original Contract Waiver Requests – Contracting Plans													
Waiver Requests Other than Sole Source (refer to dollar thresholds)				✓	✓	✓	✓		✓	✓			
Special Contract Type Added Approvals	4. Contract Types Requiring Additional Approvals (in addition to Prior Approvals listed above #1, 2 and 3)												
	Information Technology & Security RFP										✓		
	Information Technology & Security Contracts over \$500,000										✓		
	IT & Security Contracts (electronic processing, storing, or transmission of confidential information)										✓		
	IT & Security Contracts for Cloud Services										✓		
	Marketing Contracts											✓	
	Privatization Contracts								✓		✓		✓
	State of VT Employees & Retiree Contracts												✓
	Contracts including a Change Order Processes								✓		✓		
	Financial Transaction Contracts & Zero-Dollar								✓		✓		
Agreements to Receive or Access Confidential Information								✓		✓	✓		

- This guide is intended as a quick reference to monetary thresholds, primary waiver conditions, basic contract types and prior approval requirements. It is not all inclusive and is not a substitute for reading, understanding and complying with this Bulletin;
- Additional Agency or Departmental conditions, not included in this Bulletin, may apply.

¹ Supervisor – a.k.a. the Appointing Authority: any secretary, commissioner, executive director, elected officer, or other exempt head of a department or agency.

² Monetary Thresholds are cumulative - if the original contract amount plus all amendments reaches a new threshold; the requirements for the higher threshold apply.

"General Decision Number: VT20200044 01/03/2020

Superseded General Decision Number: VT20190044

State: Vermont

Construction Type: Highway

County: Windsor County in Vermont.

HIGHWAY CONSTRUCTION PROJECTS (excluding tunnels; building structures in rest areas; railroad construction; bascule, suspension & spandrel arch bridges; bridges designed for commercial navigation; bridges involving marine construction; and other major bridges)

Note: Under Executive Order (EO) 13658, an hourly minimum wage of \$10.80 for calendar year 2020 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, 2015. If this contract is covered by the EO, the contractor must pay all workers in any classification listed on this wage determination at least \$10.80 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 calendar year 2020. If this contract is covered by the EO and a classification considered necessary for performance of work on the contract does not appear on this wage determination, the contractor must pay workers in that classification at least

the wage rate determined through the conformance process set forth in 29 CFR 5.5(a)(1)(ii) (or the EO minimum wage rate, if it is higher than the conformed wage rate). The EO minimum wage rate will be adjusted annually. Please note that this EO applies to the above-mentioned types of contracts entered into by the federal government that are subject to the Davis-Bacon Act itself, but it does not apply to contracts subject only to the Davis-Bacon Related Acts, including those set forth at 29 CFR 5.1(a)(2)-(60). Additional information on contractor requirements and worker protections under the EO is available at www.dol.gov/whd/govcontracts.

Modification Number	Publication Date
0	01/03/2020

* SUVT2011-029 09/14/2011

	Rates	Fringes
CARPENTER, Includes Form Work....	\$ 16.24	0.00
CEMENT MASON/CONCRETE FINISHER...	\$ 25.34	0.00
ELECTRICIAN, Includes Installation of Traffic Signals.....	\$ 24.75	0.00
GUARDRAIL INSTALLER.....	\$ 13.51	0.00
IRONWORKER, REINFORCING.....	\$ 15.47	0.52
IRONWORKER, STRUCTURAL.....	\$ 21.15	15.54

LABORER: Asphalt Raker.....	\$ 15.01	0.00
LABORER: Common or General.....	\$ 14.43	0.00
LABORER: Concrete Worker.....	\$ 14.06	1.47
LABORER: Flagger.....	\$ 11.15	4.40
LABORER: Landscape.....	\$ 12.31	1.03
LABORER: Screedman.....	\$ 16.30	4.23
LABORER: Sign Erector/Installer.....	\$ 14.31	4.70
OPERATOR: Asphalt Roller.....	\$ 19.89	7.52
OPERATOR: Backhoe.....	\$ 19.29	0.00
OPERATOR: Bobcat/Skid Steer/Skid Loader.....	\$ 19.23	0.00
OPERATOR: Broom.....	\$ 15.88	3.72
OPERATOR: Bulldozer.....	\$ 18.94	3.35
OPERATOR: Cold Planer/Milling Machine.....	\$ 21.03	0.00
OPERATOR: Crane.....	\$ 20.37	2.63
OPERATOR: Excavator.....	\$ 19.07	1.36
OPERATOR: Grader/Blade.....	\$ 18.92	3.50
OPERATOR: Loader.....	\$ 20.55	0.00

OPERATOR: Mechanic.....	\$ 21.38	8.33
OPERATOR: Paver.....	\$ 18.64	0.00
OPERATOR: Pounder.....	\$ 18.49	0.00
OPERATOR: Roller excluding Asphalt.....	\$ 17.48	6.05
OPERATOR: Screed.....	\$ 17.82	4.09
PAINTER (Parking Lot and Highway Striping Only).....	\$ 16.39	3.56
TRUCK DRIVER, Includes all axles including Dump Trucks.....	\$ 16.55	1.14
TRUCK DRIVER: Distributor Truck.....	\$ 17.89	0.00
TRUCK DRIVER: Semi/Trailer Truck.....	\$ 13.27	4.61

WELDERS - Receive rate prescribed for craft performing operation to which welding is incidental.

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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 www.dol.gov/whd/govcontracts.

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 Regional Office for the area in which the survey was conducted because those Regional Offices have responsibility for the Davis-Bacon survey program. If the response from this initial contact is not satisfactory, then the process described in 2.) and 3.) should be followed.

With regard to any other matter not yet ripe for the formal process described here, initial contact should be with the Branch of Construction Wage Determinations. Write to:

Branch of Construction Wage Determinations
Wage and Hour Division
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

2.) If the answer to the question in 1.) is yes, then an interested party (those affected by the action) can request review and reconsideration from the Wage and Hour Administrator (See 29 CFR Part 1.8 and 29 CFR Part 7). Write to:

Wage and Hour Administrator
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

The request should be accompanied by a full statement of the interested party's position and by any information (wage payment data, project description, area practice material, etc.) that the requestor considers relevant to the issue.

3.) If the decision of the Administrator is not favorable, an interested party may appeal directly to the Administrative Review Board (formerly the Wage Appeals Board). Write to:

Administrative Review Board
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

4.) All decisions by the Administrative Review Board are final.

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END OF GENERAL DECISION

"



McFarland Johnson

McFarland-Johnson, Inc.
53 Regional Drive
Concord, NH 03301-8500
Phone: 603-225-2978
Fax: 603-225-0095
Web: www.mjinc.com

October 23, 2019

Utility and Railroad Clearance for: Hartford Roundabouts STP 0113(59)S

To Project File,

To comply with the requirements of 23 C.F.R. 635.309b, all applicable utility and railroad coordination has been completed for the subject project.

All necessary arrangements have been made for the utility work to be undertaken and completed as required for proper coordination with physical construction schedules, with necessary agreements consummated with the appropriate parties concerned.

Utility adjustments are required by proposed construction plans for the subject project.

No railroad is impacted by this project.

Sincerely,

Signature

Steven Ireland, P.E. Project Designer

Title

10/23/2019

Date

cc: MAB Project Supervisor

To: Distribution

From: Andrea Wright, Right of Way and Environmental Program Manager

Date: December 20, 2019

**Subject: Hartford STP 0113 (59)S
US Rte. #5, Sykes Mountain Road, Ralph Lehman Drive
98C026**

Right of Way Certificate

This is to certify that:

1. All necessary rights-of-way have been acquired including legal and physical possession and the Town of Hartford has the right to enter on all lands. Therefore, the right-of-way is clear.
2. All acquisitions were in accordance with current Federal Highway Administration Directives and Title III of the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, as amended.
3. No acquisition required compliance with the provisions of Title II of the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, as amended.
4. There were no items in mitigation of right-of-way damages.
5. There are no Right-of-Way Special Agreements on this project.

Andrea Wright, Right of Way and Environmental Program Manager

AW:bam

Distribution

Marvin D. Kingsbury, Federal Funds Administrator, Federal Programs Section
T. Scott Robertson, Project Manager, Municipal Assistance Bureau, Transportation Alternatives Section
Craig Keller, Chief of Utilities & Permits Section
Meredith Asselin, Financial Administrator, Finance & Administration Section
Kenneth R. Sikora, Jr., FHWA
Patrick Kirby, FHWA
ROW General File (original)

12/17/2019

Dear Permittee(s),

The Notice of Intent for the discharge of stormwater runoff from Low Risk Construction Activity under Construction General Permit (CGP) 3-9020 (Amended 2008) has been authorized. You will need the following documents to maintain compliance with this authorization. Enclosed with this cover letter is your **Authorization to Discharge under General Permit 3-9020** and a copy of the **Notice of Authorization** that you must post at your construction site. In addition, all Principal Operators must file a **Notice of Addition of Co-Permittee**. See below for more details on these and other permit requirements.

1. Authorization to Discharge under General Permit 3-9020

The authorization for Low Risk Projects is valid for two years from the date of the authorization. If the project will proceed past the expiration date, you must reapply for coverage under this or another construction stormwater permit before that time.

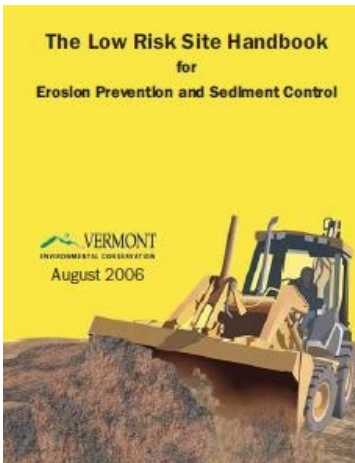
2. Notice of Authorization for Posting

The Notice of Authorization, which details the authorization and conditions you selected in completing Appendix A to the CGP, must be posted in a location visible to the public in accordance with Subpart 4.5.C of the CGP.

3. Notice of Addition of Co-Permittee

This form must be submitted for every new principal operator who joins the project, in accordance with Subpart 7.2 of the CGP. Use ANR Online to file all Notice of Additions. ANR Online can be accessed using the following link: <https://anronline.vermont.gov>. Instructions on creating an account are available on the main page.

Low Risk Site Handbook for Erosion Prevention and Sediment Control



Please provide the Principal Operator access to The Low Risk Site Handbook. This handbook details the practices that must be implemented throughout the construction project to prevent erosion and the discharge of sediment from the construction site. Some practices must be in place before construction begins, so please review the entire handbook before starting the project. The handbook can be found at the website below. Please email anr.wsmdstormwatergeneral@vermont.gov to request a hard copy of this pocket-sized handbook.

The CGP, copies of pertinent forms, and an electronic version of the Low Risk Site Handbook for Erosion Prevention and Sediment Control are available on the [Stormwater Program](#) website. If you have any questions related to your authorization, please contact the Environmental Analyst in the [Stormwater District](#) where your project is located.

Sincerely,

Stormwater Management Program

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VERMONT DEPARTMENT OF ENVIRONMENTAL CONSERVATION
AUTHORIZATION TO DISCHARGE UNDER
GENERAL PERMIT 3-9020

A determination has been made that the applicant(s) (here in after "permittee"):

Town of Hartford
173 Airport Road
White River Junction, VT 05001

And

Vermont Agency of Transportation
1 National Life Drive
Montpelier, VT 05633

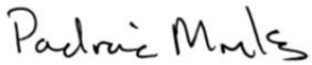
meets the criteria necessary for inclusion under General Permit 3-9020 for low risk construction activities. Subject to the conditions and eligibility provisions of General Permit 3-9020, the permittee is authorized to discharge stormwater to the White River from the following construction activities: Proposed project begins on US Route 5 approximately 400 feet south of the intersection with Sykes Mountain Avenue in the town of Hartford, VT and continues north for about 1,400 feet (425 feet of roadwork, with the remainder drainage, stormwater management, and guardrail work only). The project extends from the intersection along Sykes Mountain Avenue approximately 800 feet. Roundabouts are to be constructed at the intersection of US Route 5, Sykes Mountain Avenue, and the intersection of Sykes Mountain Avenue and Ralph Lehman Drive. Also included in the project is approach work on Beswick Drive and Ralph Lehman Drive, accommodations for bicycle and pedestrians, drainage, and the construction of raised median islands. The project is located at intersection of US Route 5 and Sykes Mountain Avenue in Hartford, Vermont.

1. **Effective Date and Expiration Date of this Authorization:** This authorization to discharge shall become effective on December 17, 2019 and shall continue until December 16, 2021. The permittee shall reapply for coverage at least 60 days prior to expiration if the project has not achieved final stabilization or if construction activities are expected after the date of expiration.
2. **Compliance with General Permit 3-9020 and this Authorization:** The permittee shall comply with this authorization and all the terms, conditions and eligibility provisions of General Permit 3-9020. The completed Notice of Intent (NOI) and Appendix A submitted for this project are incorporated by reference into this authorization and are included in the terms of this authorization. These terms include:
 - Implementation of erosion prevention and sediment control practices required by the Low Risk Site Handbook for Erosion Prevention and Sediment Control.
 - All areas of disturbance must have temporary or final stabilization within 14 days of the initial disturbance. After this time, all disturbed soil must be stabilized at the end of each workday. Between October 15 and April 15 all disturbed soil must be stabilized at the end of each workday. The following exceptions apply:
 - 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.
 - 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).
 - The total authorized disturbance is 1.06 acre(s).
 - All discharges of stormwater must pass through at least 50 feet of vegetated buffer before reaching receiving waters.

- Inspections shall be conducted at least once every (7) calendar days and within twenty-four (24) hours of the end of a storm event resulting in discharge of Stormwater from construction site.
 - 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 take immediate corrective action.
 - If, after completing corrective action, there continues to be a discharge of sediment from the construction site to waters of the State, the permittee shall notify DEC by submitting a report within 72 hours of the discharge.
3. **Transferability and Addition of Co-Permittee:** This authorization to discharge is not transferable to any person, nor may any person be added as a permittee, except in compliance with the General Permit 3-9020 including submission of a complete Notice of Transfer or Notice of Addition of Co-Permittee form.
4. **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.

Dated December 17, 2019

Emily Boedecker, Commissioner
Department of Environmental Conservation

By: 
Padraic Monks, Stormwater Program Manager

Notice of Authorization
Under Vermont Construction General Permit 3-9020
For Low Risk Projects

**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).

Project Name:	Hartford STP 0113(59)S
Permittee Name(s):	Town of Hartford; Vermont Agency of Transportation
NOI Number:	7824-9020
Date of Authorization:	December 17, 2019
Date of Expiration:	December 16, 2021

The project listed above has received authorization under General Permit 3-9020 to discharge stormwater from the following construction activities:

Proposed project begins on US Route 5 approximately 400 feet south of the intersection with Sykes Mountain Avenue in the town of Hartford, VT and continues north for about 1,400 feet (425 feet of roadwork, with the remainder drainage, stormwater management, and guardrail work only). The project extends from the intersection along Sykes Mountain Avenue approximately 800 feet. Roundabouts are to be constructed at the intersection of US Route 5, Sykes Mountain Avenue, and the intersection of Sykes Mountain Avenue and Ralph Lehman Drive. Also included in the project is approach work on Beswick Drive and Ralph Lehman Drive, accommodations for bicycle and pedestrians, drainage, and the construction of raised median islands.

This authorization includes the following requirements:

- Implementation of erosion prevention and sediment control practices required by the Low Risk Site Handbook for Erosion Prevention and Sediment Control.
- All areas of disturbance must have temporary or final stabilization within 14 days of the initial disturbance. After this time, all disturbed soil must be stabilized at the end of each workday. Between October 15 and April 15 all disturbed soil must be stabilized at the end of each workday. The following exceptions apply:
 - 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.
 - 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).
- The total authorized disturbance is 1.06 acre(s).
- All discharges of Stormwater must pass through at least 50 feet of vegetated buffer before reaching receiving waters.
- Inspections shall be conducted at least once every (7) calendar days and within twenty-four (24) hours of the end of a storm event resulting in discharge of Stormwater from construction site.
- 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 take immediate corrective action.
- If, after completing corrective action, there continues to be a discharge of sediment from the construction site to waters of the State, the permittee shall notify DEC by submitting a report within 72 hours of the discharge.

To request information on this authorization, or to report compliance concerns, please contact:

Vermont DEC, Watershed Management Division
1 National Life Drive, Davis 3
Montpelier, VT 05620



State of Vermont
Policy, Planning & Intermodal Development Division
Policy, Planning and Research Bureau
Development Review & Permitting Services Section

Agency of Transportation

Barre City Place, 219 North Main Street [phone] 802-636-0037
 Barre, VT 05641 [ttd] 800-253-0191
 vtrans.vermont.gov

! LETTER OF INTENT !
THIS IS NOT A PERMIT

November 6, 2019

Town of Hartford
 Hannah Tyler
 171 Bridge Street
 White River Junction, VT 05001

[Via E-Mail]

Subject: Hartford, US5, L.S. 161+84 LT & RT
(Hartford STP 0113(59)S - Roundabout at US5/Skyes Mountain Ave)

Dear Ms. Tyler:

Your highway permit application to reconstruct the signalized intersection at US Route 5 and Skyes Mountain Avenue to a roundabout has been reviewed and found to meet the requirements for work within the highway right-of-way.

Title 19 VSA § 1111 requires that we ensure compliance with all local ordinances and regulations relating to highways. **Your highway permit application will be processed following VTrans Permitting Services receipt of the project's contract plans.**

When issued, the permit will contain, but will not be limited to, the attached Special Conditions. As a condition of an issued permit VTrans will require that the selected Contractor for the project sign the *State Highway Access and Work Permit* (aka 19 V.S.A. §1111 Permit) prior to the start of construction in the State Highway right-of-way.

This commitment is valid for two years from the date of this letter. Should your other permits require a longer time period, please contact us relative to an extension of time.

This Letter of Intent addresses only access to, work within, and drainage affecting the State highway. It does not address other possible transportation issues, such as access to town highways, use of private roads, and use of railroad crossings. If relevant to the proposed development, such issues must be addressed separately.

If you have any further questions about this matter, please call me at (802) 498-8019.

Sincerely,

Brian R. McAyoy
 Permit Coordinator
 Permitting Services Section

Attachment

Reviewed by: Date: 11-06-19
 Theresa Gilman, Permitting Services Supervisor

cc: [Via E-Mail]

Two-Rivers Ottauquechee Regional Commission
 Steven Ireland, McFarland Johnson

SPECIAL CONDITIONS

If contradiction exist between the conditions of this permit and the contract documents, the most stringent conditions shall apply unless otherwise authorized by VTrans District Transportation Administrator.

As a condition of this permit, the Permit Holder (Town of Hartford) shall be responsible for adhering to the conditions and requirements of the attached document, **Appendix A, Operational Stormwater Permitting and Compliance**, between the Town of Hartford (Sponsor) and the Agency of Transportation (State), dated November 6, 2019. The requirements of this document are continuous and on-going unless otherwise altered, in writing, by the State. Any persons working within the State right-of-way to inspect, maintain, or repair facilities as required in this document, shall be required to wear the appropriate MUTCD safety apparel.

The Town of Hartford and/or their assignees shall be responsible for the all maintenance of all new sidewalks constructed in the State right-of-way as part of the project, **Hartford STP 0113(59)S**, as shown on the attached plans. This shall include, but is not limited to, winter snow and ice removal when deemed necessary. The Permit Holder is cautioned that all snow and ice removal shall be kept clear of the traveled portion of the State highway. Should any accumulation occur within the traveled way due to sidewalk maintenance, the Town shall clear the roadway immediately unless otherwise directed by the District Transportation Administrator.

The Town of Hartford and/or their assignees shall be responsible for landscape maintenance of vegetation placed within the center island of the roundabout and within the State right-of-way as constructed as part of the project, **Hartford STP 0113(59)S**. Landscaping shall be limited to live natural materials (trees, shrubs, grass, plants, flower, etc.). There shall be no signs, planters, landscape rocks, fences or other objects without written approval via a 19 V.S.A. §1111 permit (State Highway Access and Work Permit). Any plant modifications, other than in-kind replacements, shall require review and approval by VTrans before being installed or altered. Any persons working within the State right-of-way to maintain, water or plant seasonal vegetation shall be required to wear the appropriate MUTCD safety apparel.

The Permit Holder is advised that the State of Vermont, through its Agency of Transportation, manages State highway right-of-way and retains the right – in its sole discretion – to remove or modify any improvements, including but not limited to landscaping, as it deems necessary for transportation purpose with no due compensation to the Town.

Prior to the start of construction, the Contractor shall sign as a co-applicant to the State Highway Access and Work Permit (a/k/a 19 V.S.A. §1111 Permit) submitted for the referenced project. A copy of this application shall be provided to VTrans Permitting Services Section.

Prior to the start of construction, the Permit Holder and /or their Contractor shall submit a Maintenance and Protection of Traffic (MPT) and traffic control plan (TCP) to be implemented to the Agency for review and approval. This plan shall also include ADA pedestrian access throughout the project area. If a speed limit reduction is proposed through the project area, a temporary speed certificate shall be submitted to the Agency for approval; allow a minimum of one week for review and approval of the certificate.

Prior to the start of construction, the Permit Holder (Town of Hartford), the project resident engineer and the Contractor are required to hold a preconstruction meeting with VTrans District Transportation Administrator (DTA) to discuss the work to be completed and the Agency's expectations when working within the State highway right-of-way, including but not limited to the management of traffic and the conditions in this permit. The District Transportation Administrator can be contacted at (802) 295-8888.

Upon completion of the work, the Permit Holder shall be responsible to schedule and hold a final inspection. The Permit Holder is required to notify the District Transportation Administrator five (5) working days in advance of such inspection. The Permit Holder and/or their Contractor shall provide VTrans Permitting Services Section and the Regional District Office with a copy of any revisions to the project plans prior to or at the final inspection meeting.

This permit is granted subject to the restrictions and conditions on the back of the permit, with particular attention given to the Special Conditions listed below. This permit pertains only to the authority exercised by the Vermont Agency of Transportation (Agency) under Vermont Statutes Annotated, Title 19, Section 1111, and does not relieve the Permit Holder from the requirements of otherwise applicable statutes, rules, regulations or ordinances (e.g., Act 250, zoning, etc.). The Permit Holder shall observe and comply with all Federal and State laws and local bylaws, ordinances, and regulations in any manner affecting the conduct of the work and the action or operation of those engaged in the work, including all orders or decrees as exist at present and those which may be enacted later by bodies or tribunals having jurisdiction or authority over the work, and the Permit Holder shall defend, indemnify, and save harmless the State and all its officers, agents, and employees against any claim or liability arising from or based on the violation of any such law, bylaws, ordinances, regulations, order, or decree, whether by the Permit Holder in person, by an employee of the Permit Holder, by a person or entity hired by the Permit Holder, or by a Subcontractor or supplier.

The Permit Holder shall accomplish all work under this permit in accordance with the project plans, VTrans Standard Drawings and associated contract documents for the project entitled, Hartford STP 0113(59)S, and any future revisions or amendments to these plans; and, the COOPERATIVE AGREEMENT BETWEEN THE STATE OF VERMONT AGENCY OF TRANSPORTATION AND THE TOWN OF HARTFORD, CONTRACT #CA0135, executed May 2, 2005 AND ALL SUBSEQUENT AMENDMENTS.

All materials and construction practices shall be in accordance with the Vermont Agency of Transportation *2018 Standard Specifications for Construction*, with the latest amendments and all applicable Vermont Agency of Transportation Standard Drawings.

The Permit Holder shall arrange for and provide inspection and material testing by qualified engineering personnel and testing laboratories to ensure that all work conforms to Agency standards and the design plans. All results shall be provided to the Agency as directed in the project's contract documents unless otherwise required by the District Transportation Administrator. Any materials or tests failing Agency standards may be required to be removed and replaced in their entirety at the owner's expense.

The Permit Holder shall have a **Public Relations Specialist** assigned to address inquiries, questions and provided notification to the public of project activity, as deemed necessary. The Permit Holder and/or their assignee shall keep the Agency's District Transportation's Administrator (DTA) apprised of the project schedule; specifically, any changes related to traffic control, major construction activities and other milestones as deemed necessary by the Agency's DTA.

The Agency reserves the right to retain material Items removed from State highway right-of-way and which are deemed property of the State unless otherwise specified in the project's contract documents. These items may include but are not limited to pavement grindings, signage, traffic and pedestrian signal system components and street lighting. These items shall be delivered to a location as specified in the contract documents unless otherwise directed by the District Transportation Administrator.

The Permit Holder and/or their Contractor shall contact Derek Lyman, VTrans Traffic Signal Operations Engineer, at (802) 249-5079 or derek.lyman@state.vt.us a minimum of two weeks in advance of on-site project activity.

The Permit Holder shall be responsible for the coordination, in advance of construction, of all necessary utility relocations so as not to delay the project construction. This includes both aerial and underground utilities and temporary and permanent relocation work required to address various traffic control phases. This permit does not cover work performed by utility companies and/or their contractors, a separate 19 V.S.A. §1111 Permit shall be required from the utility owners if utility relocation work within the State highway right-of-way is needed.

The Permit Holder shall contact the Agency's Motor Vehicles' Oversize Permit Section prior to construction to notify them of any roadway restrictions associated with the project construction; this includes but is not limited to restricted travel widths less than 14 feet in width.

Please note that the Vermont Agency of Transportation is not a member of Dig Safe. The Permit Holder shall also contact Dan Ertel, State Signal Supervisor, at (802) 343-2188. Mr. Ertel will need to locate and mark all existing buried utility facilities owned by the Agency near the location of the proposed work.

All grading within the State Highway right-of-way associated with the proposed construction shall be subject to inspection and approval by the District Transportation Administrator or his or her staff. The Permit Holder shall be responsible for ensuring that all grading work in or on the State Highway right-of-way complies with applicable statutes, rules, regulations or ordinances.

In areas to be grass covered, the Permit Holder shall restore turf by preparing the area and applying the necessary topsoil, limestone, fertilizer, seed, and mulch, all to the satisfaction of the District Transportation Administrator. The Permit Holder shall be responsible for ensuring that all turf restoration work in or on the State Highway right-of-way is in compliance with applicable statutes, rules, regulations or ordinances.

The Permit Holder shall restore any abutting property owner's lawn and drive that is disturbed by the project, to the satisfaction of the owner.

Any disturbed boundary markers shall be reset by a licensed Vermont Land Surveyor.

The Permit Holder must exercise extreme care when working adjacent to and extending existing storm drainage pipes owned by the State. Any damage caused by the Permit Holder to the storm drainage system must be repaired using new materials at the expense of the Permit Holder. Repairs must be inspected by the Agency Project Inspector.

Relocated and/or new sign assemblies shall be installed in accordance with the Manual of Uniform Traffic Control Devices (MUTCD). Any damage by the Contractor to existing signs, posts, and/or bases shall be repaired or replaced at the expense of the Permit Holder and the to the satisfaction of the Agency Project Inspector.

The Permit Holder must install temporary pavement prior to weekend shutdown after completion of backfilling where an open cut excavation has been made through a roadway subject to vehicular traffic or where construction for any roadway widening for turn lanes has been brought to grade. The temporary pavement shall consist of, at least, 2 inches of compacted bituminous concrete. Temporary pavement shall be properly maintained and shall be replaced with permanent pavement prior to completion of the project or suspension of work for the winter season.

The placement, size, shape, and color of all pavement markings must be in accordance with the most recent editions of the MUTCD (Manual on Uniform Traffic Control Devices) and Vermont standards. All existing pavement markings that become disturbed or overlaid with pavement shall be replaced by the Permit Holder with "in kind" (durable or paint) markings to the satisfaction of the District Transportation Administrator. The Permit Holder shall bear all costs associated with this work.

The Permit Holder must backfill all open trenches or pits at the end of each day. With permission from the District Transportation Administrator, trenches or pits may be left open for short periods of time if properly protected. In no case shall trenches or pits be left open over a weekend. The Permit Holder shall be responsible for ensuring that all trench or pit work in or on the State Highway right-of-way is in compliance with applicable statutes, rules, regulations or ordinances.

The Permit Holder shall promptly and unconditionally pay for full repair and restoration of any and all damages to existing underground utility facilities (meaning any underground pipe, conduit, wire or cable, including appurtenances) that have been brought about by the execution of the permitted work. The Permit Holder also is required to pay for any costs to repair the highway following and resulting from any repairs to existing utilities occurring as a result of the work covered by this permit. Except with the specific, written permission of the Engineer, the Permit Holder or his or her contractor shall expose all underground facilities to verify their location and depth, at each location where the authorized boring or drilling work crosses a facility; and at reasonable intervals when closely paralleling a facility. Whenever possible, existing facilities should be crossed at a perpendicular angle. The Permit Holder shall be responsible for obtaining the modification of this permit, if necessary, for any additional survey work before initiating boring or drilling operations under the permit. The Agency will treat the Permit Holder's failure to fully, promptly, and conscientiously comply with all of conditions of this paragraph, including but not limited to the obligation to pay for repairs, as grounds for the Agency to refuse to grant any further requests by the Permit Holder for any other permits for subsurface work unless the Permit Holder furnishes irrevocable financial security, in a type and an amount deemed sufficient by the Agency in its sole discretion, prior to such future subsurface work.

This permit approves the connection of the Permit Holder's stormwater management system to the Agency's State Highway stormwater management system, which is to be constructed as shown within the highway right-of-way, on the plans referenced and attached to, this permit

All stormwater from the defined area approved by the Agency to discharge into the State Highway right-of-way shall be pre-treated (to the maximum extent practicable on the Permit Holder's land) for water volume, velocity, and quality prior to discharging into the Agency's stormwater management system.

The Permit Holder shall at a minimum install and maintain erosion prevention and sediment control measures in accordance with the Low Risk Site Handbook for Erosion Prevention and Sediment Control published by the Vermont Department of Environmental Conservation for the purposes of preventing sediment transport into the Agency's State Highway right of way and stormwater management systems or surface waters of the State. All disturbed earth areas having erosion potential must be temporarily or permanently stabilized, as soon as practicable or within seven (7) days of disturbance or, if precipitation is forecast sooner. Ditches or slopes steeper than 1:3 shall make use of appropriate biodegradable erosion matting composed of planar woven natural fiber. Stabilization measures constructed in the State Highway right-or-way shall be in compliance with the current version of the Vermont Agency of Transportation Standard Specifications for Construction.

Traffic Control and Safety

Roadway shoulder areas must be maintained free of unnecessary obstructions, including parked vehicles, at all times while work is being performed under this permit.

The Permit Holder and their contractor shall adhere to the Maintenance and Protection of Traffic (MPT) and traffic control plan (TCP) approved by the Agency, unless revisions are otherwise approved by the Agency.

The Permit Holder shall verify the appropriate safety measures needed, prior to construction, so proper devices and/or personnel are available when and as needed. Traffic control devices, shall be in conformance with the MUTCD (Manual on Uniform Traffic Control Devices), Agency standards and any additional traffic control deemed necessary by the District Transportation Administrator. The Permit Holder's failure to utilize proper measures shall be considered sufficient grounds for the District Transportation Administrator to order cessation of the work immediately.

The Permit Holder will perform construction in such a way as to minimize conflicts with normal highway traffic. When two-way traffic cannot be maintained, the Permit Holder shall provide a sign package that conforms to the MUTCD (Manual on Uniform Traffic Control Devices) or Agency standards, as well as trained Flaggers. The District Transportation Administrator may require a similar sign package with trained Flaggers whenever it is deemed necessary for the protection of the traveling public. In addition, the District Transportation Administrator may require the presence of Uniform Traffic Officers (UTOs); moreover, the presence of UTOs shall not excuse the Permit Holder from its obligation to provide the sign package and Flaggers.

The Permit Holder shall ensure that all workers exposed to the risks of moving highway traffic and/or construction equipment wear high-visibility safety apparel meeting the requirements of ISEA (International Safety Equipment Association) "American National Standards for High-Visibility Safety Apparel," and labeled as ANSI (American National Standards Institute) 107-2004, or latest revisions, for Performance Class 2 or 3 requirements. A competent person - one designated by the Permit Holder's Contractor to be responsible for worker safety within the activity area of the State highway right-of-way - shall select the appropriate class of garment. The Engineer may suspend this permit until compliance is obtained.

Insurance and Liability Requirements

Independence; Liability: The Permit Holder will act in an independent capacity and not as officers or employees of the State.

The Permit Holder shall defend the State and its officers and employees against all claims or suits arising in whole or in part from any act or omission of the Permit Holder or of any agent of the Permit Holder. The State shall notify the Permit Holder in the event of any such claim or suit, and the Permit Holder shall immediately retain counsel and otherwise provide a complete defense against the entire claim or suit.

After a final judgment or settlement, the Permit Holder may request recoupment of specific defense costs and may file suit in the Washington Superior Court requesting recoupment. The Permit Holder 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 Permit Holder.

The Permit Holder shall indemnify the State and its officers and employees in the event that the State, its officers or employees become legally obligated to pay any damages or losses arising from any act or omission of the Permit Holder.

Insurance: Before beginning any work under this Permit the Permit Holder must provide certificates of insurance to show that the following minimum coverages are in effect. It is the responsibility of the Permit Holder to maintain current certificates of insurance on file with the State for the duration of work under the Permit. No warranty is made that the coverages and limits listed herein are adequate to cover and protect the interests of the Permit Holder for the Permit Holder's operations. These are solely minimums that have been established to protect the interests of the State.

Workers' Compensation: With respect to all operations performed under the Permit, the Permit Holder shall carry workers' compensation insurance in accordance with the laws of the State of Vermont.

General Liability and Property Damage: With respect to all operations performed under the Permit, the Permit Holder shall carry general liability insurance having all major divisions of coverage including, but not limited to:

Premises - Operations
Products and Completed Operations
Personal Injury Liability
Contractual Liability

The policy shall be on an occurrence form and limits shall not be less than:

\$2,000,000 Per Occurrence
\$2,000,000 General Aggregate
\$2,000,000 Products/Completed Operations Aggregate
\$ 50,000 Fire/Legal Liability

Permit Holder shall name the State of Vermont and its officers and employees as additional insureds for liability arising out of this Permit.

Automotive Liability: The Permit Holder shall carry automotive liability insurance covering all motor vehicles, including hired and non-owned coverage, used in connection with the Permit. Limits of coverage shall not be less than: \$1,000,000 combined single limit.

Permit Holder shall name the State of Vermont and its officers and employees as additional insureds for liability arising out of this Permit.

DRAFT

Appendix A

Operational Stormwater Permitting and Compliance

November 6, 2019

1. SPONSOR Responsibilities. The SPONSOR shall undertake the following responsibilities in connection with the Stormwater Discharge Permit (SDP):

- a. Serve with the STATE as co-permittee, co-owner, and co-operator of the SDP.
- b. On an on-going, continuous basis, pursuant to 19 V.S.A. § 1111, secure, maintain, and comply with all necessary permits to work within and discharge into the STATE right-of-way, including the project's State Highway Access and Work Permit (a/k/a S.1111 permit). Routine maintenance activities will be in accord with the Manual on Uniform Traffic Control Devices (MUTCD) and VTrans traffic safety requirements (as referred in the S.1111 permit). VTrans may require additional permits in the future for work associated with the stormwater system if it other than annual routine work maintenance.
- c. Retain a qualified technical consultant to perform the following services:
 - 1) Design the Stormwater System and develop an administratively complete application package for the SDP;
 - 2) Manage the stormwater permitting process, including but not limited to any need to amend or supplement the application package in the course of Vermont Agency of Natural Resources (VANR's) review, to apply for and obtain an individual permit rather than a general permit if required by VANR, and to consult or testify in any appeal of VANR's decision on the SDP application by the parties or any third party; and
 - 3) Prepare the initial designer certification under the SDP and send to the VTrans Southeast Regional Stormwater Technician for review.
- d. Regularly inspect and maintain the gravel wetland. Check for presence of trash or debris at the inlet, forebay, wetland cells, and outlet structure. Remove trash as necessary. Check for signs of erosion and determine the cause. Repair and smooth out eroded areas and then stabilize. Check for sediment accrual in the forebay. Remove accumulated sediment as needed, or, at a minimum, when the accumulated material within the forebay approaches half the designed depth. Check for good vegetative growth within the wetland cells. Replace vegetation as needed. Check for undesirable vegetative growth including invasive species in the forebay. Remove vegetation by hand and remove wetland vegetation in the forebay if it appears to block the flow.
- e. Regularly inspect and maintain the catch basins in accordance with the S.1111 permit. Check for the presence of trash or debris at the inlet and grate and remove as necessary. Check for the presence of trash or debris within the structure and remove as necessary. Check for sediment accrual in the sump. Remove and/or vacuum sediment when the accumulated material within the sump approaches half the sump depth.

- f. Submit a complete and signed application package for SDP to the VTrans Municipal Assistance Bureau (MAB) Project Supervisor for distribution, review, and any revisions, and submission to VANR.
- g. Construct the Stormwater System as authorized by the SDP.
- h. Following completion of construction of the regulated impervious surfaces and permitted Stormwater System, prepare the initial designer certification (performed and completed by the original designer listed on the SDP) that the Stormwater System was built and is operating in compliance with the SDP.
- i. No later than ten business days before the deadline established by the SDP or other applicable VANR requirements for filing the initial designer certification with VANR, submit the initial designer certification to the VTrans Local Transportation Facilities Project Supervisor and VTrans Southeast Regional Stormwater Technician for distribution, review, any revisions, and submission to VANR.
- j. No later than sixty days after final acceptance of construction completion, provide one set of printed as-built plans for the permitted Project plus one copy in pdf format on disk to the VTrans Southeast Regional Stormwater Technician.
- k. In cooperation with the VTrans Southeast Regional Stormwater Technician, inspect, maintain, and make physical repairs to the permitted Stormwater System (which may include emergency repairs, corrective measures, and reconstruction in the event of system failure), all as needed to maintain Stormwater System function and to comply with the SDP and any and all other applicable local, state, and federal requirements, and in keeping with the maintenance requirements in sections d and e.

Using inspection report forms provided by VANR, and in coordination with the VTrans Southeast Regional Stormwater Technician, prepare draft inspection reports that note problems and maintenance/corrective actions taken by the SPONSOR and/or by the STATE; submit draft inspection reports to the VTrans Southeast Regional Stormwater Technician, review, and comment at least thirty days prior to the deadline for submitting the inspection reports to VANR; submit final inspection reports to VANR reflecting review and comments by the VTrans Southeast Regional Stormwater Technician; and provide copies of the final inspection report to the VTrans Southeast Regional Stormwater Technician.

- l. Retain written records of inspection reports and a time log of corrective/maintenance activities, and make these documents available to the STATE or VANR upon request.
- m. Coordinate and cooperate with the STATE in the amendment of the SDP and in the modification or replacement of the Stormwater System as may be reasonably necessary in view of changing transportation, development, regulatory, technical, or environmental considerations.

2. STATE Responsibilities. The STATE shall undertake the following responsibilities in connection with the SDP:

- a. Serve with the SPONSOR as co-permittee, co-owner, and co-sponsor of the SDP.
- b. Issue access permits to the SPONSOR pursuant to 19 V.S.A. § 1111 for construction, operation, and maintenance of the Stormwater System, and for emergency repairs.
- c. Provide timely review and revisions to the SPONSOR on the proposed design elements of the Stormwater System (including but not limited to the proposed stormwater treatment practices and the proposed Stormwater System's ongoing operational and maintenance needs).
- d. Provide timely review and revisions to the SPONSOR on the SDP application package.
- e. Submit the final application package for the SDP to VANR and, in coordination and cooperation with the SPONSOR, provide such additional information as VANR may reasonably require to make the application complete.
- f. Review and, as may be reasonably necessary, revise the initial designer certification to be provided by the SPONSOR, and timely submit the initial designer certification to the VANR Stormwater Section as required by the SDP.
- g. In coordination and cooperation with the SPONSOR, attend an annual inspection and timely review and comment on the draft inspection reports to be provided by the SPONSOR.
- h. In coordination and cooperation with the SPONSOR, timely prepare and submit applications for amendment or renewal as required to maintain the SDP.
- i. Timely pay VANR operating fees to maintain the SDP.

3. Administrative Authority.

- a. The STATE reserves the right to take maintenance or corrective actions and any other actions that may be reasonably necessary to maintain Stormwater System function and compliance with the SDP, to comply with other regulatory requirements, or to protect the environment or the STATE's infrastructure, including but not limited to the Stormwater System. The STATE shall provide reasonable notice to the SPONSOR of any such actions that the STATE intends to take and a reasonable opportunity for the SPONSOR to fulfill its responsibilities as set forth herein. Any such actions that the STATE undertakes shall not be construed as a waiver of its rights under this Agreement.
- b. The STATE further reserves the right to amend the SDP or to modify or replace the Stormwater System to meet changing transportation, development, technical, or environmental considerations. The STATE shall provide reasonable notice to the SPONSOR of any such actions that the STATE intends to take.

- c. The SPONSOR shall abide by all comments, revisions, notices, and amendments made by the STATE, which shall give reasonable consideration to the SPONSOR's requests.

4. Funding and Costs.

- a. The SPONSOR's costs in connection with its responsibilities set forth herein shall be reimbursed within the existing provisions and limitations of the Cooperative Agreement and Cooperative Agreement Amendment #1. Nothing herein is intended, nor shall be construed, to alter or amend the funding levels or coverage set forth in the Cooperative Agreement and Cooperative Agreement Amendment #1. As provided by the Cooperative Agreement and Cooperative Agreement Amendment #1, the SPONSOR's costs of maintaining the completed project, including but not limited to permit renewals, shall be borne solely by the SPONSOR.
- b. If changing transportation, development, technical, or environmental considerations lead the parties to amend the SDP or to modify or replace the Stormwater System, the SPONSOR and the STATE agree to coordinate compliance and apportion the costs of development, permitting, construction, compliance, operation, and maintenance associated with the amendment, modification, or replacement based on the extent of each party's responsibility for incurring these new costs.
- c. If existing or future state or federal regulations require amendment of the SDP or modification or replacement of the Stormwater System (which may occur, for example, if the receiving waters are listed as impaired pursuant to section 303(d) of the Clean Water Act), the SPONSOR and the STATE agree to coordinate compliance and apportion the costs of development, permitting, construction, compliance, operation, and maintenance associated with the new requirement based on their percentage share of the impervious surfaces regulated by the new requirement.

5. Staffing. The SPONSOR and the STATE each agrees to employ the staff necessary to carry out their responsibilities set forth herein.

6. Future Connections or Expansions. The Stormwater System will treat only the regulated impervious surfaces within the defined Project limits as provided by the SDP for this Project, and the SPONSOR shall not employ the Stormwater System or allow the Stormwater System to be employed to treat any additional impervious surfaces, stormwater facility connections, and/or discharges from other private or public sources unless and until the STATE, in its sole discretion, agrees to a written amendment to the S.1111 permit to allow future connections to or expansions of the Stormwater System and to secure any associated amendment of the SDP as may be reasonably necessary in view of changing transportation, development, regulatory, technical, or environmental considerations.

7. Communications. Communications with the STATE officials referenced in this Agreement shall be mailed or delivered to the following addresses unless or until the STATE notifies the SPONSOR in writing of a change of address:

Scott Robertson, Municipal Assistance Bureau Project Manager
Vermont Agency of Transportation
219 North Main St, 4th floor,
Barre, VT 0564
802-793-2395

Michael Johnson, SE Regional Stormwater Technician
Vermont Agency of Transportation
Dill Bldg, 2178 Airport Rd (Unit A)
Barre, VT 05641
Tel: 802-249-6906

Chris Bump, District #4 Project Manager
Vermont Agency of Transportation - District #4
223 Beswick Drive
White River Junction, VT 05001
Tel: 802-296-5567

Draft



Vermont Department of Environmental Conservation
Watershed Management Division
1 National Life Drive, Main Bldg, 2nd Fl.
Montpelier, VT 05620-3522

Agency of Natural Resources

Telephone: 802-828-1535

8/14/2017

Town of Hartford
173 Airport Road
White River Junction, VT 05001

Vermont Agency of Transportation
1 National Life Drive
Montpelier, VT 05633

Dear Permittee:

Attached is your copy of an Authorization to Discharge under Permit 7824-9015, which has been signed by the Stormwater Program Manager of the Stormwater Management Section on behalf of the Commissioner of the Department of Environmental Conservation. This authorizes the discharge of treated stormwater runoff from impervious surfaces associated with your project. Please read this authorization to discharge carefully and note the inspection and reporting requirements, and other operating conditions including payment of annual operating fees.

In addition, per the authorization, the permittee shall record a one page notice of issuance of this authorization in the local land records within fourteen (14) days of issuance of this authorization on the form provided. The permittee shall then provide a copy of the recording to the Stormwater Management Program, by submitting a copy of the recording from the local land records to this office within fourteen (14) days of the permittee's receipt of the recorded copy.

Please note these important due dates associated with your permit:

- Annual Operating Fee Due- 9/14/2017 (The payor will receive a separate invoice with payment details.)
- Initial Statement of Compliance Due- 6 months following completion of construction.
- Annual Inspection Due- 7/15/2018
- Permit Renewal Due- 6/14/2022
- Permit Expiration Due- 8/14/2022

If you have any questions pertaining to this authorization, please contact the Stormwater Management Program's Environmental Analyst assigned to your district: Matt Destino at matthew.destino@vermont.gov.

Sincerely,

Stormwater Management Program

VERMONT DEPARTMENT OF ENVIRONMENTAL CONSERVATION
AUTHORIZATION TO DISCHARGE UNDER
GENERAL PERMIT 3-9015

A determination has been made that the applicant(s):

Town of Hartford
173 Airport Road
White River Junction, VT 05001

And

Vermont Agency of Transportation
1 National Life Drive
Montpelier, VT 05633

Impervious Area: 2.43 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: Hartford STP 0113(59)S

Project Location: Intersection of US Route 5 and Sykes Mountain Avenue in Hartford, Vermont

Receiving Waters: White River

Manner of Discharge: S/N 001: This discharge point collects stormwater runoff from the entire proposed project via a closed drainage system and outlets to the pre-treatment area of a proposed gravel wetland. The proposed gravel wetland discharges to the same ditch as the existing closed drainage system that flows to an unnamed tributary to the White River. The proposed closed drainage system collects additional stormwater runoff flowing from the two other closed systems that did not previously discharge to the swale mentioned above. This additional flow will receive water quality treatment where it previously had no treatment.

Design: This project shall be constructed and operated in accordance with the site plans and details designed by McFarland Johnson, (Sheets 4 & 5, Typical Section- US Route 5, both dated 6/6/2017; Sheets 6 & 7, Typical Section- Roundabouts, both dated 6/6/2017; Sheet 8, Typical Section- Sykes Mountain Avenue, dated 6/6/2017; Sheet 9, Typical Section- Side Roads, dated 6/6/2017; Sheets 13 & 14, Gravel Wetland Details, both dated 6/6/2017; Sheet 22, Layout Plan 1, dated 6/6/2017; Sheet 24, Layout Plan 2, dated 6/6/2017; Sheet 25, Layout Plan 3, dated 6/6/2017; Sheet 26, Layout Plan 4, dated 6/6/2017; Sheet 27, Layout Plan 5, dated 6/6/2017; Sheets 33-35, Profile- Sykes Mountain Avenue, all dated 6/6/2017; Sheet 36, Profile- Beswick Drive, dated 6/6/2017; Sheet 37, Profile- Ralph Lehman Drive, dated 6/6/2017; Sheets 38 & 39, Profile- US Route 5, both dated 6/6/2017; Sheet 66, Gravel Wetland Grading Plan, dated 6/6/2017; Sheet 67, Landscape Plan 1, dated 6/6/2017; Sheet 68, Landscape Plan 2, dated 6/6/2017; Sheet 69, Landscape Plan 3, dated 6/6/2017; Sheet 70, Landscape Plan 4, dated 6/6/2017; Sheet 71, Landscape Plan 5, dated 6/6/2017; Sheets 78-82, US Route 5 Cross Sections, all dated 6/6/2017; Sheets 83-87, Sykes Mountain Ave. Cross Sections, all dated 6/6/2017; Sheet 88, Ralph Lehman Cross Sections, dated 6/6/2017; Sheet 89, Beswick Drive Cross Sections, dated 6/6/2017) 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. The first year's statement is enclosed. 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 http://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>.

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 on line at <http://puc.vermont.gov/>. The address for the Public Utility Commission is 112 State Street Montpelier, Vermont 05620-2701 (Tel. #802-828-2358).

All Other Projects – Right to Appeal to the Environmental Court

Pursuant to 10 V.S.A. Chapter 220, 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

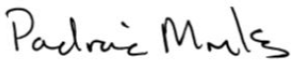
with Rule 5(b)(4)(B) of the Vermont Rules for Environmental Court Proceedings. For further information, see the Vermont Rules for Environmental Court Proceedings, available on line at www.vermontjudiciary.org. The address for the Environmental Court is 32 Cherry Street, 2nd Floor Suite 303 Burlington, Vermont 05401 (Tel. # 802-951-1740).

Effective Date and Expiration Date of this Authorization

This authorization to discharge shall become effective on August 14, 2017 and shall continue until August 14, 2022. The permittee shall reapply for coverage at least sixty (60) days prior to August 14, 2022.

Dated Monday, August 14, 2017

Emily Boedecker, Commissioner
Department of Environmental Conservation

By: 
Padraic Monks, Stormwater Program Manager
Stormwater Management Program



OFFICE MEMORANDUM

AOT - PROJECT DELIVERY BUREAU
ENVIRONMENTAL SECTION

TO: Project File
COPY: Kenneth R. Sikora, Environmental Program Manager
Scott Robertson, MAB Project Manager

FROM: Lee Goldstein, Environmental Specialist

DATE: October 11, 2017

SUBJECT: 3-Year PACE Re-Evaluation per VTrans/ FHWA Programmatic Agreement

PROJECT: Hartford STP 0113(59); US Route 5: 2 single-lane 'Roundabouts' at Ralph Lehman Drive and Sykes Mountain Avenue with 10-foot bike path and stormwater detention basin

A Programmatic Categorical Exclusion (PACE) for the above-mentioned project, per 23 CFR 771.117 (d)(1), was issued on 09/17/2001 based upon a conceptual design for roadway reconstruction, beginning south of the intersection of U.S. Route 5 and Sykes Avenue, continuing up to and including the intersection; then further along Sykes Avenue; additionally, work along Beswick Road, Lehman Drive, and a proposed connector were also to be included.

Work as originally proposed included reconstruction, widening, drainage, curbs, sidewalks, subbase, grading, pavement and signalization. Traffic maintenance was proposed on existing roads using phased construction.

Since the original PACE, subsequent NEPA re-evaluations have taken place; the second submittal was dated 04/22/2005 as (d)(1), and then on 09/25/2009 as (d)(1). Further details regarding the re-evaluations are outlined below:

- The original design, as described in the 2001 CE, called for construction of a new exclusive northbound lane on US 5; dual left turn lanes on Sykes Avenue westbound; a 5m raised landscaped median on Sykes Avenue; an eastbound right turn lane on Sykes Mountain Avenue into Beswick Drive and Ralph Lehman Drive; an eastbound left turn pocket into Sykes Avenue median to service the bus terminal; a public connector road between Beswick Drive and Ralph Lehman Drive; conversion of Beswick Drive to a one-way in up to the MacDonald's Drive; installation of an underground signal conduit and interconnect for future signal at Ralph Lehman Drive; widening and acquisition as a public road of Comfort Inn Drive; and the providing of sidewalks, crosswalks, and pedestrian-actuated signal phase to signal.
- Subsequent to the submission of the 2001 CE, the Agency of Transportation was asked to re-evaluate the project by adding an alternative with two roundabouts at the US Route 5 and Ralph Lehman Drive intersections with Sykes Mountain Avenue with a raised median island along Sykes Mountain Avenue between the two roundabouts. The roundabout alternative was approved, the design was progressed to Conceptual Plans (25%), and a public 502 hearing was held; additional modifications were made. Because the modifications to the design since the submission of the 2001 CE were substantive, a second CE was submitted to FHWA on April 22, 2005.
- Subsequent to the submission of the 2005 CE, additional design changes were made and a CE re-evaluation was submitted to FHWA on September 25, 2009. Design changes addressed in the 2009 CE

were included as follows: The diameters of the center island and the inscribed circle of the US Route 5/Sykes Mountain Avenue Roundabout were increased, resulting in additional right-of-way impacts adjacent to the roundabout. To mitigate some of the need for additional right-of-way, the design was changed from a two-lane roundabout to a single-lane roundabout with turning lanes with only single lanes exiting the roundabout for both northbound and southbound US Route 5. In addition, a ten-foot bike path was included instead of the originally proposed 8-foot path to meet VTrans Bicycle/Pedestrian requirements. These design changes provided a roundabout with a lower projected crash rate, lower construction costs, improved safety for pedestrians, and fewer property impacts and ROW costs.

- The Sykes Mountain Avenue/Ralph Lehman Road Roundabout was redesigned in 2009 as a single lane roundabout with a raised central island and truck apron to meet FHWA requirements for design speed, visibility, and pedestrian safety.

- In 2009 a stormwater quality structure north of Marketplace Junction, on the west side of US Route 5 was added to meet VANR stormwater requirements. Stormwater from the project area (US Route 5 and Sykes Mountain Avenue) will be discharged into an infiltration basin at this location. An emergency spillway is included as part of the design. Severe storm events will discharge to an adjacent watercourse during these events, following an existing channel and ultimately out-letting into the Connecticut River.

- Subsequently, additional design changes were made in 2017 as follows: the diameters of the roundabouts have been increased to accommodate large-truck U-turns, and the infiltration basin has been modified to a gravel wetland due to soil conditions at the site.

The VAOT has determined that this project still meets all the criteria specified in the Programmatic Agreement regarding Processing of Projects Eligible for Categorical Exclusion, executed 6/25/99, and thus the project qualifies for Categorical Exclusion pursuant to 23 CFR 771.117(d)(1) “Environmental Impact and Related Procedures—Categorical Exclusions” as the project consists of modernization of a highway by reconstruction.

The project will not involve substantial planning, resources, or expenditures; nor is it likely to induce significant alterations in land use, planned growth, development patterns, traffic volumes, or traffic patterns. No significant environmental impact is expected to result from construction or maintenance of this facility. Please contact Lee Goldstein, VTrans @802-828-3985 if you require additional information.

Respectfully,

Lee Goldstein 10/11/2017

Lee Goldstein,
Environmental Specialist

cc: VTrans project file

Goldstein, Lee

From: Brady, James
Sent: Thursday, October 12, 2017 4:39 PM
To: Goldstein, Lee
Subject: RE: Hartford STP 0113(59)S NEPA Re-Eval

Hi Lee,

Please use the following language:

Notice to Bidders: This project shall be subject to Avoidance and Minimization Measures to protect the habitat and hibernacula of the northern long-eared bat. Measures applicable to this project include, Time-of-Year (TOY) restrictions for any potential impacts to suitable bat habitat, which include, but are not limited to trees $\geq 3''$ and/or habitat features on bridge structures.

It is anticipated that the Contractor will be required to cut trees $\geq 3''$ in diameter within the identified project limits as part of the work. An assessment of the project limits resulted in a finding of no suitable habitat. Therefore, tree cutting, and bridge related activities, within the project limits may occur without any TOY restrictions.

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

James Brady

VTrans Biologist
james.brady@vermont.gov
Mobile: (802) 279-2562

From: Goldstein, Lee
Sent: Wednesday, October 11, 2017 4:54 PM
To: Brady, James <James.Brady@vermont.gov>
Subject: RE: Hartford STP 0113(59)S NEPA Re-Eval

Hi James, as I upload the docs for this submittal, I was wondering if you had NLEB language—or should I simply say there are no Commitments? This is the first re-eval where we would be including NLEB language as a Commitment, if any. Do you have something standard?

Thanks!

Lee

From: Brady, James
Sent: Tuesday, October 10, 2017 4:58 PM
To: Goldstein, Lee <Lee.Goldstein@vermont.gov>
Subject: Hartford STP 0113(59)S NEPA Re-Eval

Hello Lee,

Based on the updated scope, the original natural resource clearance for this project is still valid. Changes include the increased size of the roundabouts and changes in the drainage to include engineered wetlands.

Thank you,
James

James Brady, *Environmental Biologist*
Vermont Agency of Transportation
One National Life Drive
Montpelier, VT 05633-5001
Mobile: (802) 279-2562
james.brady@vermont.gov



Ernest Blais, Division Administrator
Federal Highway Administration
P.O. Box 568, Montpelier, VT 05601

September 25, 2009

Attn: Kenneth R. Sikora, Jr.

Re: **Hartford STP 0113(59)S; US Route 5: 2 single-lane 'Roundabouts'
at Ralph Lehman Drive and Sykes Mountain Avenue with 10-foot bike path
and stormwater detention basin**

Dear Mr. Blais,

The original Programmatic Categorical Exclusion (PACE) was submitted on 17 September 2001 based on conceptual design. A PACE re-evaluation was submitted on April 22, 2005 (see attached), as described below. The current project scope will involve the preparation of an operational Stormwater Permit and the acquisition of approximately 25,000 square feet of right of way from a total of nine owners. A right of way plan set is included with this CE.

The proposed project begins on US Route 5 approximately 400 feet south of the intersection with Sykes Mountain Avenue in the Town of Hartford, VT and continues north for about 1,400 feet (425 feet of roadwork, with the remainder drainage, stormwater management, and guardrail work only). The project extends from the intersection along Sykes Mountain Avenue approximately 800 feet. Roundabouts are to be constructed at the intersection of US Route 5/Sykes Mountain Avenue and the intersection of Sykes Mountain Avenue/Ralph Lehman Road. Also included in the project is approach work on Beswick Road and Ralph Lehman Road, accommodations for bicycle and pedestrians, drainage, and the construction of raised median islands.

A brief chronology of design changes follows.

- The original design, as described in the 2001 CE, called for construction of a new exclusive northbound lane on US 5; dual left turn lanes on Sykes Avenue westbound; a 5m raised landscaped median on Sykes Avenue; an eastbound right turn lane on Sykes Mountain Avenue into Beswick Drive and Ralph Lehman Drive; an eastbound left turn pocket into Sykes Avenue median to service the bus terminal; a public connector road between Beswick Drive and Ralph Lehman Drive; conversion of Beswick Drive to a one-way up to the McDonald's Drive; installation of an underground signal conduit and interconnect for future signal at Ralph Lehman Drive; widening and acquisition as a public road of Comfort Inn Drive; and the providing of sidewalks, crosswalks, and a pedestrian-actuated signal phase to signal.
- Subsequent to the submission of the 2001 CE, the Agency of Transportation was asked to


re-evaluate the project by adding an alternative with two roundabouts at the US Route 5 and Ralph Lehman Drive intersections with Sykes Mountain Avenue with a raised median island along Sykes Mountain Avenue between the two roundabouts. The roundabout alternative was approved, the design was progressed to Conceptual Plans (25%), and a public 502 hearing was held; additional modifications were made. Because the modifications to the design since the submission of the 2001 CE were substantive, a second CE was submitted to FHWA on April 22, 2005.

- Subsequently, additional design changes were made as follows: the diameter of the center island and the inscribed circle of the US Route 5/Sykes Mountain Avenue Roundabout resulted in additional right-of-way impacts adjacent to the roundabout. To mitigate some of the need for additional right-of-way, the design was changed from a two-lane roundabout to a single-lane roundabout with turning lanes with only single lanes exiting the roundabout for both northbound and southbound US Route 5. In addition, a ten-foot bike path will be used instead of the originally proposed 8-foot path to meet VTrans Bicycle/Pedestrian requirements. These design changes provide a roundabout with a lower projected crash rate, lower construction costs, improved safety for pedestrians, and fewer property impacts and ROW costs.
- The Sykes Mountain Avenue/Ralph Lehman Road Roundabout has been redesigned as a single lane roundabout with a raised central island and truck apron to meet FHWA requirements for design speed, visibility, and pedestrian safety.
- A stormwater quality structure north of Marketplace Junction, on the west side of US Route 5 has been added to meet VANR stormwater requirements. Stormwater from the project area (US Route 5 and Sykes Ave.) will be discharged into an infiltration basin at this location. An emergency spillway is included as part of the design. Severe storm events will discharge to an adjacent watercourse during these events following an existing channel and ultimately out-letting into the Connecticut River.

The VAOT has determined that this project still meets all of the criteria specified in the Programmatic Agreement regarding Processing of Projects Eligible for Categorical Exclusion, executed 6/25/99, and thus the project qualifies for Categorical Exclusion pursuant to 23 CFR 771.117(d)(1) "Environmental Impact and Related Procedures—Categorical Exclusions" as the project consists of modernization of a highway by reconstruction.

The project will not involve substantial planning, resources, or expenditures; nor is it likely to induce significant alterations in land use, planned growth, development patterns, traffic volumes, or traffic patterns. No significant environmental impact is expected to result from construction or maintenance of this facility. Please contact Lee Goldstein, Vtrans Environmental Specialist @802-828-3985 if you require additional information.

Respectfully,


John T. Narowski, P.E., Environmental Services Engineer

cc:

Joel Perrigo, Project Manager, VTrans LTF

Rob White, Chief ROW

Central Files via JTN

Project File via Environmental Section



State of Vermont
 Agency of Transportation
 National Life Building
 Drawer 33
 Montpelier, VT
 05633-5001

VTTrans *Working to Get You There*

Charles Basner, Division Administrator
 Federal Highway Administration, P.O. Box 568
 Montpelier, Vermont 05601

April 22, 2005

Attn: Robert Sikora Jr., Environmental Program Manager

Re: Hartford STP 0113(59)S - Programmatic Categorical Exclusion

Dear Mr. Sikora:

A Programmatic Categorical Exclusion (PACE) for the above-mentioned project, per 23 CFR 771.117(d)(1), was issued on September 18, 2001 (copy attached). Given the nature of changes in scope of work discussed below, and at the direction of Mark Richter, we are filing this new Programmatic CE with the FHWA.

Work on this project initially included new intersection turning lanes, a new signal system, sidewalks and pedestrian crossings, and widening and acquisition of Ralph Lehman Drive and a private connector road between Beswick Road and Ralph Lehman Drive. Since September 2001 the scope of the project has been amended to include "roundabout" intersection traffic control at Rte 5 and Sykes Mountain Avenue and Ralph Lehman Drive and Sykes Mountain Avenue. The acquisition of Ralph Lehman Drive and the private connector Road are no longer required. Necessary Right of Way takings have been accordingly reduced.

The Vermont Agency of Transportation (VTTrans) has determined that this project still meets all of the criteria specified in the Programmatic Agreement entitled "Processing of Projects Eligible for Categorical Exclusion," executed 6/25/99. The project qualifies for Categorical Exclusion pursuant to 23 CFR 771.117(d)(1) "Environmental Impact and Related Procedures - Categorical Exclusions" as the project consists of highway modernization, rehabilitation, reconstruction or replacement. Traffic will be maintained through the work zone during construction, thus no detour will be required. The updated Categorical Exclusion Analysis Sheet is attached along with updated Section 106 Determination of "No Historic Properties Affected", other resource clearance documentation, and plan cover and layout sheets.

This project will not involve substantial planning, resources, or expenditures; nor is it likely to induce significant alterations in land use, planned growth, development patterns, traffic volumes, or traffic patterns. The project will have no significant effect upon natural and cultural resources. No significant environmental impact is expected to result from construction or maintenance of this facility. Please contact Craig DiGiammarino @ 828-3962 if you require additional information.

Respectfully,

Richard Tetreault,
 Director of Program Development

Copy: Robert White, LTF Section Project Supervisor
 Bill Morse, Chief ROW
 Central Files via JTN
 Project File via Environmental Section
 Dufresne-Henry, Consultant

FILE COPY

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PROGRAMMATIC CATEGORICAL EXCLUSION CRITERIA

VTrans has determined that this project will **NOT** :

- A. Require a temporary detour outside existing right-of-way, or a temporary wetland or stream crossing which will require non-routine mitigation, or a ramp closure, unless the following conditions are met :
- (1) provisions are made for access by local traffic and the facility is posted accordingly,
 - (2) businesses dependent upon through traffic will not be unduly affected,
 - (3) the temporary detour or ramp closure will not interfere with local special events,
 - (4) the temporary detour, ramp closure, wetland or stream crossing will not substantially increase the environmental consequences of the action (project).
- B. Involve construction in wetlands and/or streams (below Ordinary High Water) totaling more than 5,000 square feet, requiring the Army Corp of Engineers to coordinate with resource agencies per General Permit 58.
- C. Require a Risk Analysis for an increase in 100-year flood water surface elevations, per EO 11998.
- D. Involve construction within, or alter drainage patterns so as to adversely affect, a Sole Source Aquifer.
- E. Require coordination with the US Fish and Wildlife Service for the preparation of a Biological Assessment for Threatened and Endangered Species, per 16 CFR Section 7.
- F. Require acquisition of additional right-of-way (including permanent or temporary construction easements) involving: more than three acres of land per mile of roadway, or 10 acres total for a non-linear improvement (such as a bridge or an intersection), or any relocation of residences or businesses.
- G. Require FHWA approval for changes in access control.
- H. Involve acquisition of, or impacts upon Prime or Unique Farmland, unless a USDA Farmland Conversion Impact Rating Part VI Site Assessment has been completed and indicates Total Site Assessment Points less than 160.
- I. Adversely Effect a historic or archaeological resource on, or eligible for inclusion on, the National Register of Historic Places.
- J. Require use (permanent or temporary) of a Section 4(f) resource, unless that use meets the criteria for a Programmatic 4(f) ; or require use of a Section 6(f) resource (property acquired or improved using Land and Water Conservation Funds) .
- K. Involve hazardous or residual waste liabilities subject to CERCLA and/or RCRA requirements.
- L. Require a bridge permit from the US Coast Guard, per 23CFR 650 Subpart H.
- M. Qualify as a Type I project and require analysis of noise abatement measures, per 23 CFR 772 and the FHWA approved VAOT Noise Policy

(NOTE: If coordination with the FHWA was required to reach this determination attach concurrence memo)

Categorical Exclusion Environmental Analysis Sheet

Town	Hartford		Project No.	STP 0113 (59) S	Route	US 5, Sykes Mountain Avenue and other TH's
Project Setting:	Urban	X	Village		Rural	
	Traffic	US 5: 11,900 Sykes: 13,300	Year	2006	Typical	US 5: 1.2-3.6-3.6-3.6-3.6-1.2 Sykes: 1.2-3.3-3.3-3.3-3.3-1.2

Project Purpose and Need:

Purpose: Improve safety and traffic operations at intersection of US Route 5 at Sykes Mountain Avenue.

Need: Several deficiencies including poor road alignments, lack of definition to abutting property access points, high traffic volumes (and resulting congestion and delay), heavy truck traffic and insufficient pedestrian facilities.

Alternatives Considered:

Alternatives considered for September 18, 2001 Categorical Exclusion:

See attached September 18, 2001 document

Additional Alternatives considered for Design and Environmental Impact Update:

Alternative 1 – Roundabout at the US Route 5/Sykes Mountain Avenue intersection and a second roundabout at the Ralph Lehman Drive/Sykes Mountain Avenue intersection, with a median on Sykes Mountain Avenue – **Alternative A was chosen as the preferred alternative by a Steering Committee comprised of the Town Director of Development, Town Engineer, VTrans DTA and VTrans LTF personnel. This alternative has the unique advantage of allowing the most access to abutting properties while still providing the needed access management.**

Alternative 2 – A traffic signal at US Route 5 with a median on Sykes Mountain Avenue and a roundabout at the Ralph Lehman Drive intersection

Alternative 3 – A roundabout at both the US Route 5 and Ralph Lehman Drive intersections, but no median on Sykes Avenue

Project Description:

Project location and description of work are shown on the Conceptual Plans; dated February 2004. In general, two intersections will be rehabilitated and upgraded to Roundabouts. The US Route 5/Sykes Mountain Avenue was signalized and will become a two lane roundabout. The Sykes Mountain Avenue/Ralph Lehman Road intersection will be a single lane roundabout.

(Projects that meet the criteria of 23 CFR771.117 (c) need only address those issues marked with an asterisk (*). This does not preclude the need to obtain applicable State and Federal concurrences and permits.)

1. **Air Quality**
 Ten year increase in ADT <10,000 vpd (10,000 allowed maximum per MOA)
 Urban intersection improvement? Yes _____ No X

2. **Noise**
 Alignment moved closer to developed property? Yes _____ No X
 If yes, apply nomograph. Results _____

3. **Water Quality**

Lakes or Ponds

VANR Lakes & Ponds Permit? Yes _____ No X _____

Rivers or Streams

VANR Stream Alteration Permit? Yes _____ No X Acquired _____

Wetlands

* Involved Yes _____ No X VT Classification _____

* Wetland impact area Temporary _____ Permanent _____

* Buffer impact area Temporary _____ Permanent _____

* VANR Conditional use determ. Yes _____ No X _____

401 Water Quality Certification Yes _____ No X _____

Stormwater Discharge Permit Yes X No _____ Possible _____

Flood Plains Encroachment Yes _____ No X _____

Significance (Describe) _____

Ground Water/Surface Water/Well Impacts Yes _____ No X _____

Describe _____

ANR Comments _____

COE Comments _____

4. **U.S. Army Corps of Engineers**

Section 404 Permit required? Yes _____ No X _____

Permit type _____

5. **U.S. Coast Guard**

Navigable waters? Yes _____ No X _____

Section 124a Permit required? Yes _____ No X _____

6. **Threatened and Endangered Species and Habitat**

Present in project area? Yes _____ No X _____

ANR Non-game and Natural Heritage Program comments N/A _____

(ref. Wm Countryman letter report) _____

USF & WS comments _____

7. **Agricultural Land**

Prime/secondary/locally important soils affected? Yes _____ No X _____

Current Land use? _____

Form 1006 parts I, III, VI, VII completed? Yes _____ No X _____

Form 1006 parts II, IV, V completed? Yes _____ No X _____

Vermont Department of Agriculture comments N/A _____

8. Hazardous/Residual Waste Liabilities

Present in project area?	Yes	<input checked="" type="checkbox"/>	No
Determination from VANR list? (list date January 30, 2002)	Yes	<input checked="" type="checkbox"/>	No
Determination from field visit?	Yes		No <input checked="" type="checkbox"/>
Boring Completed?	Yes		No <input checked="" type="checkbox"/>
Petroleum related wastes?	Yes	<input checked="" type="checkbox"/>	No
CERCLA involvement?	Yes		No <input checked="" type="checkbox"/>
Remediation required?	Yes		No <input checked="" type="checkbox"/>

Describe According to the April 2004 Vermont Hazardous Sites List, two sites are located in the project area. The following was seen in that report: Evan's Fuel Mart (corner of US Route 5 and Airport Rd) had petroleum groundwater contamination present in monitoring wells. Exxon/Mobil (corner of Sykes Mountain Avenue and US Route 5 had an underground storage tank line leak. Line was repaired. Contamination was found and investigation is needed. Two sites documented in the September 18, 2001 CE that were documented, but now closed, are the Thibideau Property on Route 5 and the Vermont Transit property on Sykes Avenue.

9. Historical or Archaeological Resources (Section 106)

Historic Resources: Present in project area?	Yes	No	<input checked="" type="checkbox"/>
Archaeological Resources: Present in project area?	Yes	No	<input checked="" type="checkbox"/>
Section 106 findings	<u>No Historic Properties Affected</u>		
Memorandum of Agreement needed?	Yes	No	<input checked="" type="checkbox"/>
SHPO coordination completed	<u>06/05/00</u>		
Advisory Council coordination completed	<u>N/A</u>		

***10. Section 4(f) Resources**

Present in project area?	Yes	No	<input checked="" type="checkbox"/>
Nature of Section 4(f) involvement:			
Public Land	Wildlife & Waterflow Refuge	Historic Property	
Temporary use (coordinate with FHWA on determination)	Yes	No	<input checked="" type="checkbox"/>
Section 6(f) involvement (LWCF Funding)?	Yes	No	<input checked="" type="checkbox"/>
Department of Interior coordination completed (Not required for Programmatic 4(f)S)	<u>N/A</u>		

***11. Right of Way**

New ROW Acquisitions:	fee simple?	Yes	<input checked="" type="checkbox"/>	No
	easement?	Yes	<input checked="" type="checkbox"/>	No

Description of taking Road widening and median design of Sykes Mountain Avenue. Also, at the 4 quadrants of the US Route 5/Sykes Mountain Avenue roundabout and 2 quadrants of the Sykes Mountain Avenue/Ralph Lehman Road roundabout.

Improved properties acquired?	Yes	No	<input checked="" type="checkbox"/>
Displacements:	Rental Units	Private Homes	Business
Relocation services to be provided			
Properties available for relocation			

12. Public Participation Opportunity

Pre-design site meeting? Yes No Date 08/28/96
 Public information meeting? Yes No Date 9/17/96;
4/23/97; 4/29/97; 9/23/97; 10/28/03; 11/25/03
 Public hearing required? Yes No Date January
2003;
7/15/04

Comments by local officials/RPC's: On December 9, 2003 the roundabout alternatives were presented to the Town Selectboard. There was unanimous support for Alternative 1 as described in this document. Also, abutting property owners and businesses have shown support for a roundabout alternative versus a traffic signal.

13. Social & Economic Concerns

Project consistent with local and regional land use plans Yes No
 Describe (attach correspondence from officials)
 Neighborhood and community concerns? Yes No
 Churches Elderly
 Schools Minorities
 Low Income Housing Handicapped
 Emergency Services Environmental Justice Exec. Order 12898

Describe

Pedestrian facilities: sidewalks ≥ 5 ft.? Yes No
 Bicycle facilities: paved shoulders ≥ 4 ft.? Yes No
 Describe Contiguous sidewalk at each intersection and crosswalk. ADA compliant.

Effect on local business? Yes No
 Describe Access management and relocation of parking

Temporary effect on business? Yes No
 Describe Minor accesses issues expected during construction

Loss of parking? Yes No
 Describe

14. Temporary Effects or Aesthetic Concerns

Detour Required? Yes No Length (attach plans)
 Temporary bridge required? Yes No (attach plans)

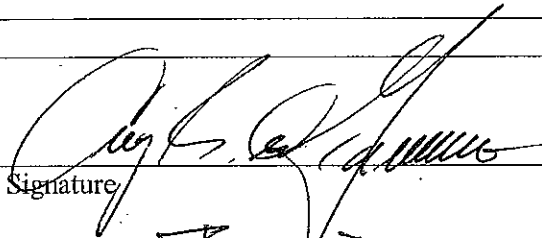
Adverse effects
 Public and public official notification or involvement
 Scenic Byway/VT Scenic Highway? Yes No
 National/State Forest Highway? Yes No
 Describe

Field Inspection Comments:

None

Completed By:

Signature

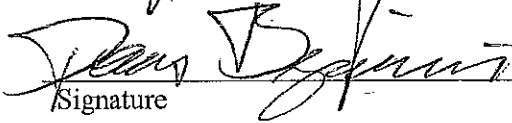


Date

4/22/05

Reviewed By:

Signature



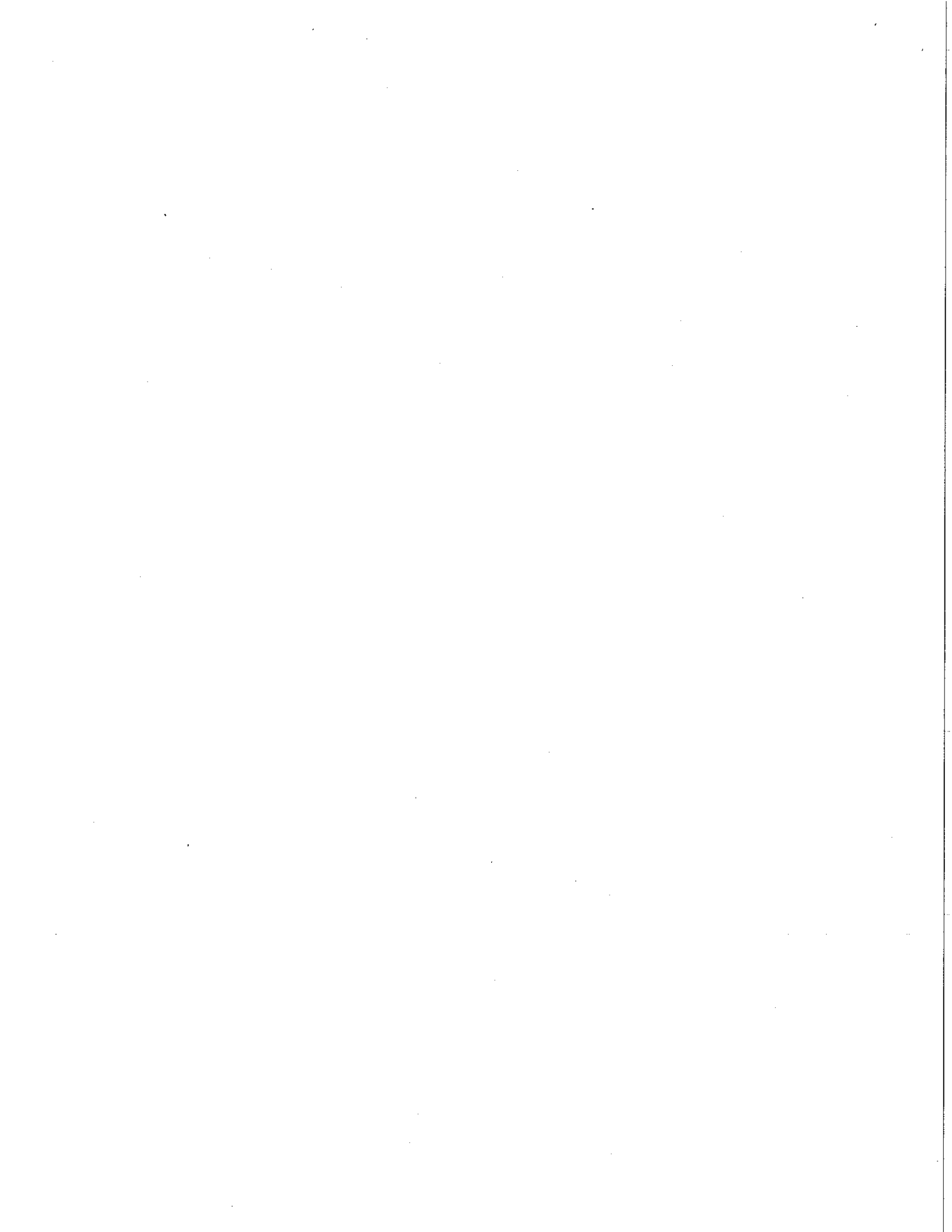
Date

4/22/05

(Note: Full documentation of the information summarized herein is preserved in the project files of the VAOT Planning Division. When appropriate, more detailed descriptions of resources and/or impact analyses should be attached to this form.)

Impact Mitigation Requirements

Describe: None



Goldstein, Lee

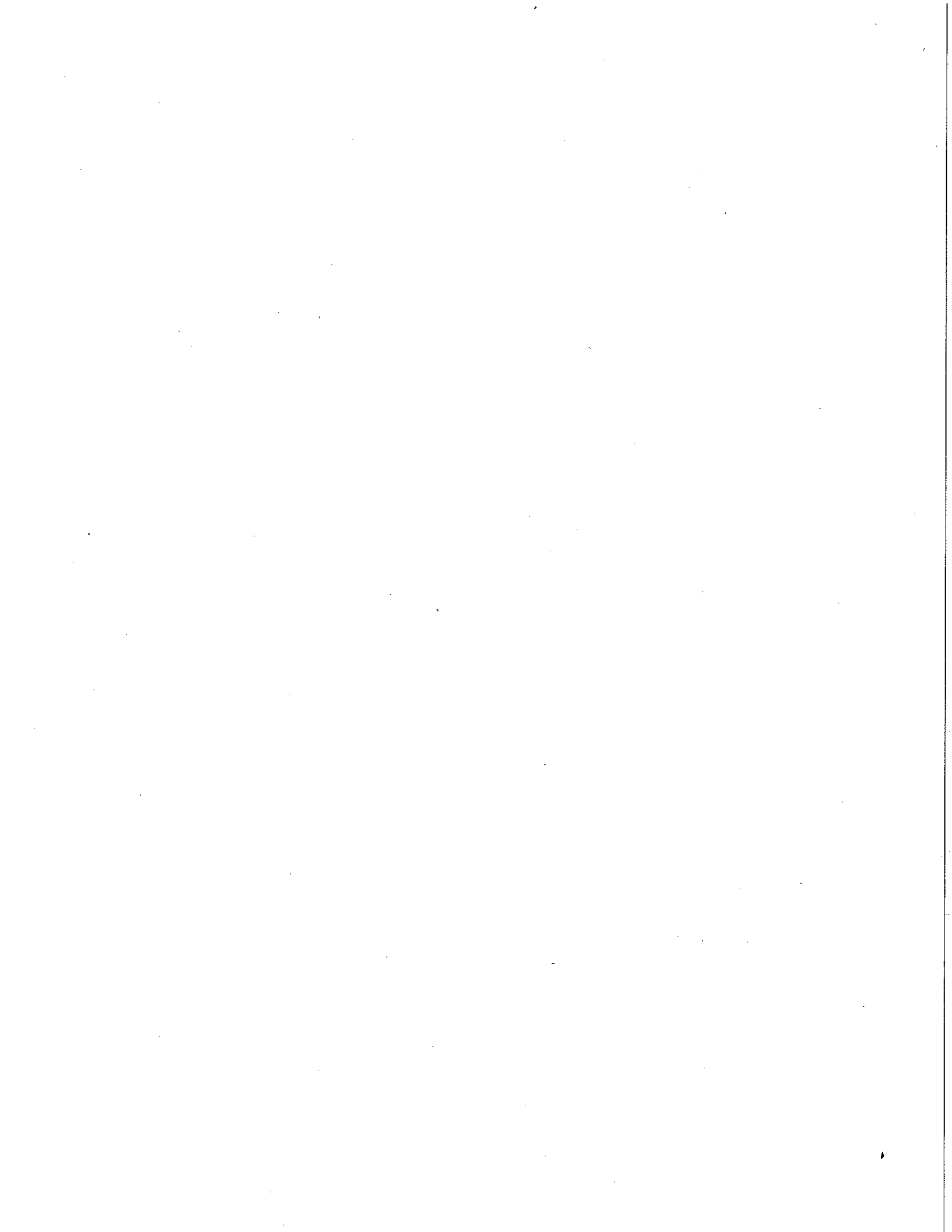
From: Newman, Scott
Sent: Friday, September 25, 2009 11:45 AM
To: Goldstein, Lee
Subject: Hartford STP 0113(59) changed SOW

Hi Lee,

I have reviewed the proposed changes to the scope of work for the above-subject project, comprising the construction of a stormwater detention pond between RT 5 and the Interstate Highway. After review of the plans and survey of the project site I have concluded that no historic properties will be affected by the additional work, and the original Section 106 NHPA determination of effect dated 4/18/05 remains valid.

Thank you.

D. Scott Newman M.Sc.
Historic Preservation Officer
Vermont Agency of Transportation
1 National Life Drive
Montpelier, VT 05633-5001
802-828-3964
fax 828-2334



No Historic Properties Affected

VAOT Project Hartford STP 0113(59)

GIS / State Planar Coordinates

Street Address Sykes Mountain Avenue
Town Hartford County Windsor

Project Description Construction of two roundabouts and approaches, removal and replacement of curb, new drainage, traffic signs, pavement markings and incidental items. Roundabouts will be placed at the intersections of Sykes Mountain Avenue and U.S. Route 5, and at Sykes Mountain Avenue and Ralph Lehman Road. The project is not in an Historic District and the entire area consists of commercial infill buildings that are less than 50 years old.

Area of Potential Effect Road surface and road sides, including building fronts along approximately 260 m of U.S. Route 5, along approximately 280 m of Sykes Mountain Avenue (from its intersection with Route 5 eastward) and along 40 m each of Beswick Road and Ralph Lehman Road (from their intersections with Sykes Mountain Road):

Map Attached

Project does not involve any ground disturbance.

There are no known or expected archeological sites in the Area of Potential Effect. See attached supporting documentation or further explanation and justification on reverse.

There are known or expected archeological sites in the Area of Potential Effect, but the project will have no effect, positive or negative, on them. See attached supporting documentation or further explanation and justification on reverse.

Completion of this form in accordance with the VAOT PA evidences that FHWA has satisfied its Section 106 responsibilities for this undertaking.

J. Pull
for Archeology Officer

4-18-05
Date

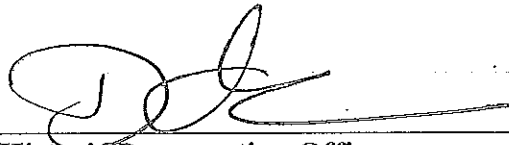
OVER →

There are no buildings or structures in the APE.

There are no historic buildings, structures, or landscapes in the Area of Potential Effect. See further explanation and justification below.

There are historic buildings, structures, or landscapes in the Area of Potential Effect, but the project will have no effect, positive or negative, on them. See further explanation and justification below.

Completion of this form in accordance with the VAOT PA evidences that FHWA has satisfied its Section 106 responsibilities for this undertaking.



Historic Preservation Officer

4-18-05
Date

Photos Attached _____
Map Attached _____

FROM: Duncan C. Wilkie, VTrans Archaeology Officer
DATE: September 25, 2009
SUBJECT: ARCHAEOLOGICAL ISSUES ONLY

Project Name: Hartford US 5 Intersection Improvement Stormwater Detention Basin
Project Number: STP 0113(59)S

On 07/29/2009, the VTrans Archaeology Officer reviewed the above project with the Transportation Archaeologist(s) and agreed to the following:

*****EXEMPT PROJECTS*****

[] This project is identified as an "Exempt Activity" based on the Programmatic Agreement (12/28/00) or some other agreed upon document.

*****PRE-PHASE 1*****

[x] That the Archaeological Resource Assessment of the Area of Potential Effect (APE) conducted by VTrans [], Consultant [], or Sub-consultant [x] Hartgen Archeological Associates, Inc. and dated 11/20/2006 is adequate to identify archaeological resources, and Does Not have a CADD map with the archaeological resources on it.

Date ARA was approved 07/29/2009.

[x] Plans dated 04/07/2008 reviewed by VTrans [x], Consultant [] or Sub-consultant [].

Recommendations:

- [x] Project CLEARED with avoidance to all archaeologically sensitive areas.
[] Project CLEARED with the following Conditions(See Conditions below)
[] Recommend more archaeological study - Phase I

*****PHASE 1 & Beyond*****

[] ARA Proposal received _____ and approved _____.

[] The above project is being reviewed at which level: ARA.

Authorization Date: _____ Consultant Firm _____.

End of field letter/report Date _____.

Determination of Effect: NO EFFECT(NE) []

CONDITIONAL NO ADVERSE EFFECT [] (See conditions below)

NO ADVERSE EFFECT (NAE) [] ADVERSE EFFECT (AE) []

Consultant Recommends: _____
Draft Report Received: _____
Comments to Consultant: _____
Final Report Received: _____
Clearance of Phase I Date: _____
Phase I Costs: \$ _____
Number of sites found: _____
Number of National Register(NR) sites: _____
Number of NR sites Mitigated: _____

[x] Additional comments or conditions that apply to this project. (see page 2 for additional comments or conditions)

J Reull

(Signature of VTrans Archaeology Officer)

7-29-09

(Date)

September 25, 2009

Project: Hartford STP 0113(59)S

Additional Comments from Page 1: The project area was determined to be not sensitive by Hartgen Archeological Associates, Inc. due to fill and grading disturbance.

Goldstein, Lee

From: Lepore, John
Sent: Tuesday, June 30, 2009 11:18 AM
To: Goldstein, Lee
Cc: Russell, Jeannine; Newman, Scott; Lepore, John
Subject: Hartford Draft CE Re-eval (Natural Resources)
Attachments: HARTFORD STP 0113 (59) - Sykes Ave.doc

Attached is a clearance from 2005 for the project based on the Conceptual Plans (detention basin not included). The information is still valid.

Upon review of the proposed detention basin between the two US 5 barrels, I have determined that it will not impact any regulated natural resources, eventhough there is a man-made ditch (constructed in the dry) on the site which contains hydrophytic vegetation. In other words, from a natural resources perspective, there are no outstanding issues and the project could be constructed (as proposed) in the plans dated April 09'.

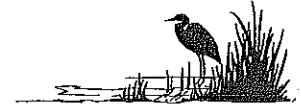
No further review is required.

If you have any questions about this, come see me...

~ John ~

AGENCY OF TRANSPORTATION

OFFICE MEMORANDUM



TO: Craig DiGiammarino, Environmental Specialist
FROM: John Lepore, Transportation Biologist
DATE: January 10, 2005
SUBJECT: HARTFORD STP 0113 (59) - Conceptual Plan Review
Reconstruction of US 5 / Sykes Avenue

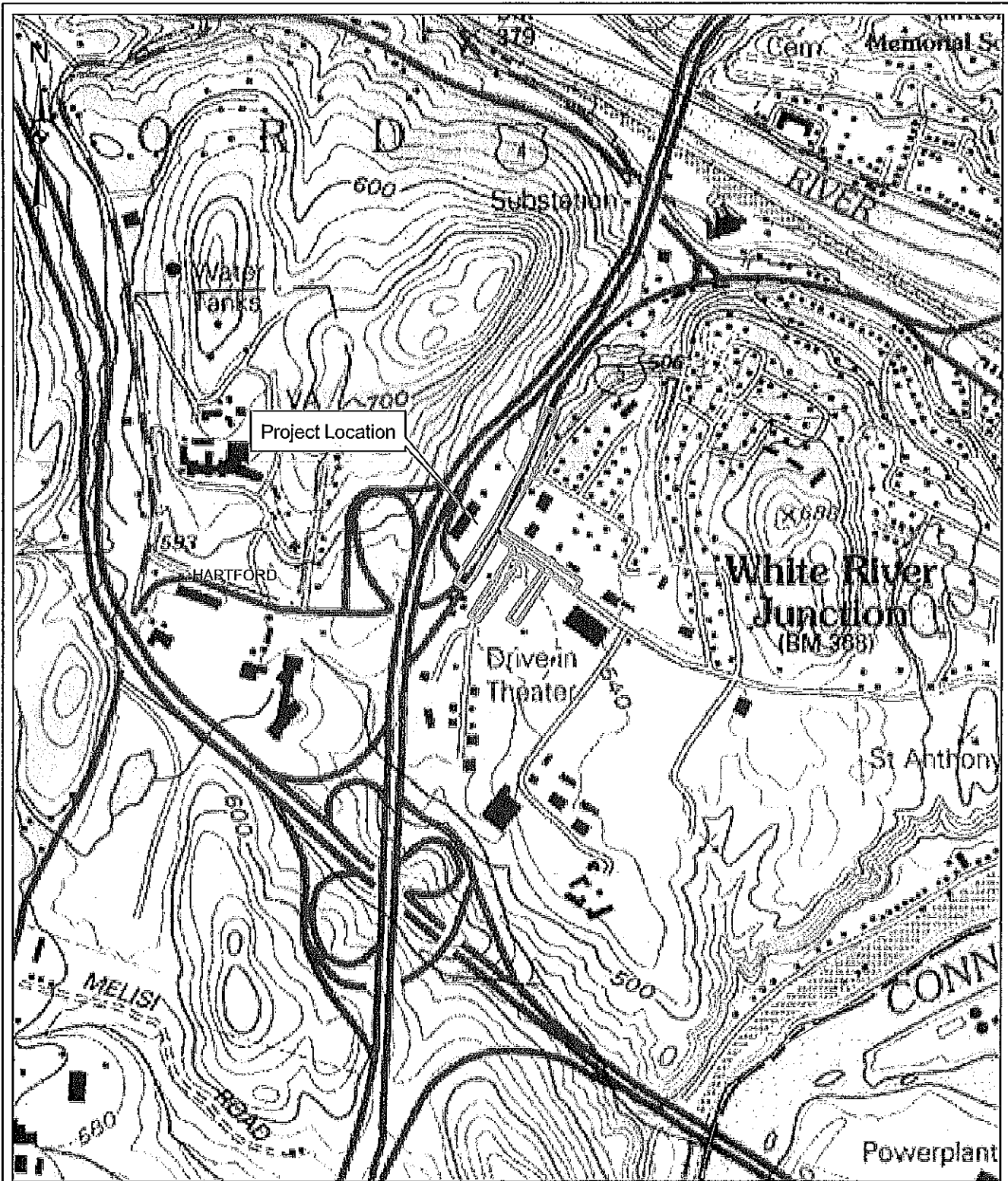
The purpose of this memorandum is to let you know that I have completed my review of the Conceptual Plans for this project dated January 29, 2004, and I have concluded that it will not impact wetlands, watercourses, and floodplains, species/habitats of special concern, farmlands, or fisheries. No further review will be required if the project is constructed as shown on the plans.

It is my understanding that this project involves the reconstruction of the intersection of US 5 and Sykes Avenue in an urbanized area of the Town of Hartford. Included in the project is the construction of two roundabouts. One will be constructed at the intersection of US 5 and Sykes Avenue, and the other will be constructed at the intersection of Sykes Avenue and Ralph Lehman Road. Also included in the project are new pavement, drainage, curbing, and traffic signals.

Hartford STP 0113(59)S
Categorical Exclusion Environmental Analysis

Attachments

- 1) USGS Locus
- 2) Water Resources Figure
- 3) Wildlife Resources Figure
- 4) Farmland Figure
- 5) Hazardous Materials Figure
- 6) Vermont Division of Historic Resources Clearance letter dated June 2, 2000.
- 7) Archaeological Resources Letter Report dated November 16, 2006
- 8) Historical Resources letter Report dated November 20, 2006
- 9) Layout Plans Dated April 7, 2009

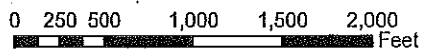



1 inch = 1,000 feet

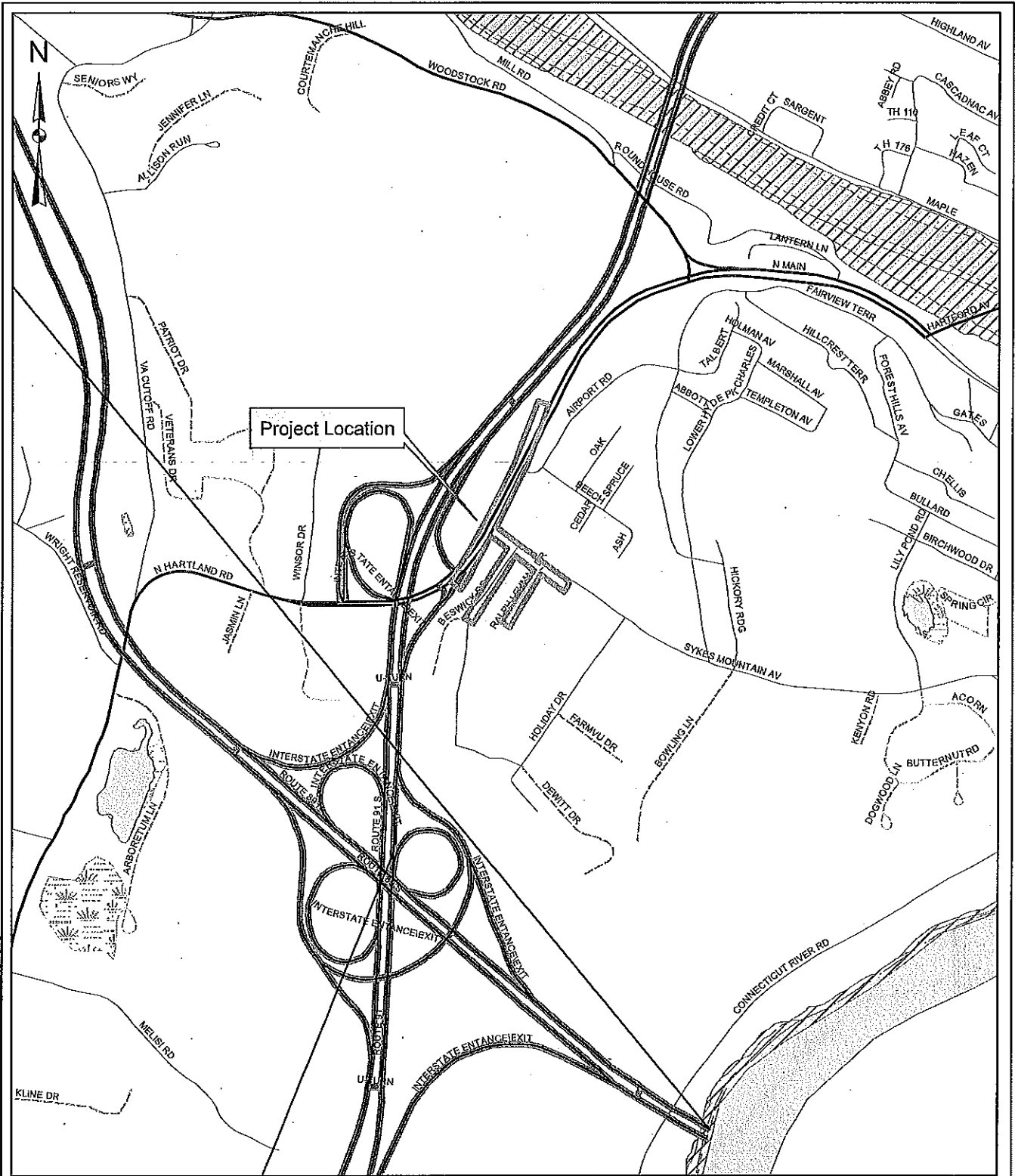
LOCUS

VTRANS
HARTFORD, VERMONT
**US ROUTE 5 AND SYKES MOUNTAIN AVE
INTERSECTION IMPROVEMENTS**

SCALE: AS SHOWN	DATE: MAY, 2009	FIGURE: 1
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 McFarland Johnson



1 inch = 1,000 feet

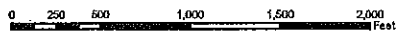
Legend

Floodplains
ZONE

- 0.2 PCT ANNUAL CHANCE FLOOD HAZARD
- A
- AE
- X
- Waterbodies

Vermont Significant Wetland Inventory
Vermont Class

- Two
- Three



VTRANS
HARTFORD, VERMONT

US ROUTE 5 AND SYKES MOUNTAIN AVE
INTERSECTION IMPROVEMENTS

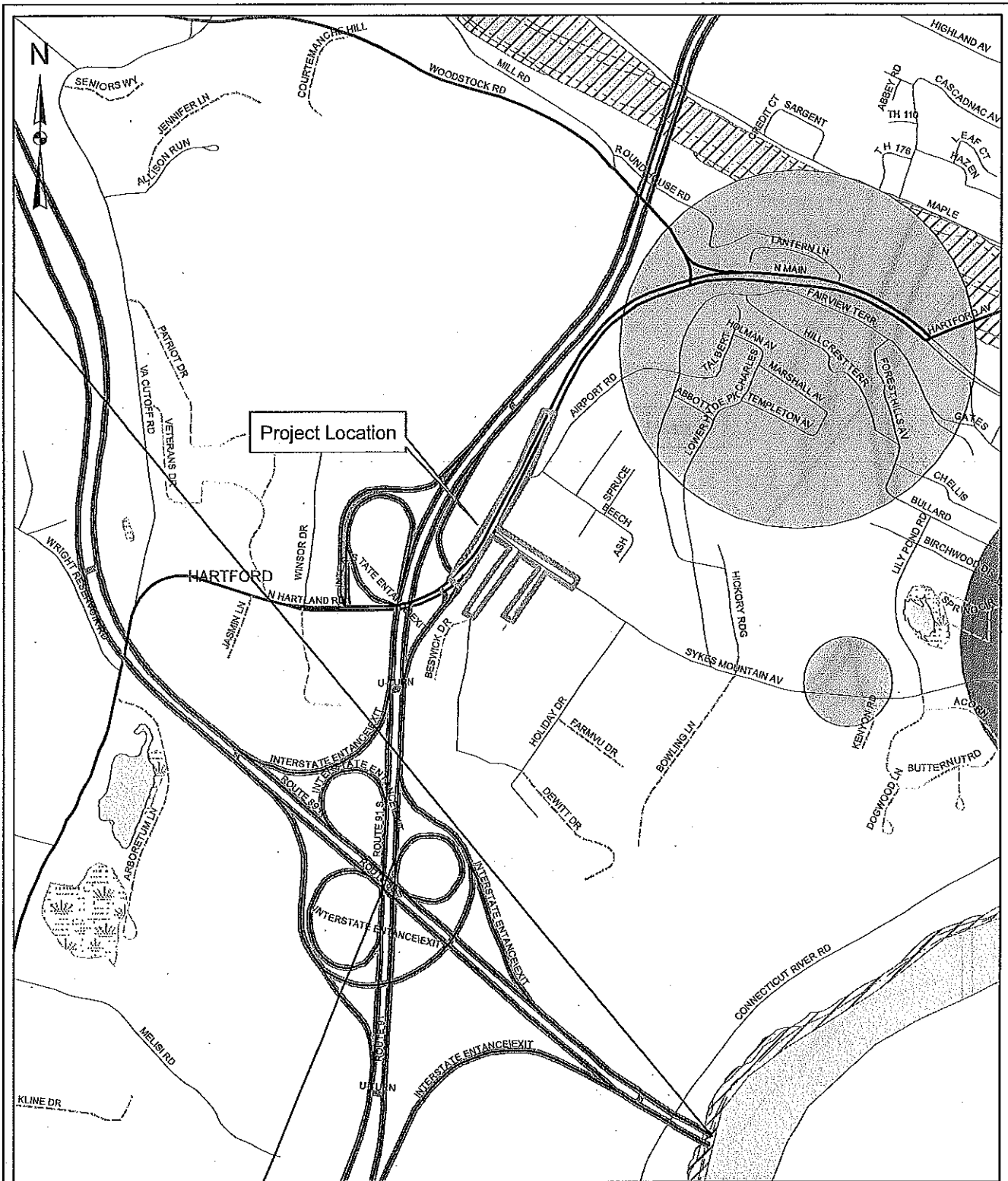
SCALE:
AS SHOWN

DATE:
MAY, 2009

FIGURE:
WATER RESOURCES

McFarland Johnson

Path



1 inch = 1,000 feet

Legend

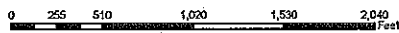
- Deer Wintering Habitat
- Vermont Significant Wetland Inventory
- Rare Species**
- Animal
- Natural Community
- Plant
- Vermont Class**
- Two
- Three

VTRANS
HARTFORD, VERMONT

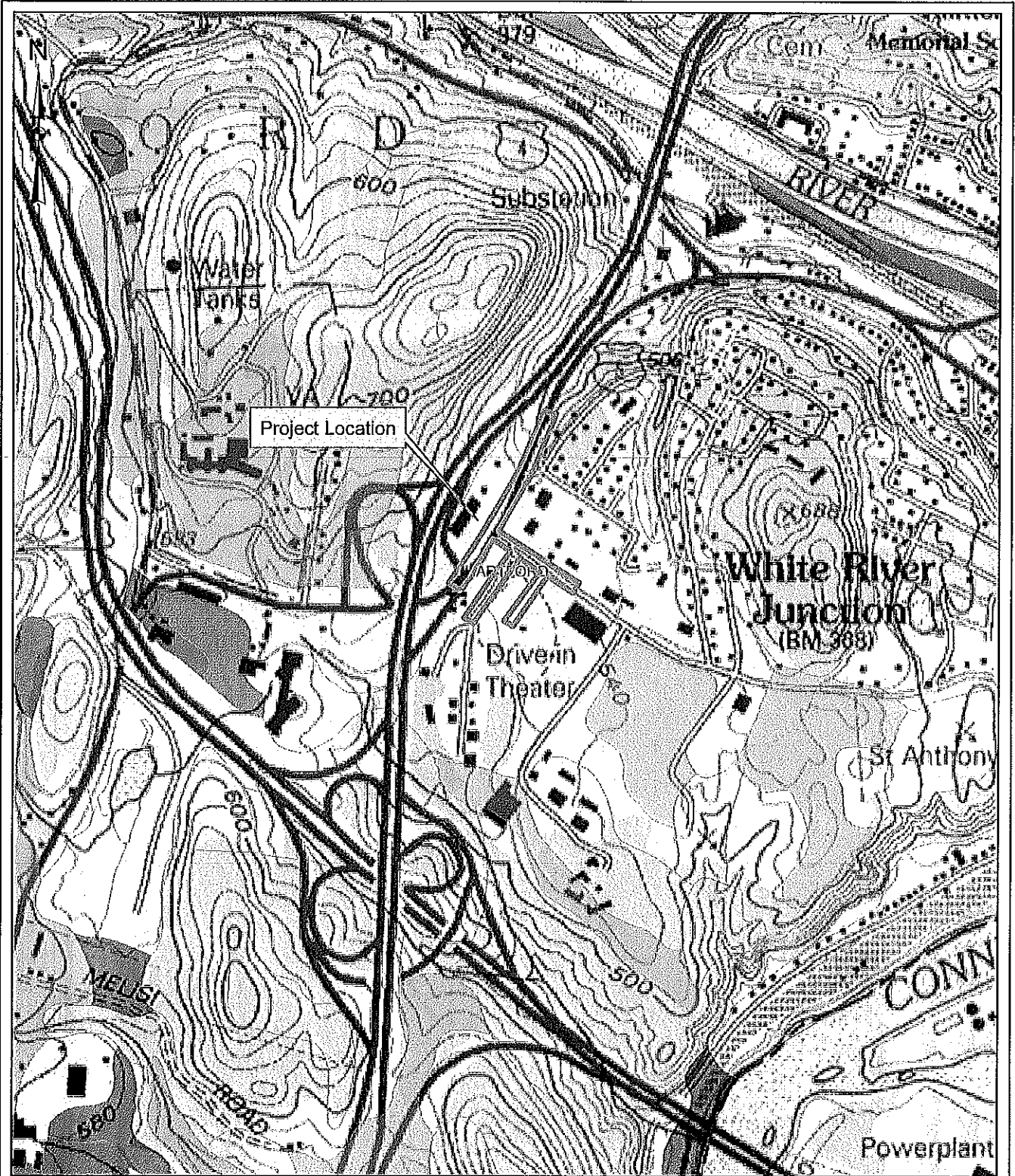
**US ROUTE 5 AND SYKES MOUNTAIN AVE
INTERSECTION IMPROVEMENTS**

SCALE: AS SHOWN	DATE: MAY, 2009	FIGURE: MILDLIFE RESOURCES
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McFarland Johnson








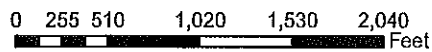
Path




1 inch = 1,000 feet

Farmland Soils

-  Not Prime or Statewide
-  Prime
-  Prime (b)
-  Statewide
-  Statewide (b)



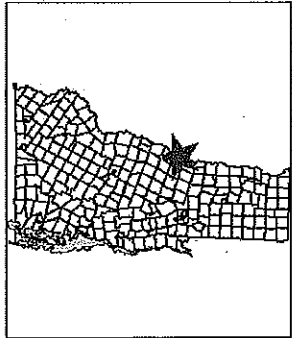
<p>VTRANS HARTFORD, VERMONT</p>		
<p>US ROUTE 5 AND SYKES MOUNTAIN AVE INTERSECTION IMPROVEMENTS</p>		
<p>SCALE: AS SHOWN</p>	<p>DATE: MAY, 2009</p>	<p>FIGURE: FARMLAND</p>
 McFarland Johnson		



ANR Environmental Interest Locator

Vermont Agency of Natural Resources (ANR)

Hartford STP 0113(59)S HazMat



Legend

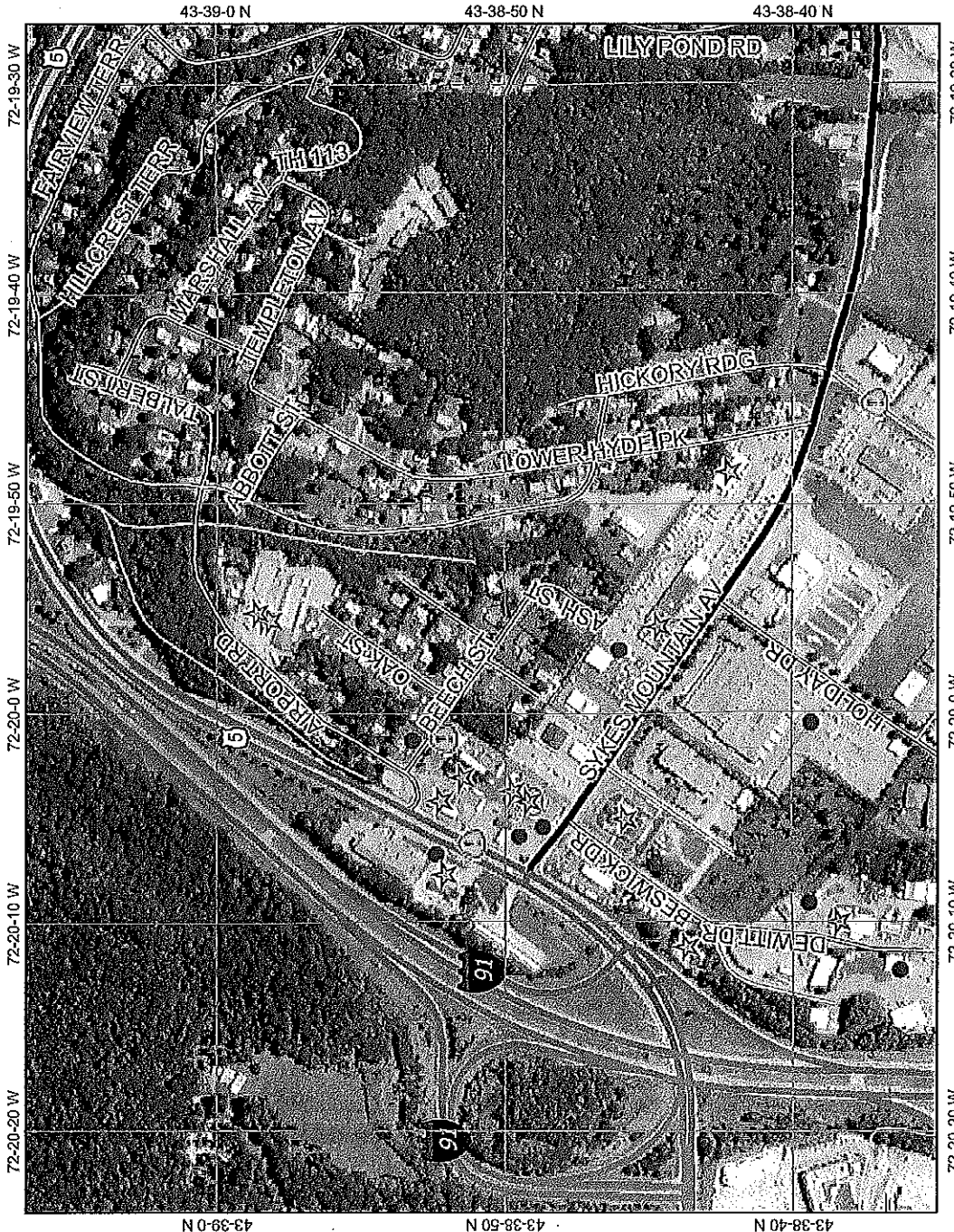
- Brownfields
- Hazardous Waste Site
- Underground Storage Tank
- Roads**
- US Highway
- Vermont State Highway
- Class One
- Light Trail
- Emerging U-Turn Area
- Proposed Class Two
- Proposed Class Three
- Proposed Vermont State Highway
- Proposed US Highway
- Discontinued Interstate
- Class Three
- Class Four
- Sidelational Forest Highway
- Military Road (No Public Access)
- Private Road
- Hydrography Lakes and Ponds (VHD 6K)
- Hydrography (VHD 6K)
- VT County Boundary (No Fill)
- NAIP Color Orthophotos
- VT State Boundary (Fill)

VT State Plane Meters (NAD83)



Scale: 1:6,853

5/6/09



Map center: 513547, 127483

DISCLAIMER: This map is for general reference only. Data layers that appear on this map may or may not be accurate, current, or otherwise reliable. VCGI and the State of Vermont make no representations of any kind, including but not limited to the warranties of merchantability or fitness for a particular use, nor are any such warranties to be implied with respect to the data on this map.

URL: http://maps.vermont.gov/imf/sites/ANR_NATRESViewer/jsp/launch.jsp



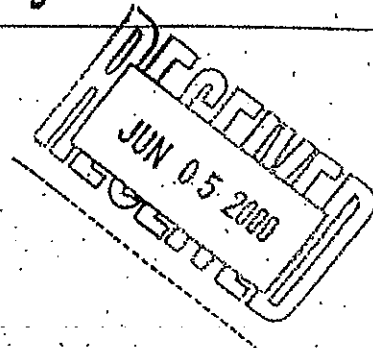
State of Vermont
Agency of Transportation
National Life Building
Drawer 33
Montpelier, VT
05633-5001

VTrans Working to Get You There

June 2, 2000

Ms. Emily Wadhams
State Historic Preservation Officer
Vermont Division for Historic Preservation
Drawer 20, National Life Building
Montpelier, Vermont 05620-0501

RECEIVED
JUN 6 2000
TECHNICAL
SERVICES



Re: Hartford STP 0113(59)S

Dear Emily:

In order to assist the Federal Highway Administration in complying with Section 106 of the National Historic Preservation Act of 1966 and its amendments, the Vermont Agency of Transportation (VAOT) has reviewed this undertaking according to the standards set forth in 36 C.F.R., regulations established by the Advisory Council on Historic Preservation to implement Section 106. Project review consists of identifying the project's potential impacts to historic buildings, structures, districts, landscapes, and settings, and to known or potential archeological resources.

This project involves improvements to Sykes Avenue, Beswick Road and Ralph Lehman Drive in Hartford. The work will include road reconstruction with widening, drainage improvements, sidewalk and curb construction, and signalization.

An archeological review determined that there are no properties of archeological significance located within the area of potential effect.

The project is located in a commercial area near Exit 11 off Interstate 91. There are several restaurants, a gas station, and a hotel within the project area. None of these buildings appear more than 50 years old, and therefore they are not eligible for the National Register of Historic Places.

After reviewing this proposal we have determined that this project qualifies for the category of "No Historic Properties Affected." No buildings, structures, districts or archeological resources listed on or eligible for the National Register of Historic Places are located in the area of potential effect.

According to our standard practice, all waste, borrow, fill, and staging areas lying outside the project area will require review by the Agency of Transportation's archeologist and clearance

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Telecommunications Relay Service 1-800-253-0191

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from your office. The construction firm will supply information about the exact locations of these areas to the agency's archeologist, and this provision will be part of the "Special Provisions" section of any construction contract.

If you agree with these findings, please affix your concur stamp to this letter.

Sincerely,
John H. Perkins, PE
Director of Technical Services Division

Scott Gurley

By Scott Gurley, Historic Preservation Specialist
Technical Services Division

SCG: hs
c: central files via John Narowski
May Sligh, VAOT Environmental Specialist
Jen Russell, VAOT Archeologist

Attachments: map
site plans
archeology summary sheet
photos

CONCUR

Emily Wadhams SHPO

Suzanne C. Gamble

DATE: 6-5-00

AGENCY OF TRANSPORTATION

OFFICE MEMORANDUM

TO: Scott R. Dillon, Division for Historic Preservation
FROM: Duncan C. Wilkie, Transportation Archaeologist-VAOT
DATE: May 26, 2000
SUBJECT: ARCHAEOLOGICAL ISSUES ONLY, Project Hartford STP 0113(S)

In the May 26, 2000 meeting, Scott Dillon, representing the Division of Historic Preservation, reviewed the above project with the Transportation Archaeologist(s) and agreed to the following:

- That the background search and/or field visit for archaeological resources is adequate for the above project.
- That the Resource Identification of the project area (APE) conducted by _____ is adequate to identify archaeological resources.
- That the above project undertaking will have "NO POTENTIAL TO CAUSE EFFECTS" on identified archaeological resources. ("New regulations"-Section 106)
- Division for Historic Preservation agrees that the above referenced project has "NO ARCHAEOLOGICAL PROPERTIES AFFECTED" in the project area (APE = area of potential effect).
- That the above referenced project will have "NO ARCHAEOLOGICAL PROPERTIES ADVERSELY AFFECTED" that are listed on or eligible for inclusion in the National Register of Historic Places.
- That the above referenced project will "ADVERSELY AFFECT ARCHAEOLOGICAL PROPERTIES".
- Archaeological resources of the Staging, Borrow, and Waste Areas for this project will be addressed in the construction contract as part of the "special conditions", and the construction company will hire a qualified professional archaeologist to evaluate these areas.
- The _____ archaeological report has been reviewed by VAOT and DHP, and accepted. The following comments (See page 2) by DHP and in the review should be addressed in the final report.
- The following additional condition(s) or comments from DHP will be met for this project: (See below and page 2)

----- (see page 2 for additional conditions) -----
There are potential historic buildings and structures issues that need following up.

R. Dillon 5/26/00
(Concur, Scott Dillon, Div. for Hist. Pres.) (date)



ARCHEOLOGICAL ASSOCIATES, INC.
CULTURAL RESOURCE SPECIALISTS
PO BOX 81 • PUTNEY, VERMONT 05346

Darren Benoit
McFarland-Johnson, Inc.
10 Ferry Street, Unit 11, Suite 210
Concord, New Hampshire 03301-5022

RE: Letter Report of Site Visit
Storm Water Detention Basin
Town of Hartford, Windsor County
HAA #V444

Dear Darren,

November 16, 2006

This letter describes the results of a site visit on November 6, 2006 to the site of a proposed storm water detention basin associated with two proposed roundabouts in the Town of Hartford, Windsor County, Vermont (Fig. 1). The project proposes to construct a storm water detention basin on a narrow parcel between US Route 5 and I-91 on the western edge of White River Junction (Fig. 2). The parcel is approximately 122 meters (400 ft) north to south and 30 meters (100 ft) east to west and the southern end narrowing to a point at the north. The parcel is bisected by a drainage ditch that extends from the south to the north through the middle of the project area (Fig. 3).

Site Visit

A site visit to the project area on November 6, 2006 examined the project area of potential effect (APE) for areas of archeological sensitivity. The following observations were made:

- The project APE is generally sloped to the middle drainage ditch that empties to the north.
- A drain pipe empties into the ditch from the southwest.
- Several trees are planted in a row along the eastern side of the parcel.
- Soil cores taken throughout the project area encountered 10 to 20 cm of dark grayish brown silty clay soil overlaying gravel.
- The soil in the project area is reported to be Windsor fine sandy loam.

These observations indicate substantial disturbance to the APE, probably due to filling and grading. The gravel encountered in the soil cores is not naturally occurring in Windsor fine sandy loam and is probably fill placed to stabilize the drainage when US Route 5 was upgraded and I-91 was constructed. The conditions observed indicate a very low potential for intact archeological deposits. No further review is recommended for this project area.

Sincerely,

A handwritten signature in cursive script, appearing to read "Thomas R. Jamison".

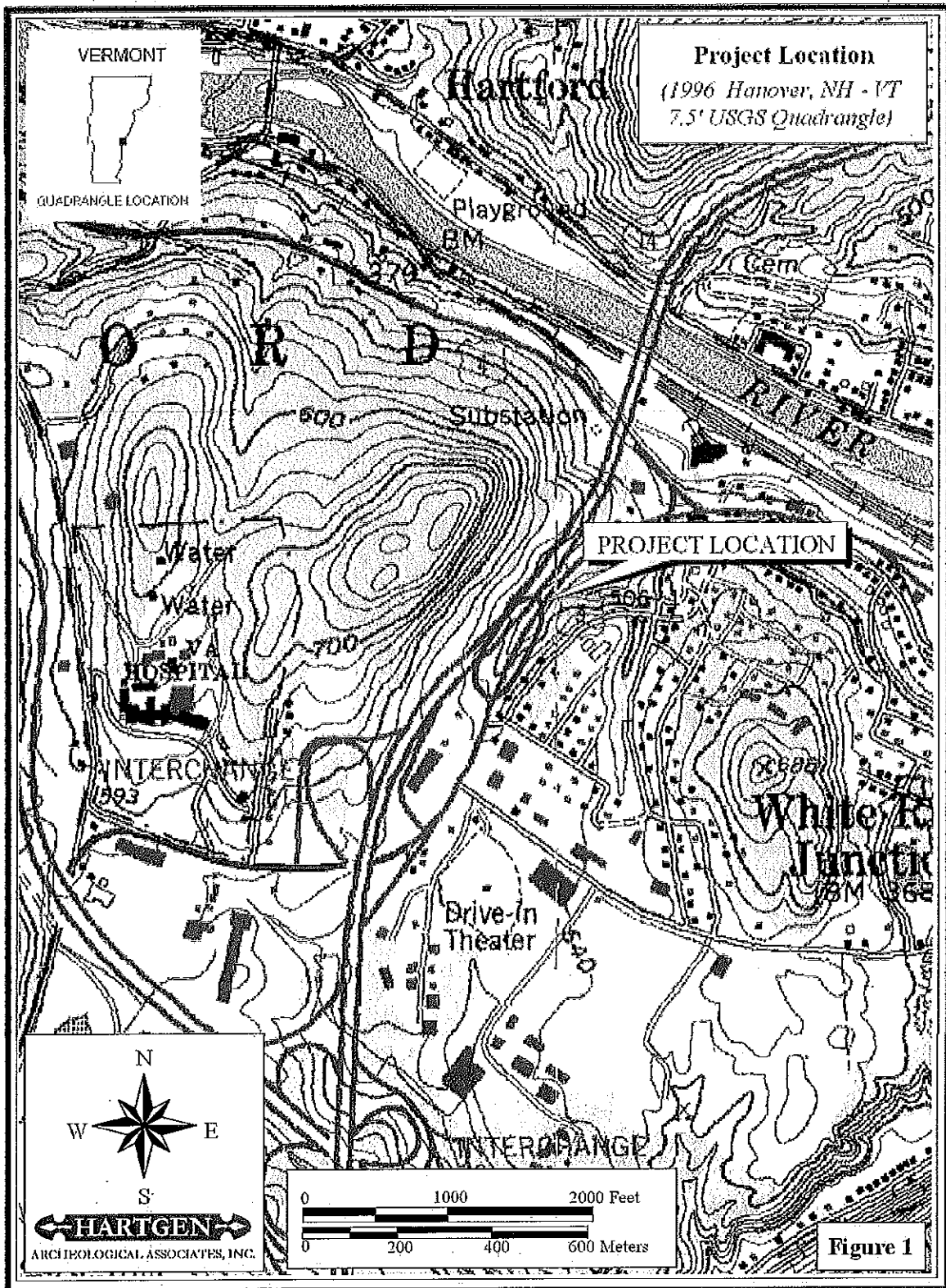
Thomas R. Jamison, Ph.D.
Project Manager

CERTIFIED DBE/WBE IN VERMONT, NEW YORK, NEW JERSEY, MAINE, NEW HAMPSHIRE,
MASSACHUSETTS, CONNECTICUT, PENNSYLVANIA, MARYLAND, AND NEW YORK CITY AGENCIES

TELEPHONE (802) 387-6020

Email: tom@hartgen.com

FAX (802) 387-8524



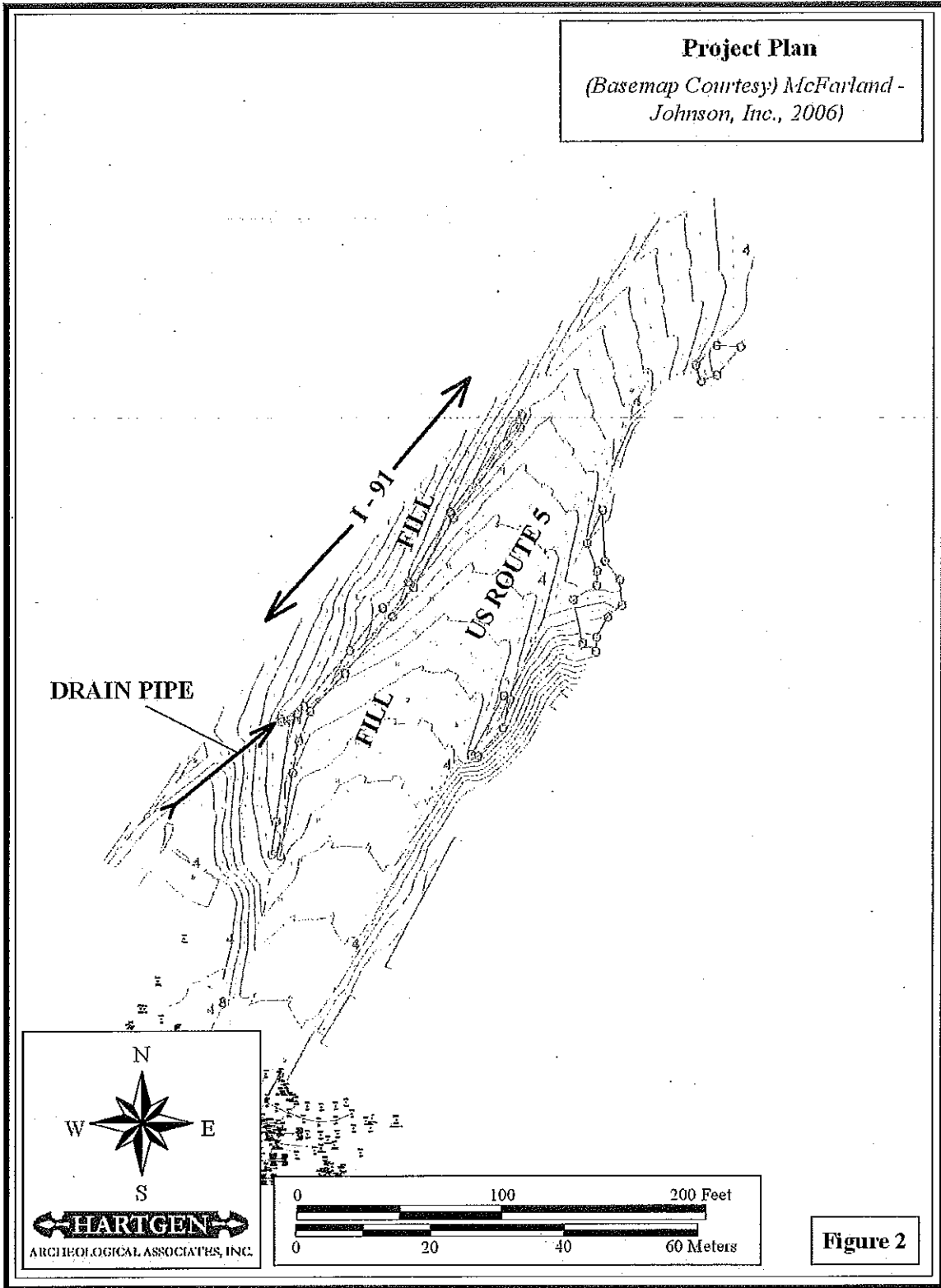




Figure 3. Project area viewed from the north. Note line of trees and landscaped slope on the left and drainage ditch on the right with I-91 beyond.



ARCHEOLOGICAL ASSOCIATES, INC.
CULTURAL RESOURCE SPECIALISTS
PO BOX 81 • PUTNEY, VERMONT 05346

Darren Benoit
McFarland-Johnson, Inc.
10 Ferry Street, Unit 11, Suite 210
Concord, New Hampshire 03301-5022

RE: Letter Report of Site Visit
Storm Water Detention Basin
Town of Hartford, Windsor County
HAA #V444

Dear Darren,

November 20, 2006

This letter describes the results of a site visit on November 6, 2006 to the site of a proposed storm water detention basin associated with two proposed roundabouts in the Town of Hartford, Windsor County, Vermont (Fig. 1). The project proposes to construct a storm water detention basin on a narrow parcel between US Route 5 and I-91 on the western edge of White River Junction (Fig. 2). The parcel is approximately 122 meters (400 ft) north to south and 30 meters (100 ft) east to west and the southern end narrowing to a point at the north. The parcel is bisected by a drainage ditch that extends from the south to the north through the middle of the project area (Fig. 3).

Site Visit

A site visit to the project area on November 6, 2006 examined the project area of potential effect (APE) for areas of archeological sensitivity. The following observations were made:

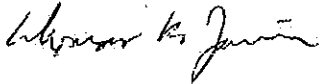
- The project APE is generally sloped to the middle drainage ditch that empties to the north.
- A drain pipe empties into the ditch from the southwest.
- Several trees are planted in a row along the eastern side of the parcel.
- Soil cores taken throughout the project area encountered 10 to 20 cm of dark grayish brown silty clay soil overlaying gravel.
- The soil in the project area is reported to be Windsor fine sandy loam.

These observations indicate substantial disturbance to the APE, probably due to filling and grading. The gravel encountered in the soil cores is not naturally occurring in Windsor fine sandy loam and is probably fill placed to stabilize the drainage when US Route 5 was upgraded and I-91 was constructed. The conditions observed indicate a very low potential for intact archeological deposits.

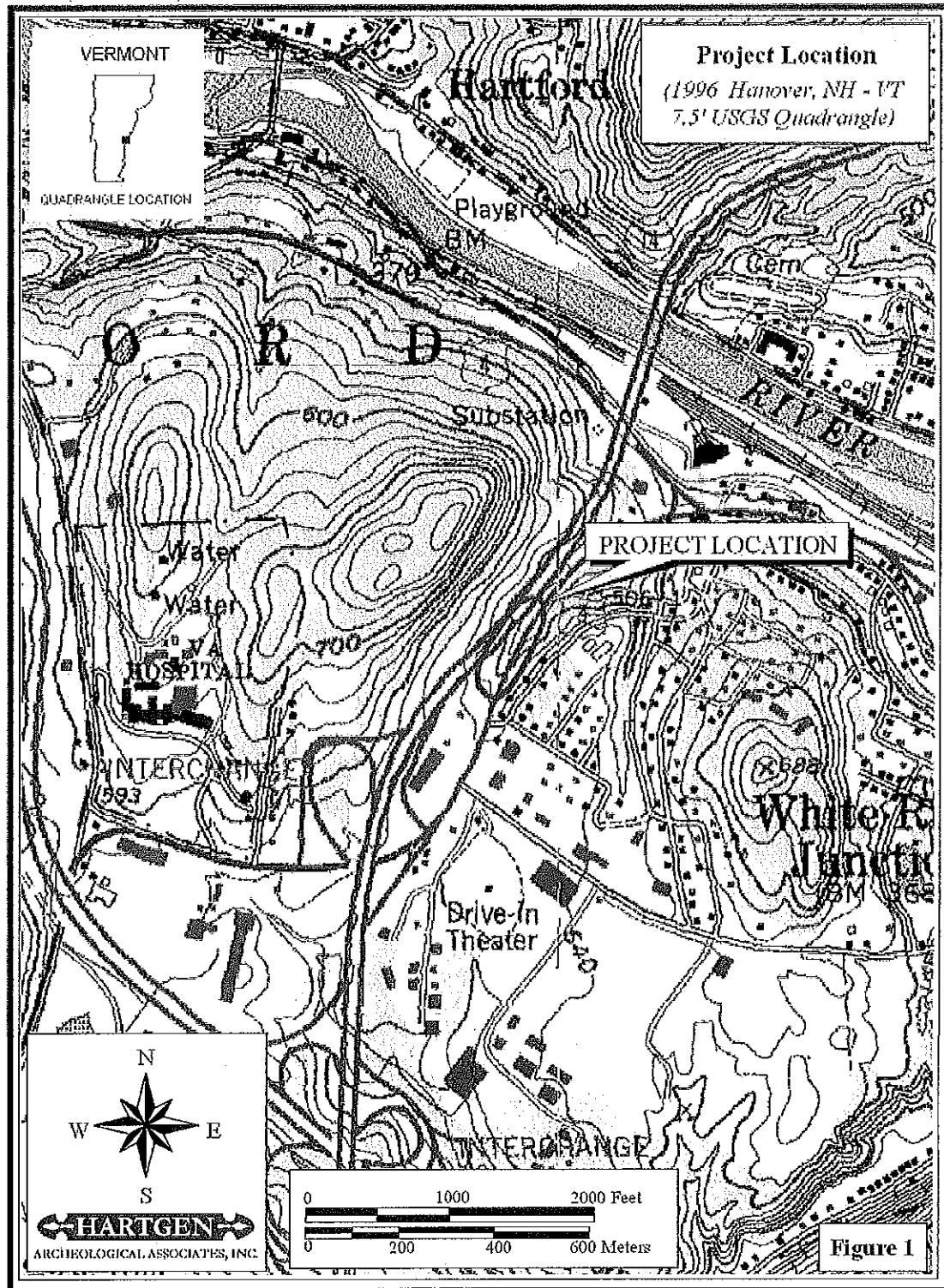
There are no National Register (NR) or State Register (SR) listed historic properties within the project APE for direct or visual effects. The NR listed White River Junction Historic District is located approximately 1.2 kilometers (4000 ft) to the east and a few other NR or SR properties are located within 1.6 kilometers (1 mi) of the APE. However, the project area is not visible from any of these properties. The immediate surroundings of the project are built up with recently constructed highways, shopping plazas, gas stations, motels and stores. None of the structures visible from the property are listed or eligible for listing on the NR or SR.

Due to the highly disturbed and built up surroundings of the project area, no further review is recommended for this project area. If project plans change to affect other areas, further review is recommended.

Sincerely,



Thomas R. Jamison, Ph.D.
Project Manager



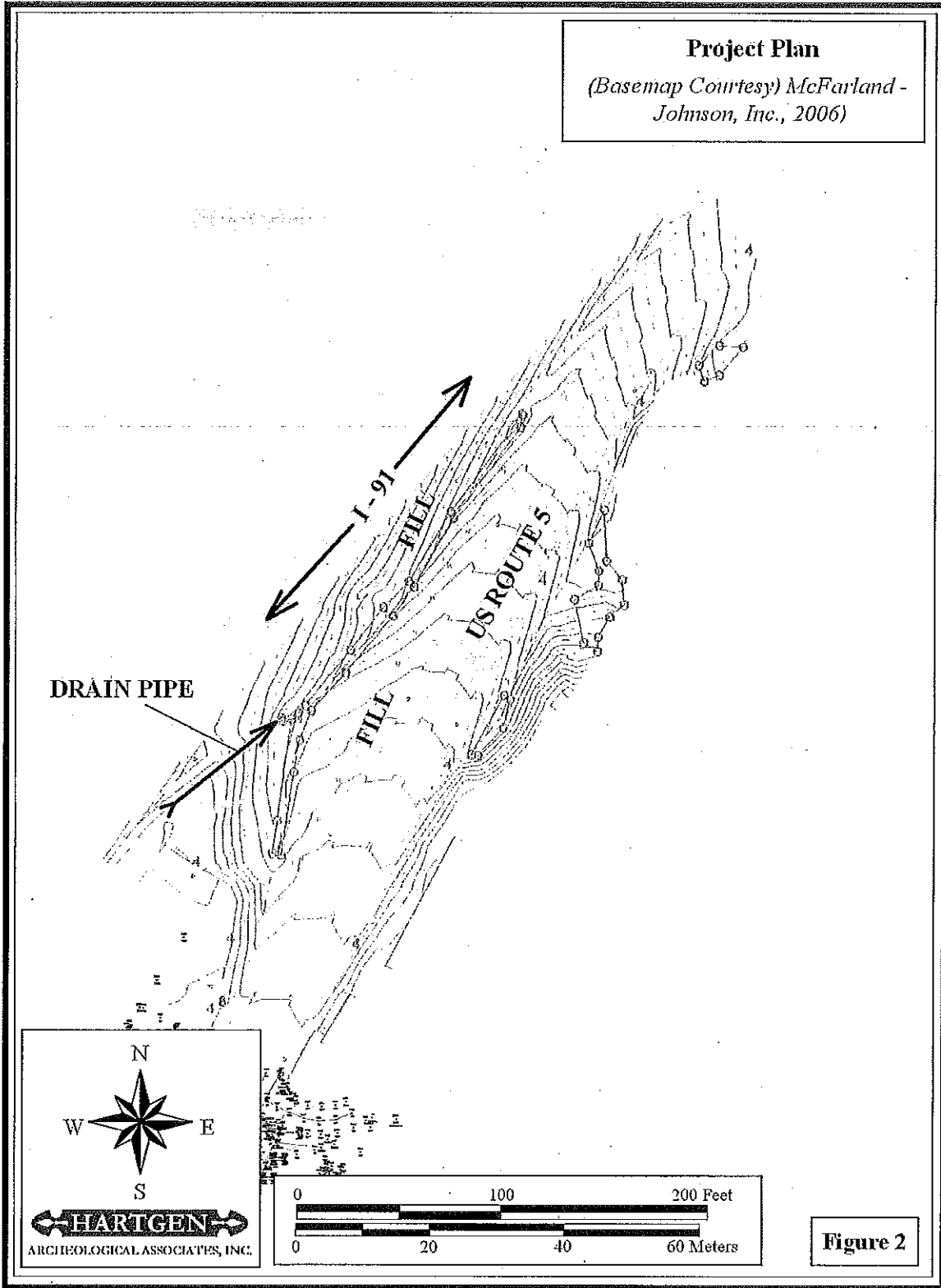




Figure 3. Project area viewed from the north. Note line of trees and landscaped slope on the left and drainage ditch on the right with I-91 beyond.

Project: Hartford STP 0113 (59) S & STP EH09(15)
Advertised Date: 02/28/2020

EXCAVATION AND DISPOSAL OF CONTAMINATED SOILS AND GROUNDWATER

1. DESCRIPTION. This work shall consist of excavating and properly disposing of contaminated soils from roadways, sidewalks, and stormwater treatment facilities in reasonably close conformity with the lines, grades, and typical cross sections shown on the Plans or established by the Engineer. The work shall include proper identification, classification, excavation, removal, treatment, transportation, disposal and final placement of the contaminated soils. The Contractor shall engage the services of a qualified environmental consultant to develop and implement a soil management plan and to coordinate plan review and approval with the Vermont Agency of Natural Resources (ANR), Department of Environmental Conservation (DEC), Sites Management Section (SMS) if contaminated soils are encountered on the project.

This work may also include management, treatment, and disposal of contaminated groundwater, if encountered.

The work to be performed near the existing gas stations in the area may contain unknown locations of contaminated soils.

2. CLASSIFICATION. The work shall be classified as follows:

- (a) Petroleum Contaminated Soils (Class I). Petroleum contaminated soils will be classified in accordance with the latest edition of the, *Investigation and Remediation of Contaminated Properties Procedure* Vermont Agency of Natural Resources (ANR Guidelines). All efforts should be made to minimize the volume of contaminated soil destined for disposal.

- (1) Petroleum contaminated soils requiring on-site or off-site remediation shall be identified as Class I Contaminated Soils, defined as follows:

Class I contaminated soils exhibit a volatile organic compound (VOC) concentration ranging from 20 to 100 parts per million (ppm) for gasoline contaminated soil, and a concentration ranging from 10 to 100 ppm for heating oil contaminated soil, as measured by a properly calibrated photo ionization detector (PID) following the field screening guidelines outlined in the ANR Guidelines.

The ANR Guidelines can be found at the following website address:
<http://dec.vermont.gov/waste-management/contaminated-sites/guidance>

For information regarding the remediation and/or disposal plan, VTrans Hazardous Materials and Waste Coordinator must be contacted. The information provided to the Contractor by the Hazardous Materials and Waste Coordinator is presented in good faith and is not intended to be a substitute for any investigation that the Contractor may conduct on their own. The Contractor is encouraged

to conduct an investigation to define the degree and extent of soil and groundwater contamination in an effort to establish the parameters of the required remediation and/or disposal plan.

- (b) Contaminated Groundwater. If contaminated groundwater is encountered and must be dewatered to complete construction of subsurface infrastructure, the Contractor shall engage an environmental consultant to develop and implement a wastewater management plan. The wastewater management plan shall be submitted to, and approved by, ANR and the municipality in conjunction with the Engineer.

The wastewater management plan shall include storage, sampling, monitoring, and treatment methods for contaminants of concern. Contaminated groundwater shall be stored in container(s) constructed of materials compatible with the contaminants encountered. Additionally, the container(s) shall be of adequate volume to store all contaminated groundwater generated during dewatering efforts. A FRAC Tank with a minimum capacity of 18,000 gallons is commonly used for excavation dewatering storage and is considered to meet the storage requirements above.

The sampling and monitoring methodology will be dependent on the treatment method selected. Treatment methods include reinjection, carbon filtration, air stripping, fractionation tank storage, and carbon filtration, or disposal at a wastewater treatment plant.

If treated wastewater is destined to be discharged to surface water, the engaged consultant shall apply for and receive a wastewater discharge permit (General Permit 3-9004). The permit application shall be reviewed and authorized by the Agency of Natural Resources and the municipality prior to implementation.

All contaminated groundwater shall be managed, stored, treated, and/or disposed in accordance with ANR *Guidance for Construction of Public Works Projects in Areas Where Contamination is Suspected or Known*.

This guidance can be found at the following website address:
http://dec.vermont.gov/sites/dec/files/documents/waterline_guide.pdf

For information regarding guidance in developing the remediation and/or disposal plan, the Contractor shall contact the Agency of Natural Resources, Waste Management Division.

3. GENERAL CONSTRUCTION REQUIREMENTS. The Contractor's consultant shall develop a contaminated soil management and disposal plan for review and approval from SMS or submit an alternate plan which must be approved by SMS and the Engineer prior to implementation.

Unless otherwise directed in writing by the Engineer, the Contractor shall comply with all provisions of the contaminated soil management and disposal plan.

All changes to the remediation/disposal plan ordered in writing by the Engineer will be paid for as Extra Work.

The Contractor shall hire a qualified consultant who shall prepare a site specific Health & Safety Plan, train site workers, monitor contamination levels of excavated soils, and ensure that the remediation/disposal plan is followed. Complete copies of the details of the plan and program shall be provided to the Engineer.

The Agency's Hazardous Materials and Waste Coordinator, or his/her representative, may also monitor the contamination levels of the excavated soils for the Engineer and ensure that the contaminated soil management and disposal plan is fully followed.

If during the excavation of petroleum contaminated soil, the Contractor encounters any condition or situation which is different from that expected, the Contractor shall immediately notify the Engineer. All excavation operations in the contaminated area shall cease until the condition or situation can be evaluated. The evaluation shall include, but is not limited to, the determination of health or other hazards to the Contractor's personnel and the immediate neighborhood, the possibility of explosion, requirements for protective clothing, and special excavation or transportation requirements.

In the event that unidentified hazardous waste or contaminated soils are encountered during construction beyond those areas identified in the plans, the Contractor shall excavate and properly dispose of the contaminated soils as necessary and be compensated under the same Contract items applied to those areas of identified contamination.

All compensation for groundwater management requirements will be made under a Supplemental Agreement in accordance with Subsection 109.06.

The Engineer will decide whether to leave the excavation open and exposed, whether barrier fence shall be erected around the excavation to act as a visible barrier, or whether to backfill it while the Agency and the Contractor are evaluating the situation and negotiating the Supplemental Agreement(s). The cost of installing barrier fence or backfilling the area, if either is required, will be included in the Supplemental Agreement(s).

No additional compensation or allowance for additional Contract time will be made for any delays incurred waiting for an agreement(s) to be executed, for failure to make an agreement(s), nor for any delays incurred in executing the remediation and/or disposal plan(s).

4. METHOD OF MEASUREMENT. The quantities of Special Provision (Excavation of Petroleum Contaminated Soils, Class I), Special Provision (Excavation of Petroleum Contaminated Soils, Class II), and Special Provision (Excavation of Contaminated Soils, Class III) to be measured for payment will be the number of cubic yards of material removed and designated for remediation and/or disposal, as is indicated on the Plans or as directed by the Engineer, as measured in its original position by cross sections, in the complete and accepted work. The quantity shall be computed by the method of average end areas, or when impractical, by other accepted methods involving three-dimensional measurement. The limits for payment shall not exceed those indicated on the Plans or designated by the Engineer in writing. The method of mass centers for computing volumes

will be allowed only when the method has been used in the original design computations.

Excavation requiring more than one handling prior to final placement will not be measured for payment for the additional handling unless specifically called for in the Contract Documents.

5. BASIS OF PAYMENT. The accepted quantities of Special Provision (Excavation of Petroleum Contaminated Soils, Class I), Special Provision (Excavation of Petroleum Contaminated Soils, Class II), and Special Provision (Excavation of Contaminated Soils, Class III) will be paid for at the Contract unit price per cubic yard. Payment shall be full compensation for performing the work specified, including research; employee training; monitoring; and developing and complying with the Health and Safety Plan; classifying, segregating, and stockpiling soil materials; performing any testing required; satisfactorily transporting and disposing of contaminated soils and for providing all materials, labor, tools, equipment, and incidentals necessary to complete the work.

Payment for contaminated soils re-used on the project will be made as follows:

- (a) The first payment of 50 percent of the actual quantity will be paid when the material is placed at the treatment site.
- (b) The remaining 50 percent of the actual quantity will be paid when the material has been incorporated back into the project.

Payment for contaminated soils not re-used on the project will be made as follows:

- (a) The first payment of 67 percent of the actual quantity will be paid when the material is placed at a treatment site or otherwise properly removed from the project.
- (b) The remaining 33 percent of the actual quantity will be paid when proper disposal in accordance with the remediation and/or disposal plan has been completed. The remaining 33 percent of the actual quantity will not be paid if proper disposal of the petroleum contaminated soil is not accomplished prior to Final Inspection.

Payment will be made under:

<u>Pay Item</u>	<u>Pay Unit</u>
900.608 Special Provision (Excavation of Petroleum Contaminated Soils, Class I)	Cubic Yard

Project: Hartford STP 0113(59)S & STP EH09(15)

Advertised Date: 02/28/2020

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 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, and one Topo shoe.
- (l) 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, will not be considered as a rover unit, and therefore will not require a rover, a bi-pod, 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.

- (a) The GNSS units shall be maintained and remain in service until either:
 - (1) a maximum of one week after the Engineer requests its removal in writing, or
 - (2) 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.

The Contractor shall build the required surface models and download them into the provided data collectors to facilitate construction inspection by the Engineer.

- (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 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. 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.

4. TRAINING REQUIREMENTS.

- (a) For all Construction Grade GNSS units, the Engineer and/or their representatives shall be provided with a minimum of two separate 8 hour minimum training sessions on the use and operation of the GNSS units during the first month of the Contract. One of the two classes shall occur within one week of delivery of GNSS units to the site. The second of the two classes shall occur at the request of the Engineer. If a Contract has multiple years of work, an additional 8 hour minimum 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.

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

6. 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, and maintenance as specified and required, 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.

Partial payments will be made as follows:

- (a) 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 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 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.
- (c) 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.

Payment will be made under:

<u>Pay Item</u>	<u>Pay Unit</u>
900.620 Special Provisions (GNSS Construction Inspection Equipment)	Each

Project: Hartford STP 0113(59)S & STP EH09(15)
Advertised Date: 02/28/2020

Street Light Assembly

1. DESCRIPTION. This work shall consist of furnishing and installing light-emitting diode (LED) luminaire fixtures, poles and foundations at the locations indicated in the Plans and as directed by the Engineer.

The work under these provisions shall be performed in accordance with these provisions, the Plans, Section 679 of the Standard Specifications and Item 900.620, Special Provision (Street Light Assembly).

2. REFERENCE STANDARDS.

(a) American National Standards Institute (ANSI).

- (1) C62.41 - Characterization of Surges in Low-Voltage (1000V and Less) AC Power Circuits
- (2) C78.377 - Specifications for the Chromaticity of Solid State Lighting Products
- (3) C82.SSL-1 - Operational Characteristics and Electrical Safety of SSL Power Supplies and Drivers
- (4) C83.77 - Harmonic Emission Limits - Related Power Quality Requirements for Lighting
- (5) C136.2 - Roadway and Area Lighting Equipment - Luminaire Voltage Classifications
- (6) C136-10 - Standard for Roadway Lighting Equipment, Locking-Type Photo Control Devices
- (7) C136-14 - Standard for Roadway Lighting, Enclosed Side-Mounted Luminaires for Horizontal Burning High Intensity Discharge Lamps
- (8) C136-22 - Standard for Roadway Lighting, Internal Labeling of Luminaires
- (9) C136-31 - Standard for Roadway Lighting Equipment Luminaire Vibration

(b) American Society for Testing and Materials (ASTM).

- (1) B117-03 - Standard Practice for Operating Salt Spray (Fog) Apparatus
- (2) D522-93a - Standard Test Methods for Mandrel Bend Test of Attached Organic Coatings
- (3) D714-87(94) - Standard Test Method for Evaluating Degree of Blistering of Paints

- (4) D1654-92 - Standard Test Method for Evaluation of Painted or Coated Specimens Subjected to Corrosive Environments
 - (5) D3359-97 - Standard Test Methods for Measuring Adhesion by Tape Test
 - (6) G7-05 - Standard Practice for Atmospheric Environmental Exposure Testing of Nonmetallic Materials: Testing for UV Resistance
- (c) International Electro-technical Commission (IEC).
- (1) IEC 60598 - Degrees of Protection Provided by Enclosures (IP Code)
- (d) Illuminating Engineering Society of North America (IESNA).
- (1) HB-93-2000 - IESNA Lighting Handbook - 9th Edition
 - (2) RP-8-00 - American National Standard Practice for Roadway Lighting
 - (3) RP-16-96 - Nomenclature and Definition
 - (4) DG-19 - Design Guide for Roundabout Lighting
 - (5) LM-31-95 - Photometric Testing of Roadway Luminaires Using Incandescent Filament and High Intensity Discharge Lamps
 - (6) LM-50-99 - Photometric Measurements for Roadway Lighting Installations
 - (7) LM-63-95 - Standard file format for Electronic Transfer of Photometric Data
- (e) National Fire Protection Association (NFPA).
- (1) 70 - National Electrical Code
 - (2) 502 - Standards for Road Tunnels, Bridges, and Other Limited Access Highways, 2004
- (f) National Electrical Manufacturers Association (NEMA).
- (1) 250 - Enclosures for Electrical Equipment
- (g) Underwriter's Laboratories Inc. (UL) Publications.
- (1) 467 - Grounding and Bonding Equipment
 - (2) 1029 - High Intensity Discharge Lamp Ballasts
 - (3) 1598 - Standard for Luminaires
 - (4) 8750 - Light-Emitting Diode (LED) Equipment for Use in Lighting Products

(5) IEUR - Guide Information for Luminaire Poles

3. SUBMITTALS.

- (a) Product Data. For each luminaire and pole, arranged in the order of lighting unit designation. Include data on features, accessories, finishes, and the following:
- (1) Physical description of fixture and pole, including dimensions and verification of indicated parameters.
 - (2) Luminaire weight, effective projected area, details of attaching luminaires, accessories, and installation and construction details.
 - (3) Manufacturer's recommended replacement parts list.
 - (4) Description, operating characteristics, electrical data, component/capacitor temperature rating, and reliability testing report for the LED Driver/Power Supply from an independent laboratory including mean-time-between-failure (MTBF).
 - (5) LEDs and Printed Circuit Board Construction.
 - (6) LED type, ratings, and description including heat dissipation design indicating margin between the maximum rated LED junction temperature and the junction temperature at operating current.
 - (7) Light Loss Factors (lumen depreciation as a function of operating current, temperature and operating hours): Provide measurement bases for these factors.
 - (8) Photometric report illustrating iso-illuminance for the project mounting height, classification type, and cutoff characteristic. All photometric files presented shall be prepared and certified by an independent testing laboratory.
 - (9) Independent laboratory IESNA LM-79 and LM-80 Reports.
 - (10) Copy of the 3G vibration test report completed using the procedure defined by ANSI C136.31-2001 American National Standard for Roadway Lighting Equipment - Luminaire Vibration. One exception to the procedure is that only one luminaire may be used during the complete test. All costs associated with the shipping and testing shall be at the Contractor's expense. Determination of acceptability will be by the reviewing Engineer.
 - (11) All components shall be submitted with a list of all standards to which the product conforms.
 - (12) Submit catalog cuts and manufacturer's drawings. Mounting bolt templates keyed to specific arms and certified by manufacturer.

- (13) Wiring diagrams for power and control wiring.
- (14) Coordination drawings including mounting and connection details, drawn to scale, for exterior luminaires, weight of the fixture inclusive of the LED Driver, and mounting and installation details drawn to scale illustrating the requirements for the ballast installation in the transformer base.
- (15) Operation and maintenance data for luminaires to include in maintenance manuals.
- (16) Provide a lighting calculation inclusive of Luminance, Illuminance, and Veiling Luminance on a grid as defined in ANSI/IESNA-RP-8-00.
- (17) Calculation(s) to be completed using the design drawings as the basis for the pole placement and mounting height. Calculations are to include average, maximum, minimum, maximum/minimum, and average/minimum for both initial and maintained luminance on an R3 roadway surface. Included with these calculations provide the veiling luminance ratio for each calculation. All maintained calculations are to include a light loss factor (LLF) of 0.9. Included as part of the lighting calculations, the fixture manufacturer shall provide their recommended Luminaire Dirt Depreciation Factor (LDD).
- (18) Submit special warranties as specified in this Section.

4. QUALITY ASSURANCE.

- (a) Electrical components, devices, and accessories shall be listed and labeled as defined in NFPA-70, Article-100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.
- (b) Luminaires, inclusive of the LEDs and LED Driver compartments, shall be UL-1598 Wet Location listed and IP66 certified.
- (c) The Engineer reserves the right to request that one fixture from the project production lot be sent to a qualified testing facility for testing to confirm the 3G vibration testing data provided as part of the submittal process. As stated, only one luminaire may be used to illustrate conformance with the 3G testing procedure defined by ANSI C136.31-2001 American National Standard for Roadway Lighting Equipment - Luminaire Vibration. All costs associated with the shipping and testing shall be at the Contractor's expense. Determination of acceptability will be by the reviewing Engineer.
- (d) Luminaires including power supply shall be RoHS compliant and lead/mercury-free.

5. DELIVERY, STORAGE, AND HANDLING. Inspect equipment as received. Return for replacement any equipment damaged in shipment. Equipment shall be stored in a clean, dry, protected area. Retain packing as received from the factory until it is to be installed. Check and seal luminaire openings

against rodents and water as necessary.

6. COORDINATION. The Contractor shall coordinate between the luminaire manufacturer and the pole manufacturer to ensure that the proposed materials, when assembled, will conform to the latest edition of the AASHTO *Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals*.

7. WARRANTY.

- (a) Special Warranty. Manufacturer's standard form in which manufacturer agrees to repair or replace luminaires or components of luminaires and lamps that fail in materials or workmanship; corrode; or fade, stain, or chalk due to effects of weather, vibration, or solar radiation within specified warranty period.

Manufacturer may exclude lightning damage, hail damage, vandalism, abuse, or unauthorized repairs or alterations from special warranty coverage.

- (1) Warranty Period for Luminaries. Five years from date of Substantial Completion.

The serial numbers for luminaires shall be listed and saved against the warranty sheet for each luminaire order. A copy of this list shall be submitted to the Engineer and the VTrans Traffic Shop upon completion and acceptance of work.

- (2) Warranty Period for LED drivers. Minimum five years from date of Substantial Completion.

- (3) Warranty Period for LED Lumen Depreciation. Lumen Depreciation shall not be more than 10 percent within the five year warranty period starting from date of Substantial Completion.

- (4) Warranty Period for Metal Corrosion. Five years from date of Substantial Completion.

- (5) Warranty Period for Color Retention. Five years from date of Substantial Completion.

8. STREET LIGHT. Luminaire shall be the Eaton Streetworks Navion: NVN-AF-04-E--T4W-10K-IP66-AP (225 watts, 24,662 lumens), or Lithonia Lighting: DSX1LED P8 40K T4M MVOLT KMA8 DNAXD U DNAXD (207 watts, 23,741 lumens), or American Electric Lighting: ATB2 60BLEDE10 MVOLT R4 (204 watts, 25,423 lumens) for the US-5 Roundabout. NVN-AF-02--T3-10K-IP66-AP (113 watts, 12,465 lumens), or Lithonia Lighting DSX1LED P3 40K T3M MVOLT KMA8 DNAXD U DNAXD (102 watts, 12,582 lumens), or American Electric Lighting: ABT0 30BLEDE10 MVOLT R3 (105 watts, 12,748 lumens) for Sykes Mountain Ave. and the Sykes/Ralph Lehman Drive Roundabout. Finish to be selected during the submittal process.

Luminaires shall include the following options as defined. Finite catalog numbers to be developed by the manufacturer and submitted with the Fabrication Drawing review process to ensure all options defined are properly incorporated into the product. Manufacturers indicated above are

provided for sourcing purposes only. Products failing to meet specification requirements will not be accepted.

- (a) UL Listed. Luminaire shall be UL 1598 listed for installation in wet locations and direct spray environments.
- (b) IESNA Testing. Comply with IESNA testing and reporting procedures for reporting luminaire photometric performance.
- (c) Installation Environment. The luminaire shall be designed to provide 100,000 hours of life, applicable to the location and environment where fixture is installed (i.e. on a bridge structure, high humidity, vibration, etc.).
- (d) Metal Parts. Free of burrs and sharp corners and edges.
- (e) Sheet Metal Components. All materials shall be corrosion-resistant aluminum, unless otherwise indicated. Each component shall be formed or supported to prevent warping and sagging.
- (f) Housings. Rigidly formed, weather and light-tight enclosures that will not warp, sag, or deform in use. All surfaces shall be protected with an electrostatically applied polyester powder coating inside and out; corrosion-resistant passing 3000 hour salt spray test; the luminaire as a complete assembly shall be rated IP66. The EPA shall be less than 0.9 square feet. Provide filter/breather for enclosed luminaries.
- (g) Construction. The luminaire shall be modular to the extent that the optics package and power supply are separate and removable from the housing and that failure of any part thereof would not require total replacement of the luminaire. The optics package and the power supply shall be sealed against the entry of moisture and dirt where the branch circuit enters the housing.
- (h) Mounting. The housing shall be designed for slip-fit mounting to the end of the mast arm. The mounting system for the luminaires shall include two (2) hot-dipped galvanized steel clamp brackets which are secured by means of two (2) stainless steel mounting bolts on each bracket. This adaptation point shall be designed for standard two (2) inch Schedule 40 tubing. Each clamp shall have a stainless steel through bolt to prevent rotation of the luminaire. The Contractor shall coordinate with the mounting arm manufacturer to ensure proper positioning of the through bolt.
- (i) Thermal Management. Heat sink design and spacing shall provide the required heat dissipation at the highest operating current but shall be arranged and oriented such that bird droppings and feathers from roosting birds cannot foul the airways and compromise the cooling efficiency. A self-cleaning heat sink design without requiring the use of hose spray is required by this application. The design of the luminaire shall provide the necessary heat dissipation to maintain the driver's case temperature to maximize the life expectancy of the driver to 100,000 hours.
- (j) Hardware Material. Unless otherwise noted, all hardware shall be stainless steel with nylon inserts for all nuts, etc.

- (k) Wiring. Branch circuit wiring to the luminaire shall be via the mast arm tenon through the slip fit. Wiring shall be secured inside the luminaire with an integral wire clamp to prevent movement and abrasion.
- (l) Conductors. The incoming AC line conductors (#12AWG or #10AWG) shall be terminated in a polarized plug/receptacle combination so that the luminaire may be locally de-energized and the plug removed without presenting a shock hazard or the potential for shorting the conductors together or to ground. The luminaire shall be designed to be removable once the plug is removed from the receptacle (any such maintenance shall normally be performed while the branch circuit connecting to the plug remains energized - the plug shall be weather-protected in case the luminaire cannot be replaced immediately).
- (m) Grounding Lug. Grounding lug connected to the housing shall be provided.
- (n) Operating Temperature Range. Luminaires shall be rated for operation over the range -40°F to +140°F.
- (o) Performance. The combined operating life rating of optics package and power supply shall be 100,000 hours minimum, where end-of-life shall be taken as the point where lumen output has decreased to 70% of the initial value.
- (p) Plastic Parts. High resistance to yellowing and other changes due to aging, exposure to heat, and UV radiation.
- (q) BUG Rating. Non-ornamental luminaires shall be classified with a maximum BUG rating of B3-U0-G5.
- (r) Reflectance. Reflecting surfaces shall have minimum reflectance as follows, unless otherwise indicated:
 - (1) White Surfaces - 89 percent.
 - (2) Specular Surfaces - 90 percent.
 - (3) Diffusing Specular Surfaces - 85 percent.
- (s) Lenses and Refractors Gaskets. Use heat and aging-resistant gaskets to seal and cushion lenses in luminaire doors.
- (t) Additional Requirements. Luminaire shall be provided with the following:
 - (1) Fixture to have anti-vermin protection.
 - (2) Ballast door and lens frame are each to be secured to housing via a 1/16 inch galvanized safety cable. This cable shall be long enough as to not interfere with the opening and closing of any doors or covers.
 - (3) Luminaire safety cable is to be galvanized steel 1/8 inch

with two crimped ends with loops, a thread-locking agent, and split lock washers on all bolts.

- (4) Wiring terminal block.
- (5) Teflon, abrasion resistant, safety cable cover.

9. LED DRIVER.

- (a) General. LED drivers used in the luminaires shall be of the luminaire manufacturer's specification, subject to the same operating requirements, quality assurance program, and terms of warranty as the luminaire.
- (b) Type. Switching-type with constant current output; commercial grade with a capacitor life rating of 100,000 hours or better at 145° F case temperature. Other components with limited shelf life or subject to degradation over time shall not be used on the driver circuit board. Rated minimum operating life for the driver shall not be less than the operating life of the overall LED package measured to 24% depreciation of initial lumen output.
- (c) Input Voltage. LED drivers designed for multi-voltage input (120-277V) shall automatically select for the connected voltage or shall be clearly marked at the point of connection for the particular voltage.
- (d) Fuses. Drivers shall be overload/overcurrent protected on the AC line side connection preferably with an electronic resettable device or a fuse; fuses shall be protected in tool-less, finger-safe holders and shall be replaceable without removing incoming power.
- (e) Surge Protection. A shielded and replaceable surge protective device (rated ANSI C62.41 Category C) shall be provided integral with the luminaire/driver package to dissipate transient voltages appearing on the AC input.
- (f) Optics. The LED optics package shall be designed to meet the lighting requirements as specified herein with a drive current no greater than 1050mA, but shall be designed and capable of continuous operation within allowable temperature limits to meet the application requirements.
- (g) Operating Temperature Range. -40°F to +140°F.
- (h) Mean Time Between Failures. The minimum MTBF shall be one million hours in accordance with Telcordia SR-322 performed by an independent laboratory at the operating current required by the application and at the maximum rating of the driver.
- (i) Efficiency. LED driver efficiency shall be 90% or higher with power factor greater than 90% at any drive current.
- (j) Legal Compliance. LED driver shall in compliance with FCC 47 CFR Part 15.

10. LEDs.

- (a) Optics Package. Consisting of one or more LED modules or 'light bars', each comprised of multiple LEDs. The number of LED modules used shall be based on the required lumen output to achieve the project illumination design goals as shown in the Plans. The optics package with the required number of light bars shall also be rated with the housing for 3G vibration. The optics package (light bars) shall be rated IP66.
- (b) Operating Temperature Range. -40°F to +140°F.
- (c) Manufacturer. Manufacturers of LEDs shall have been in the business for 15+ years, engaged in research, development, and marketing of LED wafers and shall have patents on these and related products.
- (d) Identification. LEDs used by the luminaire manufacturer shall be identified and direct-sourced from the manufacturer of the LED and shall be certified by the manufacturer of the luminaire as being the LED type and rating used in the manufacture and design of the photometric and thermal characteristics of the particular luminaire.
- (e) Color. LEDs shall be color matched for all light bars on any given luminaire to a Correlated Color Temperature (CCT) of 4000K with minimum CRI of 70.
- (f) Individual LED Failures. Consisting of one or more LED modules or 'light bars', each comprised of multiple LEDs connected such that individual LED failures may occur without affecting any other LEDs in the column and row where the failed LED occurred.
- (g) Quality Control. Quality control checks, specifications, and binning procedures used by the manufacturer of the luminaire shall be submitted along with the luminaire specification sheets and Fabrication Drawings.
- (h) Light Loss Factor. Calculated at 15 years (minimum 11 hours of operation each day) combining Light Lumen Depreciation (LLD) calculated at the maximum operating junction temperature, the Luminaire Dirt Depreciation (LDD), and an efficiency factor relating power supply degradation to light loss shall be greater than 22.5 percent.
- (i) LED Maximum Rated Junction Temperature. The overall design of the thermal package shall provide a temperature margin when operating at the maximum rated driver current in a 140°F ambient temperature, not to exceed the maximum allowable LED junction temperature.

11. Poles. Pole height shall be sized as required to meet a total mounting height (including the mast arm) of 30'. Poles shall be delivered to the job site with a factory-applied shipping wrap of cardboard or other material to fully protect against scratches and coating stain. Poles shall be blocked and bundled in groups of multiple poles, or use other equivalent means to prevent shifting and damage during transport. Pole shall match City's existing style.

- (1) Pole Construction. The 30' assembly shall be round tapered aluminum, seamless extruded 6063 Aluminum Alloy per ASTM B221 and shall be full length heat treated after base weld to produce a T6 temper; minimum 0.156" wall thickness or thicker as required to handle structural loading. The post shall be heavy wall, copper free, cast aluminum produced from certified ASTM 356.1 ingot per ASTM B179-95a or ASTM B26-95. The castings shall be formed true to the pattern with complete detail. Poles shall be structurally designed to AASHTO standards, minimum 90 mph wind loading plus a 1.3 gust factor and have an EPA rating of 10.0 for 90MPH. The cast shaft shall be circumferentially welded to the base casting and shipped as one piece for maximum structural integrity. All exposed welds below 8' shall be ground smooth. All welding shall be per ANSI/AWS D1.2-90. All welders shall be certified per Section 5 of ANSI/AWS D1.2-90. The shaft diameter shall taper from 8" above the base to 4.5" at the top. The mast arm shall produce a 4' total arm length. The mast arm shall be tapered aluminum tube, 0.125 wall alloy 6063-T6 with a 2" NPS slipfitter for fixture attachment. The breakaway transformer base shall be a cast aluminum transformer base (T-base) of alloy 356-T6 with aluminum handhole door and stainless steel hex head screw. The base shall be FHWA approved breakaway. Anchor bolts shall conform to AASHTO M314-90 Grade 55, (4) L-shaped steel anchor bolts, (4) heavy-duty flat washers, lock washers, and hex nuts (all galvanized steel).

12. FACTORY FINISHES. Manufacturer's standard paint applied to factory-assembled and factory-tested luminaire before shipping.

13. INSTALLATION.

- (a) Luminaire Attachment. Fasten to roadway lighting pole arm with mounting bracket, thru bolt, and safety cable. Safety cable is to be looped around the cast bar at the rear for the housing and then both ends are to be secured to the arm with a bolt and a washer.

Adjust luminaries that require field adjustment or aiming until values shown in illuminance array are obtained.

Cover all chips and scratches on luminaire housings using a protective coating recommended by or provided by the manufacturer of the luminaire.

14. CONNECTIONS. Tighten electrical connectors and terminals according to manufacturer's published torque-tightening values. If manufacturer's torque values are not indicated, use those specified in UL 486A and UL 486B.

Use a thread-locking agent in all fasteners before installation.

15. FIELD QUALITY CONTROL.

- (a) Inspect each installed fixture for damage. Replace damaged fixtures and components.
- (b) The contractor is responsible to verify normal operation of lighting

units after installing luminaries and energizing circuits with normal power source. Contractor is required to provide a written report illustrating measured luminance levels in foot-candles. Use meters that have been calibrated within 12 months of date of the test. Testing procedure shall comply with IESNA LM-50.

- (c) The Contractor shall prepare a written report illustrating that the proposed fixtures meet the above requirements. Report shall include a review of the tests completed, all inspections, observations, and verifications indicating interpreted results. If adjustments are made to lighting system, retest to demonstrate compliance with standard.
 - (d) Contractor to provide all manpower, equipment, lift truck, lane closures, etc. at no additional cost to demonstrate the installation complies with the Contract Documents.
 - (e) Photometric performance of installed units shall meet or exceed those values noted above.
16. METHOD OF MEASUREMENT. The quantity of Special Provision (Luminaire, LED) to be measured for payment will be the number of each, with photocell, connected both mechanically and electrically in the complete and accepted work.
17. BASIS OF PAYMENT. The accepted quantity of Special Provision (Luminaire, LED) 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.

Payment will be made under:

<u>Pay Item</u>	<u>Pay Unit</u>
900.620 Special Provision (STREET LIGHT ASSEMBLY)	Each

Project: Hartford STP 0113(59)S & STP EH09(15)
Advertised Date: 02/28/2020

MOVE PRIVATE SIGN OUTSIDE TAKING

1. DESCRIPTION. This work shall consist of relocating existing private signs out of the ROW taking at the location(s) indicated in the Plans and as directed by the Engineer.

The work under this Section shall be performed in accordance with these provisions and the Plans.

Privately owned signs greater than 15 square feet in size shall be relocated outside the ROW. Signs shall be in complete working order after relocation including foundations and any electrical or lighting associated with the existing sign. Upon completion the Private sign shall be in the same or better working condition as the existing condition prior to the Contractors work.

2. MATERIALS. Existing sign material shall not be damaged.
3. METHOD OF MEASUREMENT. The accepted quantity of Special Provision (MOVE PRIVATE SIGN OUTSIDE TAKING) to be measured for payment will be the number of each private signs moved (relocated) outside the ROW in the complete and accepted work. This Special Provision shall apply only to Privately owned signs greater than 15 square feet in size.
4. BASIS OF PAYMENT. The accepted quantity of Special Provision (MOVE PRIVATE SIGN OUTSIDE TAKING) will be paid for at the Contract unit price for each. Payment shall be full compensation for furnishing, transporting, handling, and installing the necessary materials, including reconnection of lighting, and for furnishing all labor, materials, equipment, tools, and incidentals necessary to complete the work.

Payment will be made under:

<u>Pay Item</u>	<u>Pay Unit</u>
900.620 Special Provision(MOVE PRIVATE SIGN OUTSIDE TAKING) (Sta. 34+98 RT and Sta. 61+55 RT)	Each

Project: Hartford STP 0113(59)S & STP EH09(15)
Advertised Date: 02/28/2020

PRECAST CONCRETE OUTLET STRUCTURE WITH CAST IRON GRATE

1. DESCRIPTION. This work shall consist of furnishing and installing a precast concrete box and furnishing and installing a cast iron beehive grate as shown on the plans and as directed by the Engineer.
2. GENERAL.
 - (a) The Precast Concrete Catch Basin shall be in conformance with the details on the plans. The Precast Concrete Catch Basin shall be manufactured to accept the Cast Iron Grate.
 - (b) The Cast Iron Grate shall be cast iron style as detailed on the Plans.
3. MATERIALS. Materials shall meet the requirements of the following Subsections:

Clay or Shale Sewer Brick.....	705.01
Concrete Masonry Blocks.....	705.02
Precast Drop Inlets, Catch Basins, and Manholes.....	705.04
Mortar, Type II.....	707.02
Bar Reinforcement, Level I.....	713.01
Welded Steel Wire Fabric.....	713.05
Cast Iron Frame, Grate, and Cover.....	715.01 (b)
Ductile Iron Frame and Cover.....	715.01 (c)

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

Material for steel grates shall meet the requirements of ASTM A36/A36M. For steel grates, a Type D certification shall be furnished.

Pipe stubs for precast reinforced concrete curb drop inlets shall meet the requirements of Section 601.

The term "cast iron," as used in these Specifications, or in various Contract items, when used in conjunction with covers and frames, shall be understood to mean "cast iron or ductile iron." The Contractor may use ductile iron covers and frames meeting the requirements of Subsection 715.01(c) instead of cast iron covers and frames.

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

Except for components cast using the dry cast process, precast concrete components shall not have the forms removed until a minimum compressive strength of 2000 psi has been achieved. Precast components shall not be moved until two hours after they have been cast and until a minimum compressive strength of 2000 psi has been achieved. Concrete cylinders shall be made, in accordance with AASHTO T 23, at the last placement of the day.

Reinforced precast sections shall not be shipped from the manufacturing facility until the eighth day from the date of manufacture, except when the supplier provides test results demonstrating that the design strength has been achieved.

5. METHOD OF MEASUREMENT. The quantities of Special Provision (Precast Concrete Outlet Structure with Cast Iron Grate) to be measured for payment will be the number of units used in the complete and accepted work.
6. BASIS OF PAYMENT. The accepted quantities of Special Provision (Precast Concrete Outlet Structure with Cast Iron Grate) will be paid at the Contract unit price per unit each. Payment will be full compensation for furnishing, transporting, handling, and placing the materials specified, including concrete, mortar, brick, frames, grates, pipe stubs, and for furnishing all labor, tools, equipment, and incidentals necessary to complete the work.

Excavation will be paid for as Trench Excavation of Earth. Backfill will be paid for as Granular Backfill for Structures.

Payment will be made under:

<u>Pay Item</u>	<u>Pay Unit</u>
900.620 Special Provision (Precast Concrete Outlet Structure with Cast Iron Grate)	Each

Project: Hartford STP 0113(59)S & STP EH09(15)
Advertised Date: 02/28/2020

RECTANGULAR RAPID FLASHING BEACON

1. DESCRIPTION. This work shall consist of construction of a new Rectangular Rapid Flashing Beacon System (RRFB) as shown in the Plans and as directed by the Engineer.

All provisions of section 678 - Traffic Signal Controls, except a modified or changed below, shall apply.

2. MATERIALS. Major Materials for RRFB:

(a) Housing, Posts, and Signs.

- (1) RRFB Housings shall be made from powder coated aluminum (black).
- (2) The outside edges of the RRFB indications, including any housing, shall not project beyond the outside edges of the W11-2 sign.
- (3) The RRFB shall be located between the bottom of the crossing warning sign (W11-2) and the top of the supplemental downward diagonal arrow plaque (W16-7p), rather than 12" above or below the sign assembly.
- (4) Each RRFB assembly shall be mounted on a tapered tubular aluminum pole (2 total) with an aluminum square pedestal breakaway base assembly. The poles, breakaway assemblies, and foundations shall conform to Section 678 of the Standard Specifications.
- (5) The pedestrian crossing signs (W11-2) and arrow plaques (W16-7p) shall be Type A signs, as defined in Section 675 of the Standard Specifications.
- (6) R1-6 Signs shall be installed in roadway on the roadway centerline.

(b) LED.

- (1) There shall be 8 7" x 3" amber LED arrays.
- (2) The two RRFB indications shall be aligned horizontally, with the longer dimension horizontal and with a minimum space between the two indications of approximately seven inches (7"), measured from inside edge of one indication to inside edge of the other indication.
- (3) The light intensity of the yellow indications shall meet the minimum specifications of Society of Automotive Engineers (SAE) standard J595 (Directional Flashing Optical Warning Devices for Authorized Emergency, Maintenance, and Service Vehicles) dated March 2014.

(c) Operation and Flash Rate

- (1) RRFBs shall use a much faster flash rate. Each of the two yellow indications of an RRFB shall have 70 to 80 periods of flashing per minute and shall have alternating but approximately equal periods of rapid pulsing light emissions and dark operation. During each of its 70 to 80 flashing periods per minute, one of the yellow indications shall emit two rapid pulses of light and the other yellow indication shall emit three rapid pulses of light
- (2) The flash rate of each individual yellow indication, as applied over the full on-off sequence of a plashing period of the indication, shall not be between 5 and 30 flashes per second, to avoid frequencies that might cause seizures.
- (3) When activated, the two yellow indications in e3ach RRFB shall flash in a rapidly alternating "wig-wag" flashing sequence (left light on, then right light on).
- (4) The RRFB shall be normally dark, shall initiate operation only upon pedestrian actuation, and shall cease operation at a predetermined time after the pedestrian actuation.
- (5) All RRFBs associated with a given crosswalk shall, when activated, simultaneously commence operation of their alternating rapid flashing indications and shall cease operation simultaneously.

(d) Pushbutton & Walk Duration.

- (1) Pedestrian pushbuttons shall be used to actuate the RRFBs, and a pedestrian instruction sign with the legend R10-25 PUSH BUTTON TO TURN ON WARNING LIGHTS.
- (2) The duration of a predetermined period of operation of the RRFBs following each actuation shall be based on the MUTCD procedures for timing of pedestrian clearance times for pedestrian signals (3.5 ft./sec Maximum) plus an additional 4 seconds.
- (3) The pedestrian Piezo style push buttons shall conform to the applicable provisions of the ADA.

(e) Solar Power and Radio Communications.

- (1) The solar power system (1 required per assembly) shall be housed in a NEMA 4 rated fiberglass cabinet with lockable straps.
- (2) The solar panel shall be approximately 25 ¼" H x 25 ¾" W x 1 ½" D and have an articulating mount that pivots.
- (3) The solar power system control circuitry shall be in a NEMA IP-67 rated enclosure dustproof and waterproof in up to 3' for 30 minutes.

- (4) The solar panel shall produce at least 55 watts, conform to IP-67, and be adjustable to an angle of between 40 degrees and 60 degrees from the ground.
- (5) The solar battery shall be a 12 V, 40 AH sealed gel unit that does not require periodic watering. The battery shall be capable of operation without sun for 30 days and have a life span of 2 years.
- (6) Solar & Battery installation shall be installed by manufacturer recommendations for optimum performance.
- (7) Radio communication shall be used to connect the RRFB's on either side of the street.
- (8) The radio shall operate at 900 MHz, and shall utilize frequency hopping spread spectrum network with an operating range of 3.6 vdc to 15 vdc.

3. METHOD OF MEASUREMENT. The accepted quantity of Special Provision (Rectangular Rapid Flashing Beacon) to be measured for payment will be the number of each RRFB installed in the complete and accepted work.

RRFB shall be measured as a unit and include all appurtenances described above, including R1-6 and R10-25 signs, for two pedestrian crossing signs.

4. BASIS OF PAYMENT. The accepted quantity of Special Provision (Rectangular Rapid Flashing Beacon) will be paid for at the Contract unit price for each. Payment shall be full compensation for furnishing, transporting, handling, and installing the necessary materials, and for furnishing all labor, materials, equipment, tools, and incidentals necessary to complete the work.

Payment will be made under:

<u>Pay Item</u>	<u>Pay Unit</u>
900.620 Special Provision (Rectangular Rapid Flashing Beacon)	Each

Project: Hartford, STP 0113(59)S & STP EH09(15)
Advertised Date: 02/28/2020

ADJUST ELEVATION OF VALVE BOX

1. DESCRIPTION. This work shall consist of adjusting the height of existing valve boxes.

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

2. METHOD OF MEASUREMENT. The quantity of Special Provision (Adjust Elevation of Valve Box) to be measured for payment will be the number of units modified in the complete and accepted work.

3. BASIS OF PAYMENT. The accepted quantity of Special Provision (Adjust Elevation of Valve Box) will be paid for at the Contract unit price per each. Partial payments will be made as follows:

- (a) A payment of 50% of the Contract unit price will be made upon elevation adjustment of the valve box to the finished grade of Subbase of Crushed Gravel, Fine Graded.
- (b) A payment of 25% of the Contract unit price will be made upon elevation adjustment of the valve box to the finished grade of the Superpave Bituminous Concrete Pavement Type IIS Base and Intermediate courses.
- (c) The remaining 25% of the Contract unit price will be paid upon elevation adjustment of the valve box to the finished grade of the wearing course.

Payment will be full compensation for the furnishing of all labor, tools, equipment, and incidentals necessary to complete the work.

Payment will be made under:

<u>Pay Item</u>	<u>Pay Unit</u>
900.620 Special Provision (Adjust Elevation of Valve Box)	Each

DRY WELL

1. DESCRIPTION. This work shall consist of furnishing and installing a precast concrete structure as shown on the plans and as directed by the Engineer.

2. GENERAL.

(a) The DRY WELL shall be in conformance with the details on the plans.

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

Clay or Shale Sewer Brick.....	705.01
Concrete Masonry Blocks.....	705.02
Precast Drop Inlets, Catch Basins, and Manholes.....	705.04
Mortar, Type II.....	707.02
Bar Reinforcement.....	713.01
Welded Wire Reinforcement.....	713.05
Gray Iron Castings.....	715.01(b)
Ductile Iron Castings.....	715.01(c)
Plastic Pipe, Rigid (PVC)	740.02

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

Material for steel grates shall meet the requirements of ASTM A36/A36M. For steel grates, a Type D certification shall be furnished.

Pipe stubs for precast reinforced concrete curb drop inlets shall meet the requirements of Section 601.

The term “cast iron,” as used in these Specifications, or in various Contract items, when used in conjunction with covers and frames, shall be understood to mean “cast iron or ductile iron.” The Contractor may use ductile iron covers and frames meeting the requirements of Subsection 715.01(c) instead of cast iron covers and frames.

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

Except for components cast using the dry cast process, precast concrete components shall not have the forms removed until a minimum compressive strength of 2000 psi has been achieved. Precast components shall not be moved until two hours after they have been cast and until a minimum compressive strength of 2000 psi has been achieved. Concrete cylinders shall be made, in accordance with AASHTO T 23, at the last placement of the day.

Reinforced precast sections shall not be shipped from the manufacturing facility until the eighth day from the date of manufacture, except when the supplier provides test results demonstrating that the design strength has been achieved.

5. METHOD OF MEASUREMENT. The quantities of Special Provision (DRY WELL) to be measured for payment will be the number of units used in the complete and accepted work.
6. BASIS OF PAYMENT. The accepted quantities of Special Provision (DRY WELL) will be paid at the Contract unit price per unit each. Payment will be full compensation for furnishing, transporting, handling, and placing the materials specified, including concrete, mortar, brick, frames, grates, pond drain and associated piping, pipe stubs, and for furnishing all labor, tools, equipment, and incidentals necessary to complete the work.

Excavation will be paid for as Trench Excavation of Earth. Backfill will be paid for as Granular Backfill for Structures.

Payment will be made under:

<u>Pay Item</u>	<u>Pay Unit</u>
900.620 Special Provision (DRY WELL)	Each

Project: Hartford STP 0113(59)S & STP EH09(15)
Advertised Date: 02/28/2020

BITUMINOUS CONCRETE PAVEMENT, SMALL QUANTITY

1. DESCRIPTION. This work shall consist of constructing one or more courses of bituminous mixture on a prepared foundation in accordance with these specifications and the specific requirements of the type of surface being placed, and in reasonably close conformity with the lines, grades, thicknesses, and typical cross sections shown on the Plans or established by the Engineer.

The work under this Section shall be performed in accordance with these provisions, the Plans, and the appropriate provisions of Section 406 of the Standard Specifications.

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

Performance-Graded Asphalt Binder.....	702.02
Emulsified Asphalt, RS-1H or CRS-1H	702.04
Aggregate for Bituminous Concrete Pavement	704.10

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

The grade of PG asphalt binder used to produce bituminous concrete pavement shall be 70-28. Substitutions will be accepted based on availability where the upper end temperature value is greater than 70°C (158°F) and the lower end temperature value is less than -28°C (18°F).

3. DESIGN MIX TYPES. Design mix types may be substituted based on mix availability. Allowable mix type substitutions will be accepted on a one to one thickness relationship, except as listed in Tables 1 and 2 below.

TABLE 1 – ALLOWABLE 1-1/2” MIX TYPE IVS SUBSTITUTIONS

Design ESALs (millions)	Design	Allowable Substitution	
		406.35 Superpave Bituminous Concrete Pavement	406.25 Bituminous Concrete Pavement ¹
< 0.3	Type IVS	Type III	Type III
0.3 to < 10	Type IVS	Type III	--
¹ Per Section 406.			

TABLE 2 – ALLOWABLE 3-1/2” MIX TYPE IIS SUBSTITUTIONS

Design ESALs (millions)	Design	Allowable Substitution	
		406.35 Superpave Bituminous Concrete Pavement	406.25 Bituminous Concrete Pavement ¹
< 0.3	Type IIS	Type I	Type I
0.3 to < 10	Type IIS	Type I	--
¹ Per Section 406.			

4. COMPOSITION OF MIXTURE.

- (a) Gradation. Gradation shall meet the requirements of Section 406.
- (b) Design Criteria. Design Criteria shall meet the requirements of Section 406.
- (c) Mix Design. Standard mix design will be in accordance with Subsection 406.03B with an n value of 65 gyrations. Allowable substitutions based on pre-existing approved mix designs and/or n values for intended Contract suppliers are listed in Table 3 below. A request for substitutions must be submitted in writing to the Engineer a minimum of 10 working days prior to production. Any substitutions from the standard mix design or mix types as detailed in the Plans shall not result in any increase in cost to the Agency.

TABLE 3 – ALLOWABLE SPECIFICATION SUBSTITUTIONS

Design ESALs (millions)	Design	Acceptable Specification Substitution	
	Superpave Bituminous Concrete Pavement (Gyrations)	Bituminous Concrete Pavement ¹ (75 Blow)	Med. Duty Bituminous Concrete Pavement ¹ (50 Blow)
< 0.3	50	✓	✓
0.3 to < 10	65 ²	✓	--
¹ Per Section 406. ² Standard mix design specification.			

(d) Quality Acceptance.

- (1) General. Acceptance sampling and testing will be conducted in accordance with the Agency’s Quality Assurance Program as approved by FHWA. Bituminous concrete mixtures designated under these specifications will be sampled a minimum of once per day of production or 500 tons (sublot), or other sublot size deemed appropriate, and evaluated by the Agency for each mix type (each mix design) in accordance with the following acceptance guidelines.
- (2) Acceptance Guidelines. Temperature of the bituminous mixture shall be tested using the Verified Thermometer test method and PG Asphalt Binder content determined from the batch slip. Gradation shall be tested in accordance with AASHTO T 30. Mixture volumetric properties (air voids and VMA) shall be calculated in accordance with Subsections 406.03A(b) or 406.03B(b), as appropriate.
- (3) Non-Compliant Material.
 - a. Rejection by Contractor. The Contractor may, prior to sampling, elect to remove any defective material and replace it with new material at no expense to the Agency. Any such new material will be sampled, tested, and evaluated for acceptance.
 - b. Pay Adjustment. For any non-compliant material outside the production testing tolerances contained in Table 406.03G, the representative material (sublot) shall be assessed a mixture pay adjustment according to the equation below and Table 4 Mixture Pay Adjustment.

$$\text{Dev.} = \frac{PT+OT}{PT}$$

Dev. = Sample deviation from the allowed tolerance

PT = Production tolerance (taken from Table 406.03G, e.g. 1.0 for air voids)

OT = Out of tolerance value (taken from sample report)

TABLE 4 – MIXTURE PAY ADJUSTMENT

Criteria	Mixture Pay Factor (PF _M)			
	Dev. ≤ 1.0	1.0 < Dev. ≤ 1.5	1.5 ≤ Dev. ≤ 2.0	Dev. > 2.0
AIR Voids	0	-0.05	-0.25	Remove
VMA	0	-0.05	-0.25	Remove
Aggregate passing No. 200 sieve	0	-0.05	-0.25	Remove
Aggregate larger than No. 200 sieve	0	-0.05 applied for each sieve out of tolerance	-0.10 applied for each sieve out of tolerance	Remove if any sieve out of tolerance
Filler/AC Ratio	See note 2	See note 2	See note 2	See note 2

1. Deductions will be applied per the table above in conjunction with the testing tolerances as contained in Table 406.03G JOB MIX FORMULA PRODUCTION TOLERANCES.

2. A pay factor of -0.05 will be applied and coupled with any other applicable deduction in any case that the filler/asphalt ratio is outside the criteria as contained in Table 406.03B or Table 406.03E

3. The total deduction to be applied to any mix will be the sum total of all applicable deductions as contained in the table above.

- (e) Boxed Samples. If Agency plant inspectors are not available for daily testing and inspection functions, then box samples will be taken by the Engineer at the project site to afford verification of mixture volumetrics/properties. Boxed samples will be processed and results reported to the Engineer within ten working days of being received at the Agency Central Laboratory in Berlin, Vermont.

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

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

The density of the compacted pavement shall be at least 92.0%, but not more than 97.0%, of the corresponding daily average maximum specific gravity for each mix type (each mix design) of bituminous mix placed during each day, or placed per bridge for any bridge project. For material that falls outside of this range, payment will be made by adjusting the daily production totals in accordance with Table 5:

TABLE 5 – DENSITY PAY FACTORS

Average Density	Mat Density Pay Factor (PF _D)
89.0% - 90.4%	- 0.150
90.5% - 91.9%	- 0.100
92.0% - 93.4%	0.000
93.5% - 95.4%	0.150
95.5% - 97.0%	0.000
97.1% - 98.5%	- 0.100

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

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

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

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

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

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

6. METHOD OF MEASUREMENT. The quantity of Special Provision (Bituminous Concrete Pavement, Small Quantity) to be measured for payment will be the number of tons for a lot of mixture (each type) complete in place in the accepted work (Q) as determined from the weigh tickets.

The quantities of all applicable Pay Adjustments calculated for the project will be determined as specified below.

When applicable, the measured quantity of Special Provision (Bituminous Concrete Pavement, Small Quantity) placed will be multiplied by the Mixture Pay Factor, PF_M , to determine a Mixture Pay Adjustment, PA_M , to the accepted tonnage placed (Q) for that lot based on the Contract bid price (B), as follows:

$$PA_M = PF_M \times Q \times B$$

When applicable, the measured quantity of Special Provision (Bituminous Concrete Pavement, Small Quantity) placed that day, or placed per bridge for any bridge project, will be multiplied by the Mat Density Pay Factor, PF_D , to determine a Mat Density Pay Adjustment, PA_D , to the accepted tonnage placed (Q) for that lot based on the Contract bid price (B), as follows:

$$PA_D = PF_D \times Q \times B$$

7. BASIS OF PAYMENT. The measured quantity of Special Provision (Bituminous Concrete Pavement, Small Quantity) will be paid for at the Contract unit price per ton. Payment shall be full compensation for furnishing, mixing, hauling, and placing the material specified and for furnishing all labor, tools, equipment, and incidentals necessary to complete the work.

Payment for Pay Adjustments shall be debited against the Contract prices (lump units) bid for the Pay Adjustment items.

The cost of repairing bridge deck core areas will not be paid for separately, but will be considered incidental to Special Provision (Bituminous Concrete Pavement, Small Quantity).

The costs of furnishing testing facilities and supplies at the plant will be considered included in the Contract unit price of Special Provision (Bituminous Concrete Pavement, Small Quantity).

The costs of obtaining, furnishing, transporting, and providing the straightedges required by Subsection 406.16, will be paid for under the appropriate Section 631 pay item included in the Contract.

The costs associated with obtaining samples for acceptance testing will be incidental to the cost of Special Provision (Bituminous Concrete Pavement, Small Quantity).

When not specified as items in the Contract, the costs of cleaning and filling joints and cracks, sweeping and cleaning existing paved surfaces, the emulsified asphalt applied to tack these surfaces, and tacking of manholes, curbing, gutters, and other contact surfaces will not be paid for directly, but will be incidental to Special Provision (Bituminous Concrete Pavement, Small Quantity).

Special Provision (Bituminous Concrete Pavement, Small Quantity) mixture approved by the Engineer for use in correcting deficiencies in the base course constructed as part of the Contract will not be paid for as Special Provision (Bituminous Concrete Pavement, Small Quantity), but will be incidental to the Contract item for the specified type of base course.

Special Provision (Bituminous Concrete Pavement, Small Quantity) mixture used to correct deficiencies in an existing pavement or to adjust the grade of a bituminous concrete surface completed under the Contract will be paid for at the Contract unit price for Special Provision (Bituminous Concrete Pavement, Small Quantity).

Payment will be made under:

<u>Pay Item</u>	<u>Pay Unit</u>
900.650 Special Provision (Mixture Pay Adjustment)(N.A.B.I.)	Lump Unit
900.680 Special Provision (Bituminous Concrete Pavement, Small Quantity)	Ton

Project: Hartford STP 0113(59)S & STP EH09(15)
Advertised Date: 02/28/2020

GRAVEL WETLAND, All-INCLUSIVE

1. DESCRIPTION. This work shall consist of furnishing and installing a Gravel Wetland, All-Inclusive at the location indicated in the Plans and as directed by the Engineer.
2. MATERIALS. Materials shall meet the requirements of the following Subsections but not limited to:

PVC Pipes and Fittings.....	710.06(d)
Granular Backfill for Structures.....	704.08
Aggregate for Bituminous Surface Treatment.....	704.11
Four (4) inch Leaching Stone (Rock Fill for Gabions).....	706.06(a)
Topsoil.....	755.02
Conservation Seed.....	755.04
Geotextile.....	720.01A
Mulch.....	755.10

Clear Well Chambers, Gravel Wetland Inlet Leaching Chamber, Gravel Wetland Outlet Chambers, and shop drawing submittals are specified in the Gravel Wetland, All Inclusive in the plans. Products are manufactured by the following or approved equal:

Contech Engineered Solutions
Steve Wolf, PE
Tel: (802) 233-9110
Email: SWolf@conteches.com
Website: www.conteches.com

Stormtech ADS
Tel: (860) 529-8188
Email: info@stormtech.com
Website: www.stormtech.com

NDS Stormchambers
Tel: (877) 426-9128
Email: info@stormchambers.com
Website: www.stormchambers.com

3. GENERAL. Furnishing of all labor, equipment, and materials necessary to construct the Gravel, All Inclusive will be included.

All work will be done in strict conformance with these specifications and the details shown on the plans. The item includes but not limited to:

- Fine grading
- Topsoil within the gravel wetland area
- Seeding the gravel wetland area
- 1½" clean crushed stone for ramp and travel way
- 1½" clean washed crushed stone under topsoil for the gravel wetland

1" clean washed stone for gravel wetland
 1½" clean crushed stone bedding material under gravel wetland
 Geotextile fabric under gravel wetland
 Polyethylene leaching chambers
 Perforated PVC piping
 Cleanouts and observation risers
 PVC from inlet structure to distribution manifold
 Distribution manifold
 Connection of pipes to inlet and outlet structures

Separate measurement of pavement will be made by the following:

Unclassified Excavation.....Item 203.17
 24" CPEP.....Item 601.0920
 Stone Fill, Type 1.....Item 613.10
 Precast Concrete Outlet Structure with CI Gate.....Item 900.620

4. CONSTRUCTION REQUIREMENTS. The Contractor shall use crushed stone to provide a stable foundation for the chambers as well as provide a more stable work platform for construction of the wetland bed. Care shall be used to not disturb the subgrade material. Any subgrade material that is disturbed by construction activities shall be removed and replaced at no additional cost to the Owner.

Leaching chambers shall be placed as indicated on the plans. The chambers shall be placed in straight lines and at a constant grade along the basin. PVC pipe and PVC manifold pipe shall be used to transmit water from the inlet structure to the chambers. Clean out risers shall be installed as indicated on the plans. One (1) inch bedding crushed stone shall be placed around the PVC pipe and chambers to the depth indicated. The stone shall be placed in eight (8) inch lifts and compacted. Care shall be used when placing the stone as to not disturb the pipe or chamber alignments and grade. The one (1) inch stone shall be brought to nine (9) inches below finish grade.

A six (6) in layer of ¾" pea stone shall be placed over the one (1) inch stone. Three (3) inches of topsoil shall be placed over the pea stone.

5. METHOD OF MEASUREMENT. The quantity of Special Provision (Gravel Wetland Stormwater Treatment Basin) to be measured for payment will be on a lump sum basis in the complete and accepted work.

6. BASIS OF PAYMENT. The accepted quantity of Special Provision (Gravel Wetland Stormwater Treatment Basin) will be paid for at the Contract lump sum price. Payment will be full compensation for furnishing, handling, and placing the materials specified, including concrete, 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 (Gravel Wetland, All Inclusive)	Lump Sum

STAMPED CONCRETE ISLAND, 8 INCH

1. DESCRIPTION. This work shall consist of designing, furnishing and installing stamped concrete aprons and/or islands at the locations shown in the Plans and as directed by the Engineer.

The work under this Section shall be performed in accordance with these provisions, the Plans, and Section 618 of the Standard Specifications.

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 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
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 Compound.....	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)
Ground Granulated Blast-Furnace Slag (GGBFS)	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. All hardened concrete surfaces to have plastic concrete placed against it will be saturated with water, and excess water shall be removed just prior to plastic concrete contacting it.

Where Stamped Concrete Islands are specified in the Plans, the Design Concrete Stamp in the “Brick” pattern shall be used to stamp the concrete, and “Color Hardener” and “Color Release” shall be used to apply a brick red color to the concrete. The products are manufactured by the following companies:

Scofield

Website: <http://www.scofield.com/index.htm>

Bullion Coatings

Website: <https://www.decorativeconcretehoustontx.com/>

Solomon Colors

Website: <https://www.solomoncolors.com/index.php>

Or approved equal.

Alternate stamping patterns or colors may be used if approved by the Engineer. If alternative products are to be used, they shall be of equal quality, detail, function, and performance to that provided by the designated manufacturer.

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

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

TABLE 1 – CLASSIFICATION AND PROPORTIONING

HPC Class	Required Cem. Mat. (lbs/yd ³) ¹	Maximum W/CM Ratio	Max. Slump (in.) ²	Air Content (%)	Coarse Aggr. Gradation Table	28 Day Comp. Strength (psi) ³	28 Day Modulus of Rupture (psi) ³
AA	705	0.40	---	7.0 ± 1.5	704.02A	4000	650
A	611	0.44	---	7.0 ± 1.5	704.02B	4000	650
B	564	0.49	---	7.0 ± 1.5	704.02C	3500	650

¹ See additional tables below for required cementitious materials.

² The mix shall not exhibit segregation at the slump/spread used at placement. If the Engineer suspects there is segregation, the Engineer will require a slump/spread test be performed by the Contractor to visually observe the

characteristics of the mix. If in the opinion of the Engineer the mix does exhibit segregation, the load will be rejected and subsequent load(s) shall be tested, at a minimum of 3 loads or until the problem is corrected.

- ³ The listed 28-day compressive strength or modulus of rupture will serve as the basis of designing or approving the concrete mix.

TABLE 2 – REQUIRED CEMENTITIOUS MATERIALS

HPC Class	Cement (lbs/cy)		Fly Ash (lbs/cy)		Silica Fume Admixture (lbs/cy)		Cementitious Materials(lbs/cy)
AA	524	+	141	+	40	=	705
A	449	+	122	+	40	=	611
B	412	+	113	+	40	=	565

OR

HPC Class	Cement (lbs/cy)		GGBFS (lbs/cy)		Silica Fume Admixture(lbs/cy)		Cementitious Materials(lbs/cy)
AA	489	+	176	+	40	=	705
A	418	+	153	+	40	=	611
B	384	+	141	+	40	=	565

OR

HPC Class	Blended Silica Fume Cement (8.0%)(lbs/cy)		Fly Ash (lbs/cy)		Cementitious Materials(lbs/cy)
AA	564	+	141	=	705
A	489	+	122	=	611
B	452	+	113	=	565

OR

HPC Class	Blended Silica Fume Cement (8.0%)(lbs/cy)		GGBFS (lbs/cy)		Cementitious Materials(lbs/cy)
AA	529	+	176	=	705
A	458	+	153	=	611
B	424	+	141	=	565

If bagged silica fume is being used, the total number of bags for the batch shall be the least number of whole bags required - round the fractional numbers of bags required down to the next whole

number. The maximum amount of silica fume used shall be 40 lbs/cy. The total batch weight of silica fume ignored shall be substituted with Portland cement. Exceptions: For a one cubic yard batch, use 50 lbs of silica fume.

If the blended silica fume cement contains silica fume at a rate other than that required for the approved design mix, the Contractor shall provide additional silica fume or cement, as required, to provide concrete meeting the mix design requirements. The additional cement or silica fume provided shall be of the same brand and type as contained in the silica fume cement blend.

Type A Water-Reducing, or Type D Water-Reducing and Retarding, or Type F Water-Reducing, High Range, or Type G Water-Reducing, High Range, and Retarding Admixture shall be required to produce a workable mixture. The use of an accelerating or water-reducing-accelerating admixture to alter the setting characteristics of concrete mixtures shall be employed only with the approval of the Engineer. 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 Contractor, following mix design criteria and procedures outlined by the Agency, shall submit the mix design, required data, and test results to the Structural Concrete Engineer for review and approval. For initial submittals, a minimum of two weeks shall be allowed for evaluation of the submitted mix design, test results and required data. No production of concrete for the project shall commence until the Structural Concrete Engineer has reviewed and approved the concrete mix design.

The concrete materials shall be proportioned using the absolute volumes method in accordance with the requirements for each class as specified in Table 1 or a reviewed and approved alternate mix design. The volumetric proportioning method such as that outlined in *ACI Standard 211.1*, or other approved volumetric proportioning methods shall be employed in the mix design.

Production activities shall operate so that no intentional deviations are made from the reviewed and approved mix design. If test results indicate a failure to obtain the 28-day compressive strength as specified in Table 1 as tested in accordance with *AASHTO T 22* or *AASHTO T 97*, changes to the mix design shall be made with no extra payment. Changes may include, but are not limited to, using additional cementitious materials, changing the sources of cementitious materials or aggregates, using a high range water-reducer or other additives, or, if necessary obtaining concrete from another supplier.

- (a) In lieu of the high performance concrete mix specifications provided herein, the Contractor may submit (for the Structural Concrete Engineer's and Engineer's review and acceptance) a high performance Portland cement concrete mix, provided the following requirements are met:

A minimum of 30 calendar days – 37 calendar days, if the first time the mix is being submitted – prior to placement (or prior to the pre-placement meeting, if one is required),

the Contractor shall submit (for approval) the mix design for the class of concrete specified. The mix design(s) shall be submitted to the Agency's Materials Laboratory, 2178 Airport Road Unit B, Berlin, Vermont 05641, attention Structural Concrete Engineer. No class of concrete shall be placed on a project until the mix design is approved.

- (1) The mix design must contain the following (including name and source of materials):
 - a. Saturated Surface Dry or Dry Weights
 - b. Compressive Strength
 - c. Cement Content in lbs/cubic yard
 - d. Mineral Admixture Content (each) in lbs/cubic yard
 - e. Air Content
 - f. Water/Cementitious Material Ratio
 - g. Chemical Admixtures (types, brand names, dosages)
 - h. Laboratory Test Results (strength, air content, water/cement ratio, slump) Alkali-Silica Reactivity (ASR) *AASHTO T 303* modified. The modification shall be run using the proposed job cementitious material proportioning with the aggregate found to have the highest ASR potential. The expansion shall be below 0.10%.

The first time a mix design is submitted, the Contractor shall include surface resistivity test results for a minimum of three 4 inch diameter x 8 inch high test cylinders, made and cured in accordance with *AASHTO T 22*. The information shall include the individual results from testing 3 specimens, but no specimen shall exceed the maximum specified. Testing shall be performed by a Cement and Concrete Reference Laboratory (CCRL) qualified laboratory. The surface resistivity of the test mix shall be measured at 28 and 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 first time a mix design is submitted, the Contractor shall include alkali-silica reactivity test data for both fine and coarse aggregates. 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 an independent Laboratory accredited in the specific test method. The

maximum allowable mortar bar expansion when tested per *AASHTO T 303* or *ASTM C 1567* shall be 0.10%.

- (2) The cylinder test results shall be submitted with the following data regarding fabrication of the specimens:
 - a. Size of Batch
 - b. Type of Mixer
 - c. Mixing Time
 - d. Type of Cure
 - e. Age Upon Delivery

After the materials to be furnished by the Contractor have been reviewed and accepted, no proposed change in the source, proportions, or characteristics of the materials shall be made without the review and acceptance of the Engineer. No new materials shall be used until such materials and their proportions have been reviewed and accepted by the Engineer. In no case shall concrete from more than one batch plant be permitted on the same structure without prior written approval of the Engineer.

The Engineer may order concrete production and delivery suspended and a new mix or altered mix design submitted if components or final product material characteristics are determined to be out of tolerances, unsatisfactory, or if proposed changes in the source, proportions, or characteristics of the materials are proposed. No production of concrete for the project shall resume until the Structural Concrete Engineer has reviewed and accepted the new or altered mix design. For evaluation, new mix design submittals shall be considered as initial mix design submittals.

The various classes of concrete shall have air content by volume as specified. The entrained air shall be obtained by the use of an approved admixture.

Strict adherence to the requirements herein is required when using concrete with mineral admixtures. The setting time may be retarded in cool weather. The Engineer, after consultation with the Structural Concrete Engineer, may require that the curing period, as designated in Table 5, be extended.

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 mineral 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, report, and print batch weight tickets in English units the quantity of all aggregates, cementitious material, and the water incorporated into each batch and shall identify and record the addition of the required admixtures. All materials added to the concrete batch after initial batching shall be added to the printed batch weight ticket prior to delivery.

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 notice of intent to place concrete so that arrangements can be made for laboratory inspection and control. 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) 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 Part 4(d) of this specification.

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.

- (b) 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 or revocation of acceptance testing at the facility.

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.

- (c) 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.

- (d) 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

- (e) 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 GGBFS. Fly Ash or Ground Granulated Blast-Furnace Slag (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. Concrete may be mixed at the site of construction, at a central point, or wholly or in part in transit mixers. Stamped concrete aprons and islands shall be constructed to the depths and widths shown in the Plans, as recommended by the manufacturer and as directed by the Engineer. 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 the ambient air temperature is 60°F or above, the elapsed time may be reduced as necessary as directed by the Engineer or in accordance with the requirements of Part 7(a) of this specification.

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) Authorization by field inspection personnel must be obtained prior to the addition of water or admixtures at the project site. If water is added in excess of the specified maximum W/CM ratio, the concrete shall not be used.
- (3) Each load of concrete delivered at the job site shall be accompanied by a State of Vermont Batch Slip signed by the authorized Agency representative, if present, at the plant. If an Agency representative is not present at the time of batching, a batch weight ticket meeting the requirements of Part 4 of this specification shall accompany the delivery vehicle.
- (4) 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.

- (5) 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.

- (6) 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 Part 5(c) of this specification.

- (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.

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.

No transit mixer or agitator shall be charged with the ingredients of the concrete unless an authorized Agency representative is present and authorizes it. This requirement may be waived by the Engineer if a batch weight slip, as specified in Part 5(a)(3) of this specification, accompanies the delivery vehicle to the site.

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.

If bagged mineral admixtures are being used, the transit mixer maximum load size shall be limited to 80% of the manufacturer's rated mixing capacity. Also, legal vehicle load restrictions shall not be exceeded. The mixer shall be capable of combining the ingredients of the concrete into a thoroughly mixed and uniform mass and of discharging the concrete with a satisfactory degree of uniformity.

If bagged mineral admixtures are being used, agitators, when loaded, shall also not exceed 80% of the manufacturer's rated mixing capacity or legal load restrictions and shall be capable of maintaining the mixed concrete in a thoroughly mixed and uniform mass, and of discharging the concrete with a satisfactory degree of uniformity.

The Engineer may require the Contractor to perform uniformity tests on a transit mixer or agitator. 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.

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 if admixtures, water, or other ingredients are added to the mix in the field.

If additional mixing water is required to maintain the specified slump and is added with the permission of the Engineer, a minimum of 20 revolutions of the transit mixer drum at mixing speed shall be required before discharge of any concrete. At no time shall the total water introduced into any mix exceed the maximum W/CM ratio specified in Table 1.

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. FIELD TESTS. 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. For bridge deck pours, and other pours as required by the Engineer, 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.

The Contractor shall plan the pattern layout in order to coordinate slab dimensions and construction joint locations with stamping pattern dimensions where necessary.

- (a) Trial Pour. The Contractor shall provide a one and a half (1.5) foot x four (4) foot mock-up to the Engineer to demonstrate methods of obtaining consistent visual appearance. The mock-up shall be constructed a minimum of one month prior to the start of final work, using materials and methods to be used in the final work. The mock-up shall be located on site in a location determined by the Engineer. Samples of materials used in the mock-up shall be retained for comparison with materials used in the final work. The accepted mock-up will constitute a visual standard for the final work. The mock-up shall be removed when no longer required for comparison with the final work. The work and materials required for the mock up shall be incidental to the final installed stamped concrete island or apron. The purpose of the trial pour is to ensure that the mix can be placed and finished in accordance with these specifications.

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. 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) Air Content Tests. Air content tests shall be made in accordance with the pressure method specified in *AASHTO T 152*, for acceptance or rejection.

(e) Compressive Strength Tests.

(1) General. The number of compressive strength tests performed 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*.

(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. 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.
- 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	2	Curing box
Job control – applicable curing period	2	On structure

- (f) 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 sidewalls for decks shall extend below and fully enclose the entire superstructure.

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 Part 16 of this specification. 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.

When using direct-fired or indirect-fired heaters, 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 temperature with a maximum gradation of 1°F. The Inspector will use the thermometer to take periodic temperature measurements of the concrete and enclosure temperatures at varying locations.

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.

9. FORMS. The Contractor shall be responsible for, and shall make good, any injury arising from inadequate forms. The Engineer shall inspect and accept 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 in the construction of substructure elements in locations where the Engineer agrees that removable formwork is impossible to employ.

- (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.

- (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 shall be filled with cement mortar in accordance with the requirements of Part 15 of this specification.

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

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

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

- (g) Removal of Forms.

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

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

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

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

- (1) General. Use of SIPCMF for superstructure deck slab construction shall be subject to the following requirements:
 - a. Fascia overhangs shall be formed with removable forms that leave the resulting concrete with a flat-surfaced finish.
 - b. Bays that are constructed in stages such that a longitudinal joint is required shall be made with removable forms.
- (2) Design Requirements. The following requirements shall govern the design of SIPCMF:
 - a. The design span shall be the clear span of the form plus 2 inches, measured parallel to the form flute (also referred to as the form valley).
 - b. The design load shall be the sum of the weight of forms, bar reinforcement, plastic concrete, and 55 pounds per square foot for construction loads.
 - c. The unit working stress shall not exceed 75% of the specified minimum yield strength of the material.
 - d. The dead load deflection shall not exceed 1/180 times the form span length or 1/2 inch, whichever is less.

- e. Physical design properties shall be computed with the requirements of the latest edition of the *American Iron and Steel Institute Specifications for the Design of Cold-Formed Steel Structural Members*.
- (3) Construction Requirements. The following construction requirements shall apply to the use of SIPCMF:
- a. Construction Drawings. The Contractor shall submit construction drawings for SIPCMF in accordance with the requirements of Subsection 105.03. These drawings shall contain the following information as a minimum:
 - 1. The name of the SIPCMF supplier.
 - 2. A layout showing the compression and tension region of each beam/girder.
 - 3. The method of SIPCMF attachment for the compression and tension regions.
 - 4. The geometric properties of each type of panel being used.
 - 5. The number, location, and type of panels being used within each girder bay.
 - 6. Panel laps, considering the direction of concrete pours.
 - 7. The specifications for the material used to fill the flutes.
 - 8. Any other material data, erection information, or miscellaneous notes that may be required.
 - b. Handling and Installation. Care and protection shall be given the metal form sheets, supports, and accessory items during handling, shipping, and storage. During loading, hoisting, and unloading operations, extra precaution and care shall be taken to prevent damage to ends, corners, and edges of form sheets, supports, and accessory items.

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

Form supports shall be placed in direct contact with the flange of beam/girder/stringer or floor beam. All attachments shall be made by permissible welds, bolts, clips, or other approved means. The welding of form supports to steel not considered weldable or to portions of flanges subject to tensile stresses shall not be permitted. Welds and welding shall

be in accordance with the requirements of Subsection 506.10, with the exception that a 1/8-inch fillet weld will be permitted.

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

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

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

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

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

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

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

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

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

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

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

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

10. 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. The Contractor shall be ACI certified and have constructed a minimum of 10 concrete stamping projects. The Contractor shall submit a resume, including a minimum of three (3) references from concrete stamping projects constructed within two (2) years prior to the commencement of this project, to the Engineer for review and approval. The work under this Section shall not commence until the Engineer approves Contractor qualifications.

- (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 Part 5 of this specification.

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 12 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.

11. 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 Part 7(b) of this specification.

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.

12. 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.

13. 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 approved bonding agent 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.

14. 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.

15. CONCRETE FINISHING.

- (a) Finishing. A color hardener shall be broadcast evenly over a freshly screeded and floated concrete surface. The color hardener shall be worked into the concrete surface, integrating the color with the concrete. The hardener shall be allowed to be wet out with bleed water prior to floating. If necessary, additional material shall be broadcast and worked into the surface to intensify the final color appearance.

The concrete set time shall be monitored carefully. When concrete is set adequately to support worker's weight, color release shall be broadcast evenly over the slab surface at the rate of three pounds (3 lbs) per one hundred square feet (100 ft²).

The stamping operation shall be performed using the stamping tool kit, and shall be performed quickly and continuously across the entire pour as follows:

- (1) Place each tool on slab surface, aligned with each other and slab edges as pattern requires.
- (2) Step on back of stamping tool to create full depth impression in concrete.
- (3) Use special half tools and texture mats at slab edges, walls, and corners.
- (4) Broom texture surface where required.

The concrete slab shall be allowed to thoroughly cure prior to rinsing residual powder release from the surface. Ensure the surface is clean and apply protective waterproofing sealer to flush apron only.

Finishing Bridge Decks and Overlays.

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

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

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

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

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

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

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

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

- (2) Turf Drag. When specified on the Plans, the surface shall be given a suitable texture with an artificial turf drag made of molded polyethylene or other material or method

that will provide an acceptable finish. The selection of turf drag or other method should be capable of producing a surface texture with a horizontal peak-to-peak distance ranging from 0.02 inch to less than or equal to 0.25 inch and having a peak-to-peak amplitude of 0.005 inch to 0.8 inch. A turf drag material or other acceptable method that will minimize tearing and rolling of coarse aggregate from the surface shall be used.

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

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

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

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

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

If the 10-minute maximum, as specified in Part 16(c) of this specification, 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 Part 15(a)(1) of this specification 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 Part 15(a)(1) of this specification to ensure a smooth ride and seamless transition to the finishing machine's finished area.

16. 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 (Parts)	Effective Cure Time (Days)
Substructure	16(b)(1), (2), (3), (5), (7), (8)	7
Superstructure	16(b)(2), (8)	10 ¹
Retaining walls	16(b)(1), (2), (5), (6), (8)	7
Headwalls	16(b)(1), (2), (5), (6), (8)	7
Sidewalks, curbs, and gutters	16(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 Part 16(b)(4) of this specification. 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.

17. 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 by 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.

18. METHOD OF MEASUREMENT. The quantity of Special Provision (Stamped Concrete Island, 8 Inch) of the depth specified to be measured for payment will be the number of square yards of stamped concrete apron placed in the complete and accepted work.

19. BASIS OF PAYMENT. The accepted quantity of Special Provision (Stamped Concrete Island, 8 Inch) of the depth specified will be paid for at the Contract unit price per square yard. Payment will be full compensation for furnishing, handling, and placing the materials specified, including concrete, and for furnishing all labor, tools, equipment, and incidentals necessary to complete the work. 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 Special Provision (Stamped Concrete Island, 8 Inch) 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 Special Provision (Stamped Concrete Island, 8 Inch).

Costs for all materials, labor, and incidentals for stay-in-place corrugated metal forms and form filling materials will not be paid for separately, but will be considered incidental to the Contract unit prices for Special Provision (Stamped Concrete Island, 8 Inch).

Payment will be made under:

<u>Pay Item</u>	<u>Pay Unit</u>
900.675 Special Provision (Stamped Concrete Island, 8 Inch)	Square Yard

Traffic Management Plan
FOR
Hartford STP 0113(59)S & STP EH09(15)
Roundabouts on US Route 5 and Sykes Mountain Avenue,
Sidewalks along Sykes Mountain Avenue
January 28, 2020



This TMP and the information contained herein is for informational purposes only and has been developed for use by the Contractor in the development of any required site-specific traffic control plan. The information as contained in the TMP should not be considered “all inclusive” of conditions or scenarios that will be encountered on site during construction operations. Rather, it should be used in conjunction with all other contract plans, specifications, permits and other requirements when preparing any site-specific traffic control plan.

Table of Contents

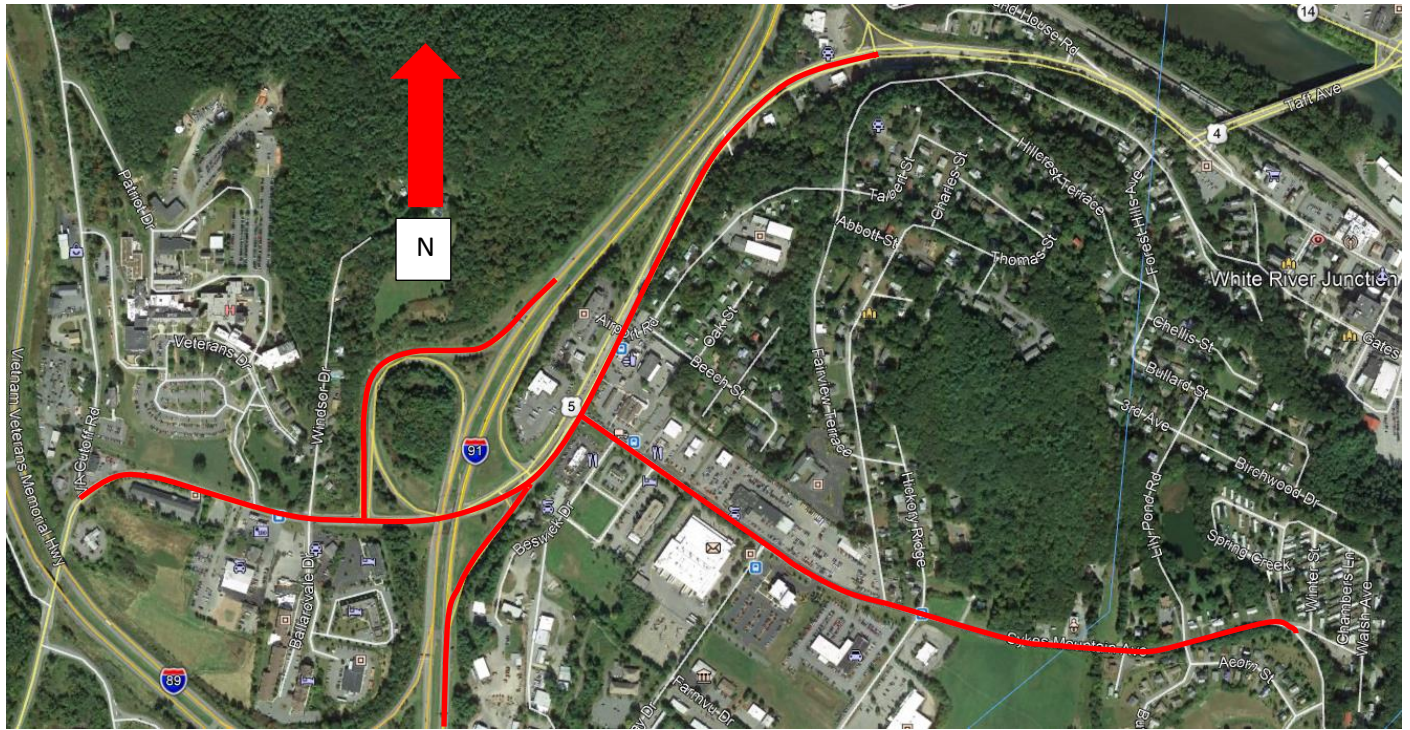
1.0	Project Description	3
2.0	TMP Team – Contact Information	7
3.0	Preliminary Work Zone Impact Assessment	10
4.0	Existing Conditions.....	16
5.0	Work Zone Impact Management Strategies	21
5.1	Temporary Traffic Control (TTC)	21
5.2	Transportation Operations (TO)	23
5.3	Public Information and Outreach (PI&O)	24
6.0	TMP Implementation/Monitoring.....	26
7.0	TMP Review Approvals	27
8.0	Appendices	28

1.0 Project Description

- Project location.
 - The project begins on US Route 5 approximately 400 feet south of the intersection with Sykes Mountain Avenue and continues north for about 800 feet. The project also extends from the intersection along Sykes Mountain Avenue approximately 3,500 feet to the intersection of Lily Pond Road. Roundabouts are to be constructed at the intersection of US Route 5/Sykes Mountain Avenue and the intersection of Sykes Mountain Avenue/Ralph Lehman Drive. Also included in the project is approach work on Beswick Drive and Ralph Lehman Drive, accommodations for bicycle and pedestrians, drainage, and the construction of raised median islands. Sidewalk improvements extend from the US Post Office driveway to the intersection of Lily Pond Road and Sykes Mountain Avenue.



- Work zone limits



- The work zone limits along US Route 5 begin at the intersection of the VA Cutoff Rd and continue to the intersection of US Route 4.
- The work zone limits for Sykes Mountain Avenue begin at the intersection of US Route 5 and continue to the intersection of Walsh Avenue.
- The work zone on I-91 includes the off ramps to US Route 5 and extend to the I-89 North off Ramp to I-91 North.
- The only anticipated work on the Interstate and Ramps are advance warning signs.
- Project background information.
 - To address concerns about the capacity of the existing US Route 5/Sykes Mountain Avenue intersection, a scoping study was initiated to evaluate alternatives for improving the capacity of the intersection. Following the completion of the scoping study, the Agency of Transportation was asked to reevaluate the project by adding roundabouts with a raised median island along Sykes Mountain Avenue. The roundabout alternative was approved, and the design was progressed.
 - Work to be performed under this project includes the construction of two (2) new roundabouts at the intersections of US Route 5 with Sykes Mountain Avenue and Sykes Mountain Avenue with Ralph Lehman Drive, shared use path for the accommodation of pedestrians and bicycles, street lighting, drainage, median islands and new landscaping.

- An additional project including sidewalk improvements from the US Post Office driveway to the intersection of Lily Pond Road will be constructed at the same time.
- Overview of roadways directly affected by the project work.
 - Work will extend varying lengths down each side road within the project limits, as shown on the contract plans. This work is limited to the side roads off of Sykes Mountain Avenue and include Beswick Drive and Ralph Lehman Drive. There are no side roads within the project limits on US Route 5.
- Overview of driveways directly affected by the project.
 - Work will extend varying lengths into each driveway within the project limits. Each driveway is unique, and the Contractor shall consult the contract plans, specifications and right-of-way agreements for specific information regarding impacts to each driveway.
 - The Contractor shall become familiar and abide by all conditions outlined in the easement documents that have been obtained for the projects, including but not limited to restrictions for driveway closures on the Credit Union property.
 - In general, the Contractor shall maintain access to each business during all working hours unless prior approval is obtained from **BOTH** the business owner/operator and the Resident Engineer.
 - The Contractor is encouraged to make regular contact with the Public Information Officer and the Business Owners to keep them apprised of the weekly construction operations schedule and potential impacts to traffic and customers.
- Specific traffic restrictions expected on major roadways during the work.
 - Traffic restrictions expected during construction include lane shifts, lane closures, restriction of turning movements and shoulder closures.
 - In general, the Contractor shall maintain a minimum of two (2) lanes of traffic (one in each direction) on both Sykes Mountain Avenue and US Route 5 during major construction.
 - Left turn lanes at the intersection of US Route 5 and Sykes Mountain Avenue from all directions, must be maintained in addition to the thru lane in each direction on US Route 5 and a right turn lane on Sykes Mountain Avenue unless and until the traffic flow has been altered to that of a roundabout.
 - The Contractor may hold traffic for up to 10 minutes in a one-hour period during non-peak traffic hours for the purpose of wearing course paving, striping and other activities with prior approval of the Resident Engineer. Peak hours of traffic volumes are assumed to be between 7 am and 10 am and 4 pm and 7 pm. The Contractor shall inform the Public Information Officer and Resident Engineer a minimum of one (1) day in advance of these anticipated stoppages of traffic.

- Other projects that may impact this project.
 - Lebanon – Hartford I-89 Bridge replacement. This project is anticipated to detour some I-89 ramp traffic through the project limits at night in the second year of its construction (anticipated to be 2021).
 - A Municipally managed sidewalk project on US 5 South of the project limits.
- Anticipated construction schedule
 - Target construction schedule: Construction activities are anticipated to begin in the spring of 2020 with major construction taking place during the summer and fall of 2020 and spring and summer of 2021. Minor construction activities (including final placement of final wearing course, striping and landscaping) are anticipated to be completed in the fall of 2021.
 - A winter shutdown is anticipated. The Contractor shall meet with both the Town of Hartford and VTrans local maintenance to review the condition of the project prior to a winter shut down to ensure the temporary shutdown condition does not pose any difficulties or problem for winter maintenance activities. The Town and VTrans may require the Contractor to correct issues identified during the meeting prior to winter shutdown.
 - The Contractor may elect to work through the winter at which time the Contractor may be expected to provide winter maintenance throughout the project limits for both VTrans and the Town of Hartford.

2.0 TMP Team – Contact Information

Defining the roles and responsibilities from the initial stages of the project helps to coordinate all the activities related to the TMP development, implementation, and monitoring. This section includes contact information and roles and responsibilities for major personnel involved in the project.

- **TMP Development Managers** – Agency/Municipality/Contractor personnel who have the primary responsibility for reviewing and approving the TMP.
- **TMP Implementation Task Leaders** – Agency/Municipality/Contractor personnel who manage, complete, oversee, or assist in specific transportation management tasks (examples include: temporary traffic control inspector/supervisor, resident engineer, public information officer, etc.) during the work.
- **Emergency Contacts** – Public or semi-public agencies (examples include: hospitals, schools, Hartford Public Works, etc.) that need to be kept informed about work zone activities that limit or restrict travel through the project and especially in the case of a road or business closure.
 - **Town of Hartford VT Town Manager** – Brannon Godfrey (802-295-9353, bgodfrey@hartford-vt.org)
 - **Town of Hartford Public Works Director** – Hannah Tyler (802-295-3622, htyler@hartford-vt.org)
 - **Dartmouth Hitchcock Medical Center** – (603-650-5000)
 - **US Department of Veterans Affairs Medical Center** – (802-295-9363)
 - **Hartford School District Superintendent** – Tom DeBalsi (802-295-8600, debalsit@hartfordschools.net)
 - **Hartford Fire Department Chief** – Scott Cooney (802-295-3232, fire@hartford-vt.org)
 - **Hartford Police Chief** – Philip Kasten (non-emergency 802-295-9425) pkasten@hartford-vt.org
 - **VTrans District 4** – Trevor Starr (802-295-8888, trevor.starr@vermont.gov)

Contact information and roles and responsibilities of major personnel involved in the project (These tables are to be modified as personnel change during the project).

TMP Development Managers			
Group:	Consultant		Town of Hartford
Name/Title:	Steven Ireland, P.E. / Project Manager	Name/Title:	Hannah Tyler / Director of Public Works
Other Info:	McFarland Johnson	Other Info:	Town of Hartford
Phone:	603-225-2978	Phone:	802-295-3622
Email:	sireland@mjinc.com	Email:	htyler@hartford-vt.org
Group:	Consultant		VTrans
Name/Title:	Gregory Goyette, P.E. / Project Manager	Name/Title:	Scott Robertson, P.E. / PM
Other Info:	Stantec	Other Info:	VTrans
Phone:	802-864-0165	Phone:	802-793-2395
Email:	krobie@dubois-king.com	Email:	scott.robertson@vermont.gov
Group:	Consultant		VTrans
Name/Title:	Ken Robie, P.E. / MPM	Name/Title:	Derek Kenison, P.E. / PM
Other Info:	DuBois & King	Other Info:	VTrans
Phone:	802-728-3376	Phone:	802-595-4316
Email:	greg.goyette@stantec.com	Email:	Derek.Kenison@vermont.gov

Roles and Responsibilities: Review and approval of the Traffic Management Plan prepared by the Contractor.

TMP Implementation Task Leaders			
Group:	Consultant		Agency
Name/Title:	Dillon Bianchi	Name/Title:	Hannah Tyler / Director of Public Works
Other Info:	GPI	Other Info:	Town of Hartford
Phone:	1-802-363-5325	Phone:	802-295-3622
Email:	dbianchi@gpinet.com	Email:	htyler@hartford-vt.org
Name/Title:	TBD / Public Information Officer	Name/Title:	
Other Info:		Other Info:	
Phone:		Phone:	
Email:	_	Email:	_

Roles and Responsibilities: Overseeing traffic management tasks on-site while construction activities are being executed.

TMP Emergency Service Contacts			
Group:	Fire / EMS		Police
Name/Title:	Scott D. Cooney / Fire Chief	Name/Title:	Phillip Kasten / Chief of Police
Other Info:		Other Info:	
Phone:	911 non-emergency 802-295-3232	Phone:	911 non-emergency 802-295-9425
Email:	scooney@hartford-vt.org	Email:	pkasten@hartford-vt.org

Roles and Responsibilities: Provide emergency response services as required.

Contractor			
Group:	Contractor		Superintendent
Name/Title:	TBD	Name/Title:	TBD
Other Info:	TBD	Other Info:	TBD
Phone:	TBD	Phone:	TBD
Email:	TBD	Email:	TBD
Roles and Responsibilities: Prepare and execute the Traffic Management Plan that addresses site specific vehicular and pedestrian mobility needs. Actively engage the emergency response personnel when the project is about to be advanced in a manner that could impact their operations or ability to serve the people.			
	Contractor's Competent Person		Contractor's Safety Officer
Name/Title:	TBD	Name/Title:	TBD
Other Info:	TBD	Other Info:	TBD
Phone:	TBD	Phone:	TBD
Email:	TBD	Email:	TBD

Roles and Responsibilities: Points of contact for concerns raised after the Traffic Management Plan is implemented and the Contractor's Superintendent is not available.

3.0 Preliminary Work Zone Impact Assessment

This Preliminary assessment of the work zone has been performed to help identify issues or uncover problem areas that should be considered during project development. However, the information contained herein is for informational purposes only and has been developed for use by the Contractor in the development of any required site-specific traffic control plan. The information as contained in the TMP should not be considered “all inclusive” of conditions or scenarios that will be encountered on site during construction operations. Rather, it should be used in conjunction with all other contract plans, specifications and other requirements when preparing any site-specific traffic control plan.

- **Does the project include a long-term closure and/or extended weekend closure?**
 - No. Due to the businesses in the area a long-term closure is not possible. A night time closure/detour may be acceptable for a night or two to complete the final wearing course of pavement. The Contractor shall obtain approval from the Resident Engineer prior to implementing any such night time closure or detour. Coordination with the Lebanon – Hartford I-89 project may require additional approvals depending on the date and times of such traffic control.
- **Can traffic be detoured?**
 - No. While “Thru” traffic on US Route 5 might be able to detour around the project limits it would be impractical to sign a partial detour route for “Thru” traffic when drivers unfamiliar with the area would be reluctant to know if they are “Thru” traffic or not. Additionally, removing traffic from the project limits may adversely impact businesses further.
 - The Town of Hartford is opposed to detouring traffic without first improving the existing Town roads proposed to be included as the detour route. Any request by the Contractor to alter this requirement shall include necessary improvements to local roads.
- **Is the existing shoulder sufficient to support traffic during construction?**
 - No. The existing shoulders are narrow with severely damaged pavement that cannot support traffic.
 - Once a proposed shoulder has been constructed it may be used as part of a traffic shift during various phases of construction. The contractor is cautioned to verify that shifted traffic utilizing the proposed shoulder can safely navigate turning movements into and out of businesses and side roads.
- **Are there pedestrian/bicycle facilities that must be maintained?**
 - Yes. The intent of the construction phasing plans within the TMP is to provide pedestrian access the length of the project along US Route 5 and Sykes Mountain Avenue during all phases of construction. Temporary pedestrian accommodations have been shown in Phase 1A and continued throughout the duration of the project. As the permanent pedestrian facilities are constructed, they are to remain in place and open to pedestrians during construction.

- A pedestrian traffic control plan will need to be developed by the contractor. This plan needs to account for the significant pedestrian volumes observed walking from the VA Hospital to the McDonalds.
- The contractor shall provide a Temporary Pedestrian Access Route (TPAR) for review and written approval by the resident engineer a minimum of three weeks before such plan is implemented. This plan shall detail the construction phasing and schedule and the specific methods of maintaining safe pedestrian access throughout the construction area. This plan shall provide the location and details of temporary construction signing, markings, barricades, channelizing devices, TPAR and methods to maintain access to adjacent properties, businesses, residences, etc.
- Pedestrian access shall be provided to all adjacent properties, buildings, residences, commercial properties and transit stops. This may include temporary walkways spanning the construction area.
- Signs and barricades shall be used to provide advance notice of the route of any pedestrian detours. The TPAR shall have a minimum unobstructed width of 4 feet. If the TPAR is less than 5 feet in width, a 5 foot by 5 foot passing space must be provided at least every 200 feet. The surface of the TPAR shall be firm, stable and slip-resistant and continuous with a minimum 80 inches overhead clearance for the length of the TPAR. The TPAR shall maintain the same level of accessibility and detectability as the facility that is being closed. The TPAR shall not lead pedestrians into conflicts with vehicles, equipment, or construction operations.
- When temporary crosswalks are utilized for the TPAR, temporary detectable warnings shall be placed at each end of the temporary crosswalks. The temporary crosswalk shall be delineated with temporary pavement markings or tape. The markings shall be parallel 12- inch-wide white lines placed 7 feet on center apart. It should be noted that curb parking shall be prohibited for at least 50 feet in advance of midblock crosswalks. Temporary crosswalk signs shall be provided for the crosswalk.
- Individual channelizing devices, tape, or rope used to connect individual devices and other discontinuous barriers and devices, pavement markings are not detectable by persons with visual disabilities. These measures do not provide acceptable path guidance on temporary or re-aligned sidewalks or other pedestrian facilities. Pedestrian channelizing devices shall include a continuously detectable bottom and top edge throughout the length of the facility such that it can be followed by pedestrians using long canes for guidance.
- Channelizing devices on both sides of the TPAR shall include a continuous solid top and bottom rails. The top edge of the top rail shall be between 32 inches and 38 inches above the ground level. The bottom rail shall be at least 5 inches wide, with the bottom edge of the bottom rail surface no higher than 2 inches above the ground.
- If the TPAR is adjacent to moving traffic, construction operations/equipment, or

drop-offs, then crashworthy channelizing devices that meet the requirements of the MUTCD shall be used.

- The contractor shall not store or place any construction materials, equipment or signs in the pedestrian path of travel.
- Provision of the TPAR and all its elements, including but not limited to signs, channelizing devices, barricades, temporary curb ramps, temporary pavement markings and other traffic control devices shall be considered incidental to contract Item 641.11 Traffic Control, All- Inclusive.
- It is anticipated that bicycles will ride in the lane with cars and take the full width of the lane through the project limits during construction.
- Bicyclist are to be expected and accommodations should be taken to ensure that obstacles, equipment, construction materials, traffic control devices, etc. Do not encroach into the bicycle path of travel. It is important that the cyclist's routes are free of ruts, sand and mud to prevent unsafe conditions for bicycle travel. All costs for accommodating Bicycles shall be included in the unit price bid for contract Item 641.11 Traffic Control, All- Inclusive.
- **Will temporary drainage structures be required?**
 - No.
- **Will traffic control extend onto Interstate 91 or Interstate 89?**
 - Yes. Traffic control signage is anticipated to extend onto Interstate 91 and may extend onto Interstate 89 if required by the Contractor's site-specific traffic control plan. Signs are anticipated to be standard advanced warning signs and shall be MUTCD compliant. Placement will be determined by the Contractor per MUTCD and VTrans standards.
 - No physical changes to the traffic patterns, lane widths, lane locations, speed limits or use of median crossovers are anticipated.
- **Are there any railroad crossings within the project limits?**
 - No.
- **Does it appear that maintaining traffic will require additional right-of-way?**
 - No. Additional right-of-way beyond what is shown on the plans is not anticipated and if required due to the Contractor's means and methods must be secured by the Contractor.
- **Could maintenance of traffic have impacts on existing or proposed utilities?**
 - Existing gas and water valves should be adjusted during construction in a manner to minimize traffic impacts.
 - Proposed water line construction has been noted to be complete in Phase 1A so that all testing requirements may be completed at one time for the water line.
 - Sewer work should be conducted during the appropriate phase of construction so as not to construct sewer lines under live traffic conditions whenever possible.

- The existing signal components, span wire and poles will need to be relocated or replaced for multiple phases of construction to maintain traffic and construct the proposed roadway. If the contractor elects to relocate existing signal components, span wire, or poles uniformed traffic officers shall be utilized to control the intersection while the signals are not in operation. This operation should be sufficiently detailed in the site-specific traffic control plan produced by the Contractor to ensure a smooth transition for traffic from one phase of construction to another.
- The Contractor shall coordinate the relocation of the new utility pole at approximately Station 34+56, Right 33 ft prior to completing construction on the south side of Sykes Mountain Avenue if the pole has not been relocated prior to the start of construction.
- The Contractor shall re-confirm with Consolidated Communications that the underground telephone line shown through the detention basin is in fact abandoned and can be removed as needed by the Contractor. The Contractor is advised to use extreme caution while installing the guardrail in the vicinity of the detention basin. The underground telephone line running parallel to US 5 is fiber optic and provides connectivity to thousands of customers in the area. Damage to this line would take significant time to repair and be extremely costly. Installation of this guardrail may require an extended lane shift for hand digging of guardrail posts dependent on the dig safe location of the underground telephone.
- **Can the contractor restrict the roadway throughout the duration of construction?**
 - The contractor may reduce the total travel lanes through the project limits to the following minimums:
 - US Route 5 northbound: one (1) through lane and one (1) left turn lane at the intersection of Sykes Mountain Avenue.
 - US Route 5 southbound: one (1) through lane and one (1) left turn lane at the intersection of Sykes Mountain Avenue.
 - Sykes Mountain Avenue eastbound: one (1) through lane
 - Sykes Mountain Avenue westbound: one (1) through/left lane and one (1) right turn lane at the intersection of US Route 5.
 - Additional restrictions must be approved by the Resident Engineer, coordinated with the Public Information Officer and may only occur during non-peak traffic hours (typically between 10am and 4pm or 7pm and 7am). Restrictions of this nature shall be detailed in the Contractor's site-specific traffic control plan.
 - At no time shall the Contractor restrict traffic on I-91 or I-89.
 - The Contractor shall monitor queue lengths of traffic in key locations and adjust signal timing and operations as necessary to prevent excessive queues. Key locations have been determined based on traffic simulations. Temporary signal timings for the I-91 North off ramp and US 5 intersection are provided in this TMP as a starting point for the Contractor. Adjustments to the signal timings are the responsibility of the Contractor during construction and may be necessary to control queue lengths in the following key locations:

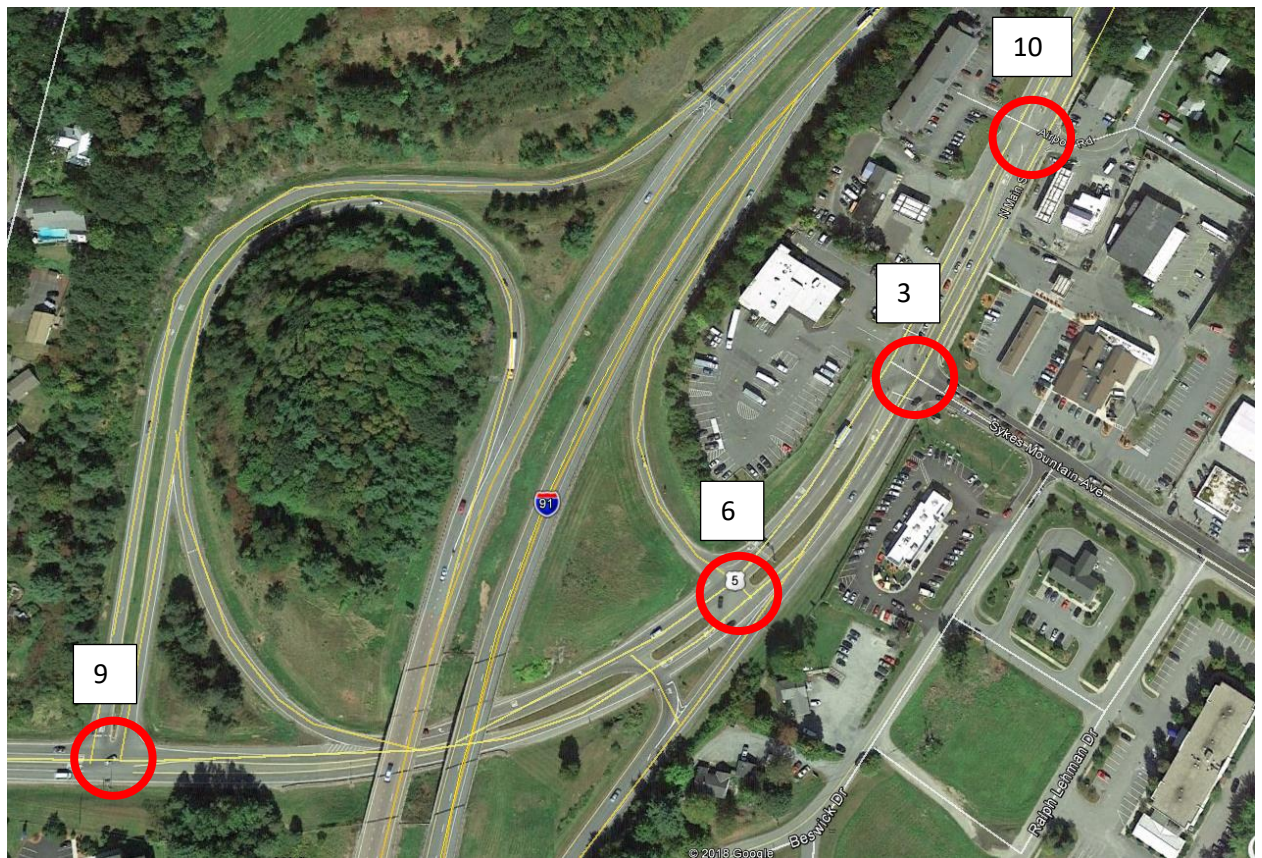
- I-91 North off ramp to US 5 – Maximum queue length 600 feet from the temporary signalized intersection with US 5. This maximum queue length approximates existing operational conditions of the off-ramp under stop sign control. Increasing this queue length would increase the likelihood of traffic backing up onto I-91 Northbound resulting in a stop condition on I-91.
 - I-91 South off ramp to US 5 - Maximum queue length 700 feet from the stop-controlled intersection with US 5. Traffic simulations predict the maximum queue length to be approximately 400 feet in the PM condition. If the Contractor observes queue lengths greater than 700 feet Uniformed Traffic Officers or a temporary signal may be required to prevent queue lengths from growing to the point, they reach the interstate.
 - US 5 North – Maximum queue length 800 feet from the temporary signalized intersection of US 5 and I-91 North Off Ramp. Queue lengths that block this intersection could significantly impact the queue lengths on the I-91 South off ramp.
 - US 5 South – Maximum queue length 800 feet from the intersection of Airport Rd and US 5.
 - Sykes Mountain Ave West – Maximum queue length 800 feet from the intersection of Sykes Mountain Ave and US 5 (this is approximately the intersection of Sykes Mountain Ave and Bowling Lane).
- Overnight (8pm to 6 am) the Contractor may include additional lane closures in their site-specific traffic control plan for the approval of the Resident Engineer.
- If night work is required, night work shall be performed in accordance with the National Cooperative Highway Research Program (NCHRP) Report 475 - "guide lines for design and operation of nighttime traffic control for highway maintenance and construction". The contractor shall submit a lighting plan, including equipment specification sheets, to the engineer for review a minimum of two (2) weeks prior to night work beginning. All costs associated with the design, approval and implementation of the lighting system will be considered incidental to contract item 641.11 Traffic Control, All- Inclusive.
- On Holidays and weekends construction activities shall not restrict the roadway beyond the total travel lane minimums listed above in this section.
- **Will the project timing be affected by special events:**
 - Due to the multi-year duration of the project, special events in the Town of Hartford will occur during construction. the Contractor shall coordinate traffic restrictions with the Public Information Officer and Resident Engineer to minimize impacts to events of this nature.
 - School bus routes are anticipated to be affected by increased delay through the project limits. Anticipated delays shall be coordinated with the school superintendent and the Public Information Officer.
 - Holidays are anticipated to have increased traffic volumes and the Contractor should anticipate not working a day prior to the holiday and a day following the holiday for the holidays listed:

- Memorial Day
 - Independence Day
 - Labor Day
 - Columbus Day – Indigenous Peoples’ Day
 - Veteran’s Day
 - Thanksgiving
 - Christmas
- **Is winter construction anticipated:**
 - No, the Contractor may choose to work through the winter dependent on weather conditions providing they can meet all material placement requirements within the plans and specifications. The minimum lane requirements stated previously must be maintained on a paved surface at all times during winter construction.
- **Are there any major projects to be considered in the region:**
 - The Lebanon – Hartford I-89 Bridge replacement project will significantly affect the traffic patterns in the area. The Contractor shall coordinate their site-specific traffic control plan with this project and provide contact information as requested by the Lebanon – Hartford I-89 bridge replacement project.
 - Hartford, STP EH10(18) – sidewalk project along US 5 in Hartford may be under construction in 2021. The Contractor shall coordinate their site-specific traffic control plan with this sidewalk project and provide contact information as requested.
 - Hartford, IM 091-2(90) – North and South Bridge project on I-91 in Hartford may be under construction in 2020 and 2021. The Contractor shall coordinate their site-specific traffic control plan with this interstate bridge project and provide contact information as requested.
- **Roadwork in the immediate area that may affect traffic or the Contractor’s operations:**
 - There is no specific road work or developments known that will affect the Contractor’s operations. The Contractor is advised that Sykes Mountain Avenue has seen recent growth and additional commercial growth is anticipated. This growth is not specifically known at this time and may be included at a later update of the TMP.

4.0 Existing Conditions

This section provides an overview of the existing conditions within the study area. The existing conditions generally include:

- **Roadway characteristics (history, number of lanes).**
 - US 5 – maintained by VTrans, two (2) thru lanes in each direction with additional turning lanes at significant intersections.
 - Sykes Mountain Avenue – maintained by the Town of Hartford, one (1) lane in each direction with a left turning lane at the US 5 signalized intersection.
 - Beswick Drive – maintained by the Town of Hartford, one (1) lane in each direction
 - Ralph Lehman Drive – private road (owned by Hartford Land Co.), one (1) lane in each direction
- **Historical traffic data (volumes, queue lengths, peak hours).**
 - See Appendix B for peak hour volumes of key locations. The picture below indicates four key intersections from which queue lengths must be monitored by the Contractor. The intersection numbers correspond to the intersection numbers for the traffic simulations.



- Existing queue lengths have been developed by traffic simulations and confirmed by observation at key locations as shown below. See Appendix C for traffic simulation queue lengths
 - AM conditions:
 - I-91 North off ramp to US 5 – Maximum queue length 1162 feet from the stop-controlled intersection with US 5.
 - I-91 South off ramp to US 5 - Maximum queue length 177 feet from the stop-controlled intersection with US 5.
 - US 5 North – Maximum queue length 21 feet from the stop-controlled intersection with I-91 North off ramp.
 - US 5 South – Maximum queue length 56 feet from the intersection of Airport Road and US 5.
 - Sykes Mountain Avenue Westbound – Maximum queue length 157 feet from the intersection with US 5.

Table 1; AM TMP queue length (ft) comparison:

Key Location:	Key Intersection	Existing queue	Simulated TCP queue	Maximum queue allowed
I-91 North off ramp	6	1162	299	600
I-91 South off ramp	9	177	120	700
US 5 North	6	21	182	800
US 5 South	10	56	31	800
Sykes Mountain Ave	3	157	187	800

- PM conditions:
 - I-91 North off ramp to US 5 – Maximum queue length 283 feet from the stop-controlled intersection with US 5.
 - I-91 South off ramp to US 5 - Maximum queue length 263 feet from the stop-controlled intersection with US 5.
 - US 5 North – Maximum queue length 137 feet from the stop-controlled intersection with I-91 North off ramp.
 - US 5 South – Maximum queue length 241 feet from the intersection of Airport Road and US 5.
 - Sykes Mountain Avenue Westbound – Maximum queue length 416 feet from the intersection with US 5.

Table 2; PM TMP queue length (ft) comparison:

Key Location:	Key Intersection	Existing queue	Simulated TCP queue	Maximum queue allowed
I-91 North off ramp	6	283	352	600
I-91 South off ramp	9	263	390	700
US 5 North	6	77	290	800
US 5 South	10	55	52	800
Sykes Mountain Ave	3	160	232	800

- **Traffic Operations (signal timings).**
 - Signal Timing charts for Sykes Mountain Ave and US 5: See Appendix D.
 - Signal Timing charts for I-91 North off ramp and US 5: See Appendix D.
- **Crash Data.**
 - The intersection of Sykes Mountain Avenue and US 5 is a high crash location per the VTrans High Crash Location Report. Current crash data may be obtained from the VTrans web site at: <http://apps.vtrans.vermont.gov/CrashPublicQueryTool/>
 - The intersection of Beswick Drive and Sykes Mountain Avenue has numerous crashes related to left turning movements. Current crash data may be obtained from the VTrans web site at: <http://apps.vtrans.vermont.gov/CrashPublicQueryTool/>
- **Pedestrian/bicycle facilities.**
 - There are existing sidewalks on US 5 between Airport Road and Sykes Mountain Avenue and on Sykes Mountain Avenue between Beswick Drive and Ralph Lehman Drive.
 - The TMP has been created to provide pedestrian access on at least one side of US 5 and Sykes Mountain Avenue as soon as possible from the start of construction and throughout the entire construction timeline. The Contractor’s site-specific traffic control plan is required to provide the same or better access as show in the TMP plans throughout the duration of construction.
 - Bicyclists are anticipated to travel through the project limits sharing the travel lane with cars and trucks.
 - The Contractor’s site-specific traffic control plan shall include ADA compliant temporary pedestrian facilities if existing or previously built facilities are temporarily closed during construction due to the Contractor’s means and methods.
- **Transit facilities and School Bus Stops.**
 - Green Mountain Transit (GMT) bus stops is located on Sykes Mountain Avenue at approximately Sta 34+00 Lt. The Contractor shall coordinate with GMT during construction to maintain access to the bus stop.
 - When school is in session, school bus stop accommodations are required. Bus stop locations shall be coordinated with the local school transportation coordinator. Additional flaggers will be stationed at these locations during typical morning pick-up and afternoon drop-off time periods while work is being performed in these areas.
- **Truck routes.**
 - Truck traffic will remain on the project roadways during construction.
 - The Contractor is advised that approximately twice per week a very large truck travels through the project limits carrying a pre-fabricated home. The Contractor shall coordinate with the Public Information Officer and Dale Snyder of Dale’s Homes Inc. (1-802-295-7216) to provide access.
 - Accommodations for large vehicle loads for haulers is required.
 - A Super Load Permit is required for any load that is 10’-6” wide or over 100 feet long or more than 108,000 lbs. Lane width reductions less than 11 feet are not anticipated. If the Contractor does reduce lane widths to less than 11 feet, coordination with the

DMV will be required for Super Load routing purposes. Contractor shall notify the DMV a minimum of fourteen (14) days in advance of any such lane restriction.

- **Local community and business concerns /issues.**
 - Emergency service vehicles shall always be allowed access through the project limits.
 - Access to local businesses shall always be maintained unless prior approval is obtained from the business owner/operator and the Resident Engineer. The Contractor shall coordinate any such action with the Public Information Officer.
 - Local business open signs shall be provided and placed by the Contractor to appropriately direct the traveling public through construction areas into the driveways of all open businesses. These signs shall be coordinated through the Public Information Officer and Resident Engineer.
 - These signs shall meet current MUTCD requirements for font and retro-reflectivity.
 - A typical application would be to provide a sign stating “Business Open” with an arrow pointing toward the business entrance when vehicles need to cross through a work area to enter the business.
 - Communications and accommodations for postal deliveries, newspaper routes, trash services and/or other delivery services interrupted by the project should be communicated with proper contacts and the Public Information Officer.

5.0 Work Zone Impact Management Strategies

This section provides an overview of various strategies deployed to improve the safety and mobility of work zones and reduce the work zone impacts on the road users, community, and businesses.

The strategies are grouped according to the following three (3) categories:

1. Temporary Traffic Control (TTC)
2. Transportation Operations (TO)
3. Public Information and Outreach (PI&O)

5.1 Temporary Traffic Control (TTC)

A TTC plan describes temporary traffic control measures to be used for facilitating road users through a work zone or incident area. The TTC plan plays a vital role in providing continuity of reasonably safe and efficient road user flow and highway worker safety when a work zone, incident or other event temporarily disrupts normal road user flow. The TTC plan shall be consistent with the provisions of the Manual on Uniform Traffic Control Devices (MUTCD) and the AASHTO Roadside Design Guide.

Typical applications from the latest edition of the MUTCD shall be used to facilitate road users through the work zone. These typical applications can be found in Part 6 of the MUTCD, Temporary Traffic Control. Proper use of these methods shall be used to ensure a safe and efficient road user flow and highway worker safety when a work zone, incident, or other event temporarily disrupts normal road user flow. A site-specific traffic control plan is required to be developed by the Contractor. The site-specific traffic control plan should utilize typical traffic control applications from the MUTCD and VTrans standards in its development. The Typical Applications provided below should not be considered “all inclusive” of conditions or scenarios that will be encountered on site during construction operations.

MUTCD Typical Applications recommended for this project include:

- Typical Application 3 – Work on the Shoulders
- Typical Application 4 – Short Duration or Mobile Operation on a Shoulder
- Typical Application 6 – Shoulder Work with Minor Encroachment
- Typical Application 10 – Lane Closure on a Two-Lane Road Using Flaggers
- Typical Application 12 – Lane Closure on a Two-Lane Road Using Traffic Control Signals
- Typical Application 15 – Work in the Center of a Road with Low Traffic Volumes
- Typical Application 21 – Lane Closure on the Near Side of an Intersection
- Typical Application 22 – Right-Hand Lane Closure on the Far Side of an Intersection
- Typical Application 26 – Closure in the Center of an Intersection

- Typical Application 27 – Closure at the Side of an Intersection
- Typical Application 28 – Sidewalk Detour or Diversion
- Typical Application 29 – Crosswalk Closures and Pedestrian Detours
- Typical Application 30 – Interior Lane Closure on a Multi-Lane Street
- Typical Application 34 – Lane Closure with a Temporary Traffic Barrier

These typical applications are not the intended to be the only traffic control applications that are available to the Contractor. The Contractor shall develop site-specific traffic control plans.

Temporary traffic control strategies recommended for use:

- Construction phasing/staging
- Lane shifts or short-term closures during off peak hours
- One-lane, two-way controlled operation
- Night work
 - A temporary lighting plan will be required if night work is performed. This lighting and plan shall be considered incidental to the work performed at night.
- Weekend work
- Work hour restrictions for peak travel
- Pedestrian/bicycle access improvements
- Business access improvements

Traffic control devices recommended for use:

- Temporary signs
- Arrow Boards
- Portable Changeable Message Signs *
- Channelizing devices
- Temporary pavement markings
- Flaggers
- Uniformed Traffic Officers (UTO's)
- Temporary traffic signals
- Portable concrete barrier
- Temporary impact attenuators
- Temporary/portable lighting devices

* The Portable Changeable Message Signs (PCMS) and the messages displayed should not replace any of the signing detailed in the MUTCD and should not be used if standard traffic control devices adequately provide the information the motorists need to traverse the work zone safely. The PCMS shall consist of either one or two phases, typically, a phase shall consist of up to three lines of eight characters per line. The PCMS should be used as a supplement and not as a substitute for conventional static signs and pavement markings. The PCMS should communicate what information motorist will need to know, unnecessary information should be avoided. Messages should be updated periodically to describe current

work activity so that the PCMS continues to command attention of the motorists. Care should be given to avoid repeating messages covered by static signs.

Project coordination strategies:

- Other area projects (Lebanon-Hartford I-89, Municipally managed sidewalk project Hartford STP EH10(18) and an Interstate 91 Bridge project Hartford, IM 091-2(90))
- Utilities
- Right-of-way
- Public transit (Bus Transit Company)
- Local Businesses (McDonalds, Ryder, Sunoco, Car Dealerships, Bank, Hotel Restaurant...etc.)
- Public Information Officer

General conditions project wide.

- During non-work periods, all equipment shall be moved to a location off paved shoulders and outside the clear zone or protected by traffic barrier or guardrail.
- Flaggers shall be required to attend an approved four-hour training course. The contractor shall provide the engineer with copies of all certifications obtained for each flagger, incidental to Item 530. 15.
- All personnel serving as a trained flagger shall wear safety apparel meeting requirements of ISEA "American National Standard of High Visibility Apparel" and labeled as meeting the ANSI 107-2004 standard performance for class 2 and class 3 risk exposure. Individuals engaged in traffic control shall wear the high-visibility vests required for both day and nighttime work situations, without exception.

5.2 Transportation Operations (TO)

The TO component shall include the identification of strategies to mitigate impacts of the work zone on the operation of the transportation system within the work zone impact area. The work zone impact area consists of the immediate work zone as well as the affects to the surrounding roadways and communities.

Additional information can be acquired from the “Workzone Safety and Mobility Guidance Document”

http://vtransengineering.vermont.gov/sites/aot_program_development/files/documents/publications/WorkZoneSafetyMobilityGuidanceDocument.pdf

and the “Workzone Safety and Mobility Guidance Document – Appendix A Temporary Traffic Control Devices”

http://vtransengineering.vermont.gov/sites/aot_program_development/files/documents/publications/WorkZoneSafetyMobility%20Appendix%20A%20%20Temp.%20Traffic%20Control%20Devices%209-12.pdf

TO management strategies recommended for use:

- Variable work hours
- Signal timing/coordination improvements
- Temporary traffic signals (I-91 Northbound off-ramp with US 5 and US 5 with Sykes Mountain Avenue)
- Construction safety supervisors/inspectors
- Monitoring traffic queue lengths
- Monitoring road user flow
- Media coordination
- Incident/Emergency management coordination
- Incident/Emergency response plan
- Cooperative police enforcement
- Increased penalties for work zone violations

The Contractor shall develop a contingency plan that addresses specific actions that will be taken to restore or minimize impacts on traffic when the congestion or delay exceeds original estimates due to unforeseen events. This includes work zone crashes, traffic volumes higher than predicted, delayed pick up of lane closures, etc.

The contingency/incident management plan shall include a collaborative effort with the emergency response and public safety community. Development of such a plan is crucial in the early phases to properly integrate the concerns of the first responder personnel. The Contractor shall include key components, such as the following six items, in developing the plan.

- Incident Detection and Verification
- Incident Classification and Response
- Site Management
- Site Clearance
- Motorist Information
- Evaluation

5.3 Public Information and Outreach (PI&O)

Public Information and Outreach can be important for the success of all projects. This project will create an impact on travelers, businesses, residents, and truckers. Properly informing these stakeholders of what to expect during construction will ensure proper public support and reduce problems during construction. It is important to be upfront and clear on the impacts that this project will have on the community, and as such the following measures are recommended:

- Social Media to inform the public
- The Town of Hartford, VT website
- Fact Sheets
- Business concerns/issues

Public awareness strategies recommended for use:

- Press kits
- Brochures and mailers
- Press releases/media alerts
- Project information center
- Project website – possibly supported from the Town of Hartford VT website
- Public meetings/hearings
- Coordination with media/school/business/emergency services

Motorist information strategies recommended for use:

- Radio traffic news
- Portable changeable message signs
- Email alerts

6.0 TMP Implementation/Monitoring

The TMP needs to be implemented in the field, as specified, unless any changes have been approved by the agency. To help ensure appropriate implementation, 23 CFR 630 Subpart J § 630.1012(e) requires that the Town of Hartford, VT and the Contractor each designate a trained person at the project level who has the primary responsibility and sufficient authority for implementing the TMP and other safety and mobility aspects of the project.

Monitoring the performance of the TMP during the construction phase is important to establish whether the predicted impacts closely resemble the actual conditions in the field, whether the TMP strategies are effective in managing the impacts. TMP monitoring is needed for both oversight and evaluation purposes, such as:

- Monitoring and documenting TMP changes during construction.
 - Including signal timing adjustments for improved queue length control
- Preparing an evaluation of the TMP, including lessons learned.
- Refining work zone impact analysis processes and models based on outcomes.

TMP monitoring includes details of any specific observational, logging, and/or recording activities conducted during the project for work zone performance measurement purposes. The Contractor shall collect data as needed to effectively manage and monitor the performance of the TMP. Examples of possible performance measures (data collection) for TMP monitoring include:

- Traffic Volume
- Queue lengths
- Delay time
- Travel time
- Number of crashes/incidents
- Incident response and clearance times
- Type and frequency of legitimate complaints received

The Contractor shall meet with the TMP Implementation Task leaders on a regular basis to discuss and assess the safety and mobility impacts of the project work zone to date. Data collected by the Contractor shall be provided to help assess how well the TMP is managing the project impacts and to identify and address issues before they become problems. It also provides the opportunity to verify that all key stakeholders and project officials have been receiving timely notifications where required.

7.0 TMP Review Approvals

The TMP and changes to the TMP must be approved by the Town of Hartford, VTrans District 4 Maintenance, the Resident Engineer and the TMP Implementation Task Leaders prior to implementation.

8.0 Appendices

- Appendix A – Potential Construction Sequencing Plans
- Appendix B – Peak Hour Traffic Volumes at Key Locations
- Appendix C – Traffic Simulation Queue Length Report
- Appendix D – Temporary Signal Timings

APPENDIX A

Potential Construction Sequencing Plans

Phase 1 – Removal of Median Islands

Work hours: Normal Daytime

Description: Remove the center median islands on US Route 5 and construct minimum of 5 inches of temporary pavement in median island locations from Sta 9+50 to Sta 19+20. Shift traffic with barrels and other traffic control devices as needed in this and subsequent phases. Construct temporary signal at I-91 Northbound Off Ramp and US Route 5 intersection. Adjust existing signal timings at US Route 5 and Sykes Mountain Avenue intersection. Adjust signal head locations as needed and adjust span wire by setting pole at Sta 15+42 Rt, back 8 feet inline with existing span wire. Construct detention basin and associated drainage for project outfall. Construction of all water line work.

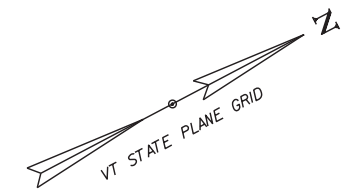
Impact to Existing Traffic Operations:

- Two-way traffic with left turn lanes on US Route 5 can be maintained.
- US Route 5 will be constrained to one through lane North and one through lane South.
- Temporary reconfiguration of the I-91 Northbound Off Ramp intersection.
 - Left turning traffic headed South on US Route 5 will line up across from the I-91 Northbound On Ramp entrance
 - 3 poles and 2 span wires with temporary signal heads will control the flow of traffic
- Flagger and UTO control
 - Of the intersections during signal work
 - As required to control traffic for the water line construction
 - As required for the stormwater and associated drainage construction
 - Flagger can only stop and release traffic, but a UTO can direct traffic

Risk and possible mitigation measures:



- **Risk:** Varying lane shifts through the project limits as the Contractor accesses the existing median islands and constructs the water lines.
Mitigation Measure: Well delineated work area with Flaggers, UTO's, approach signage, barrels, cones and other associated traffic control devices. Regular driving reviews by the contractor can identify damaged or moved devices early.
- **Risk:** Trench cuts in the pavement will need to be backfilled after each working day. If these trenches are not paved in a timely manner, it will lead to additional maintenance for the Contractor and can reduce mobility through the project site via large bumps or potholes in the travel way.
Mitigation Measure: Conditions should be included that set parameters for the contractor to pave in trench cuts with temporary pavement at the end of each work week (or other maximum length of trench) for all pipe trenches. This will affect production, but will allow for a paved surface for all public travel areas and reduce maintenance of the roadway for the Contractor.

- **Risk:** Traffic Queue lengths blocking other intersections.
Mitigation Measure: Conditions should be monitored by the Contractor, especially during peak hours. See Section 4 of the TMP for maximum queue length allowed during AM and PM peak hours.



PHASE I

LEGEND

WORK AREA UNDER TRAFFIC CONDITIONS	
WORK AREA CLOSED TO TRAFFIC	



PROJECT NAME: HARTFORD	PLOT DATE: 10/15/2019
PROJECT NUMBER: STP 0113(59)S	DRAWN BY: M. LOVETT
FILE NAME: zc334bdr_tsphl.dgn	CHECKED BY: B. COLBURN
PROJECT LEADER: S. IRELAND	SHEET 1 OF 8
DESIGNED BY: S. IRELAND	
TRAFFIC SAFETY PLAN - PHASE I	

Phase 1A – Construction of the Left side of US Route 5

Work hours: Normal Daytime with Possible Night Work in some locations

Description: Adjust signal head locations at the intersection of US Route 5 and Sykes Mountain Avenue for lane locations during Phase 1A to allow the Contractor space for full box reconstruction of the left side of US Route 5. Construct curbing, sidewalks, drainage, drive entrances and all work to binder grade within limits shown on the Traffic Safety Plan Phase 1A. Maintain access to all businesses and Town roads during construction.

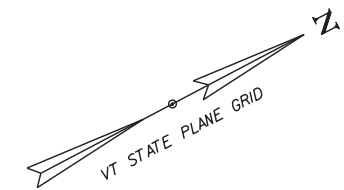
Impact to Existing Traffic Operations:

- US Route 5 will be constrained to one through lane North and one through lane South.
- Temporary reconfiguration of the I-91 Northbound Off-Ramp intersection continues.
- Flagger and UTO control
 - Of the intersections during signal work
 - As required to control traffic for business access
 - As required for the stormwater and associated drainage construction
 - Flagger can only stop and release traffic, but a UTO can direct traffic

Risk and possible mitigation measures:



- **Risk:** Varying lane shifts and rerouting of vehicles through the project limits as the Contractor accesses the existing driveway entrances.
Mitigation Measure: Well delineated work area with Flaggers, UTO's, approach signage, barrels, cones and other associated traffic control devices. Good communication with property abutters will be required. The Contractor may choose to perform some work at night to more easily maintain access. Night work will require a lighting plan developed by the Contractor. The lighting plan shall be considered incidental to work performed at night.
- **Risk:** Trench cuts in the pavement will need to be backfilled after each working day. If these trenches are not paved in a timely manner, it will lead to additional maintenance for the Contractor and can reduce mobility through the project site via large bumps or potholes in the travel way. Drop offs along the edge of a trench are a hazard to vehicles and will not be allowed during non-work hours.
Mitigation Measure: Conditions should be included that set parameters for the contractor to pave in trench cuts with temporary pavement at the end of each work week (or other maximum length of trench) for all pipe trenches. This will affect production, but will allow for a paved surface for all public travel areas and reduce maintenance of the roadway for the Contractor. Drop offs along any travel lane shall comply with VTrans standards T-35 & T-36.
- **Risk:** Traffic Queue lengths blocking other intersections will lead to significant delays and will be considered unacceptable.

Mitigation Measure: Conditions should be monitored by the Contractor, especially during peak hours. See Section 4 of the TMP for maximum queue length allowed during AM and PM peak hours.



PHASE IA

LEGEND

WORK AREA UNDER TRAFFIC CONDITIONS	
WORK AREA CLOSED TO TRAFFIC	



PROJECT NAME: HARTFORD	PLOT DATE: 10/15/2019
PROJECT NUMBER: STP 0113(59)S	DRAWN BY: M. LOVETT
FILE NAME: zc334bdr_tsphla.dgn	CHECKED BY: B. COLBURN
PROJECT LEADER: S. IRELAND	SHEET 2 OF 8
DESIGNED BY: S. IRELAND	
TRAFFIC SAFETY PLAN - PHASE IA	

Phase 2 – Construction of the Southeast Corner of US Route 5 and Sykes Mountain Avenue

Work hours: Normal Daytime with possible Night Work in some locations.

Description: Adjust signal head locations at the intersection of US Route 5 and Sykes Mountain Avenue for lane locations during Phase 2 to allow the Contractor space for full box reconstruction of the Southeast corner of US Route 5 and Sykes Mountain Avenue. Construct curbing, sidewalks, drainage, drive entrances and all work to binder grade within limits shown on Traffic Safety Plan Phase 2. Maintain access to all businesses and Town roads during construction. Construct temporary pedestrian access with Temporary Traffic Barrier or other approved barrier to separate pedestrians from the work area and from traffic. All ends of Temporary Traffic Barrier shall be sloped out of the clear zone or protected from errant vehicles. Contractor to install a temporary impact attenuator to protect span wire poles and any other obstruction from being struck.

Impact to Existing Traffic Operations:

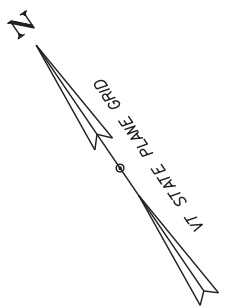
- US Route 5 will be constrained to one through lane North and one through lane South.
- Temporary reconfiguration of the I-91 Northbound Off Ramp intersection continues.
 - Truck turning movements may require a single lane for I-91 Northbound Off Ramp traffic to enter onto US Route 5. Work to be performed during non-peak hours under traffic conditions.
- Flagger and UTO control
 - Of the intersections during signal work
 - As required to control traffic for business and local road access
 - As required for the stormwater and associated drainage construction
 - Flagger can only stop and release traffic, but a UTO can direct traffic
- Temporary pedestrian access
 - May require multiple shifts of Temporary Traffic Barrier near the I-91 Northbound Off Ramp intersection with US Route 5
 - Temporary crosswalk markings will be maintained by the Contractor.
 - Contractor shall provide pedestrian access through work areas adjacent to construction along the Southeast edge of US 5 and Sykes Mountain Avenue.

Risk and possible mitigation measures:

- **Risk:** Varying lane shifts and rerouting of vehicles through the project limits as the Contractor accesses the existing driveway entrances.
Mitigation Measure: Well delineated work area with Flaggers, UTO's, approach signage, barrels, cones and other associated traffic control devices. Good communication with property abutters and potential night work will be required to maintain access.
- **Risk:** Trench cuts in the pavement will need to be backfilled after each working day. If these trenches are not paved in a timely manner, it will lead to additional maintenance for

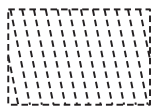
the Contractor and can reduce mobility through the project site via large bumps or potholes in the travel way. Drop offs along the edge of a trench are a hazard to vehicles and will not be allowed during non-work hours.


- **Mitigation Measure:** Conditions should be included that set parameters for the contractor to pave in trench cuts with temporary pavement at the end of each work week (or other maximum length of trench) for all pipe trenches. This will affect production but will allow for a paved surface for all public travel areas and reduce maintenance of the roadway for the Contractor. Drop offs along any travel lane shall comply with VTrans standards T-35 & T-36.
- **Risk:** Traffic Queue lengths blocking other intersections will lead to significant delays and will be considered unacceptable.
- **Mitigation Measure:** Conditions should be monitored by the Contractor, especially during peak hours. See Section 4 of the TMP for maximum queue length allowed during AM and PM peak hours.
- **Risk:** Maintaining pedestrian access during construction.
Mitigation Measure: Conditions should be monitored by the Contractor to ensure the temporary access route is ADA compliant during construction. The route should be reviewed weekly for conformance and all deficiencies addressed immediately. Temporary Traffic Barrier may require multiple locations shifts depending on the Contractor's mean and methods.
- **Risk:** Vehicle collision with Temporary traffic Barrier.
Mitigation Measure: All ends of Temporary Traffic Barrier shall be sloped out of the clear zone or protected from errant vehicles.

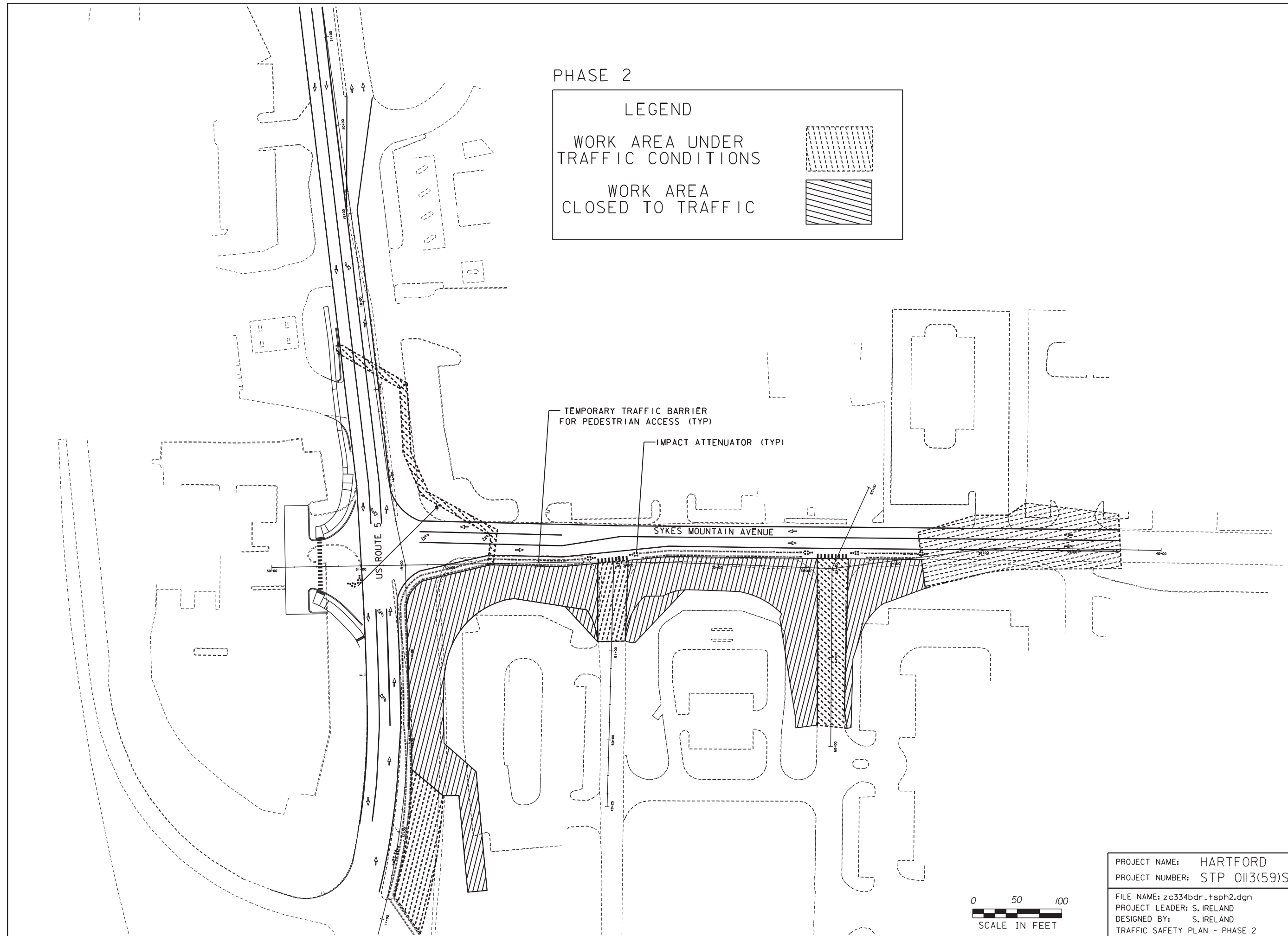


PHASE 2

LEGEND

WORK AREA UNDER TRAFFIC CONDITIONS 

WORK AREA CLOSED TO TRAFFIC 



PROJECT NAME:	HARTFORD	PLOT DATE:	10/15/2019
PROJECT NUMBER:	STP 0113(59)S	DRAWN BY:	M. LOVETT
FILE NAME:	zc334bdr_tsph2.dgn	CHECKED BY:	B. COLBURN
PROJECT LEADER:	S. IRELAND	TRAFFIC SAFETY PLAN - PHASE 2	SHEET 3 OF 8

Phase 3 – Construction of the center of Sykes Mountain Avenue

Work hours: Normal Daytime

Description: Adjust signal head locations at the intersection of US Route 5 and Sykes Mountain Avenue for lane locations during Phase 3 to allow the Contractor space for full box reconstruction of the center of Sykes Mountain Avenue. Maintain access to all businesses and Town Roads during construction. Pave full width of work area and do not install median island at this time. Pedestrian access shall be maintained on sidewalks constructed under Phase 1A and Phase 2 for the remainder of the project.

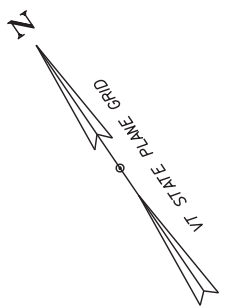
Impact to Existing Traffic Operations:

- US Route 5 will be constrained to one through lane North and one through lane South.
- Temporary reconfiguration of the I-91 Northbound Off Ramp intersection continues.
- Flagger and UTO control
 - Of the intersections during signal work
 - As required to control traffic for business and local road access
 - As required for the full box re-construction on Sykes Mountain Avenue
 - Flagger can only stop and release traffic, but a UTO can direct traffic

Risk and possible mitigation measures:

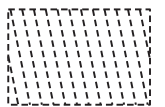
- **Risk:** Varying lane shifts and rerouting of vehicles through the project limits as the Contractor accesses the existing driveway entrances.
Mitigation Measure: Well delineated work area with Flaggers, UTO's, approach signage, barrels, cones and other associated traffic control devices. Good communication with property abutters will be required to maintain access.
- **Risk:** Full box re-construction of the pavement will need to be backfilled after each working day. If these areas are not paved in a timely manner, it will lead to additional maintenance for the Contractor and can reduce mobility through the project site via large bumps or potholes in the travel way. Drop offs along the edge of a trench are a hazard to vehicles and will not be allowed during non-work hours.
Mitigation Measure: Conditions should be included that set parameters for the contractor to complete this work in a two-week period and permanently pave half of the work area at the end of the first week. The remainder of the area shall be paved by the end of the second week. This will affect production, but will allow for a paved surface for all public travel areas and reduce maintenance of the roadway for the Contractor. Drop offs along any travel lane shall comply with VTrans standards T-35 & T-36.
- **Risk:** Traffic Queue lengths blocking other intersections will lead to significant delays and will be considered unacceptable.


Mitigation Measure: Conditions should be monitored by the Contractor, especially during peak hours. See Section 4 of the TMP for maximum queue length allowed during AM and PM peak hours.

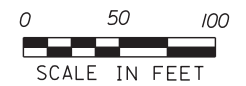
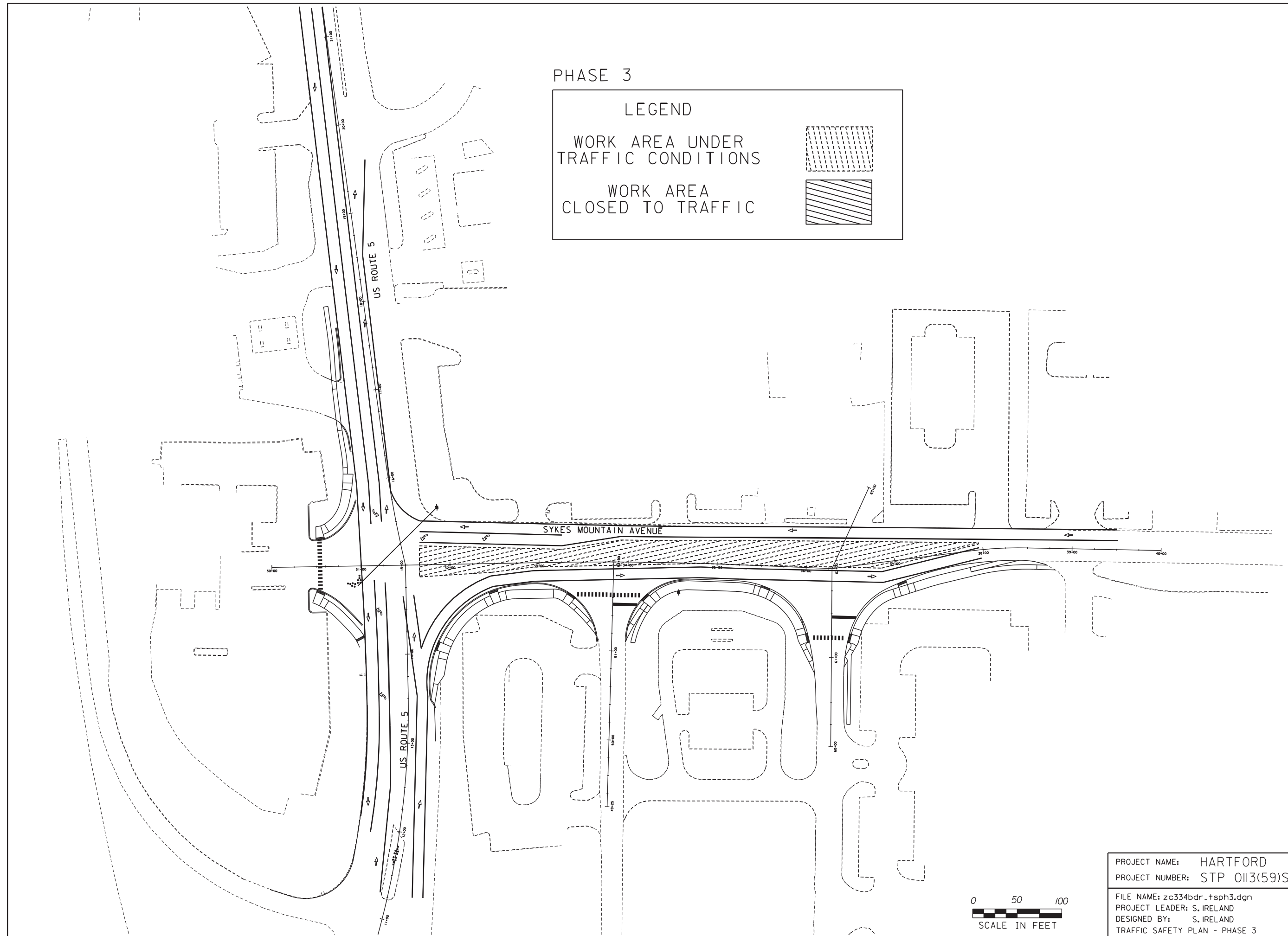


PHASE 3

LEGEND

WORK AREA UNDER TRAFFIC CONDITIONS 

WORK AREA CLOSED TO TRAFFIC 



PROJECT NAME:	HARTFORD	PLOT DATE:	10/15/2019
PROJECT NUMBER:	STP 0113(59)S	DRAWN BY:	M. LOVETT
FILE NAME:	zc334bdr_tsph3.dgn	CHECKED BY:	B. COLBURN
PROJECT LEADER:	S. IRELAND	SHEET	4 OF 8
DESIGNED BY:	S. IRELAND		
TRAFFIC SAFETY PLAN - PHASE 3			

Phase 4 – Construction of the Northeast Corner of US Route 5 and Sykes Mountain Avenue

Work hours: Normal Daytime with Possible Night Work in some locations

Description: Adjust signal head locations at the intersection of US Route 5 and Sykes Mountain Avenue for lane locations of Phase 4 to allow the Contractor space for full box reconstruction of the Northeast corner of US Route 5 and Sykes Mountain Avenue. Construct curbing, sidewalks, drainage, drive entrances and all work to binder grade within limits shown on Traffic Safety Plan Phase 4. Maintain access to all businesses and Town Roads during construction.

Impact to Existing Traffic Operations:

- US Route 5 will be constrained to one through lane North and one through lane South.
- Temporary reconfiguration of the I-91 Northbound Off Ramp intersection continues.
- Flagger and UTO control
 - Of the intersections during signal work
 - As required to control traffic for business and local road access
 - Flagger can only stop and release traffic, but a UTO can direct traffic

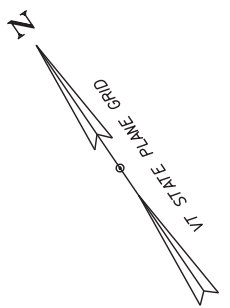
Risk and possible mitigation measures:

- **Risk:** Varying lane shifts and rerouting of vehicles through the project limits as the Contractor accesses the existing driveway entrances.
Mitigation Measure: Well delineated work area with Flaggers, UTO's, approach signage, barrels, cones and other associated traffic control devices. Good communication with property abutters and potential night work will be required to maintain access.
- **Risk:** Trench cuts in the pavement will need to be backfilled after each working day. If these trenches are not paved in a timely manner, it will lead to additional maintenance for the Contractor and can reduce mobility through the project site via large bumps or potholes in the travel way. Drop offs along the edge of a trench are a hazard to vehicles and will not be allowed during non-work hours.
Mitigation Measure: Conditions should be included that set parameters for the contractor to pave in trench cuts with temporary pavement at the end of each work week (or other maximum length of trench) for all pipe trenches. This will affect production but will allow for a paved surface for all public travel areas and reduce maintenance of the roadway for the Contractor. Drop offs along any travel lane shall comply with VTrans standards T-35 & T-36.
- **Risk:** Traffic Queue lengths blocking other intersections will lead to significant delays and will be considered unacceptable.

Mitigation Measure: Conditions should be monitored by the Contractor, especially during peak hours. See Section 4 of the TMP for maximum queue length allowed during AM and PM peak hours.

- **Risk:** Maintaining bus stop during construction.

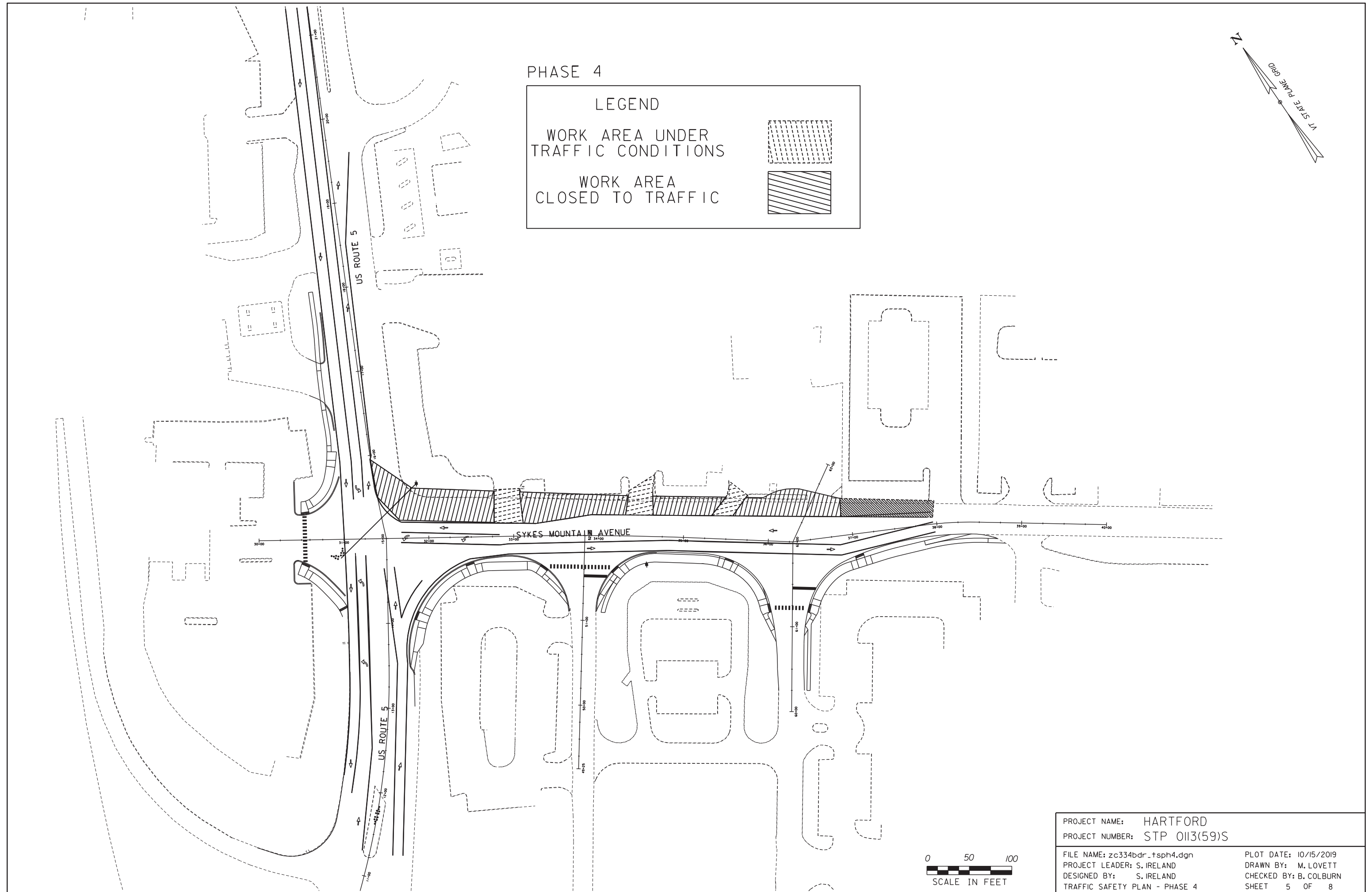
Mitigation Measure: Contractor shall ensure a temporary bus stop be provided during construction. The location shall be coordinated with the GMT and shall make provisions for ADA access. Temporary signage may be required.



PHASE 4

LEGEND

WORK AREA UNDER TRAFFIC CONDITIONS	
WORK AREA CLOSED TO TRAFFIC	



PROJECT NAME:	HARTFORD	PLOT DATE:	10/15/2019
PROJECT NUMBER:	STP 0113(59)S	DRAWN BY:	M. LOVETT
FILE NAME:	zc334bdr_tsph4.dgn	CHECKED BY:	B. COLBURN
PROJECT LEADER:	S. IRELAND	SHEET	5 OF 8
DESIGNED BY:	S. IRELAND		
TRAFFIC SAFETY PLAN - PHASE 4			

Phase 5 – Construction of the remaining Right side of US Route 5

Work hours: Normal Daytime with Possible Night Work in some locations

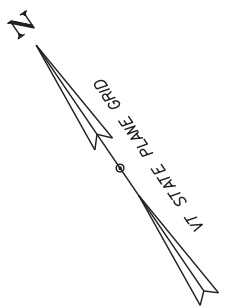
Description: Adjust signal head locations at the intersection of US Route 5 and Sykes Mountain Avenue for lane locations of Phase 5 to allow the Contractor space for full box reconstruction of the Northeast corner of US Route 5 and Sykes Mountain Avenue. Construct curbing, sidewalks, drainage, drive entrances and all work to binder grade within limits shown on Traffic Safety Plan Phase 5. Maintain access to all businesses and Town Roads during construction.

Impact to Existing Traffic Operations:

- US Route 5 will be constrained to one through lane North and one through lane South.
- Temporary reconfiguration of the I-91 Northbound Off Ramp intersection continues.
- Flagger and UTO control
 - Of the intersections during signal work
 - As required to control traffic for business and local road access
 - Flagger can only stop and release traffic, but a UTO can direct traffic

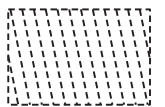
Risk and possible mitigation measures:


- **Risk:** Varying lane shifts and rerouting of vehicles through the project limits as the Contractor accesses the existing driveway entrances.
Mitigation Measure: Well delineated work area with Flaggers, UTO's, approach signage, barrels, cones and other associated traffic control devices. Good communication with property abutters and potential night work will be required to maintain access.
- **Risk:** Trench cuts in the pavement will need to be backfilled after each working day. If these trenches are not paved in a timely manner, it will lead to additional maintenance for the Contractor and can reduce mobility through the project site via large bumps or potholes in the travel way. Drop offs along the edge of a trench are a hazard to vehicles and will not be allowed during non-work hours.
Mitigation Measure: Conditions should be included that set parameters for the contractor to pave in trench cuts with temporary pavement at the end of each work week (or other maximum length of trench) for all pipe trenches. This will affect production but will allow for a paved surface for all public travel areas and reduce maintenance of the roadway for the Contractor. Drop offs along any travel lane shall comply with VTrans standards T-35 & T-36.
- **Risk:** Traffic Queue lengths blocking other intersections will lead to significant delays and will be considered unacceptable.
Mitigation Measure: Conditions should be monitored by the Contractor, especially during peak hours. See Section 4 of the TMP for maximum queue length allowed during AM and PM peak hours.

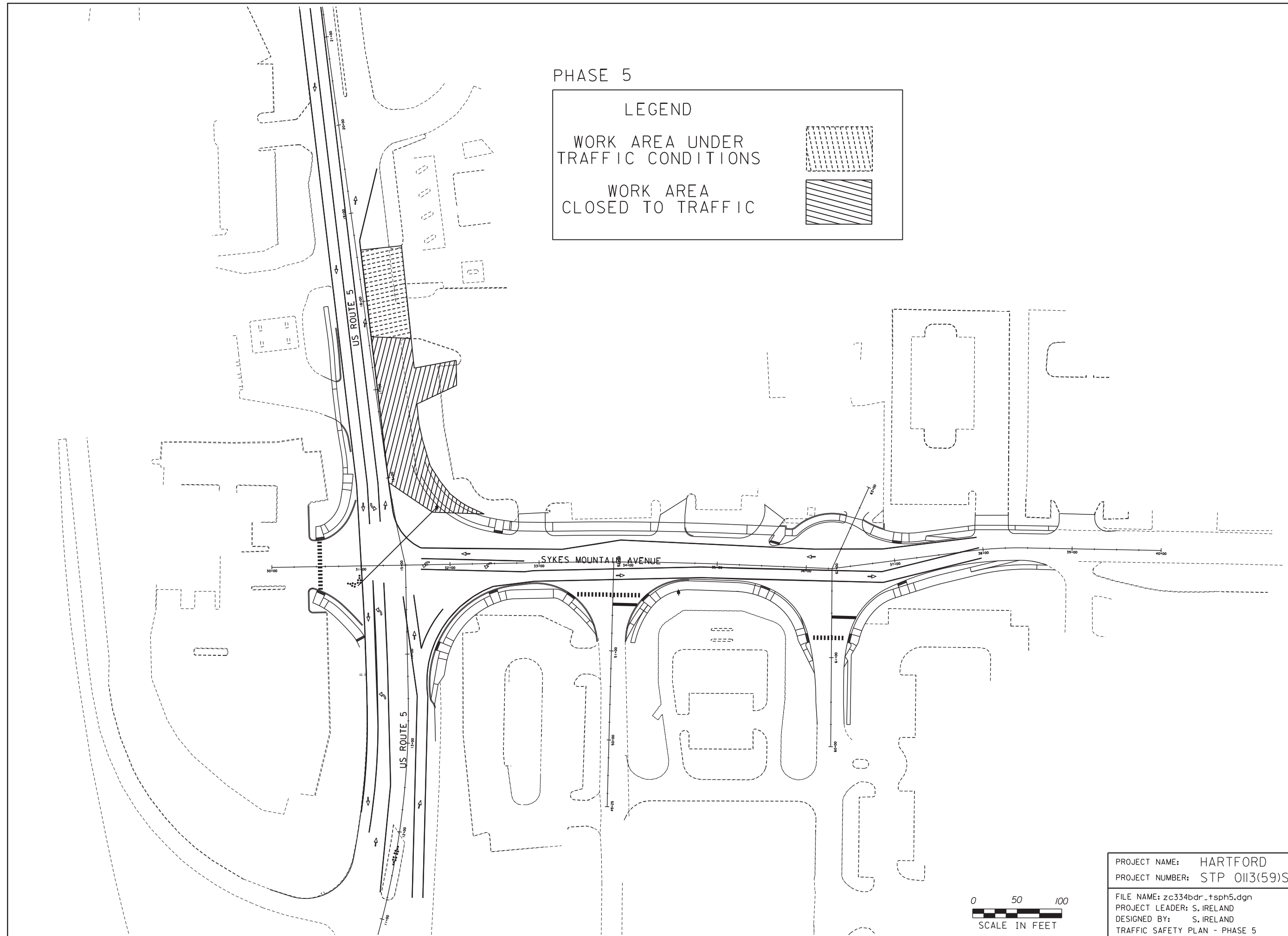


PHASE 5

LEGEND

WORK AREA UNDER TRAFFIC CONDITIONS 

WORK AREA CLOSED TO TRAFFIC 



PROJECT NAME: HARTFORD	PLOT DATE: 10/15/2019
PROJECT NUMBER: STP 0113(59)S	DRAWN BY: M. LOVETT
FILE NAME: zc334bdr_tsph5.dgn	CHECKED BY: B. COLBURN
PROJECT LEADER: S. IRELAND	SHEET 6 OF 8
DESIGNED BY: S. IRELAND	
TRAFFIC SAFETY PLAN - PHASE 5	

Phase 6 – Construction of the Center Roundabout Islands

Work hours: Normal Daytime with Possible Night Work in some locations

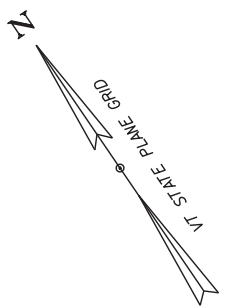
Description: Remove signal at the intersection of US Route 5 and Sykes Mountain Avenue. Convert traffic flow to roundabout with one lane approaching on each leg. Construct curbing, sidewalks, islands, truck aprons and all work to finish grade within the limits shown on the Traffic Safety Plan Phase 6. Placement of additional temporary pavement will be required to ensure that the lip of the truck apron does not exceed 2” maximum once traffic is allowed to traverse the truck apron. Additional miscellaneous locations have been shown on Traffic Safety Plan 6 as requiring finish work, including curbing and ADA tip downs. Maintain access to all businesses and Town Roads during construction.

Impact to Existing Traffic Operations:

- US Route 5 will be constrained to one through lane North and one through lane South.
- Left turning lanes have been removed.
- Temporary reconfiguration of the I-91 Northbound Off Ramp intersection continues.
- Flagger and UTO control
 - Of the intersections during center island work
 - As required to control traffic for business and local road access
 - Flagger can only stop and release traffic, but a UTO can direct traffic

Risk and possible mitigation measures:

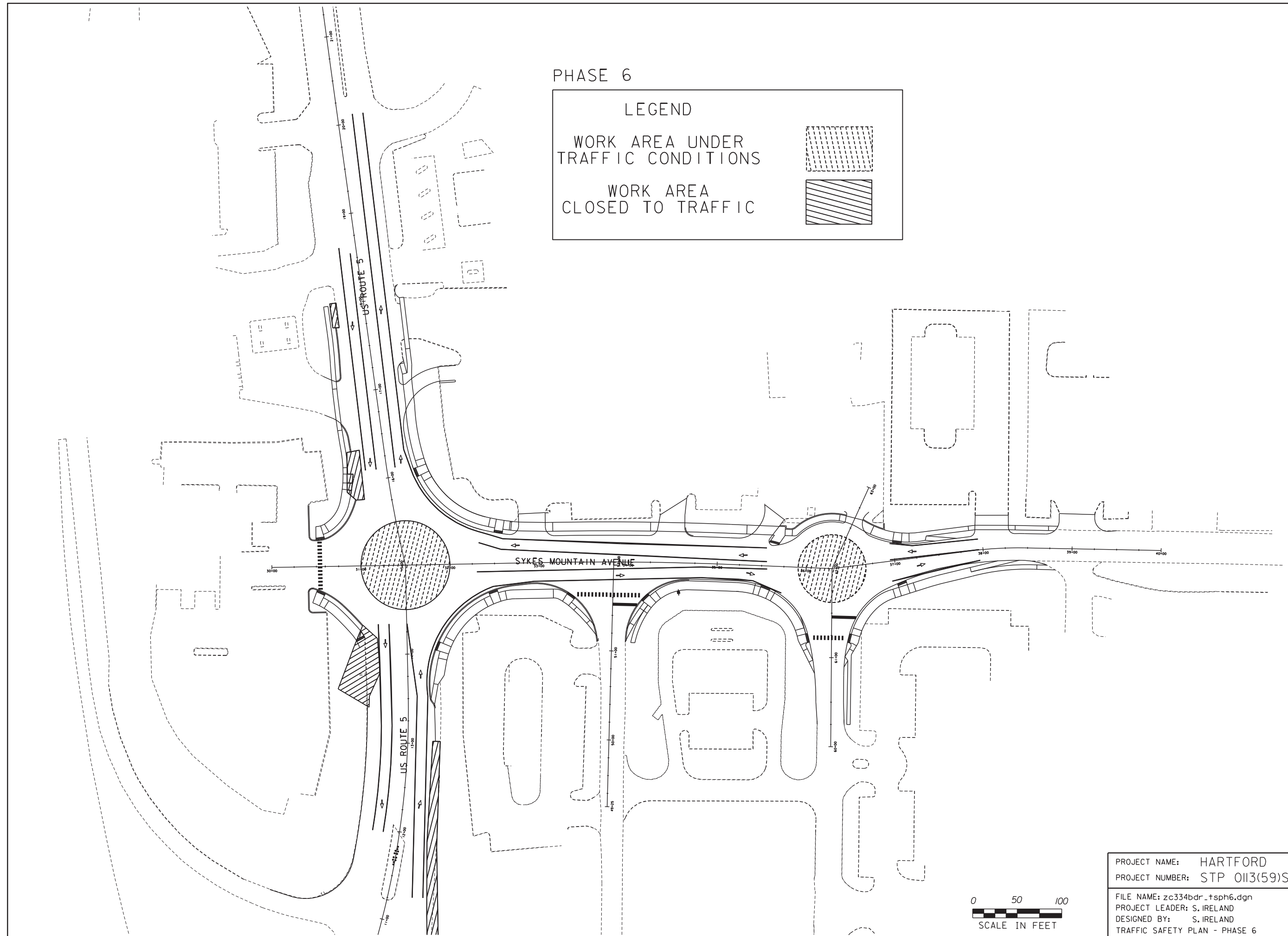
- **Risk:** Permanent change and rerouting of vehicles through the project limits to a roundabout configuration without truck aprons.
Mitigation Measure: Well delineated work area with Flaggers, UTO’s, approach signage, barrels, cones and other associated traffic control devices. Good communication with property abutters and potential night work will be required to maintain access. The additional width allowed by restricting each approach leg to one lane provides additional space for truck turning movements.
- **Risk:** Traffic Queue lengths blocking other intersections will lead to significant delays and will be considered unacceptable.
Mitigation Measure: Conditions should be monitored by the Contractor, especially during peak hours. See Section 4 of the TMP for maximum queue length allowed during AM and PM peak hours.



PHASE 6

LEGEND

WORK AREA UNDER TRAFFIC CONDITIONS	
WORK AREA CLOSED TO TRAFFIC	



PROJECT NAME:	HARTFORD	PLOT DATE:	10/15/2019
PROJECT NUMBER:	STP 0113(59)S	DRAWN BY:	M. LOVETT
FILE NAME:	zc334bdr_tsph6.dgn	CHECKED BY:	B. COLBURN
PROJECT LEADER:	S. IRELAND	SHEET	7 OF 8
DESIGNED BY:	S. IRELAND		
TRAFFIC SAFETY PLAN - PHASE 6			

Phase 7 – Construction of the Median Islands

Work hours: Normal Daytime with potential Night Work in some locations

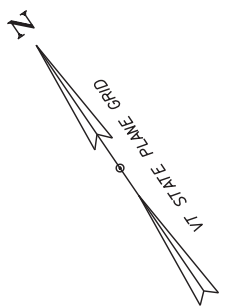
Description: Construct median islands on US Route 5 and Sykes Mountain Avenue, including the portions of median islands removed in Phase 1 to allow for traffic shifting. Median islands beyond the project limits shall be restored to same or better condition. Remove temporary signal at the intersection of I-91 Northbound Off Ramp and US Route 5. Construct curbing, sidewalks, islands, and all work to finish grade within limits shown on Traffic Safety Plan Phase 7. Any additional temporary pavement placed along the lip of the truck apron to prevent the lip from exceeding 2” shall be ground out just prior to permanent pavement. Wearing course pavement may be placed at night to reduce traffic disruption. Night work will require the development of a temporary lighting plan. The temporary lighting plan shall be incidental to the work performed at night and no additional compensation beyond bid prices shall be made for work at night. Maintain access to all businesses and Town Roads during construction.

Impact to Existing Traffic Operations:

- US Route 5 will be constrained to one through lane North and one through lane South.
- Left turning lanes have been removed.
- Flagger and UTO control
 - Of the intersections during median island work
 - As required to control traffic for business and local road access
 - As required for placement of wearing coarse pavement
 - Flagger can only stop and release traffic, but a UTO can direct traffic

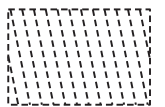

Risk and possible mitigation measures:

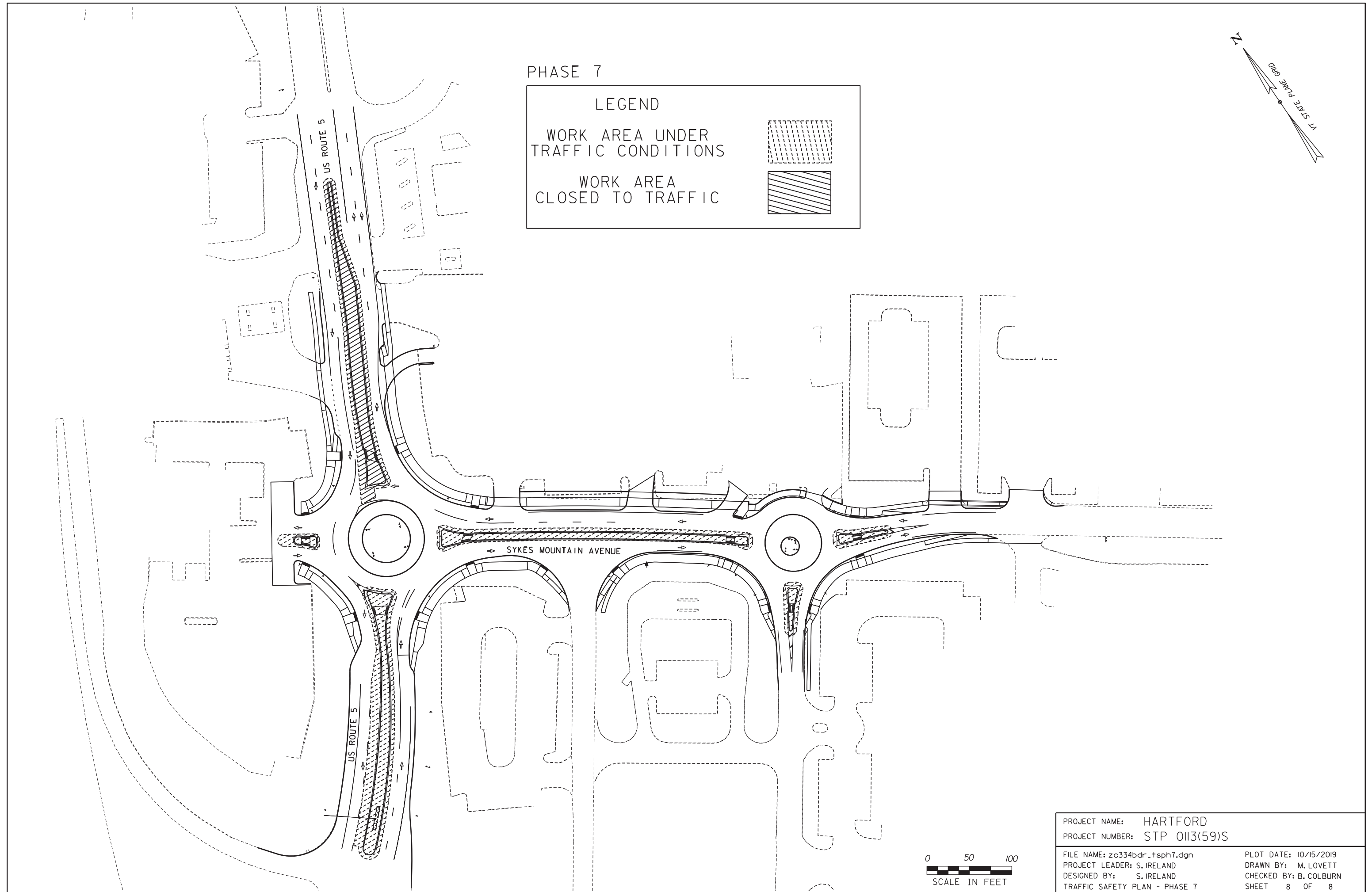
- **Risk:** Potential night work reduces traffic disruptions but increases worker safety concerns and impaired driver concerns.
Mitigation Measure: Well delineated work area with Flaggers, UTO’s, approach signage, barrels, cones and other associated traffic control devices. Advanced notification and enforcement with temporary lighting conditions may be required.
- **Risk:** Traffic Queue lengths blocking other intersections will lead to significant delays and will be considered unacceptable.
Mitigation Measure: Conditions should be monitored by the Contractor, especially during peak hours. See Section 4 of the TMP for maximum queue length allowed during AM and PM peak hours.



PHASE 7

LEGEND

WORK AREA UNDER TRAFFIC CONDITIONS	
WORK AREA CLOSED TO TRAFFIC	



PROJECT NAME:	HARTFORD	PLOT DATE:	10/15/2019
PROJECT NUMBER:	STP 0113(59)S	DRAWN BY:	M. LOVETT
FILE NAME:	zc334bdr_tsph7.dgn	CHECKED BY:	B. COLBURN
PROJECT LEADER:	S. IRELAND	SHEET	8 OF 8
DESIGNED BY:	S. IRELAND		
TRAFFIC SAFETY PLAN - PHASE 7			

APPENDIX B

Peak Hour Traffic Volumes at Key Locations

Traffic volumes adjusted to 2018 numbers prior to entry to synchro. (number X 1.01 per year before 2018) (1% growth per year used)

Peak Hour Data for Intersection

Int ID: 31408926
 Community: HARTFORD
 Road 1: I-91
 Road 2: US-5

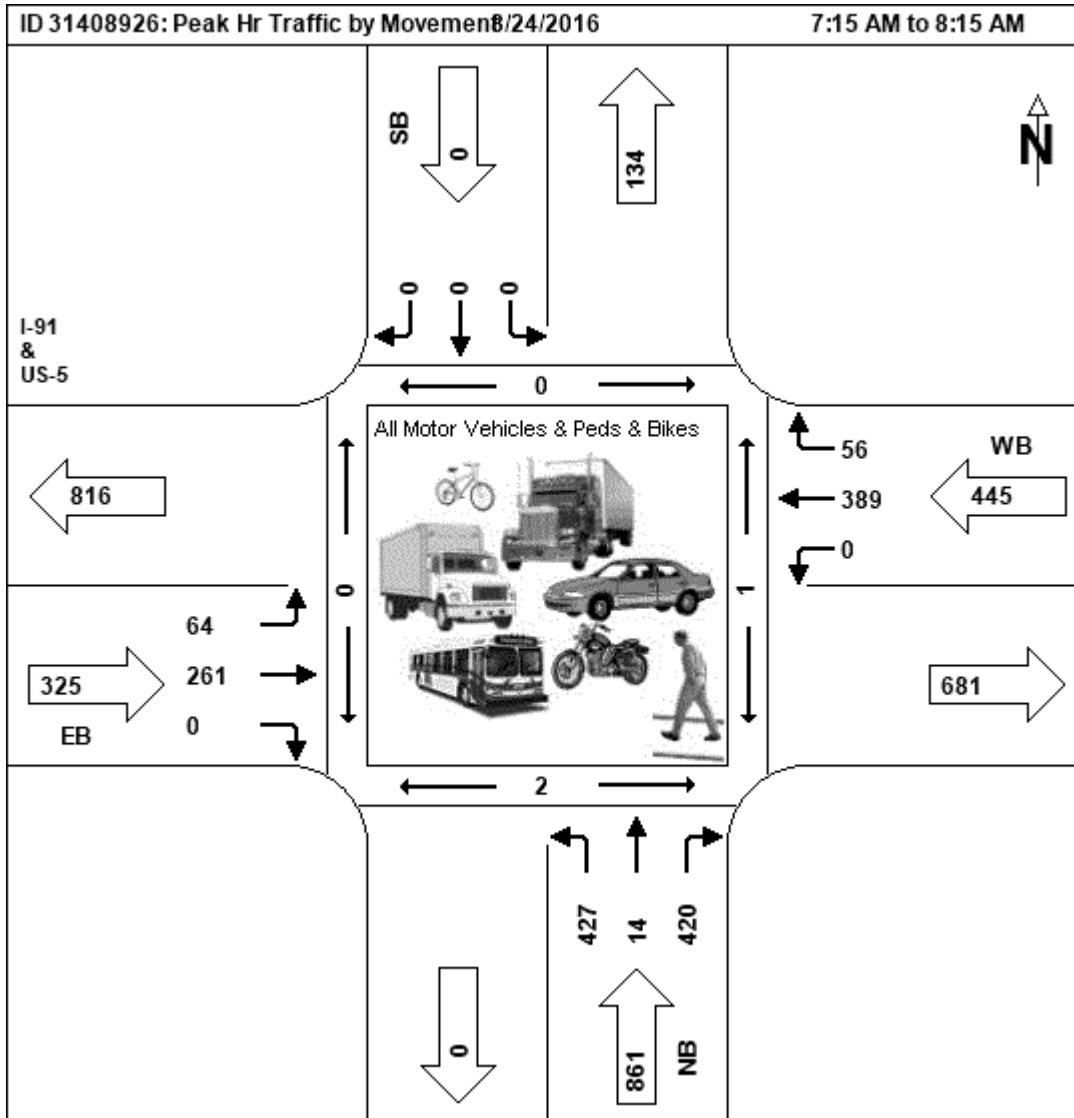
Corridor:
 Road 3: I-91
 Road 4: US-5

|<< < > >>| 1-4 of 4

AM Peak Hour
 08/24/2016

Start Time	NB				App Total	EB				App Total	SB				App Total	WB				App Total	Int Total
	Left	Thru	Right	Ped		Left	Thru	Right	Ped		Left	Thru	Right	Ped		Left	Thru	Right	Ped		
7:15 AM	97	7	67	0	171	11	58	0	2	69	0	0	0	0	0	0	87	12	0	99	339
7:30 AM	102	1	98	0	201	12	47	0	0	59	0	0	0	0	0	0	99	18	0	117	377
7:45 AM	130	5	137	0	272	22	56	0	0	78	0	0	0	0	0	0	112	11	0	123	473
8:00 AM	98	1	118	1	217	19	100	0	0	119	0	0	0	0	0	0	91	15	0	106	442
Total	427	14	420	1	861	64	261	0	2	325	0	0	0	0	0	0	389	56	0	445	1631
PHF	0.82	0.50	0.77		0.79	0.73	0.65			0.68							0.87	0.78		0.90	
HV %	5	14	6			11	7										8	7			

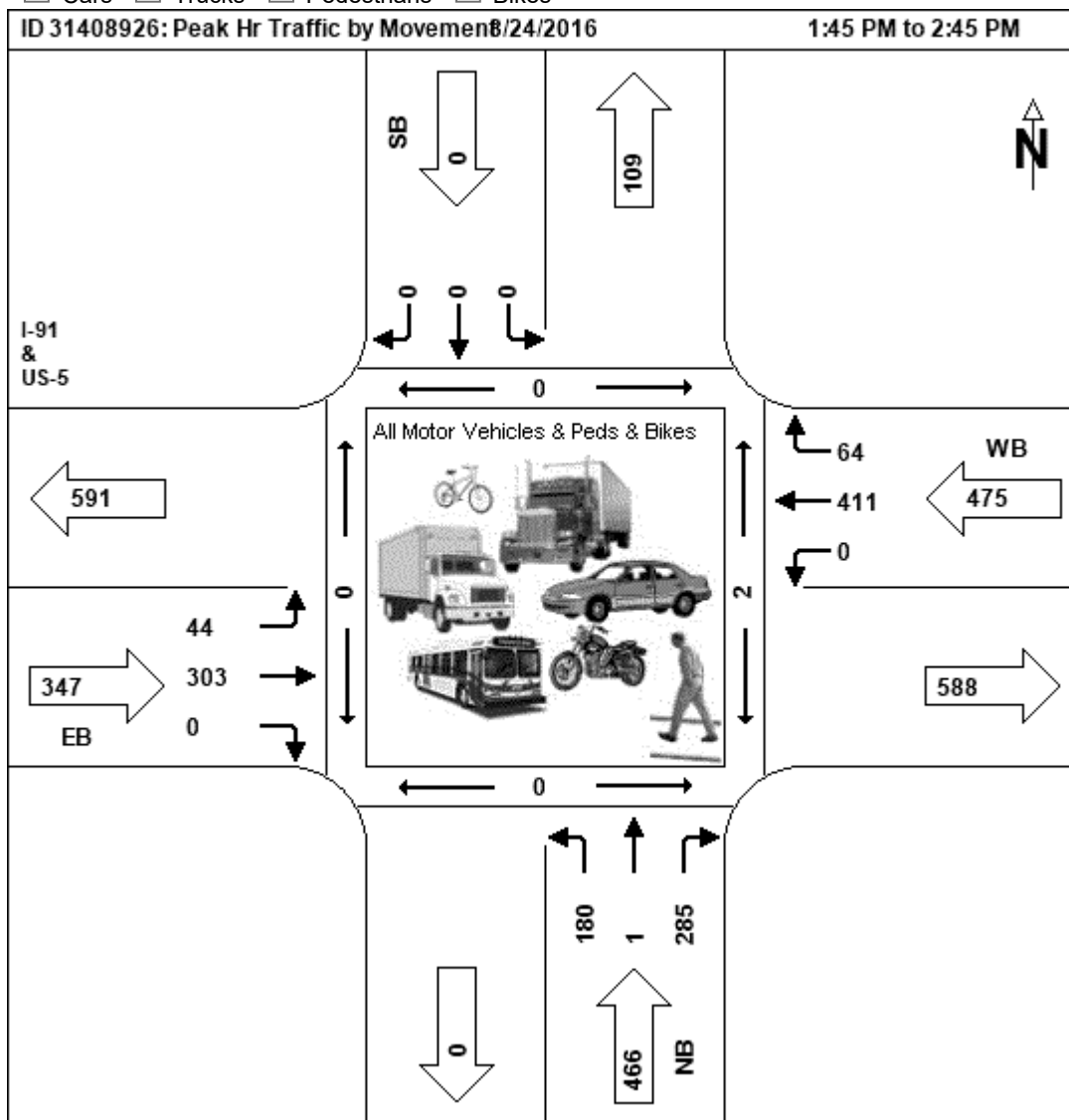
Cars Trucks Pedestrians Bikes



**Midday Peak Hour
08/24/2016**

Start Time	NB				App Total	EB				App Total	SB				App Total	WB				App Total	Int Total
	Left	Thru	Right	Ped		Left	Thru	Right	Ped		Left	Thru	Right	Ped		Left	Thru	Right	Ped		
1:45 PM	41	0	57	0	98	14	71	0	0	85	0	0	0	0	0	118	15	0	133	316	
2:00 PM	42	0	77	1	119	6	90	0	0	96	0	0	0	0	0	88	14	0	102	317	
2:15 PM	46	1	68	0	115	14	76	0	0	90	0	0	0	0	0	108	19	0	127	332	
2:30 PM	51	0	83	1	134	10	66	0	0	76	0	0	0	0	0	97	16	0	113	323	
Total	180	1	285	2	466	44	303	0	0	347	0	0	0	0	0	411	64	0	475	1288	
PHF	0.88	0.25	0.86		0.87	0.79	0.84			0.90						0.87	0.84		0.89		
HV %	8	0	5			5	2									2	8				

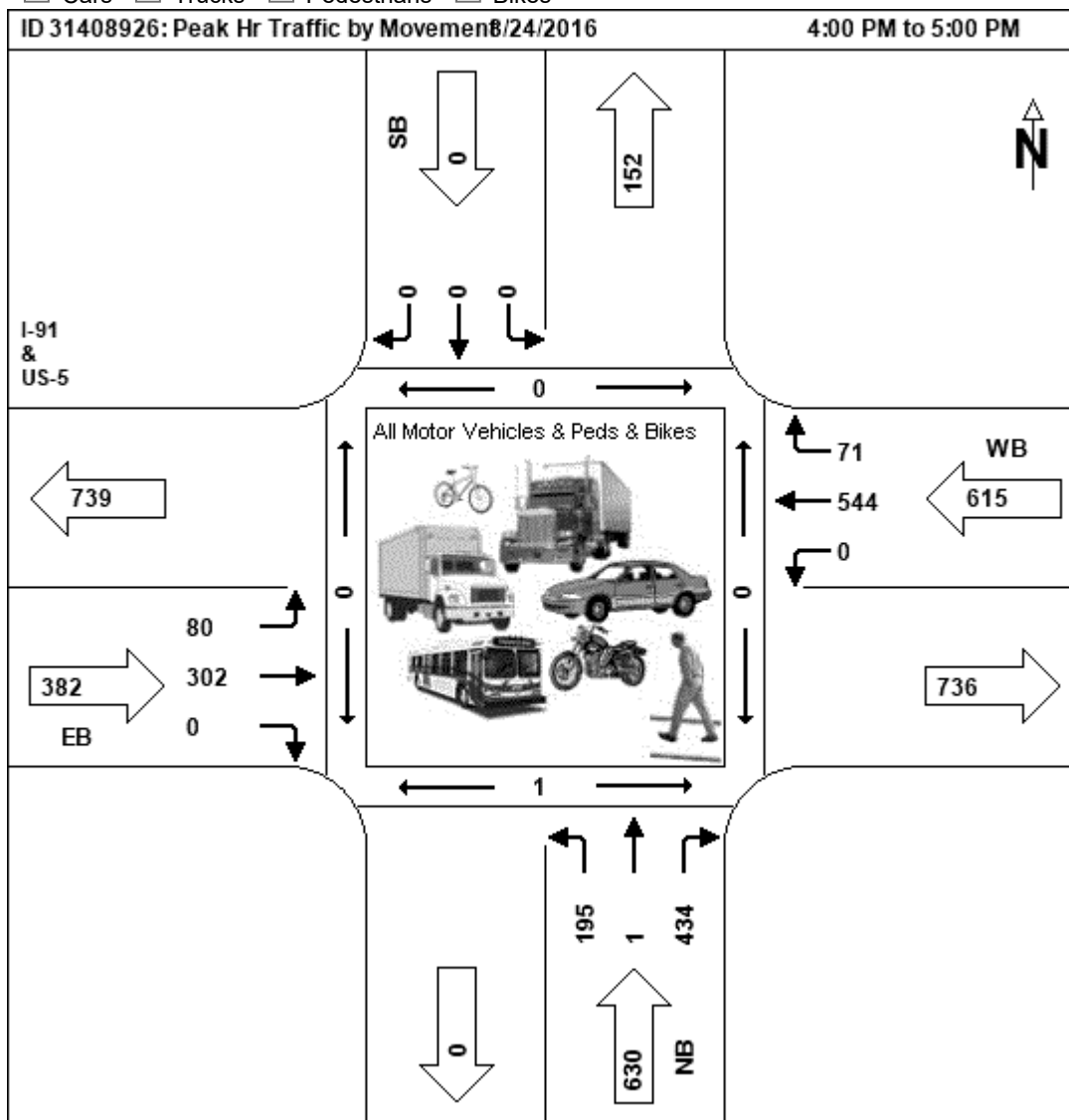
Cars Trucks Pedestrians Bikes



**PM Peak Hour
08/24/2016**

Start Time	NB				App Total	EB				App Total	SB				App Total	WB				App Total	Int Total
	Left	Thru	Right	Ped		Left	Thru	Right	Ped		Left	Thru	Right	Ped		Left	Thru	Right	Ped		
4:00 PM	69	0	100	0	169	18	88	0	0	106	0	0	0	0	0	0	133	15	0	148	423
4:15 PM	45	0	104	0	149	23	72	0	0	95	0	0	0	0	0	0	157	23	0	180	424
4:30 PM	44	0	119	0	163	24	73	0	1	97	0	0	0	0	0	0	137	19	0	156	416
4:45 PM	37	1	111	0	149	15	69	0	0	84	0	0	0	0	0	0	117	14	0	131	364
Total	195	1	434	0	630	80	302	0	1	382	0	0	0	0	0	0	544	71	0	615	1627
PHF	0.71	0.25	0.91		0.93	0.83	0.86			0.90							0.87	0.77		0.85	
HV %	4	0	2			1	2										2	3			

Cars Trucks Pedestrians Bikes



Traffic volumes adjusted to 2018 numbers prior to entry to synchro. (number X 1.01 per year before 2018) (1% growth per year used)

Peak Hour Data for Intersection

Int ID: 31408925
 Community: HARTFORD
 Road 1: I-91
 Road 2: US-5

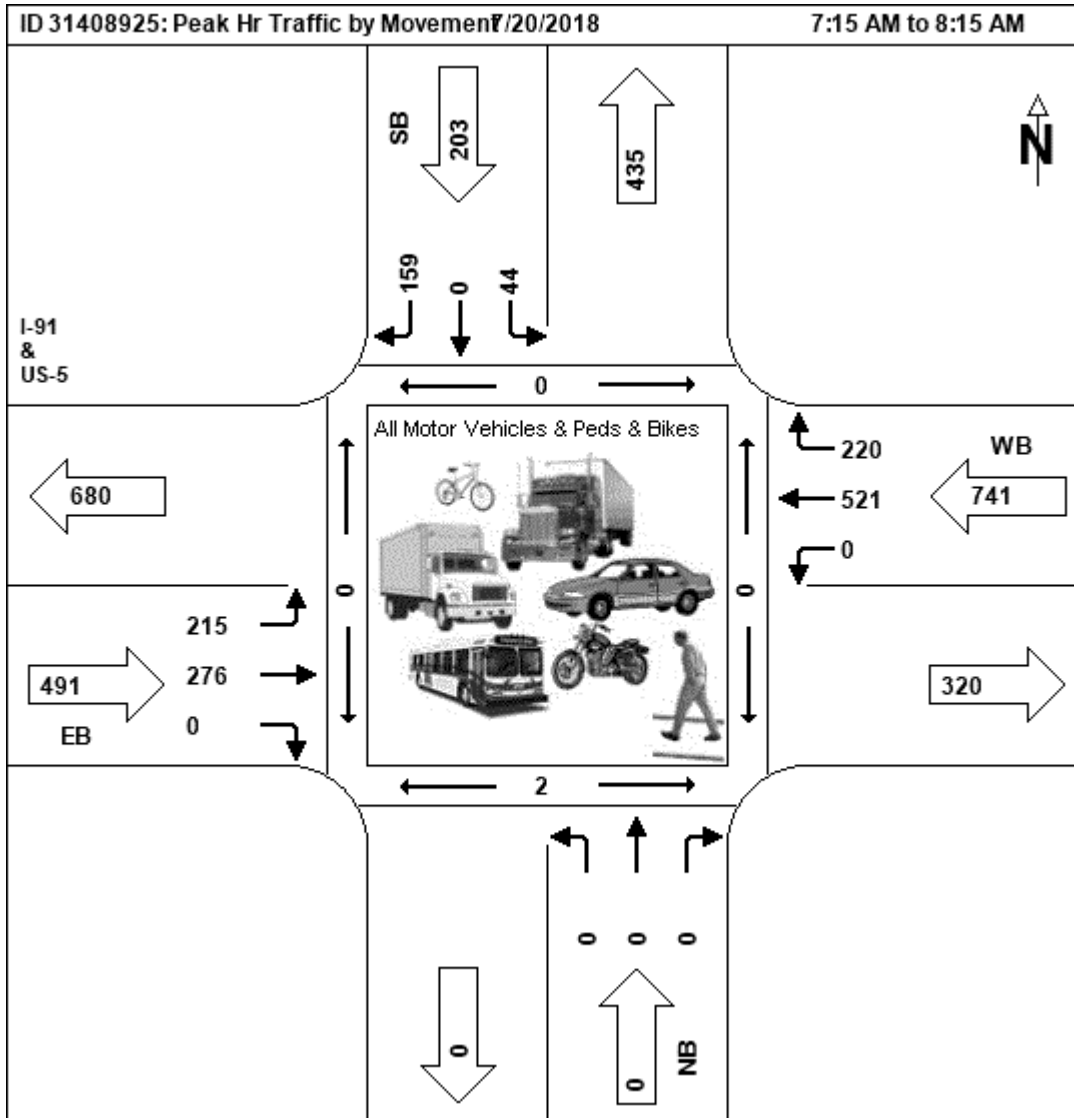
Corridor:
 Road 3:
 Road 4: US-5

<< < > >> 1-6 of 6

AM Peak Hour
 07/20/2018

Start Time	EB				SB				WB				App Total	Int Total	
	Left	Thru	Right	Ped	Left	Thru	Right	Ped	Left	Thru	Right	Ped			
7:15 AM	49	61	0	0	8	0	48	0	56	0	126	45	0	171	337
7:30 AM	54	60	0	0	9	0	34	0	43	0	132	66	0	198	355
7:45 AM	53	68	0	2	10	0	39	0	49	0	154	63	0	217	387
8:00 AM	59	87	0	0	17	0	38	0	55	0	109	46	0	155	356
Total	215	276	0	2	491	44	159	0	203	0	521	220	0	741	1435
PHF	0.910.79				0.84 0.65				0.91				0.85		0.85
HV %	13 9				0				7 7						

- Cars Trucks Pedestrians Bikes



Midday Peak Hour 07/20/2018

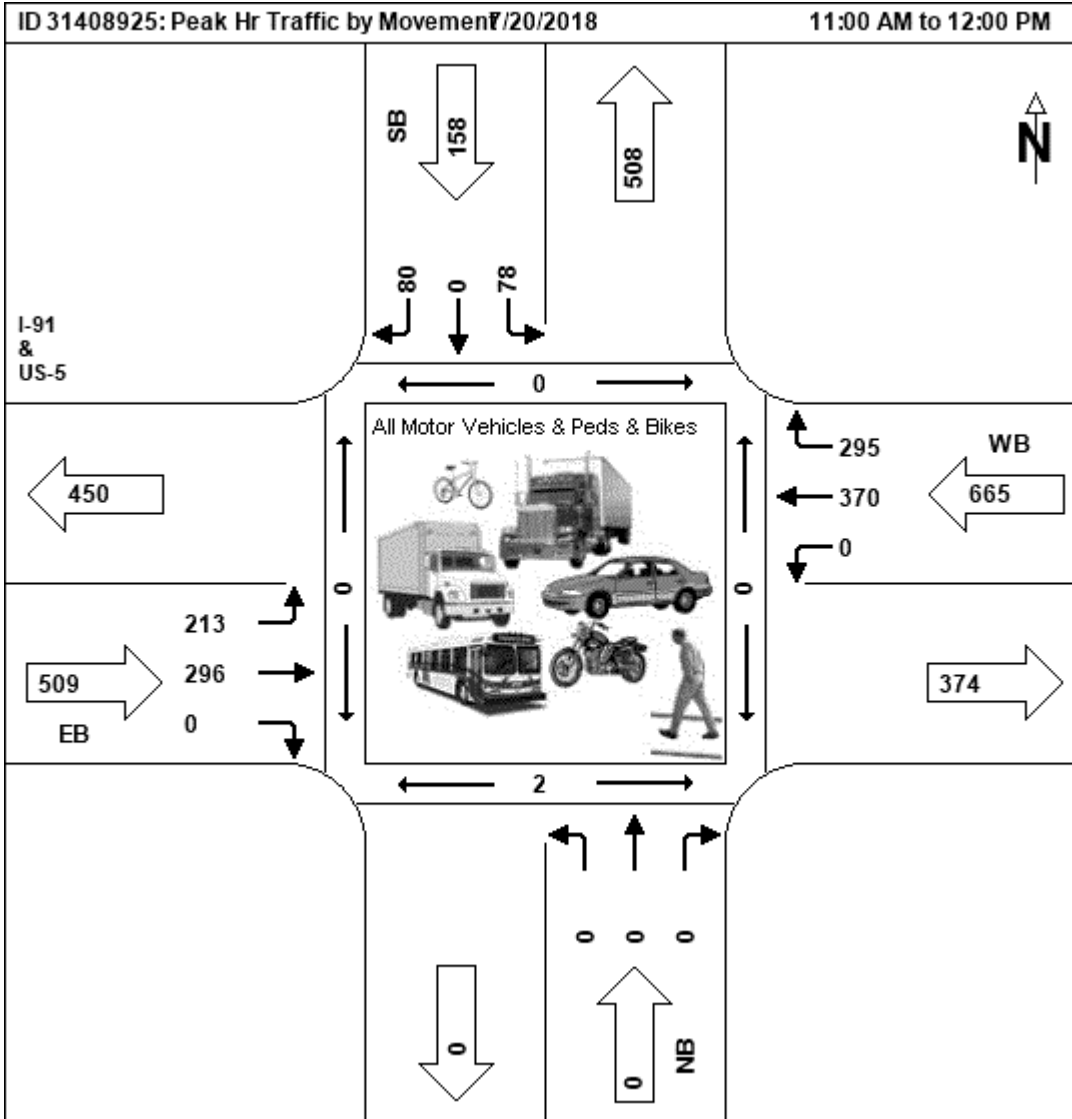
EB

SB

WB

Start Time	EB				App Total	SB				App Total	WB				App Total	Int Total
	Left	Thru	Right	Ped		Left	Thru	Right	Ped		Left	Thru	Right	Ped		
11:00 AM	47	70	0	0	117	18	0	16	0	34	0	99	77	0	176	327
11:15 AM	74	68	0	1	142	20	0	19	0	39	0	102	62	0	164	345
11:30 AM	48	75	0	0	123	19	0	24	0	43	0	82	83	0	165	331
11:45 AM	44	83	0	1	127	21	0	21	0	42	0	87	73	0	160	329
Total	213	296	0	2	509	78	0	80	0	158	0	370	295	0	665	1332
PHF	0.72	0.89			0.90	0.93		0.83		0.92		0.91	0.89		0.94	
HV %	5	10				5		1				7	5			

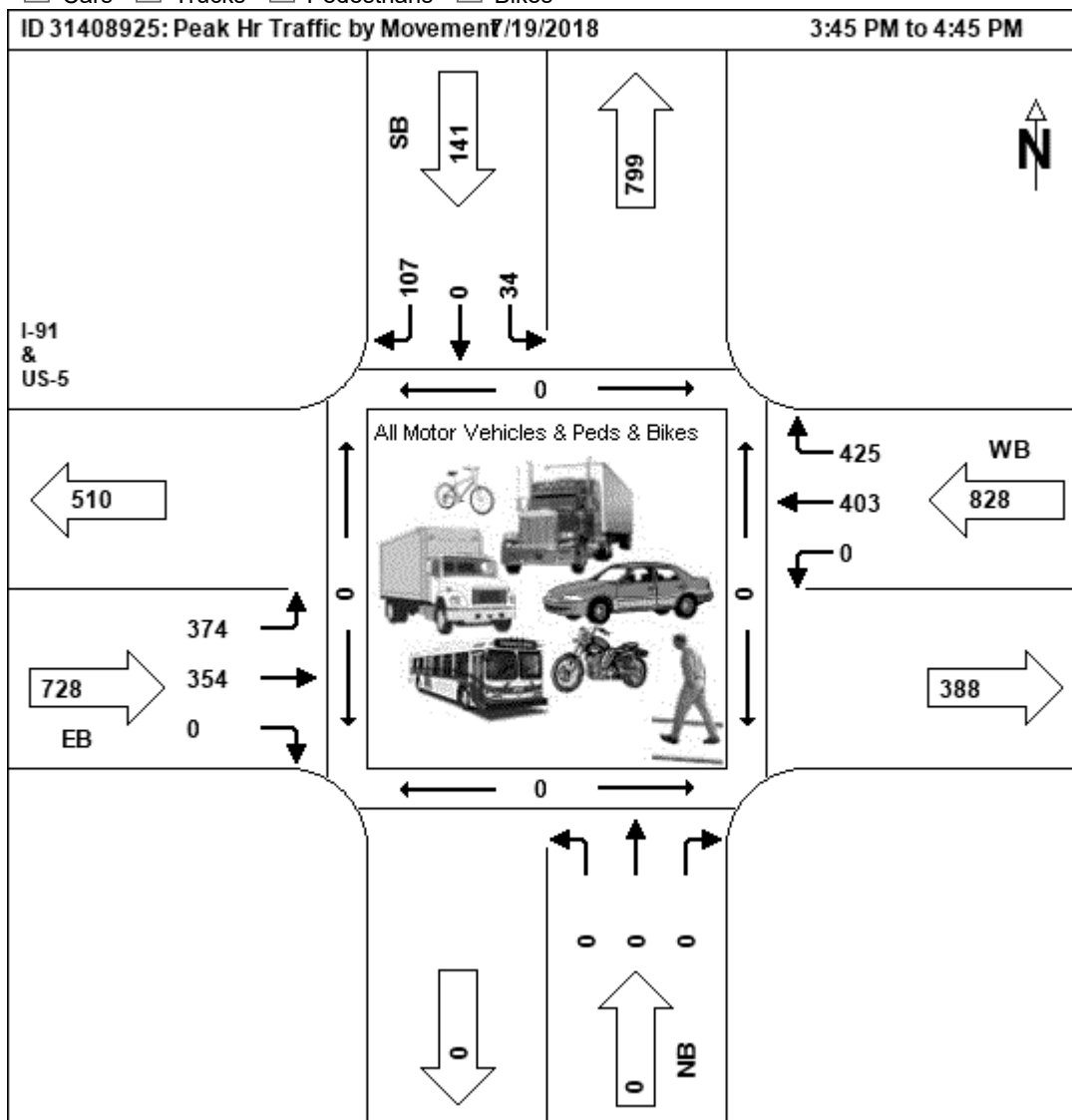
Cars Trucks Pedestrians Bikes



**PM Peak Hour
07/19/2018**

Start Time	NB				App Total	EB				App Total	SB				App Total	WB				App Total	Int Total		
	Left	Thru	Right	Ped		Left	Thru	Right	Ped		Left	Thru	Right	Ped		Left	Thru	Right	Ped				
3:45 PM	0	0	0	0	0	84	78	0	0	162	7	0	21	0	28	0	93	106	0	199	389		
4:00 PM	0	0	0	0	0	95	91	0	0	186	11	0	27	0	38	0	108	96	0	204	428		
4:15 PM	0	0	0	0	0	75	81	0	0	156	10	0	34	0	44	0	106	95	0	201	401		
4:30 PM	0	0	0	0	0	120	104	0	0	224	6	0	25	0	31	0	96	128	0	224	479		
Total	0	0	0	0	0	374	354	0	0	728	34	0	107	0	141	0	403	425	0	828	1697		
PHF						0.78	0.85					0.81	0.77					0.80	0.93	0.83			0.92
HV %						2	6					9	4					8	4				

Cars Trucks Pedestrians Bikes



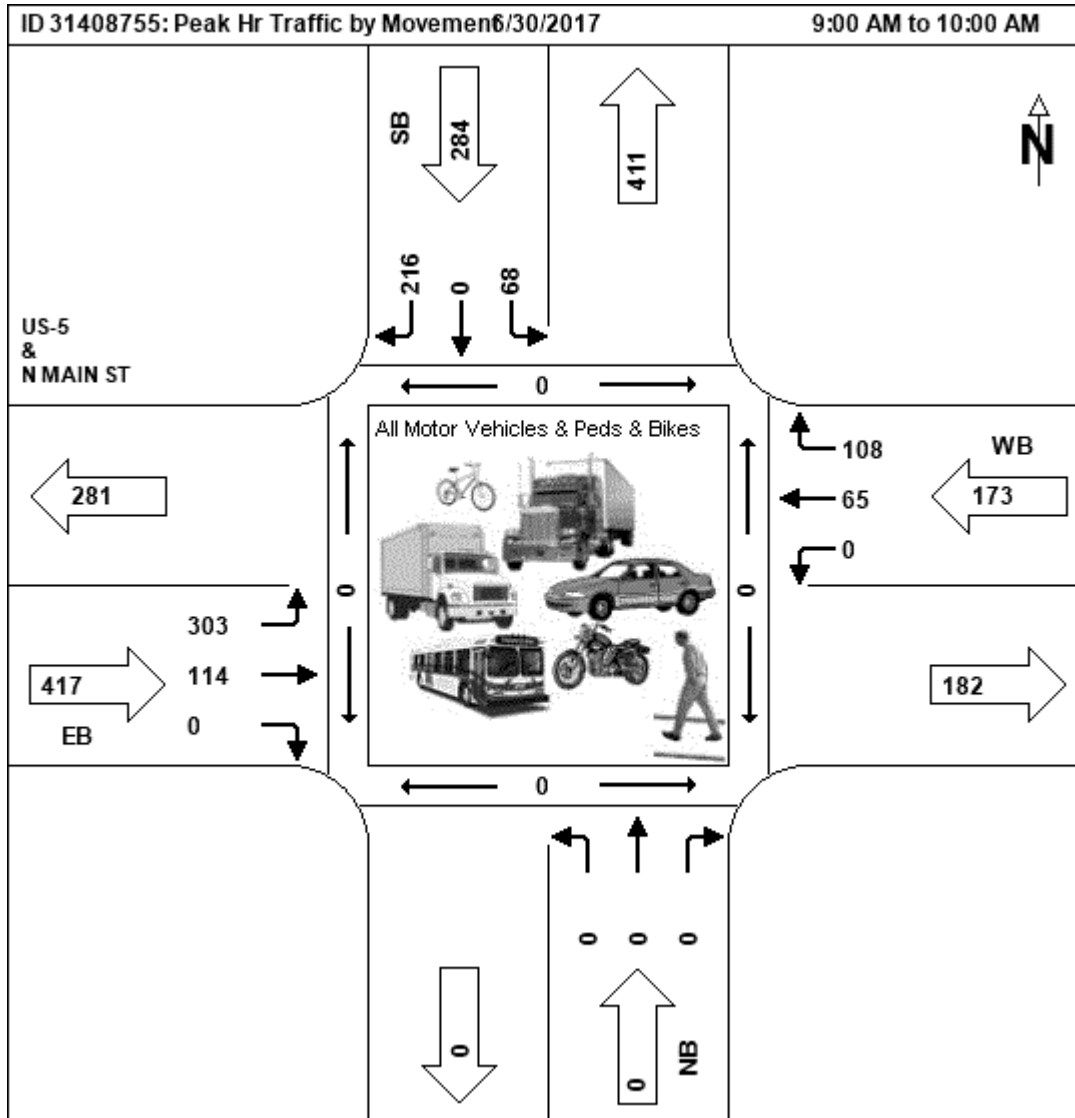
Peak Hour Data for Intersection

Int ID: 31408755
 Community: HARTFORD
 Road 1: US-5
 Road 2: N MAIN ST
 Corridor: NA
 Road 3:
 Road 4: US-5

**AM Peak Hour
06/30/2017**

Start Time	NB				App Total	EB				App Total	SB				App Total	WB				App Total	Int Total					
	Left	Thru	Right	Ped		Left	Thru	Right	Ped		Left	Thru	Right	Ped		Left	Thru	Right	Ped							
9:00 AM	0	0	0	0	0	77	28	0	0	105	19	0	53	0	72	0	13	28	0	41	218					
9:15 AM	0	0	0	0	0	70	25	0	0	95	19	0	67	0	86	0	15	36	0	51	232					
9:30 AM	0	0	0	0	0	65	29	0	0	94	10	0	40	0	50	0	23	24	0	47	191					
9:45 AM	0	0	0	0	0	91	32	0	0	123	20	0	56	0	76	0	14	20	0	34	233					
Total	0	0	0	0	0	303	114	0	0	417	68	0	216	0	284	0	65	108	0	173	874					
PHF						0.83 0.89					0.85 0.85					0.83					0.71 0.75					0.85
HV %						8 4					12					5					12 6					

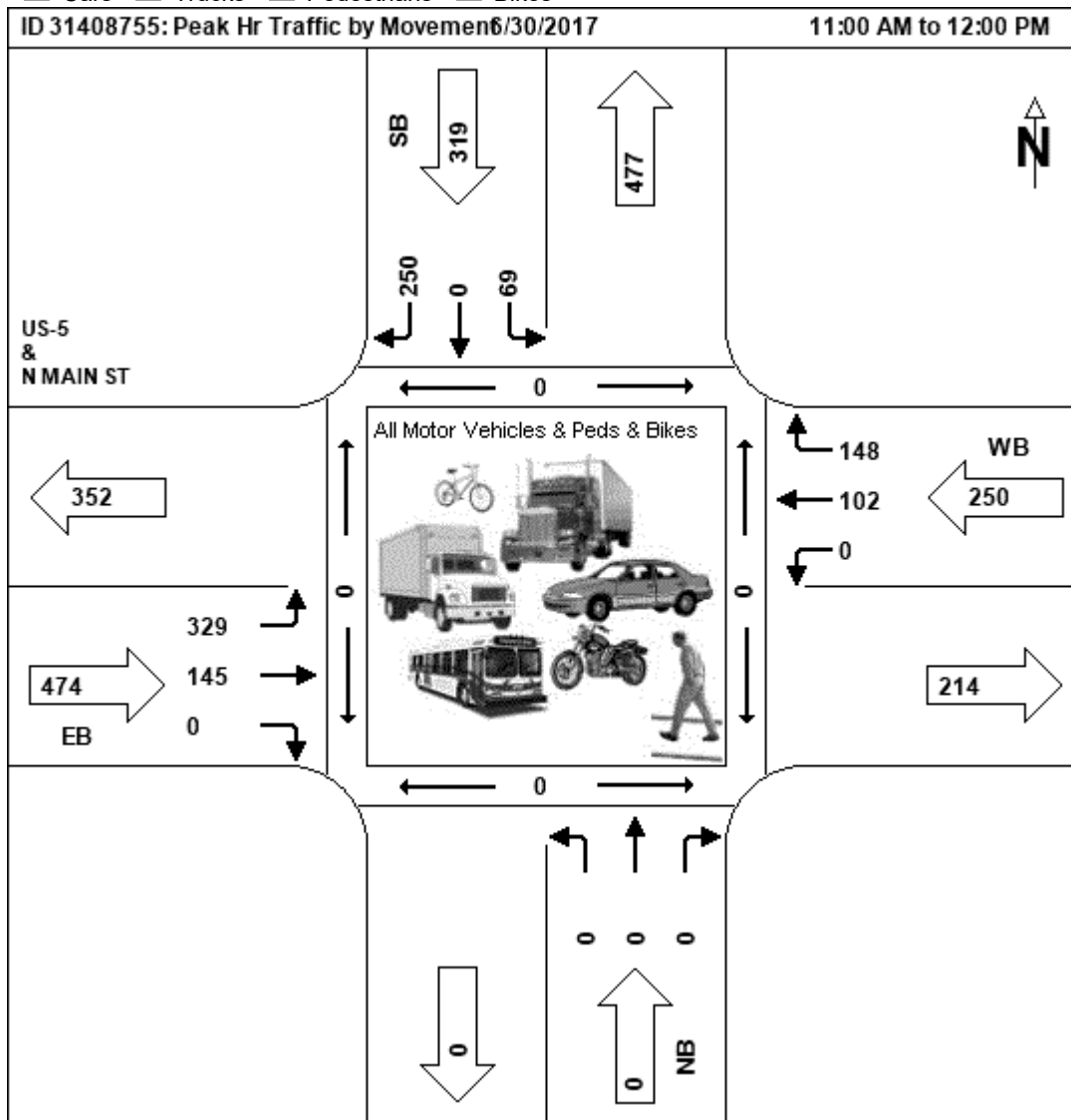
Cars Trucks Pedestrians Bikes



Midday Peak Hour 06/30/2017

Start Time	NB				App Total	EB				App Total	SB				App Total	WB				App Total	Int Total
	Left	Thru	Right	Ped		Left	Thru	Right	Ped		Left	Thru	Right	Ped		Left	Thru	Right	Ped		
11:00 AM	0	0	0	0	0	83	39	0	0	122	19	0	31	0	50	0	25	33	0	58	230
11:15 AM	0	0	0	0	0	84	36	0	0	120	10	0	61	0	71	0	19	39	0	58	249
11:30 AM	0	0	0	0	0	81	31	0	0	112	16	0	82	0	98	0	22	35	0	57	267
11:45 AM	0	0	0	0	0	81	39	0	0	120	24	0	76	0	100	0	36	41	0	77	297
Total	0	0	0	0	0	329	145	0	0	474	69	0	250	0	319	0	102	148	0	250	1043
PHF						0.98	0.93				0.97	0.72	0.76		0.80	0.71	0.90			0.81	
HV %						5	3				3	6				4	5				

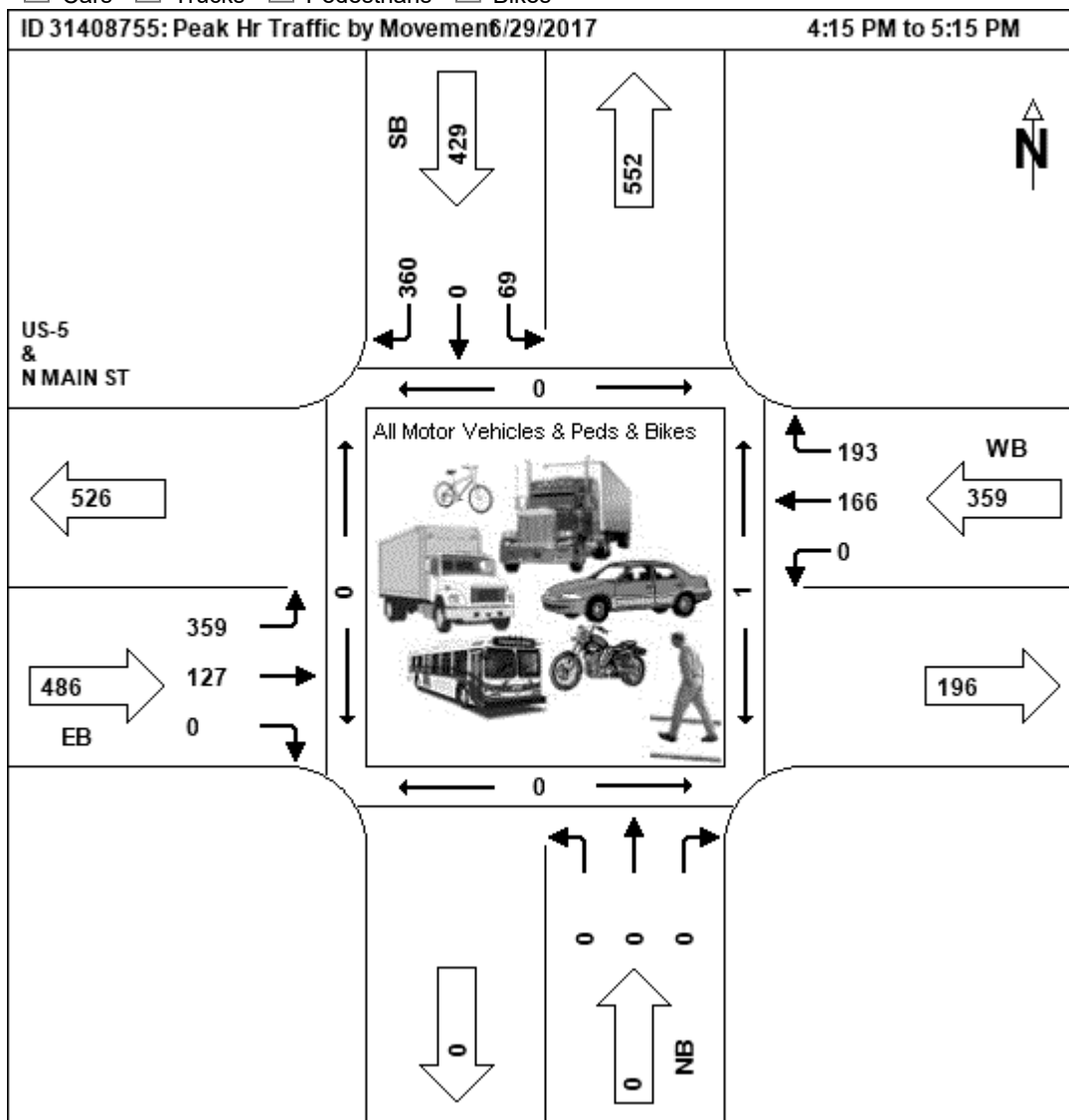
Cars
 Trucks
 Pedestrians
 Bikes



**PM Peak Hour
06/29/2017**

Start Time	NB				App Total	EB				App Total	SB				App Total	WB				App Total	Int Total
	Left	Thru	Right	Ped		Left	Thru	Right	Ped		Left	Thru	Right	Ped		Left	Thru	Right	Ped		
4:15 PM	0	0	0	0	0	83	28	0	0	111	16	0	84	0	100	0	54	41	0	95	306
4:30 PM	0	0	0	1	0	87	26	0	0	113	19	0	77	0	96	0	39	36	0	75	284
4:45 PM	0	0	0	0	0	102	39	0	0	141	22	0	94	0	116	0	26	57	0	83	340
5:00 PM	0	0	0	0	0	87	34	0	0	121	12	0	105	0	117	0	47	59	0	106	344
Total	0	0	0	1	0	359	127	0	0	486	69	0	360	0	429	0	166	193	0	359	1274
PHF						0.88	0.81				0.86	0.78				0.92	0.77	0.82			0.85
HV %						1	2				6	3				1	3				

Cars Trucks Pedestrians Bikes



Traffic volumes adjusted to 2018 numbers prior to entry to synchro. (number X 1.01 per year before 2018) (1% growth per year used)

Peak Hour Data for Intersection

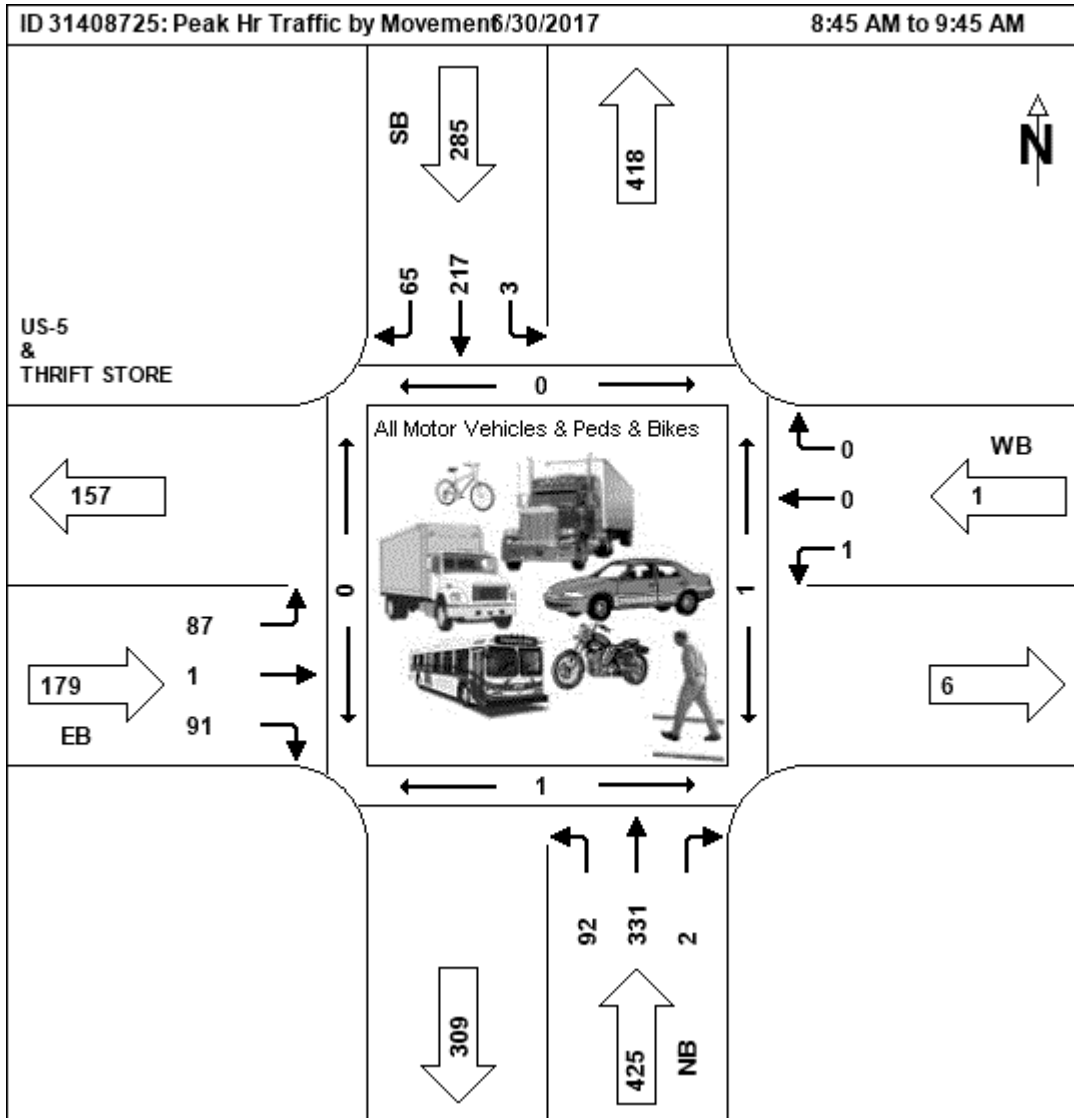
Int ID: 31408725
 Community: HARTFORD
 Road 1: US-5
 Road 2: THRIFT STORE
 Corridor: NA
 Road 3: US-5
 Road 4: US-4

<< < > >> 1-8 of 8

AM Peak Hour
06/30/2017

Start Time	NB				EB				SB				WB				App Total	Int Total		
	Left	Thru	Right	Ped	Left	Thru	Right	Ped	Left	Thru	Right	Ped	Left	Thru	Right	Ped				
8:45 AM	21	95	0	0	30	0	34	0	64	1	55	15	0	71	0	0	0	0	0	251
9:00 AM	27	71	1	1	19	0	17	1	36	1	50	16	0	67	1	0	0	0	1	203
9:15 AM	22	82	1	0	19	1	23	0	43	0	55	17	0	72	0	0	0	0	0	220
9:30 AM	22	83	0	0	19	0	17	0	36	1	57	17	0	75	0	0	0	0	0	216
Total	92	331	2	1	87	1	91	1	179	3	217	65	0	285	1	0	0	0	1	890
PHF	0.85	0.87	0.50		0.92	0.73	0.25	0.67	0.70	0.75	0.95	0.96		0.95	0.25					0.25
HV %	15	10	0		5	0	3		0	7	12			0						

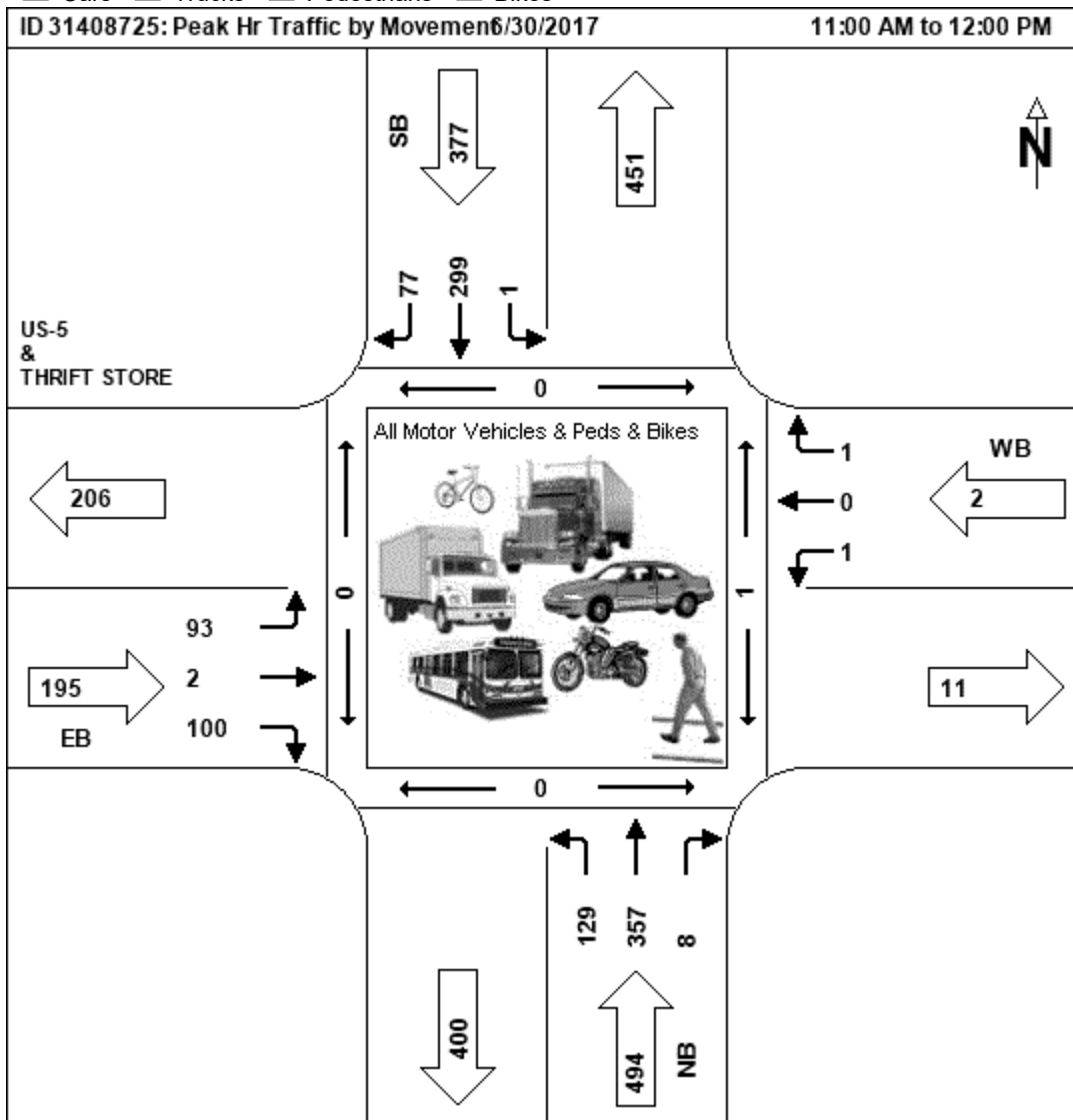
Cars Trucks Pedestrians Bikes



Midday Peak Hour 06/30/2017

Start Time	NB				App Total	EB				App Total	SB				App Total	WB				App Total	Int Total
	Left	Thru	Right	Ped		Left	Thru	Right	Ped		Left	Thru	Right	Ped		Left	Thru	Right	Ped		
11:00 AM	26	84	3	0	113	33	0	20	0	53	0	63	17	0	80	0	0	1	0	1	247
11:15 AM	28	96	2	1	126	25	0	15	0	40	0	66	14	0	80	0	0	0	0	0	246
11:30 AM	37	88	2	0	127	19	1	28	0	48	1	76	23	0	100	0	0	0	0	0	275
11:45 AM	38	89	1	0	128	16	1	37	0	54	0	94	23	0	117	1	0	0	0	1	300
Total	129	357	8	1	494	93	2	100	0	195	1	299	77	0	377	1	0	1	0	2	1068
PHF	0.85	0.93	0.67		0.96	0.70	0.50	0.68		0.90	0.25	0.80	0.84		0.81	0.25		0.25		0.50	
HV %	13	6	0			3	0	8			100	4	9			0		0			

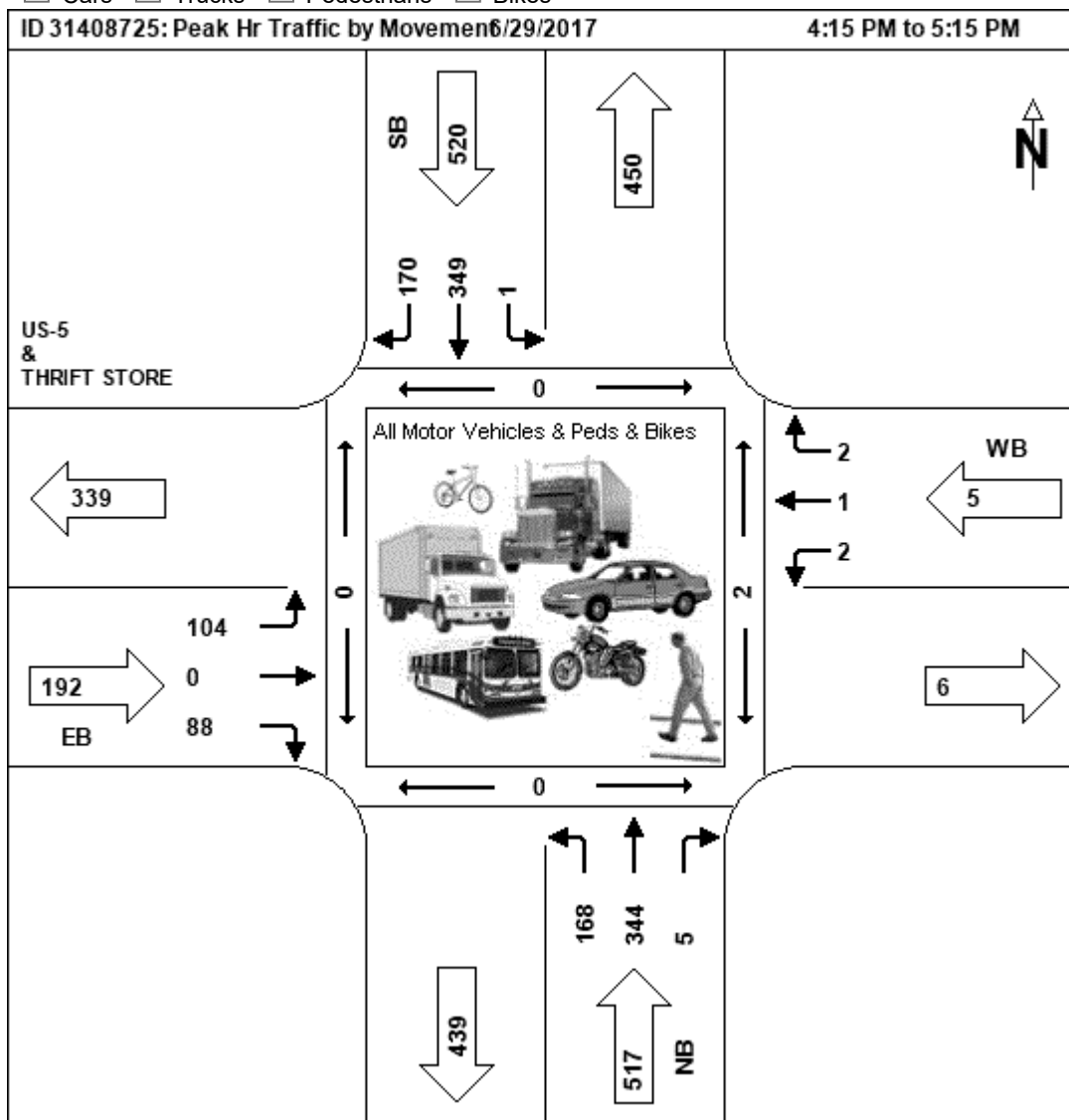
Cars
 Trucks
 Pedestrians
 Bikes



**PM Peak Hour
06/29/2017**

Start Time	NB				App Total	EB				App Total	SB				App Total	WB				App Total	Int Total
	Left	Thru	Right	Ped		Left	Thru	Right	Ped		Left	Thru	Right	Ped		Left	Thru	Right	Ped		
4:15 PM	43	77	2	1	122	33	0	20	0	53	0	90	39	0	129	2	0	0	0	2	306
4:30 PM	39	87	0	1	126	24	0	23	0	47	1	78	46	0	125	0	0	0	0	0	298
4:45 PM	41	91	0	0	132	24	0	23	0	47	0	75	50	0	125	0	1	1	0	2	306
5:00 PM	45	89	3	0	137	23	0	22	0	45	0	106	35	0	141	0	0	1	0	1	324
Total	168	344	5	2	517	104	0	88	0	192	1	349	170	0	520	2	1	2	0	5	1234
PHF	0.93	0.95	0.42		0.94	0.79		0.96		0.91	0.25	0.82	0.85		0.92	0.25	0.25	0.50		0.63	
HV %	7	1	20			4		2			0	1	4			0	0	0			

Cars Trucks Pedestrians Bikes



Peak Hour Data for Intersection

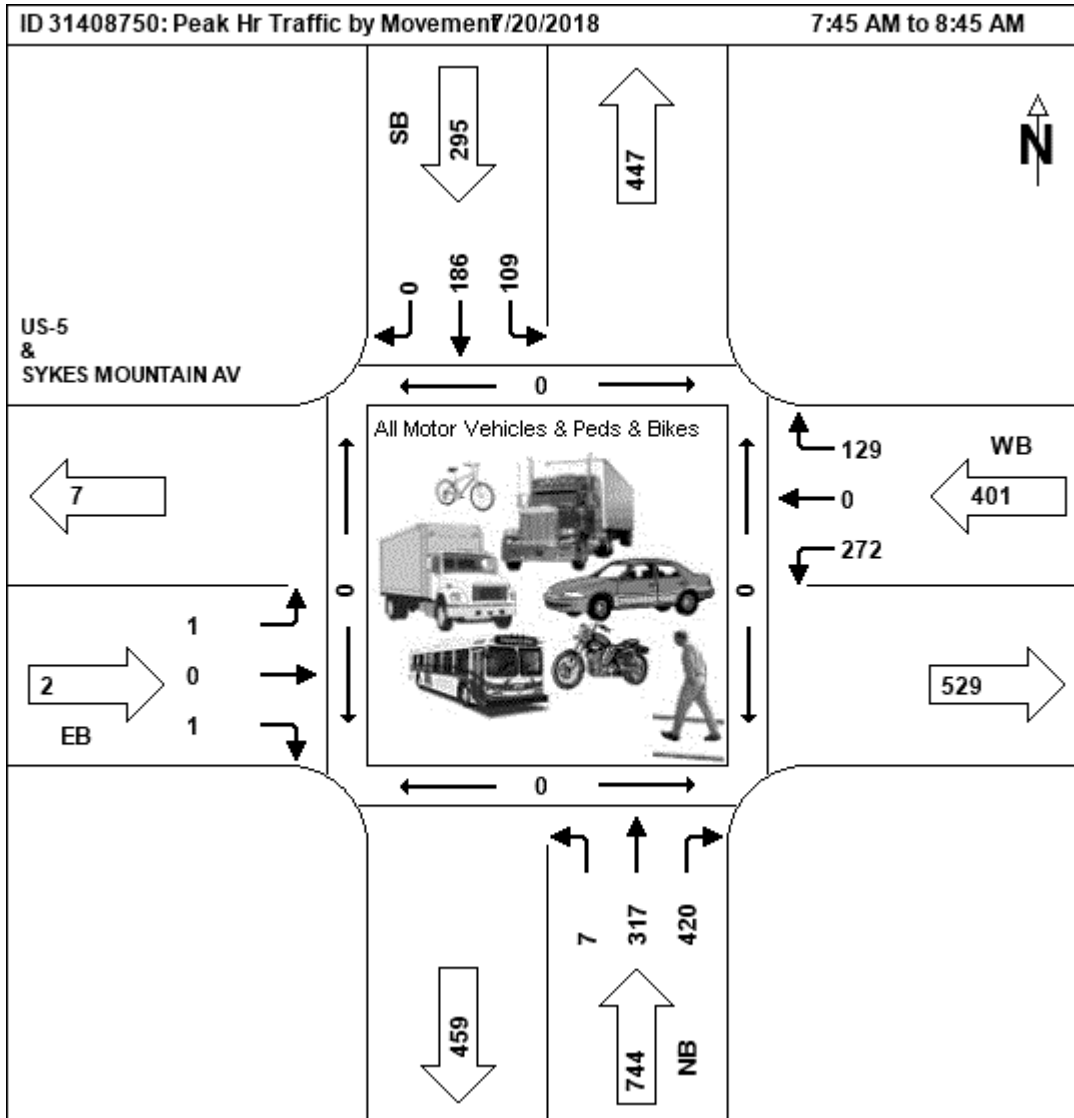
Int ID: 31408750
 Community: HARTFORD
 Road 1: US-5
 Road 2: SYKES MOUNTAIN AV

Corridor: NA
 Road 3: US-5
 Road 4: CLOSED DEALERSHIP

AM Peak Hour
 07/20/2018

Start Time	NB					EB					SB					WB					App Total	Int Total
	Left	Thru	Right	Ped	Total	Left	Thru	Right	Ped	Total	Left	Thru	Right	Ped	Total	Left	Thru	Right	Ped	Total		
7:45 AM	1	88	116	0	205	0	0	1	0	1	35	60	0	0	95	68	0	26	0	94	395	
8:00 AM	0	80	112	0	192	1	0	0	0	1	23	46	0	0	69	66	0	34	0	100	362	
8:15 AM	2	67	91	0	160	0	0	0	0	0	29	38	0	0	67	72	0	25	0	97	324	
8:30 AM	4	82	101	0	187	0	0	0	0	0	22	42	0	0	64	66	0	44	0	110	361	
Total	7	317	420	0	744	1	0	1	0	2	109	186	0	0	295	272	0	129	0	401	1442	
PHF	0.44	0.90	0.91		0.91	0.25		0.50	0.78	0.78	0.78	0.94		0.78	0.94	0.73		0.73		0.91		
HV %	29	9	8		100	0		5	9		12			9								

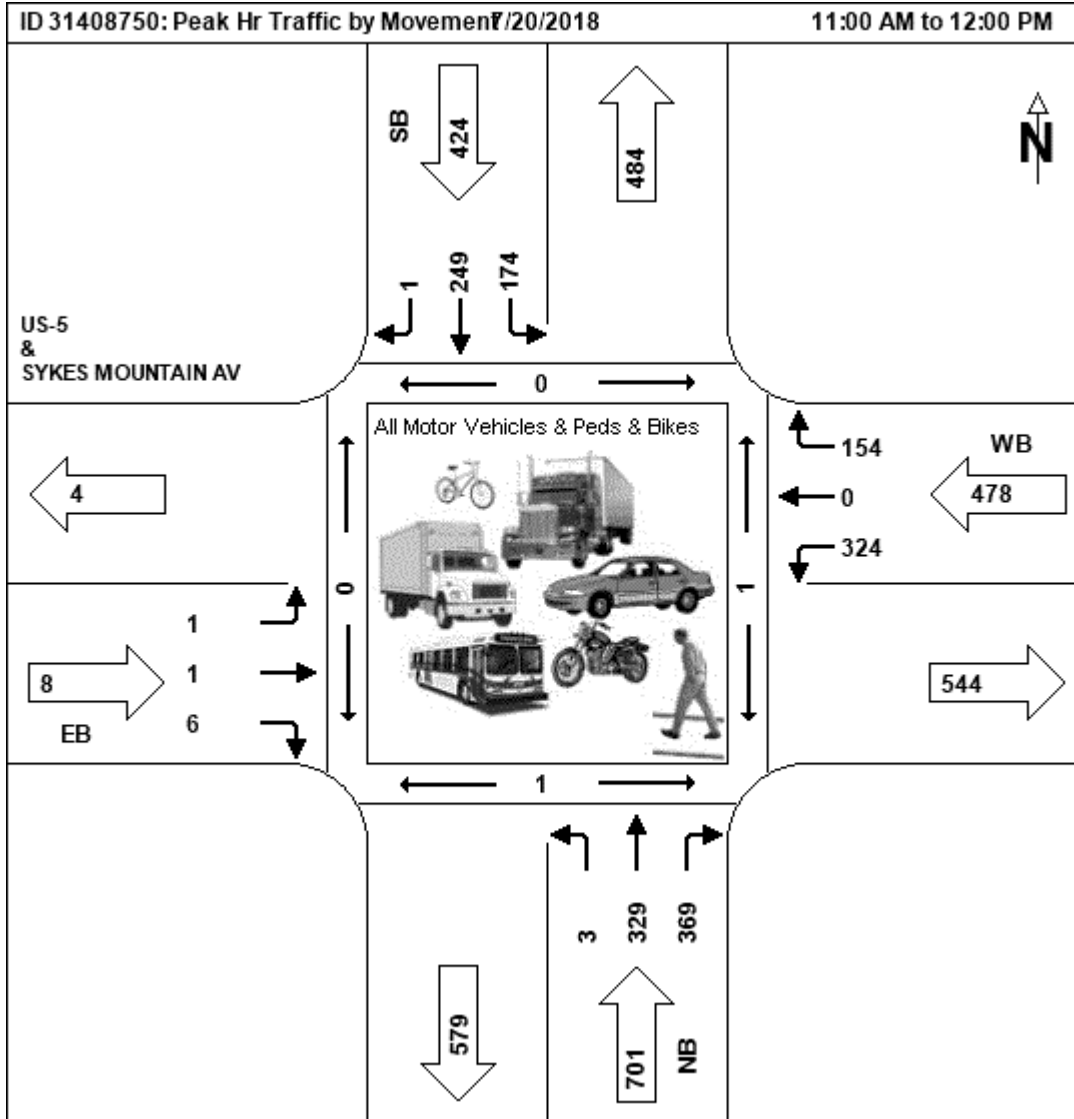
- Cars
- Trucks
- Pedestrians
- Bikes



Midday Peak Hour 07/20/2018

Start Time	NB					EB					SB					WB					App Total	Int Total
	Left	Thru	Right	Ped	App Total	Left	Thru	Right	Ped	App Total	Left	Thru	Right	Ped	App Total	Left	Thru	Right	Ped	App Total		
11:00 AM	0	73	88	0	161	1	1	1	0	3	41	59	1	0	101	81	0	39	0	120	385	
11:15 AM	1	93	80	0	174	0	0	1	0	1	40	70	0	0	110	78	0	32	0	110	395	
11:30 AM	1	79	92	1	172	0	0	1	0	1	39	61	0	0	100	79	0	33	0	112	385	
11:45 AM	1	84	109	0	194	0	0	3	1	3	54	59	0	0	113	86	0	50	0	136	446	
Total	3	329	369	1	701	1	1	6	1	8	174	249	1	0	424	324	0	154	0	478	1611	
PHF	0.75	0.88	0.85		0.90	0.25	0.25	0.50		0.67	0.81	0.89	0.25		0.94	0.94		0.77		0.88		
HV %	33	12	5			100	100	33			6	10	100			10		2				

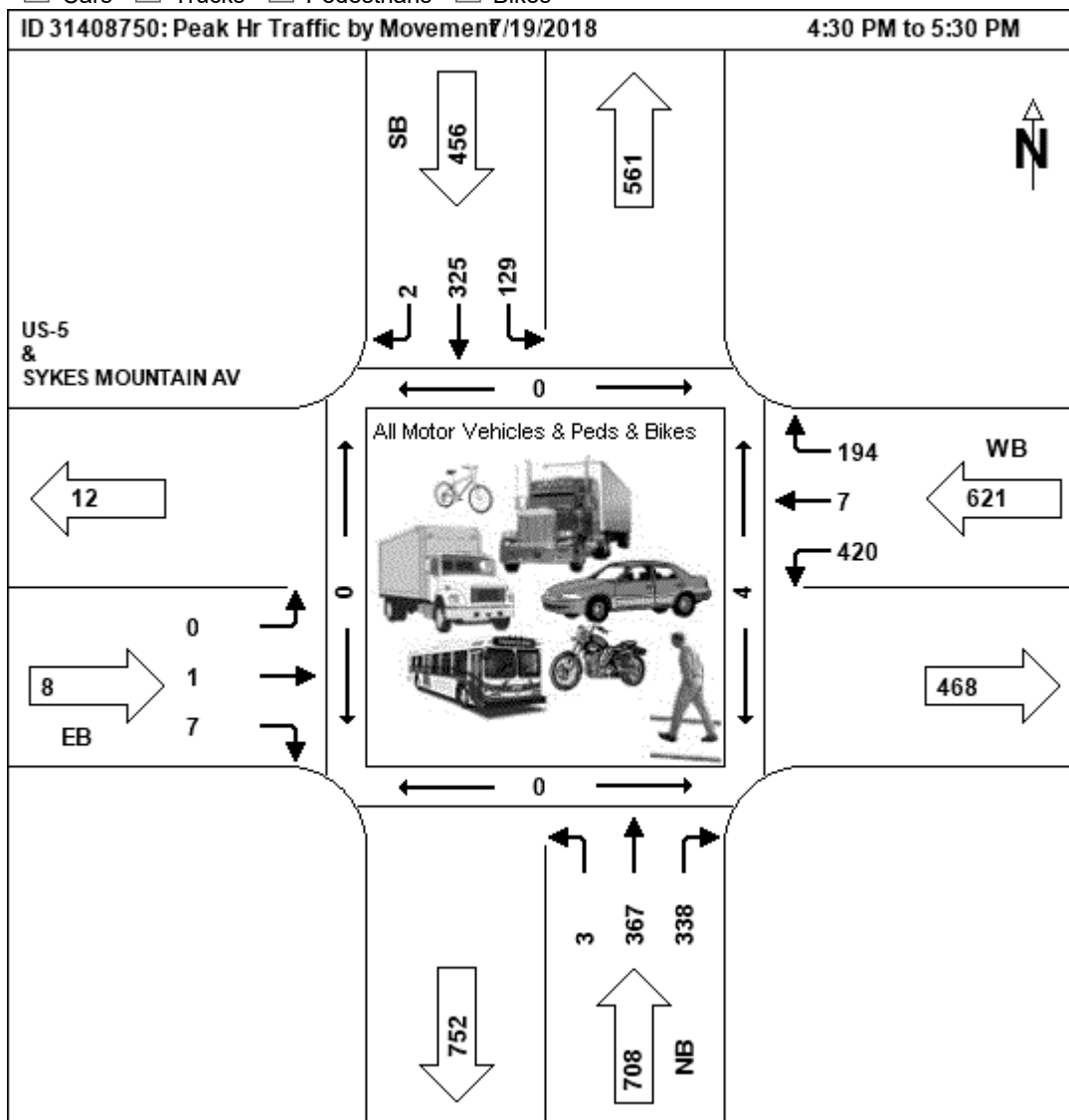
Cars
 Trucks
 Pedestrians
 Bikes



**PM Peak Hour
07/19/2018**

Start Time	NB				App Total	EB				App Total	SB				App Total	WB				App Total	Int Total
	Left	Thru	Right	Ped		Left	Thru	Right	Ped		Left	Thru	Right	Ped		Left	Thru	Right	Ped		
4:30 PM	0	95	93	0	188	0	1	3	0	4	32	99	1	0	132	99	0	56	0	155	479
4:45 PM	1	89	89	0	179	0	0	2	0	2	25	65	1	0	91	96	0	35	0	131	403
5:00 PM	0	92	80	4	172	0	0	2	0	2	36	90	0	0	126	112	6	55	0	173	473
5:15 PM	2	91	76	0	169	0	0	0	0	0	36	71	0	0	107	113	1	48	0	162	438
Total	3	367	338	4	708	0	1	7	0	8	129	325	2	0	456	420	7	194	0	621	1793
PHF	0.38	0.97	0.91		0.94	0.25	0.58			0.50	0.90	0.82	0.50	0.86	0.93	0.29	0.87		0.90		
HV %	0	5	4			0	0				1	3	100		3	14	4				

Cars Trucks Pedestrians Bikes



Peak Hour Data for Intersection

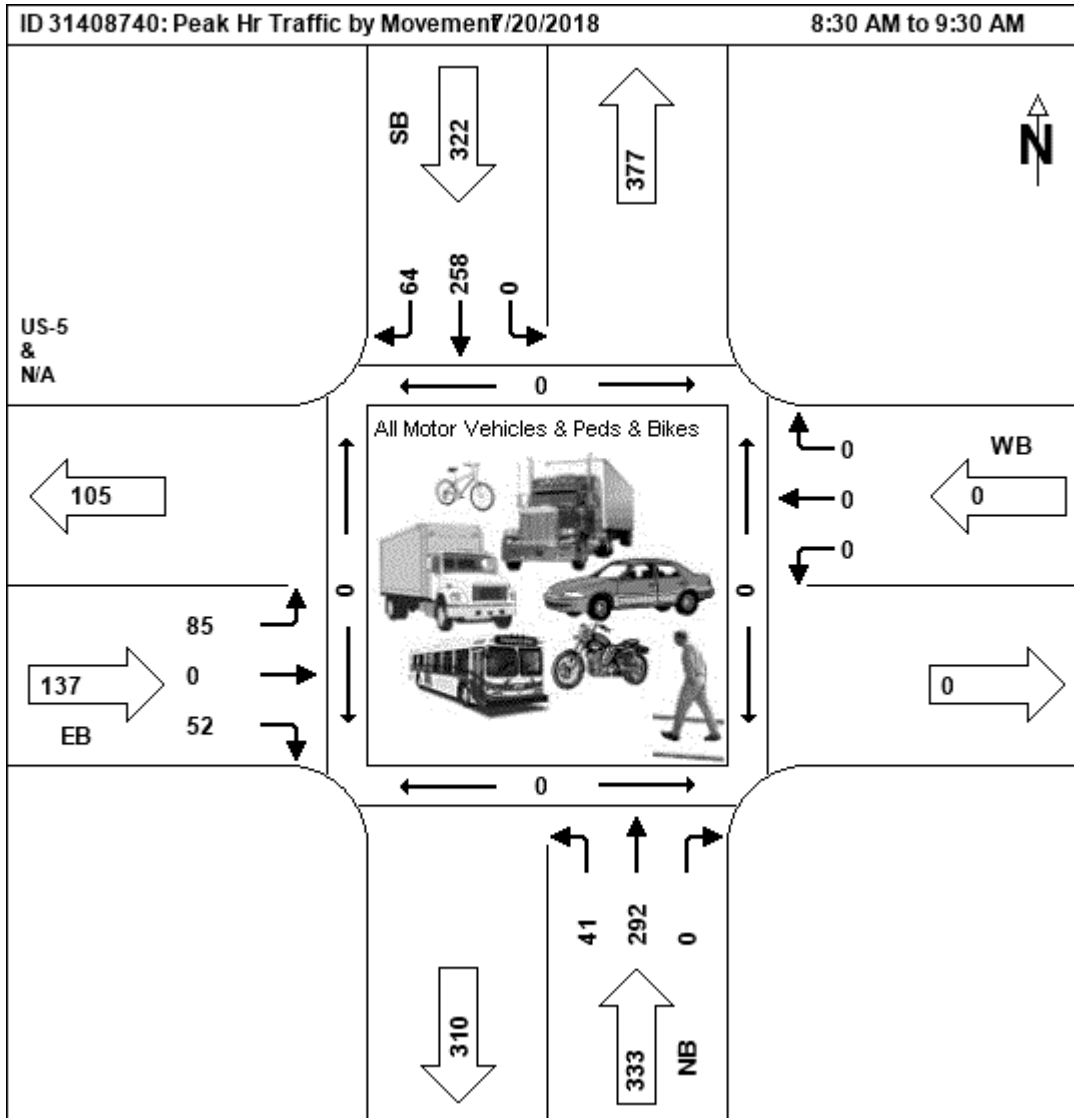
Int ID: 31408740
 Community: HARTFORD
 Road 1: US-5
 Road 2:

Corridor: NA
 Road 3: US-5
 Road 4: VA CUTOFF RD

AM Peak Hour
 07/20/2018

Start Time	NB				EB				SB				WB				App Total	Int Total
	Left	Thru	Right	Ped	Left	Thru	Right	Ped	Left	Thru	Right	Ped	Left	Thru	Right	Ped		
8:30 AM	8	66	0	0	24	0	7	0	0	71	6	0	0	0	0	0	182	
8:45 AM	12	75	0	0	19	0	21	0	0	77	22	0	0	0	0	0	226	
9:00 AM	9	76	0	0	20	0	13	0	0	63	18	0	0	0	0	0	199	
9:15 AM	12	75	0	0	22	0	11	0	0	47	18	0	0	0	0	0	185	
Total	41	292	0	0	85	0	52	0	137	258	64	0	322	0	0	0	792	
PHF	0.85	0.96			0.96	0.89	0.62	0.86	0.84	0.73	0.81							
HV %	17	14			5	13			17	6								

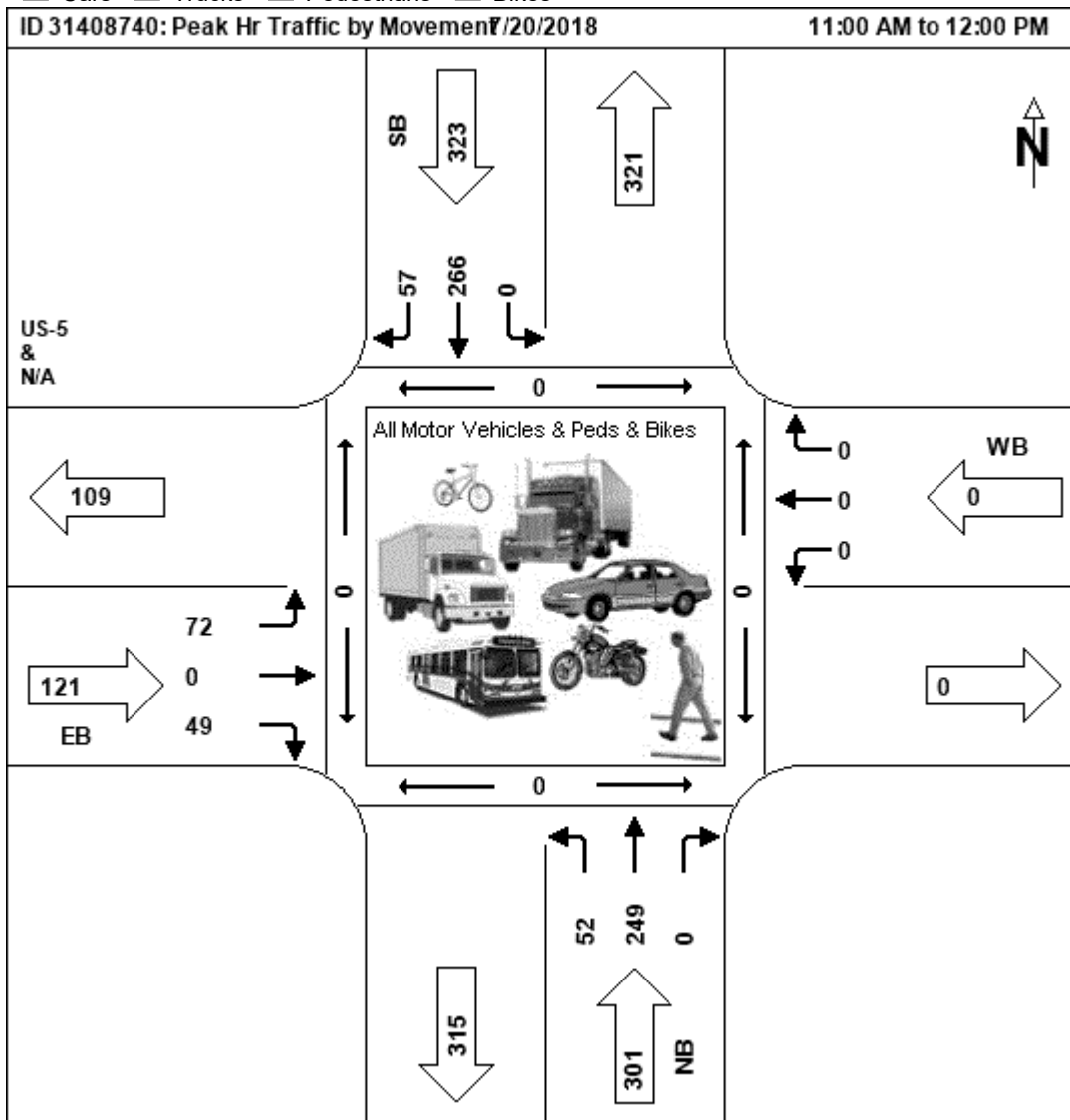
- Cars Trucks Pedestrians Bikes



Midday Peak Hour 07/20/2018

Start Time	NB				EB				SB				WB				App Total	Int Total			
	Left	Thru	Right	Ped	Left	Thru	Right	Ped	Left	Thru	Right	Ped	Left	Thru	Right	Ped					
11:00 AM	8	56	0	0	18	0	13	0	0	59	12	0	0	0	0	0	64	31	71	0	166
11:15 AM	15	67	0	0	14	0	14	0	0	67	14	0	0	0	0	0	82	28	81	0	191
11:30 AM	15	65	0	0	18	0	12	0	0	70	15	0	0	0	0	0	80	30	85	0	195
11:45 AM	14	61	0	0	22	0	10	0	0	70	16	0	0	0	0	0	75	32	86	0	193
Total	52	249	0	0	72	0	49	0	121	266	57	0	323	0	0	0	301	121	323	0	745
PHF	0.87	0.93			0.92	0.82	0.88		0.95	0.95	0.89		0.94								
HV %	8	16			3	6			12	5											

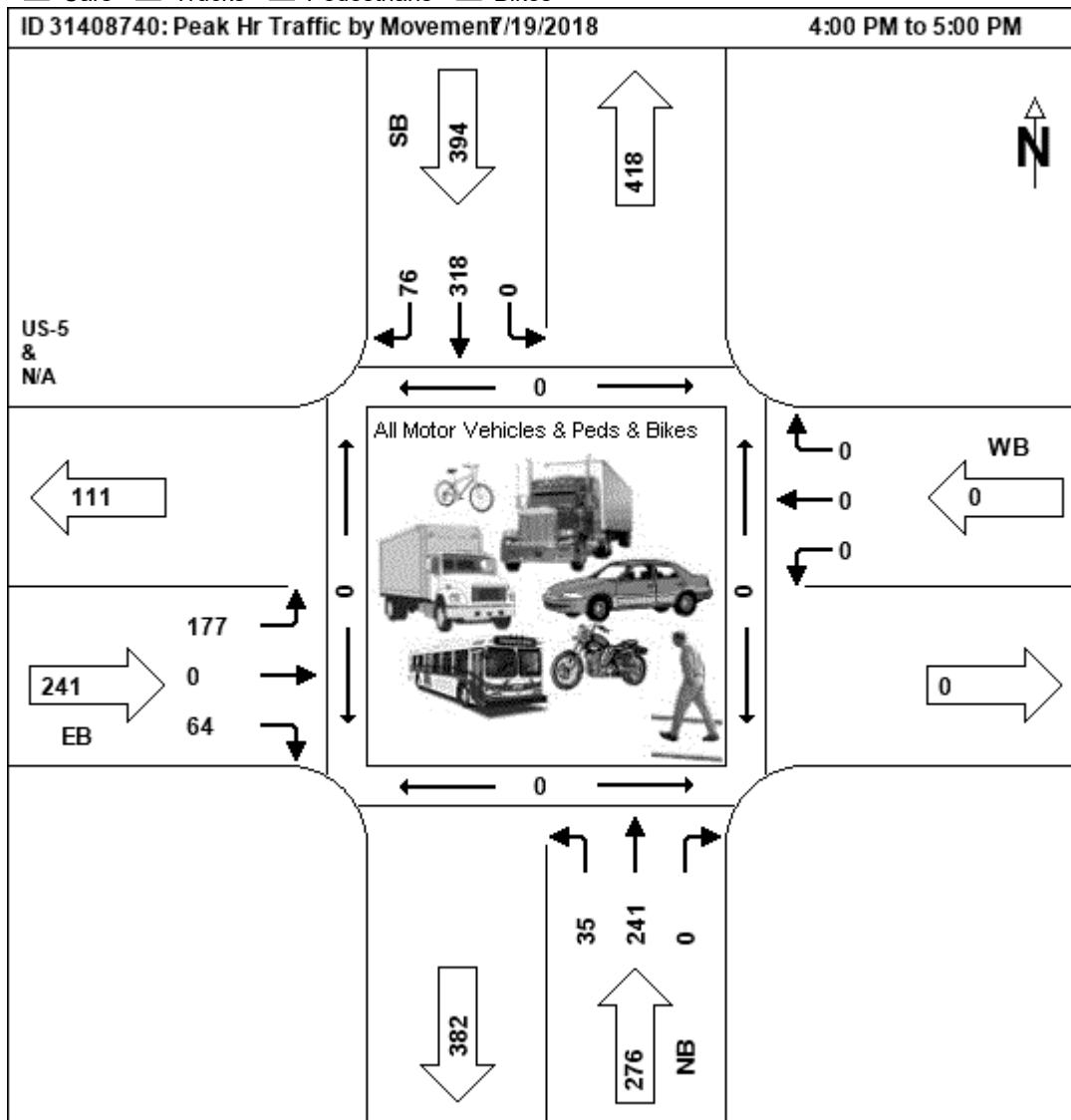
Cars
 Trucks
 Pedestrians
 Bikes



**PM Peak Hour
07/19/2018**

Start Time	NB				App Total	EB				App Total	SB				App Total	WB				App Total	Int Total
	Left	Thru	Right	Ped		Left	Thru	Right	Ped		Left	Thru	Right	Ped		Left	Thru	Right	Ped		
4:00 PM	8	57	0	0	65	47	0	14	0	61	0	79	13	0	92	0	0	0	0	0	218
4:15 PM	6	59	0	0	65	29	0	16	0	45	0	82	23	0	105	0	0	0	0	0	215
4:30 PM	9	75	0	0	84	63	0	19	0	82	0	76	17	0	93	0	0	0	0	0	259
4:45 PM	12	50	0	0	62	38	0	15	0	53	0	81	23	0	104	0	0	0	0	0	219
Total	35	241	0	0	276	177	0	64	0	241	0	318	76	0	394	0	0	0	0	0	911
PHF	0.73	0.80			0.82	0.70	0.84		0.73	0.97	0.83			0.94							
HV %	0	5			3		0			5	4										

Cars Trucks Pedestrians Bikes



Peak Hour Data for Intersection

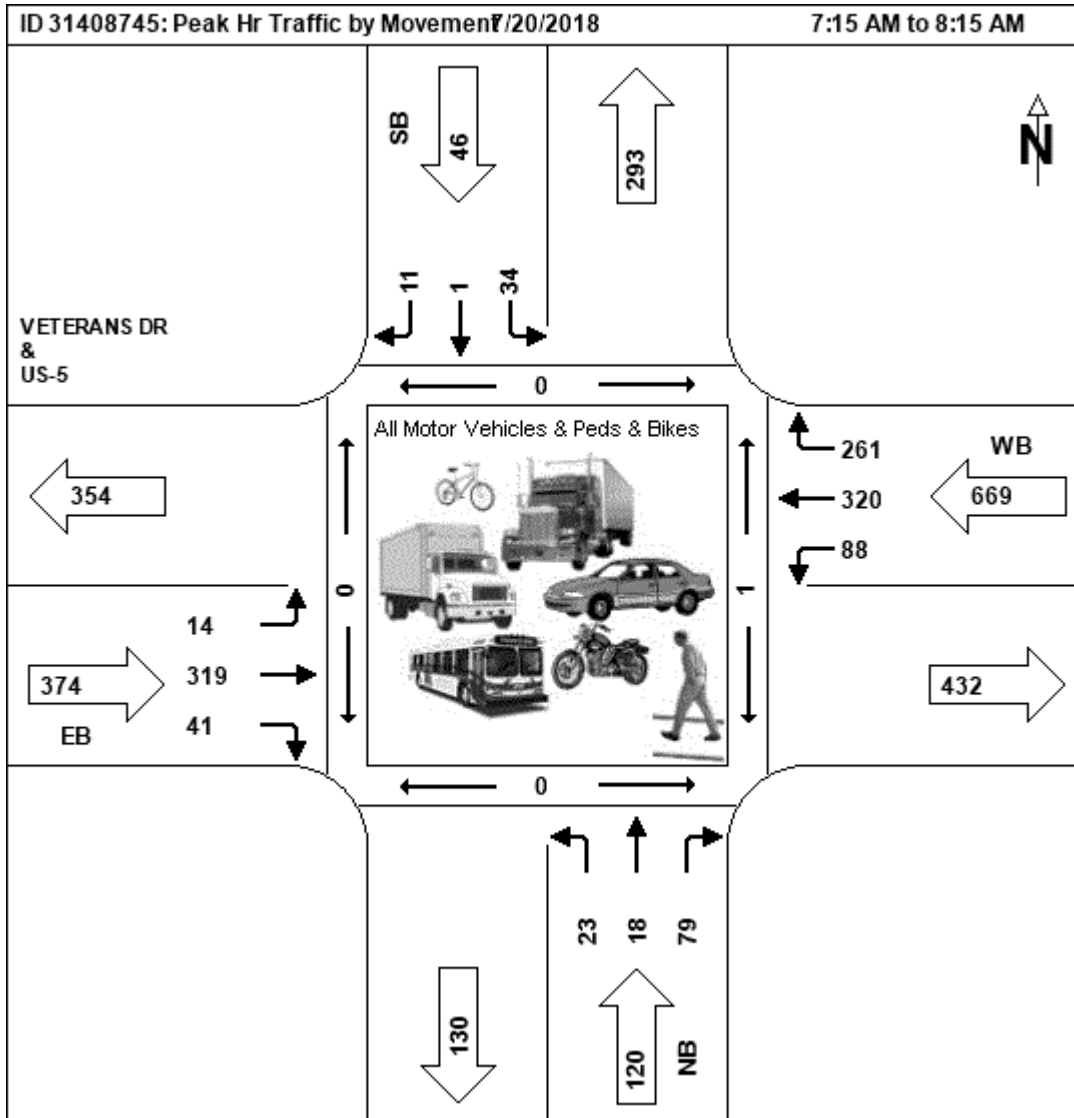
Int ID: 31408745
 Community: HARTFORD
 Road 1: VETERANS DR
 Road 2: US-5

Corridor: NA
 Road 3: CONVENIENCE STORE
 Road 4: US-5

AM Peak Hour
 07/20/2018

Start Time	NB				App Total	EB				App Total	SB				App Total	WB				App Total	Int Total
	Left	Thru	Right	Ped		Left	Thru	Right	Ped		Left	Thru	Right	Ped		Left	Thru	Right	Ped		
7:15 AM	4	5	23	0	32	6	65	8	0	79	12	0	0	0	12	26	55	90	0	171	294
7:30 AM	3	4	15	0	22	3	74	9	0	86	6	0	1	0	7	27	77	60	0	164	279
7:45 AM	9	6	21	1	36	3	81	13	0	97	5	0	4	0	9	18	100	65	0	183	325
8:00 AM	7	3	20	0	30	2	99	11	0	112	11	1	6	0	18	17	88	46	0	151	311
Total	23	18	79	1	120	14	319	41	0	374	34	1	11	0	46	88	320	261	0	669	1209
PHF	0.64	0.75	0.86		0.83	0.58	0.81	0.79		0.83	0.71	0.25	0.46		0.64	0.81	0.80	0.73		0.91	
HV %	0	0	0			0	18	0			18	0	0			0	14	1			

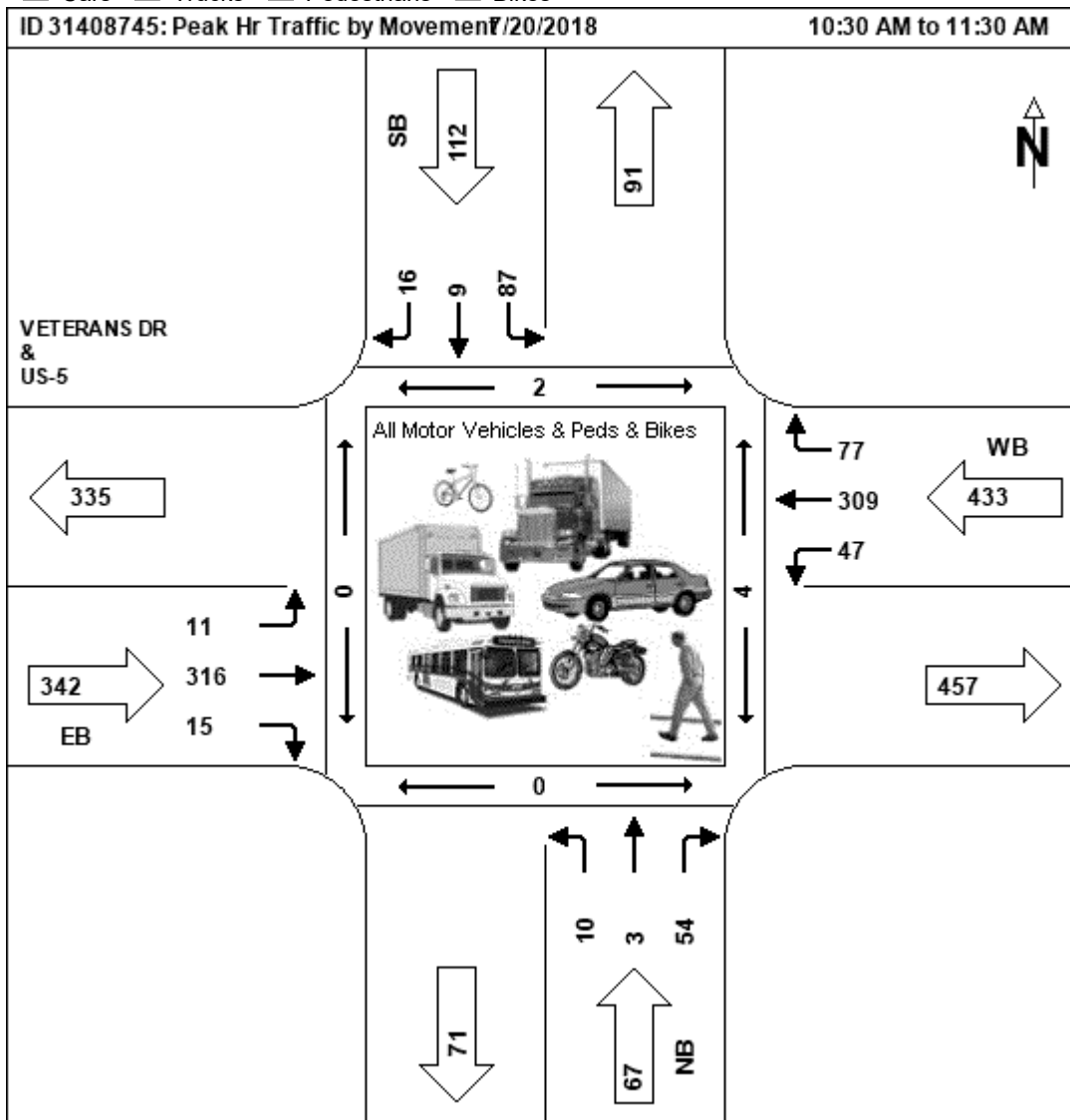
- Cars Trucks Pedestrians Bikes



Midday Peak Hour 07/20/2018

Start Time	NB				App Total	EB				App Total	SB				App Total	WB				App Total	Int Total
	Left	Thru	Right	Ped		Left	Thru	Right	Ped		Left	Thru	Right	Ped		Left	Thru	Right	Ped		
10:30 AM	4	1	12	1	17	3	86	2	0	91	15	2	6	0	23	11	77	25	1	113	244
10:45 AM	2	2	12	0	16	1	76	3	0	80	27	1	5	0	33	11	71	18	1	100	229
11:00 AM	1	0	13	2	14	5	74	4	0	83	15	2	2	0	19	14	79	16	0	109	225
11:15 AM	3	0	17	1	20	2	80	6	0	88	30	4	3	0	37	11	82	18	0	111	256
Total	10	3	54	4	67	11	316	15	0	342	87	9	16	0	112	47	309	77	2	433	954
PHF	0.63	0.38	0.79		0.84	0.55	0.92	0.63	0.94	0.73	0.56	0.67	0.76	0.84	0.94	0.77	0.96				
HV %	0	0	6		0	16	7		2	11	6		2	14	6						

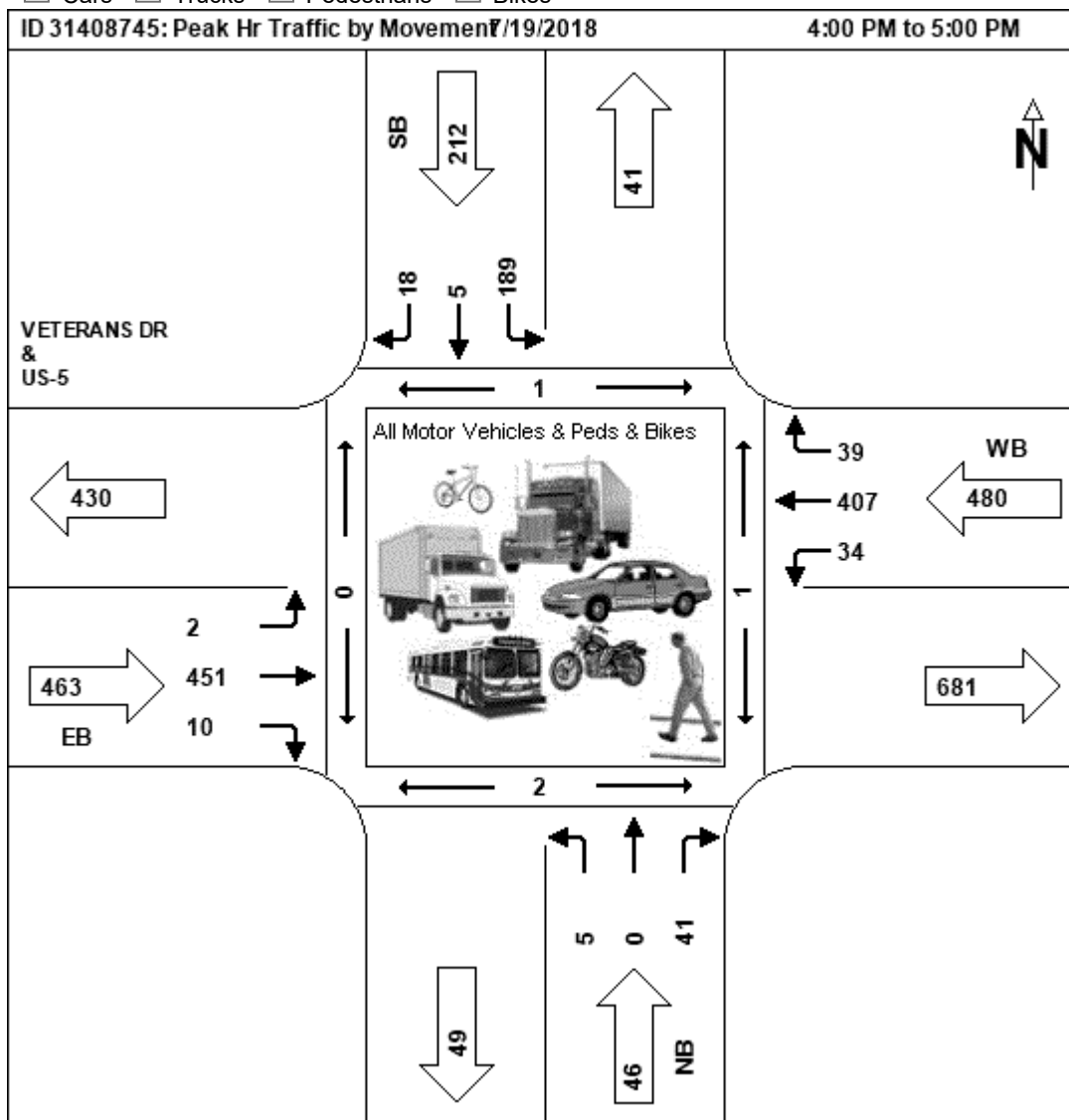
Cars
 Trucks
 Pedestrians
 Bikes



PM Peak Hour 07/19/2018

Start Time	NB				App Total	EB				App Total	SB				App Total	WB				App Total	Int Total
	Left	Thru	Right	Ped		Left	Thru	Right	Ped		Left	Thru	Right	Ped		Left	Thru	Right	Ped		
4:00 PM	1	0	9	1	10	2	110	0	2	112	53	0	6	0	59	11	100	9	0	120	301
4:15 PM	1	0	11	0	12	0	93	5	0	98	46	2	3	0	51	8	108	9	1	125	286
4:30 PM	3	0	12	0	15	0	150	2	0	152	46	1	3	0	50	10	96	9	0	115	332
4:45 PM	0	0	9	0	9	0	98	3	0	101	44	2	6	0	52	5	103	12	0	120	282
Total	5	0	41	1	46	2	451	10	2	463	189	5	18	0	212	34	407	39	1	480	1201
PHF	0.42	0.85	0.77	0.25	0.75	0.50	0.76	0.89	0.63	0.75	0.90	0.77	0.94	0.81	0.96						
HV %	0	0	0	5	0	2	0	0	0	0	0	6	13								

Cars
 Trucks
 Pedestrians
 Bikes



Peak Hour Data for Intersection

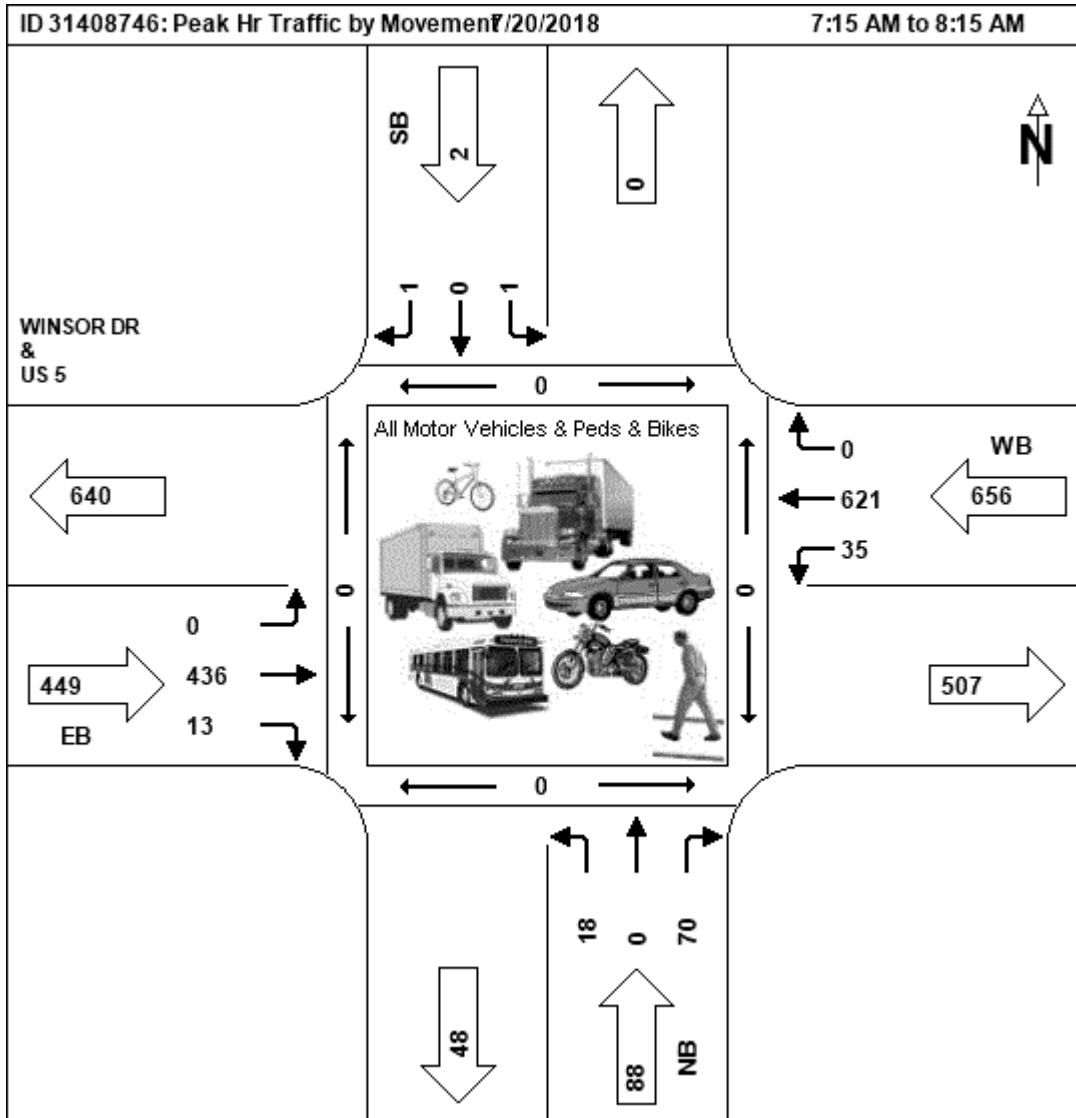
Int ID: 31408746
 Community: HARTFORD
 Road 1: WINSOR DR
 Road 2: US 5

Corridor:
 Road 3: BALLARDVALE DR
 Road 4: US 5

AM Peak Hour
 07/20/2018

Start Time	NB				App Total	EB				App Total	SB				App Total	WB				App Total	Int Total
	Left	Thru	Right	Ped		Left	Thru	Right	Ped		Left	Thru	Right	Ped		Left	Thru	Right	Ped		
7:15 AM	1	0	19	0	20	0	105	3	0	108	0	0	0	0	0	8	154	0	0	162	290
7:30 AM	7	0	13	0	20	0	95	2	0	97	1	0	0	0	1	3	158	0	0	161	279
7:45 AM	5	0	19	0	24	0	104	5	0	109	0	0	1	0	1	13	172	0	0	185	319
8:00 AM	5	0	19	0	24	0	132	3	0	135	0	0	0	0	0	11	137	0	0	148	307
Total	18	0	70	0	88	0	436	13	0	449	1	0	1	0	2	35	621	0	0	656	1195
PHF	0.64		0.92		0.92	0.83	0.65			0.83	0.25		0.25		0.50	0.67	0.90			0.89	
HV %	0		6			13	15				0		0			0	7				

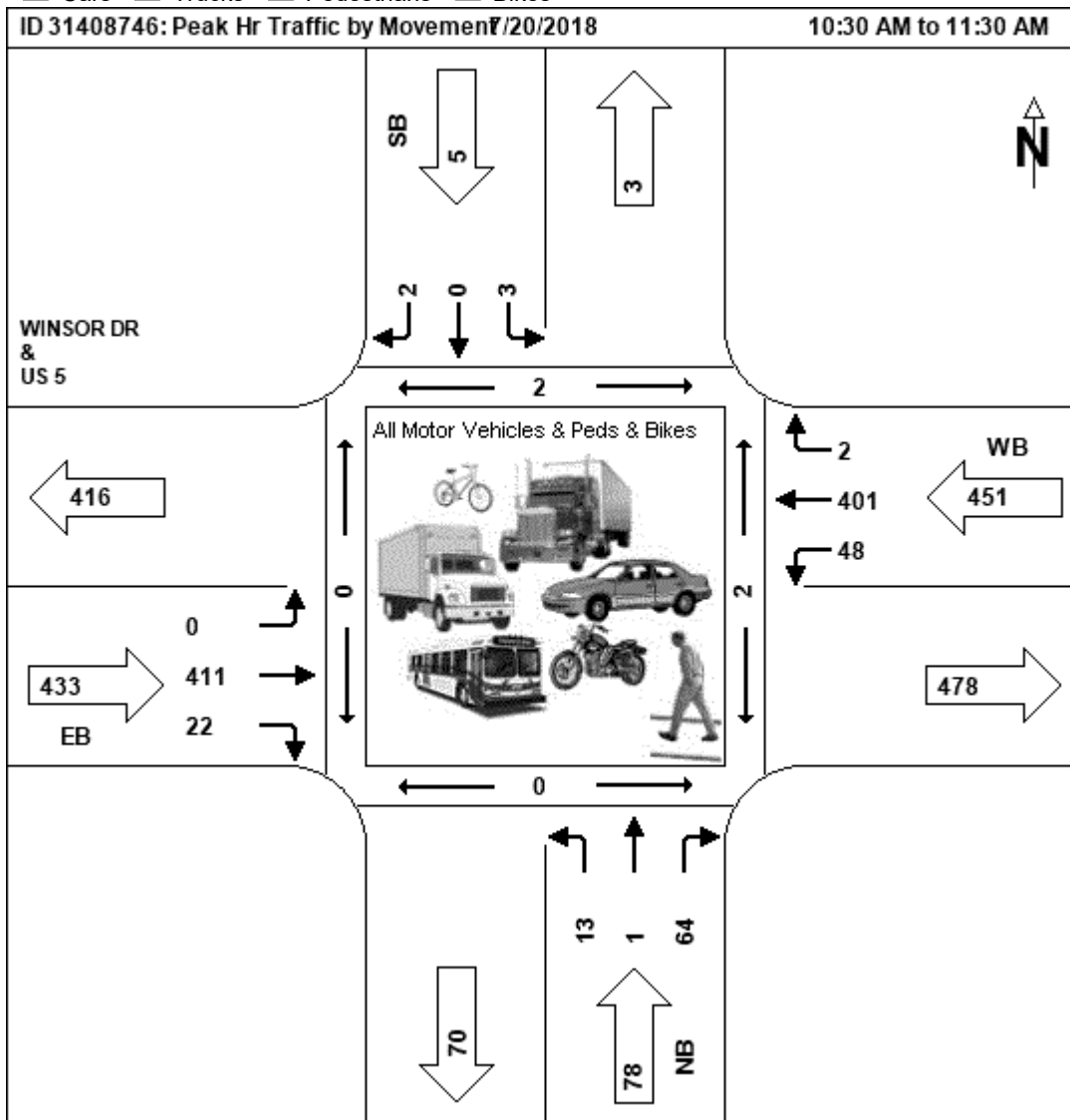
- Cars Trucks Pedestrians Bikes



Midday Peak Hour 07/20/2018

Start Time	NB				App Total	EB				App Total	SB				App Total	WB				App Total	Int Total
	Left	Thru	Right	Ped		Left	Thru	Right	Ped		Left	Thru	Right	Ped		Left	Thru	Right	Ped		
10:30 AM	3	1	12	1	16	0	106	6	0	112	1	0	2	0	3	12	106	1	1	119	250
10:45 AM	3	0	21	1	24	0	98	4	0	102	0	0	0	0	0	13	87	0	1	100	226
11:00 AM	4	0	18	0	22	0	92	6	0	98	1	0	0	0	1	8	103	1	0	112	233
11:15 AM	3	0	13	0	16	0	115	6	0	121	1	0	0	0	1	15	105	0	0	120	258
Total	13	1	64	2	78	0	411	22	0	433	3	0	2	0	5	48	401	2	2	451	967
PHF	0.81	0.25	0.76		0.81	0.89	0.92		0.89	0.75	0.25		0.42	0.80	0.95	0.50		0.94			
HV %	0	0	8			10	5		0	0			10	7	0						

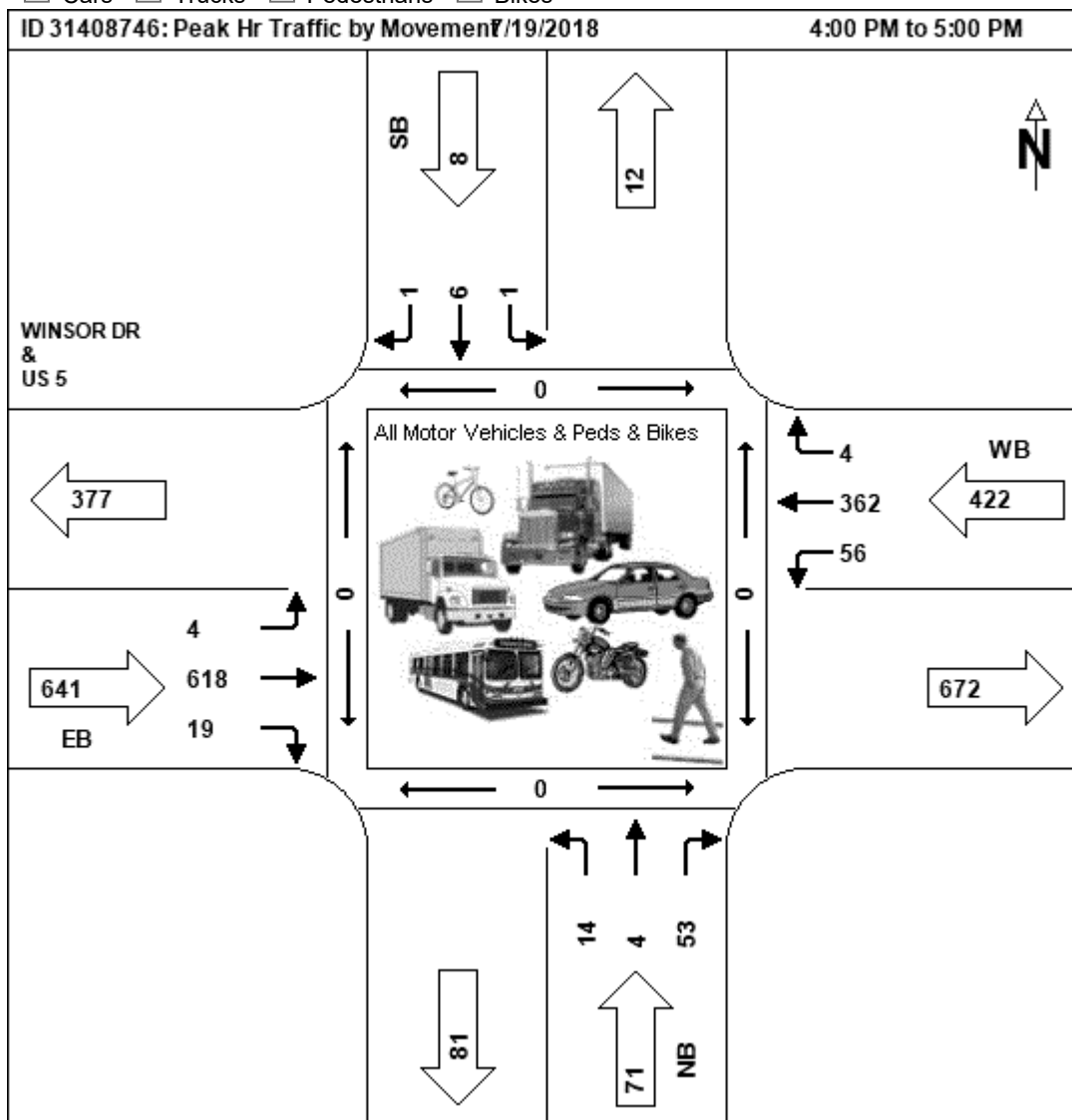
Cars
 Trucks
 Pedestrians
 Bikes



**PM Peak Hour
07/19/2018**

Start Time	NB				App Total	EB				App Total	SB				App Total	WB				App Total	Int Total
	Left	Thru	Right	Ped		Left	Thru	Right	Ped		Left	Thru	Right	Ped		Left	Thru	Right	Ped		
4:00 PM	4	0	18	0	22	1	155	8	0	164	1	1	0	0	2	17	80	0	0	97	285
4:15 PM	6	0	15	0	21	1	130	3	0	134	0	0	0	0	0	22	84	0	0	106	261
4:30 PM	2	0	10	0	12	0	182	4	0	186	0	0	0	0	0	8	106	3	0	117	315
4:45 PM	2	4	10	0	16	2	151	4	0	157	0	5	1	0	6	9	92	1	0	102	281
Total	14	4	53	0	71	4	618	19	0	641	1	6	1	0	8	56	362	4	0	422	1142
PHF	0.58	0.25	0.74		0.81	0.50	0.85	0.59		0.86	0.25	0.30	0.25		0.33	0.64	0.85	0.33		0.90	
HV %	0	0	4			25	4	0			0	0	0			4	5	0			

Cars Trucks Pedestrians Bikes



Assume 50% each direction

use 1% growth per year to get all data to 2018.

9/25/17
Beswick
AM 123 \leftrightarrow 125
PM 122 \leftrightarrow 124

connector
9/27/17
AM 31 \updownarrow 32
PM 34 \updownarrow 35

Ralph

Lehman

5/18/16
= Holiday
AM 246 \leftrightarrow 251
PM 278 \leftrightarrow 284

5/21/16
Airport
AM 118 \leftrightarrow 121
PM 129 \leftrightarrow 132

Lowery
Hyde Park

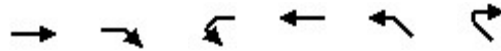
Bowling

APPENDIX C

Traffic Simulation Queue Length Report

Lanes, Volumes, Timings
1: N Main St & US Route 5

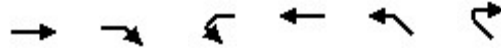
07/09/2019



Lane Group	EBT	EBR	WBL	WBT	NWL	NWR
Lane Configurations	↔↔		↶	↗	↶↶	↷
Traffic Volume (vph)	303	114	68	216	65	108
Future Volume (vph)	303	114	68	216	65	108
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)		680	0		0	150
Storage Lanes		0	1		2	1
Taper Length (ft)			25		25	
Lane Util. Factor	0.95	0.95	1.00	1.00	0.97	1.00
Frt	0.959					0.850
Flt Protected			0.950		0.950	
Satd. Flow (prot)	3394	0	1770	1863	3433	1583
Flt Permitted			0.491		0.950	
Satd. Flow (perm)	3394	0	915	1863	3433	1583
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)	124					117
Link Speed (mph)	30			30	30	
Link Distance (ft)	1824			983	1114	
Travel Time (s)	41.5			22.3	25.3	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	329	124	74	235	71	117
Shared Lane Traffic (%)						
Lane Group Flow (vph)	453	0	74	235	71	117
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(ft)	12			12	24	
Link Offset(ft)	0			0	0	
Crosswalk Width(ft)	16			16	16	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)		9	15		15	9
Number of Detectors	2		1	2	1	1
Detector Template	Thru		Left	Thru	Left	Right
Leading Detector (ft)	100		20	100	20	20
Trailing Detector (ft)	0		0	0	0	0
Detector 1 Position(ft)	0		0	0	0	0
Detector 1 Size(ft)	6		20	6	20	20
Detector 1 Type	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0		0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0		0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0		0.0	0.0	0.0	0.0
Detector 2 Position(ft)	94			94		
Detector 2 Size(ft)	6			6		
Detector 2 Type	Cl+Ex			Cl+Ex		
Detector 2 Channel						
Detector 2 Extend (s)	0.0			0.0		
Turn Type	NA		Perm	NA	Prot	Perm
Protected Phases	4			8	2	
Permitted Phases			8			2

Lanes, Volumes, Timings
1: N Main St & US Route 5

07/09/2019

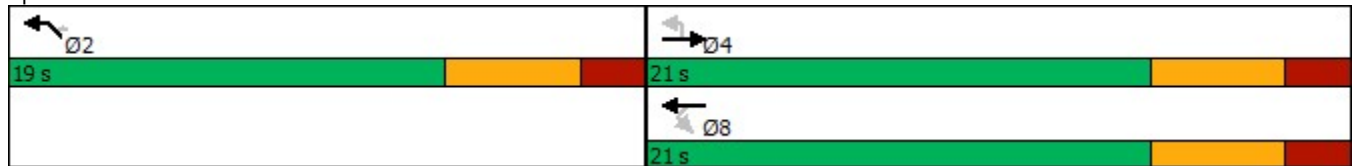


Lane Group	EBT	EBR	WBL	WBT	NWL	NWR
Detector Phase	4		8	8	2	2
Switch Phase						
Minimum Initial (s)	10.0		10.0	10.0	10.0	10.0
Minimum Split (s)	16.0		16.0	16.0	16.0	16.0
Total Split (s)	21.0		21.0	21.0	19.0	19.0
Total Split (%)	52.5%		52.5%	52.5%	47.5%	47.5%
Maximum Green (s)	15.0		15.0	15.0	13.0	13.0
Yellow Time (s)	4.0		4.0	4.0	4.0	4.0
All-Red Time (s)	2.0		2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0		0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0		6.0	6.0	6.0	6.0
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0		3.0	3.0	3.0	3.0
Recall Mode	None		None	None	Min	Min
Act Effect Green (s)	10.8		10.8	10.8	10.0	10.0
Actuated g/C Ratio	0.33		0.33	0.33	0.30	0.30
v/c Ratio	0.38		0.25	0.38	0.07	0.21
Control Delay	7.0		10.3	10.5	8.8	3.8
Queue Delay	0.0		0.0	0.0	0.0	0.0
Total Delay	7.0		10.3	10.5	8.8	3.8
LOS	A		B	B	A	A
Approach Delay	7.0			10.5	5.7	
Approach LOS	A			B	A	

Intersection Summary

Area Type:	Other
Cycle Length:	40
Actuated Cycle Length:	32.8
Natural Cycle:	40
Control Type:	Actuated-Uncoordinated
Maximum v/c Ratio:	0.38
Intersection Signal Delay:	7.8
Intersection LOS:	A
Intersection Capacity Utilization:	46.7%
ICU Level of Service:	A
Analysis Period (min):	15

Splits and Phases: 1: N Main St & US Route 5



Lanes, Volumes, Timings
 3: US Route 5 & Ryder Drive/Sykes Mountain Ave

07/09/2019



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	SBL	SBR	NEL2	NEL	NER
Lane Configurations		↕			↕	↕	↕	↕	↕	↕	↕
Traffic Volume (vph)	1	0	1	272	0	129	109	186	7	317	420
Future Volume (vph)	1	0	1	272	0	129	109	186	7	317	420
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0	220	0		100	0
Storage Lanes	0		0	0		1	1	2		1	0
Taper Length (ft)	25			25			25			25	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.88	1.00	0.97	0.95
Frt		0.932				0.850		0.850		0.915	
Flt Protected		0.976			0.950		0.950		0.950	0.979	
Satd. Flow (prot)	0	1694	0	0	1770	1583	1770	2787	1770	3237	0
Flt Permitted		0.867			0.757		0.950		0.950	0.979	
Satd. Flow (perm)	0	1505	0	0	1410	1583	1770	2787	1770	3237	0
Right Turn on Red			Yes			Yes					Yes
Satd. Flow (RTOR)		210				210				426	
Link Speed (mph)		30			30		30			30	
Link Distance (ft)		264			230		482			463	
Travel Time (s)		6.0			5.2		11.0			10.5	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	1	0	1	296	0	140	118	202	8	345	457
Shared Lane Traffic (%)											
Lane Group Flow (vph)	0	2	0	0	296	140	118	202	8	802	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Right	Left	Left	Right
Median Width(ft)		0			0		12			36	
Link Offset(ft)		0			0		0			0	
Crosswalk Width(ft)		16			16		16			16	
Two way Left Turn Lane											
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15	9	15	15	9
Number of Detectors	1	2		1	2	1	1	1	1	1	
Detector Template	Left	Thru		Left	Thru	Right	Left	Right	Left	Left	
Leading Detector (ft)	20	100		20	100	20	20	20	20	20	
Trailing Detector (ft)	0	0		0	0	0	0	0	0	0	
Detector 1 Position(ft)	0	0		0	0	0	0	0	0	0	
Detector 1 Size(ft)	20	6		20	6	20	20	20	20	20	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel											
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 2 Position(ft)		94			94						
Detector 2 Size(ft)		6			6						
Detector 2 Type		Cl+Ex			Cl+Ex						
Detector 2 Channel											
Detector 2 Extend (s)		0.0			0.0						
Turn Type	Perm	NA		Perm	NA	Perm	Prot	Prot	Prot	Prot	
Protected Phases		4			8		1	6	5	2	
Permitted Phases	4			8		8					

Lanes, Volumes, Timings
 3: US Route 5 & Ryder Drive/Sykes Mountain Ave

07/09/2019

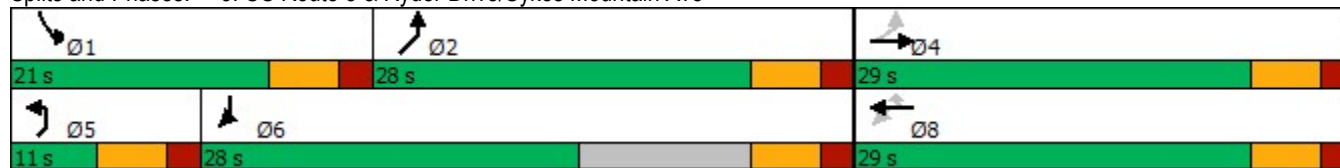


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	SBL	SBR	NEL2	NEL	NER
Detector Phase	4	4		8	8	8	1	6	5	2	
Switch Phase											
Minimum Initial (s)	8.0	8.0		8.0	8.0	8.0	5.0	11.0	5.0	11.0	
Minimum Split (s)	16.0	16.0		16.0	16.0	16.0	15.0	17.0	11.0	17.0	
Total Split (s)	29.0	29.0		29.0	29.0	29.0	21.0	28.0	11.0	28.0	
Total Split (%)	37.2%	37.2%		37.2%	37.2%	37.2%	26.9%	35.9%	14.1%	35.9%	
Maximum Green (s)	23.0	23.0		23.0	23.0	23.0	15.0	22.0	5.0	22.0	
Yellow Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0	2.0	2.0	2.0	2.0	2.0	
Lost Time Adjust (s)		0.0			0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)		6.0			6.0	6.0	6.0	6.0	6.0	6.0	
Lead/Lag							Lead	Lag	Lead	Lag	
Lead-Lag Optimize?							Yes	Yes	Yes	Yes	
Vehicle Extension (s)	2.0	2.0		2.0	2.0	2.0	2.0	2.0	2.0	2.0	
Recall Mode	None	None		None	None	None	None	Min	None	Min	
Act Effct Green (s)		16.0			16.0	16.0	8.7	24.4	5.5	14.6	
Actuated g/C Ratio		0.29			0.29	0.29	0.16	0.44	0.10	0.26	
v/c Ratio		0.00			0.73	0.23	0.43	0.16	0.05	0.68	
Control Delay		0.0			31.3	1.9	29.9	11.0	31.0	13.0	
Queue Delay		0.0			0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay		0.0			31.3	1.9	29.9	11.0	31.0	13.0	
LOS		A			C	A	C	B	C	B	
Approach Delay					21.8		18.0			13.2	
Approach LOS					C		B			B	

Intersection Summary

Area Type:	Other
Cycle Length:	78
Actuated Cycle Length:	55.1
Natural Cycle:	60
Control Type:	Actuated-Uncoordinated
Maximum v/c Ratio:	0.73
Intersection Signal Delay:	16.6
Intersection LOS:	B
Intersection Capacity Utilization:	65.1%
ICU Level of Service:	C
Analysis Period (min):	15



















Splits and Phases: 3: US Route 5 & Ryder Drive/Sykes Mountain Ave



Lanes, Volumes, Timings

6: I-91 NB off Ramp/I-91 NB on ramp & US Route 5

07/09/2019

												
Lane Group	EBL2	EBL	EBR	NBL	NBT	NBR	SBL	SBT	SBR	SWL	SWR	SWR2
Lane Configurations												
Traffic Volume (vph)	66	270	0	436	15	429	0	0	0	0	397	58
Future Volume (vph)	66	270	0	436	15	429	0	0	0	0	397	58
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)		110	0	0		150	0		0	0	250	
Storage Lanes		1	0	0		1	0		0	0	1	
Taper Length (ft)		25		25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.88	1.00
Frt						0.850					0.850	0.850
Flt Protected	0.950	0.950			0.954							
Satd. Flow (prot)	1770	1770	0	0	1777	1583	0	0	0	0	2787	1583
Flt Permitted	0.950	0.950			0.954							
Satd. Flow (perm)	1770	1770	0	0	1777	1583	0	0	0	0	2787	1583
Link Speed (mph)		30			30			30		30		
Link Distance (ft)		840			1151			400		463		
Travel Time (s)		19.1			26.2			9.1		10.5		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	72	293	0	474	16	466	0	0	0	0	432	63
Shared Lane Traffic (%)												
Lane Group Flow (vph)	72	293	0	0	490	466	0	0	0	0	432	63
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Right	Right
Median Width(ft)		24			0			0		12		
Link Offset(ft)		0			0			0		0		
Crosswalk Width(ft)		16			16			16		16		
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15	15	9	15		9	15		9	15	9	9
Sign Control		Free			Stop			Stop		Free		

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	46.6%
ICU Level of Service	A
Analysis Period (min)	15

Lanes, Volumes, Timings
 9: US Route 5 & I-91 SB ramp

07/09/2019



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	215	276	521	220	44	159
Future Volume (vph)	215	276	521	220	44	159
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Fr _t				0.850	0.894	
Fl _t Protected	0.950				0.989	
Satd. Flow (prot)	1770	1863	1863	1583	1647	0
Fl _t Permitted	0.950				0.989	
Satd. Flow (perm)	1770	1863	1863	1583	1647	0
Link Speed (mph)		30	30		30	
Link Distance (ft)		306	840		585	
Travel Time (s)		7.0	19.1		13.3	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	234	300	566	239	48	173
Shared Lane Traffic (%)						
Lane Group Flow (vph)	234	300	566	239	221	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(ft)		12	12		12	
Link Offset(ft)		0	0		0	
Crosswalk Width(ft)		16	16		16	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15			9	15	9
Sign Control		Free	Free		Stop	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	61.6%
Analysis Period (min)	15
	ICU Level of Service B

Lanes, Volumes, Timings
10: US Route 5 & Airport Dr

07/09/2019



















Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	30	29	417	30	30	295
Future Volume (vph)	30	29	417	30	30	295
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0	0		0	325	
Storage Lanes	1	0		0	1	
Taper Length (ft)	25				25	
Lane Util. Factor	1.00	1.00	0.95	0.95	1.00	0.95
Frt	0.934		0.990			
Flt Protected	0.975				0.950	
Satd. Flow (prot)	1696	0	3504	0	1770	3539
Flt Permitted	0.975				0.950	
Satd. Flow (perm)	1696	0	3504	0	1770	3539
Link Speed (mph)	30		30			30
Link Distance (ft)	782		482			2055
Travel Time (s)	17.8		11.0			46.7
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	33	32	453	33	33	321
Shared Lane Traffic (%)						
Lane Group Flow (vph)	65	0	486	0	33	321
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(ft)	12		12			12
Link Offset(ft)	0		0			0
Crosswalk Width(ft)	16		16			16
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15	9		9	15	
Sign Control	Stop		Free			Free

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	29.3%
ICU Level of Service	A
Analysis Period (min)	15

Lanes, Volumes, Timings
 12: Dunkin Donuts/Veterans Dr & US Route 5

07/09/2019

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	14	319	41	88	320	261	23	18	79	34	1	11
Future Volume (vph)	14	319	41	88	320	261	23	18	79	34	1	11
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.985			0.947			0.911			0.968	
Flt Protected		0.998			0.993			0.991			0.964	
Satd. Flow (prot)	0	1831	0	0	1752	0	0	1682	0	0	1738	0
Flt Permitted		0.998			0.993			0.991			0.964	
Satd. Flow (perm)	0	1831	0	0	1752	0	0	1682	0	0	1738	0
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		906			287			190			542	
Travel Time (s)		20.6			6.5			4.3			12.3	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	15	347	45	96	348	284	25	20	86	37	1	12
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	407	0	0	728	0	0	131	0	0	50	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Sign Control		Free			Free			Stop			Stop	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	75.5%
ICU Level of Service	D
Analysis Period (min)	15

Lanes, Volumes, Timings
 15: US Route 5 & VA Cutoff Rd

07/09/2019



Lane Group	WBL	WBR	SEL	SER	NEL	NER
Lane Configurations						
Traffic Volume (vph)	258	64	85	52	41	292
Future Volume (vph)	258	64	85	52	41	292
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.973		0.948		0.882	
Flt Protected	0.962		0.970		0.994	
Satd. Flow (prot)	1744	0	1713	0	1633	0
Flt Permitted	0.962		0.970		0.994	
Satd. Flow (perm)	1744	0	1713	0	1633	0
Link Speed (mph)	30		30		30	
Link Distance (ft)	906		2012		1510	
Travel Time (s)	20.6		45.7		34.3	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	280	70	92	57	45	317
Shared Lane Traffic (%)						
Lane Group Flow (vph)	350	0	149	0	362	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Right
Median Width(ft)	12		12		12	
Link Offset(ft)	0		0		0	
Crosswalk Width(ft)	16		16		16	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15	9	15	9	15	9
Sign Control	Free		Stop		Free	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	56.4%
ICU Level of Service	B
Analysis Period (min)	15

Lanes, Volumes, Timings
 18: Store Driveway/US Route 4 & US Route 5

07/09/2019

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	93	335	2	3	220	66	1	0	1	88	1	92
Future Volume (vph)	93	335	2	3	220	66	1	0	1	88	1	92
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	380		0	0		150	0		0	0		0
Storage Lanes	1		0	0		1	0		0	0		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.95	0.95	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.999				0.850		0.932				0.850
Flt Protected	0.950				0.999			0.976			0.953	
Satd. Flow (prot)	1770	3536	0	0	3536	1583	0	1694	0	0	1775	1583
Flt Permitted	0.950				0.999			0.976			0.953	
Satd. Flow (perm)	1770	3536	0	0	3536	1583	0	1694	0	0	1775	1583
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		2055			1824			609			1803	
Travel Time (s)		46.7			41.5			13.8			41.0	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	101	364	2	3	239	72	1	0	1	96	1	100
Shared Lane Traffic (%)												
Lane Group Flow (vph)	101	366	0	0	242	72	0	2	0	0	97	100
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Sign Control		Free			Free			Stop			Stop	

Intersection Summary

Area Type: Other

Control Type: Unsignalized

Intersection Capacity Utilization 34.1% ICU Level of Service A

Analysis Period (min) 15

Lanes, Volumes, Timings
 24: Ballardvale Dr/Windsor Dr & US Route 5

07/09/2019



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕		↗	↘		↗	↘			↕	
Traffic Volume (vph)	0	436	13	35	621	0	18	0	70	1	0	1
Future Volume (vph)	0	436	13	35	621	0	18	0	70	1	0	1
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Fr _t		0.996						0.850			0.932	
Fl _t Protected				0.950			0.950				0.976	
Satd. Flow (prot)	0	1855	0	1770	1863	0	1770	1583	0	0	1694	0
Fl _t Permitted				0.950			0.950				0.976	
Satd. Flow (perm)	0	1855	0	1770	1863	0	1770	1583	0	0	1694	0
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		287			306			926			699	
Travel Time (s)		6.5			7.0			21.0			15.9	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	474	14	38	675	0	20	0	76	1	0	1
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	488	0	38	675	0	20	76	0	0	2	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Sign Control		Free			Free			Stop			Stop	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	43.7%
ICU Level of Service	A
Analysis Period (min)	15

Lanes, Volumes, Timings
 27: Beswick Dr & Sykes Mountain Ave

07/09/2019



Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	497	32	32	369	32	32
Future Volume (vph)	497	32	32	369	32	32
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.992			0.932		
Flt Protected				0.996	0.976	
Satd. Flow (prot)	1848	0	0	1855	1694	0
Flt Permitted				0.996	0.976	
Satd. Flow (perm)	1848	0	0	1855	1694	0
Link Speed (mph)	30			30	30	
Link Distance (ft)	230			250	275	
Travel Time (s)	5.2			5.7	6.3	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	540	35	35	401	35	35
Shared Lane Traffic (%)						
Lane Group Flow (vph)	575	0	0	436	70	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(ft)	0			0	12	
Link Offset(ft)	0			0	0	
Crosswalk Width(ft)	16			16	16	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	9		15	15		9
Sign Control	Free			Free	Stop	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	56.3%
Analysis Period (min)	15
	ICU Level of Service B

Lanes, Volumes, Timings
 30: Ralph Lehman Dr & Sykes Mountain Ave

07/09/2019



Lane Group	EBR	EBR2	NBL	NBR	NWL2	NWL
Lane Configurations						
Traffic Volume (vph)	521	8	8	8	8	393
Future Volume (vph)	521	8	8	8	8	393
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.865		0.932			
Flt Protected			0.976			0.950
Satd. Flow (prot)	1611	0	1694	0	0	1770
Flt Permitted			0.976			0.950
Satd. Flow (perm)	1611	0	1694	0	0	1770
Link Speed (mph)	30		30			30
Link Distance (ft)	250		271			704
Travel Time (s)	5.7		6.2			16.0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	566	9	9	9	9	427
Shared Lane Traffic (%)						
Lane Group Flow (vph)	575	0	18	0	0	436
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Right	Right	Left	Right	Left	Left
Median Width(ft)	0		12			12
Link Offset(ft)	0		0			0
Crosswalk Width(ft)	16		16			16
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	9	9	15	9	15	15
Sign Control	Free		Stop			Free

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	36.1%
Analysis Period (min)	15
	ICU Level of Service A

Lanes, Volumes, Timings
33: Beswick Dr

07/09/2019



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	5	11	55	0	16	54
Future Volume (vph)	5	11	55	0	16	54
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.905					
Flt Protected	0.986					0.989
Satd. Flow (prot)	1662	0	1863	0	0	1842
Flt Permitted	0.986					0.989
Satd. Flow (perm)	1662	0	1863	0	0	1842
Link Speed (mph)	30		30		30	
Link Distance (ft)	248		265		275	
Travel Time (s)	5.6		6.0		6.3	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	5	12	60	0	17	59
Shared Lane Traffic (%)						
Lane Group Flow (vph)	17	0	60	0	0	76
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(ft)	12		0		0	
Link Offset(ft)	0		0		0	
Crosswalk Width(ft)	16		16		16	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15	9		9	15	
Sign Control	Stop		Stop		Stop	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	20.4%
Analysis Period (min)	15
	ICU Level of Service A

Lanes, Volumes, Timings
34: Ralph Lehman Dr

07/09/2019



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	12	4	0	0	0	0
Future Volume (vph)	12	4	0	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.968					
Flt Protected	0.963					
Satd. Flow (prot)	1736	0	0	1863	1863	0
Flt Permitted	0.963					
Satd. Flow (perm)	1736	0	0	1863	1863	0
Link Speed (mph)	30			30	30	
Link Distance (ft)	248			305	271	
Travel Time (s)	5.6			6.9	6.2	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	13	4	0	0	0	0
Shared Lane Traffic (%)						
Lane Group Flow (vph)	17	0	0	0	0	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(ft)	12			0	0	
Link Offset(ft)	0			0	0	
Crosswalk Width(ft)	16			16	16	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15	9	15			9
Sign Control	Stop			Stop	Stop	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	6.7%
Analysis Period (min)	15
	ICU Level of Service A

Lanes, Volumes, Timings
37: Holiday Dr & Sykes Mountain Ave

07/09/2019



Lane Group	NBL	NBR	SET	SER	NWL	NWT
Lane Configurations						
Traffic Volume (vph)	63	63	458	63	63	338
Future Volume (vph)	63	63	458	63	63	338
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.932		0.984			
Flt Protected	0.976					0.992
Satd. Flow (prot)	1694	0	1833	0	0	1848
Flt Permitted	0.976					0.992
Satd. Flow (perm)	1694	0	1833	0	0	1848
Link Speed (mph)	30		30			30
Link Distance (ft)	1534		704			683
Travel Time (s)	34.9		16.0			15.5
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	68	68	498	68	68	367
Shared Lane Traffic (%)						
Lane Group Flow (vph)	136	0	566	0	0	435
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(ft)	12		0			0
Link Offset(ft)	0		0			0
Crosswalk Width(ft)	16		16			16
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15	9		9	15	
Sign Control	Stop		Free			Free

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	66.6%
Analysis Period (min)	15
	ICU Level of Service C

Lanes, Volumes, Timings
 40: Sykes Mountain Ave & Lowery hyde Park

07/09/2019



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	0	0	0	0	0	0
Future Volume (vph)	0	0	0	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt						
Flt Protected						
Satd. Flow (prot)	0	1863	1863	0	1863	0
Flt Permitted						
Satd. Flow (perm)	0	1863	1863	0	1863	0
Link Speed (mph)		30	30		30	
Link Distance (ft)		683	208		871	
Travel Time (s)		15.5	4.7		19.8	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	0	0	0
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	0	0	0	0	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(ft)		0	0		12	
Link Offset(ft)		0	0		0	
Crosswalk Width(ft)		16	16		16	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15			9	15	9
Sign Control		Free	Free		Stop	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	0.0%
ICU Level of Service	A
Analysis Period (min)	15

Lanes, Volumes, Timings
42: Bowling Ave & Sykes Mountain Ave

07/09/2019



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Volume (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Future Volume (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt												
Flt Protected												
Satd. Flow (prot)	0	1863	0	0	1863	0	0	1863	0	0	1863	0
Flt Permitted												
Satd. Flow (perm)	0	1863	0	0	1863	0	0	1863	0	0	1863	0
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		208			1172			999			796	
Travel Time (s)		4.7			26.6			22.7			18.1	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Sign Control		Stop			Stop			Stop			Stop	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	0.0%
ICU Level of Service	A
Analysis Period (min)	15

Queuing and Blocking Report
AM Baseline

07/09/2019

Intersection: 1: N Main St & US Route 5

Movement	EB	EB	WB	WB	NW	NW
Directions Served	UT	TR	L	T	L	L
Maximum Queue (ft)	95	134	87	87	70	50
Average Queue (ft)	43	60	34	43	23	15
95th Queue (ft)	79	105	71	76	56	41
Link Distance (ft)	1741	1741	932	932	1053	1053
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (ft)						
Storage Blk Time (%)						
Queuing Penalty (veh)						

Intersection: 3: US Route 5 & Ryder Drive/Sykes Mountain Ave

Movement	EB	WB	WB	SB	SB	SB	NE	NE	NE
Directions Served	LTR	LT	R	L	R	R>	<	L	LR
Maximum Queue (ft)	28	157	78	121	53	72	28	135	262
Average Queue (ft)	1	103	41	55	28	28	3	65	111
95th Queue (ft)	9	161	68	96	57	63	16	118	216
Link Distance (ft)	202	153	153		405	405		390	390
Upstream Blk Time (%)		2							
Queuing Penalty (veh)		4							
Storage Bay Dist (ft)				220			100		
Storage Blk Time (%)								1	
Queuing Penalty (veh)								0	

Intersection: 6: I-91 NB off Ramp/I-91 NB on ramp & US Route 5

Movement	EB	NB	NB	SW	SW	SW
Directions Served	L	LT	R	R	R	>
Maximum Queue (ft)	21	1162	175	18	20	38
Average Queue (ft)	1	1075	175	1	1	3
95th Queue (ft)	7	1384	175	8	7	17
Link Distance (ft)	789	1110		390	390	
Upstream Blk Time (%)		78				
Queuing Penalty (veh)		0				
Storage Bay Dist (ft)			150		250	
Storage Blk Time (%)		80	2			
Queuing Penalty (veh)		341	10			

Queuing and Blocking Report
AM Baseline

07/09/2019

Intersection: 9: US Route 5 & I-91 SB ramp

Movement	EB	WB	SB
Directions Served	L	R	LR
Maximum Queue (ft)	100	51	177
Average Queue (ft)	50	10	86
95th Queue (ft)	80	33	145
Link Distance (ft)	245	789	511
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 10: US Route 5 & Airport Dr

Movement	WB	SB
Directions Served	LR	L
Maximum Queue (ft)	62	56
Average Queue (ft)	28	8
95th Queue (ft)	52	32
Link Distance (ft)	730	
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		325
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 12: Dunkin Donuts/Veterans Dr & US Route 5

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (ft)	73	94	67	69
Average Queue (ft)	11	34	35	26
95th Queue (ft)	45	84	59	56
Link Distance (ft)	839	218	157	511
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 15: US Route 5 & VA Cutoff Rd

Movement	WB	SE	NE
Directions Served	LR	LR	LR
Maximum Queue (ft)	73	112	75
Average Queue (ft)	8	51	10
95th Queue (ft)	37	92	40
Link Distance (ft)	839	1973	1487
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 18: Store Driveway/US Route 4 & US Route 5

Movement	EB	NB	SB
Directions Served	L	LTR	LT
Maximum Queue (ft)	51	23	147
Average Queue (ft)	15	1	44
95th Queue (ft)	46	11	90
Link Distance (ft)		530	1755
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)	380		
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 24: Ballardvale Dr/Windsor Dr & US Route 5

Movement	EB	WB	NB	NB	SB
Directions Served	LTR	L	L	TR	LTR
Maximum Queue (ft)	17	29	45	52	29
Average Queue (ft)	1	10	13	29	3
95th Queue (ft)	6	32	39	50	17
Link Distance (ft)	218	245	879	879	660
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (ft)					
Storage Blk Time (%)					
Queuing Penalty (veh)					

Intersection: 27: Beswick Dr & Sykes Mountain Ave

Movement	WB	NB
Directions Served	LT	LR
Maximum Queue (ft)	115	74
Average Queue (ft)	18	37
95th Queue (ft)	72	69
Link Distance (ft)	194	224
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 30: Ralph Lehman Dr & Sykes Mountain Ave

Movement	NB
Directions Served	LR
Maximum Queue (ft)	49
Average Queue (ft)	13
95th Queue (ft)	39
Link Distance (ft)	202
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 33: Beswick Dr

Movement	WB	NB	SB
Directions Served	LR	TR	LT
Maximum Queue (ft)	30	56	50
Average Queue (ft)	10	33	25
95th Queue (ft)	33	50	47
Link Distance (ft)		232	224
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 34: Ralph Lehman Dr

Movement	EB
Directions Served	LR
Maximum Queue (ft)	31
Average Queue (ft)	11
95th Queue (ft)	36
Link Distance (ft)	190
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 37: Holiday Dr & Sykes Mountain Ave

Movement	NB	NW
Directions Served	LR	LT
Maximum Queue (ft)	183	75
Average Queue (ft)	61	31
95th Queue (ft)	119	77
Link Distance (ft)	1506	
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 40: Sykes Mountain Ave & Lowery hyde Park

Movement
Directions Served
Maximum Queue (ft)
Average Queue (ft)
95th Queue (ft)
Link Distance (ft)
Upstream Blk Time (%)
Queuing Penalty (veh)
Storage Bay Dist (ft)
Storage Blk Time (%)
Queuing Penalty (veh)

Intersection: 42: Bowling Ave & Sykes Mountain Ave

Movement

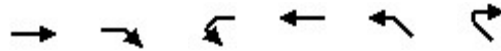
- Directions Served
- Maximum Queue (ft)
- Average Queue (ft)
- 95th Queue (ft)
- Link Distance (ft)
- Upstream Blk Time (%)
- Queuing Penalty (veh)
- Storage Bay Dist (ft)
- Storage Blk Time (%)
- Queuing Penalty (veh)

Network Summary

Network wide Queuing Penalty: 356

Lanes, Volumes, Timings
1: N Main St & US Route 5

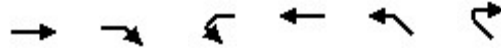
07/09/2019



Lane Group	EBT	EBR	WBL	WBT	NWL	NWR
Lane Configurations	↔↔		↵	↕	↵↵	↵
Traffic Volume (vph)	363	139	70	364	168	195
Future Volume (vph)	363	139	70	364	168	195
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)		680	0		0	150
Storage Lanes		0	1		2	1
Taper Length (ft)			25		25	
Lane Util. Factor	0.95	0.95	1.00	1.00	0.97	1.00
Frt	0.959					0.850
Flt Protected			0.950		0.950	
Satd. Flow (prot)	3394	0	1770	1863	3433	1583
Flt Permitted			0.448		0.950	
Satd. Flow (perm)	3394	0	835	1863	3433	1583
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)	151					212
Link Speed (mph)	30			30	30	
Link Distance (ft)	1824			983	1114	
Travel Time (s)	41.5			22.3	25.3	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	395	151	76	396	183	212
Shared Lane Traffic (%)						
Lane Group Flow (vph)	546	0	76	396	183	212
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(ft)	12			12	24	
Link Offset(ft)	0			0	0	
Crosswalk Width(ft)	16			16	16	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)		9	15		15	9
Number of Detectors	2		1	2	1	1
Detector Template	Thru		Left	Thru	Left	Right
Leading Detector (ft)	100		20	100	20	20
Trailing Detector (ft)	0		0	0	0	0
Detector 1 Position(ft)	0		0	0	0	0
Detector 1 Size(ft)	6		20	6	20	20
Detector 1 Type	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0		0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0		0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0		0.0	0.0	0.0	0.0
Detector 2 Position(ft)	94			94		
Detector 2 Size(ft)	6			6		
Detector 2 Type	Cl+Ex			Cl+Ex		
Detector 2 Channel						
Detector 2 Extend (s)	0.0			0.0		
Turn Type	NA		Perm	NA	Prot	Perm
Protected Phases	4			8	2	
Permitted Phases			8			2

Lanes, Volumes, Timings
1: N Main St & US Route 5

07/09/2019

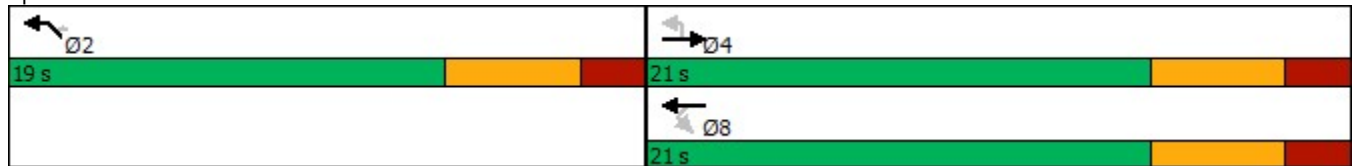


Lane Group	EBT	EBR	WBL	WBT	NWL	NWR
Detector Phase	4		8	8	2	2
Switch Phase						
Minimum Initial (s)	10.0		10.0	10.0	10.0	10.0
Minimum Split (s)	16.0		16.0	16.0	16.0	16.0
Total Split (s)	21.0		21.0	21.0	19.0	19.0
Total Split (%)	52.5%		52.5%	52.5%	47.5%	47.5%
Maximum Green (s)	15.0		15.0	15.0	13.0	13.0
Yellow Time (s)	4.0		4.0	4.0	4.0	4.0
All-Red Time (s)	2.0		2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0		0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0		6.0	6.0	6.0	6.0
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0		3.0	3.0	3.0	3.0
Recall Mode	None		None	None	Min	Min
Act Effect Green (s)	12.5		12.5	12.5	10.2	10.2
Actuated g/C Ratio	0.36		0.36	0.36	0.29	0.29
v/c Ratio	0.41		0.25	0.59	0.18	0.35
Control Delay	6.9		10.2	13.1	10.4	4.1
Queue Delay	0.0		0.0	0.0	0.0	0.0
Total Delay	6.9		10.2	13.1	10.4	4.1
LOS	A		B	B	B	A
Approach Delay	6.9			12.6	7.0	
Approach LOS	A			B	A	

Intersection Summary

Area Type: Other
 Cycle Length: 40
 Actuated Cycle Length: 34.8
 Natural Cycle: 40
 Control Type: Actuated-Uncoordinated
 Maximum v/c Ratio: 0.59
 Intersection Signal Delay: 8.8
 Intersection LOS: A
 Intersection Capacity Utilization 57.0%
 ICU Level of Service B
 Analysis Period (min) 15

Splits and Phases: 1: N Main St & US Route 5



Lanes, Volumes, Timings
 3: US Route 5 & Ryder Drive/Sykes Mountain Ave

07/09/2019



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	SBL	SBR	SBR2	NEL2	NEL	NER
Lane Configurations		↕			↕	↕	↕	↕		↕	↕	
Traffic Volume (vph)	0	1	7	420	7	194	129	325	2	3	367	338
Future Volume (vph)	0	1	7	420	7	194	129	325	2	3	367	338
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0	220	0			100	0
Storage Lanes	0		0	0		1	1	2			1	0
Taper Length (ft)	25			25			25				25	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.88	1.00	1.00	0.97	0.95
Frt		0.880				0.850		0.850			0.928	
Flt Protected					0.953		0.950			0.950	0.975	
Satd. Flow (prot)	0	1639	0	0	1775	1583	1770	2787	0	1770	3270	0
Flt Permitted					0.724		0.950			0.950	0.975	
Satd. Flow (perm)	0	1639	0	0	1349	1583	1770	2787	0	1770	3270	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		8				211		91			216	
Link Speed (mph)		30			30		30				30	
Link Distance (ft)		264			230		482				463	
Travel Time (s)		6.0			5.2		11.0				10.5	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	1	8	457	8	211	140	353	2	3	399	367
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	9	0	0	465	211	140	355	0	3	766	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Right	Right	Left	Left	Right
Median Width(ft)		0			0		12				36	
Link Offset(ft)		0			0		0				0	
Crosswalk Width(ft)		16			16		16				16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15	9	9	15	15	9
Number of Detectors	1	2		1	2	1	1	1		1	1	
Detector Template	Left	Thru		Left	Thru	Right	Left	Right		Left	Left	
Leading Detector (ft)	20	100		20	100	20	20	20		20	20	
Trailing Detector (ft)	0	0		0	0	0	0	0		0	0	
Detector 1 Position(ft)	0	0		0	0	0	0	0		0	0	
Detector 1 Size(ft)	20	6		20	6	20	20	20		20	20	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 2 Position(ft)		94			94							
Detector 2 Size(ft)		6			6							
Detector 2 Type		Cl+Ex			Cl+Ex							
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0							
Turn Type		NA		Perm	NA	Perm	Prot	Prot		Prot	Prot	
Protected Phases		4			8		1	6		5	2	
Permitted Phases	4			8		8						

Lanes, Volumes, Timings
 3: US Route 5 & Ryder Drive/Sykes Mountain Ave

07/09/2019

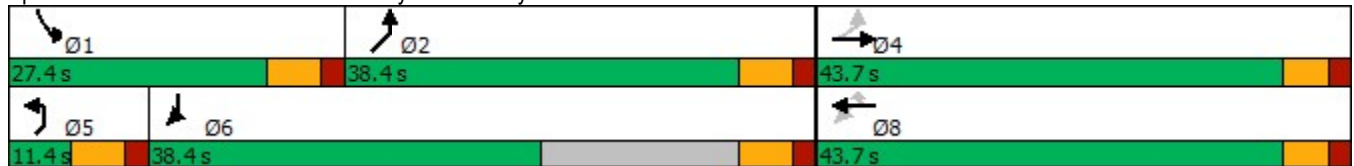


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	SBL	SBR	SBR2	NEL2	NEL	NER
Detector Phase	4	4		8	8	8	1	6		5	2	
Switch Phase												
Minimum Initial (s)	38.0	38.0		38.0	38.0	38.0	21.0	32.0		5.0	32.0	
Minimum Split (s)	43.7	43.7		43.7	43.7	43.7	27.4	38.4		11.4	38.4	
Total Split (s)	43.7	43.7		43.7	43.7	43.7	27.4	38.4		11.4	38.4	
Total Split (%)	39.9%	39.9%		39.9%	39.9%	39.9%	25.0%	35.1%		10.4%	35.1%	
Maximum Green (s)	38.0	38.0		38.0	38.0	38.0	21.0	32.0		5.0	32.0	
Yellow Time (s)	3.7	3.7		3.7	3.7	3.7	4.4	4.4		4.4	4.4	
All-Red Time (s)	2.0	2.0		2.0	2.0	2.0	2.0	2.0		2.0	2.0	
Lost Time Adjust (s)		0.0			0.0	0.0	0.0	0.0		0.0	0.0	
Total Lost Time (s)		5.7			5.7	5.7	6.4	6.4		6.4	6.4	
Lead/Lag							Lead	Lag		Lead	Lag	
Lead-Lag Optimize?							Yes	Yes		Yes	Yes	
Vehicle Extension (s)	2.0	2.0		2.0	2.0	2.0	2.0	2.0		2.0	2.0	
Recall Mode	None	None		None	None	None	None	Min		None	Min	
Act Effect Green (s)		38.0			38.0	38.0	21.0	57.1		5.0	32.0	
Actuated g/C Ratio		0.35			0.35	0.35	0.19	0.52		0.05	0.29	
v/c Ratio		0.02			0.99	0.31	0.41	0.24		0.04	0.69	
Control Delay		13.9			76.9	4.7	43.2	11.5		51.0	28.0	
Queue Delay		0.0			0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay		13.9			76.9	4.7	43.2	11.5		51.0	28.0	
LOS		B			E	A	D	B		D	C	
Approach Delay		13.9			54.3		20.5				28.1	
Approach LOS		B			D		C				C	

Intersection Summary

Area Type: Other
 Cycle Length: 109.5
 Actuated Cycle Length: 109.5
 Natural Cycle: 110
 Control Type: Actuated-Uncoordinated
 Maximum v/c Ratio: 0.99
 Intersection Signal Delay: 35.2
 Intersection LOS: D
 Intersection Capacity Utilization 91.3%
 ICU Level of Service F
 Analysis Period (min) 15



















Splits and Phases: 3: US Route 5 & Ryder Drive/Sykes Mountain Ave



Lanes, Volumes, Timings

6: US Route 5 & I-91 NB off Ramp/I-91 NB on ramp

07/09/2019

												
Lane Group	NBL	NBT	NBR	SBL	SBT	SBR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Volume (vph)	199	1	443	0	0	0	82	308	0	0	555	73
Future Volume (vph)	199	1	443	0	0	0	82	308	0	0	555	73
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		150	0		0	110		0	0		250
Storage Lanes	0		1	0		0	1		0	0		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00
Frt			0.850									0.850
Flt Protected		0.953					0.950					
Satd. Flow (prot)	0	1775	1583	0	0	0	1770	1863	0	0	3539	1583
Flt Permitted		0.953					0.950					
Satd. Flow (perm)	0	1775	1583	0	0	0	1770	1863	0	0	3539	1583
Link Speed (mph)		30			30			30				30
Link Distance (ft)		1151			400			850				463
Travel Time (s)		26.2			9.1			19.3				10.5
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	216	1	482	0	0	0	89	335	0	0	603	79
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	217	482	0	0	0	89	335	0	0	603	79
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			12				12
Link Offset(ft)		0			0			0				0
Crosswalk Width(ft)		16			16			16				16
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Sign Control		Stop			Stop			Free				Free

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	50.3%
ICU Level of Service	A
Analysis Period (min)	15

Lanes, Volumes, Timings
 9: US Route 5 & I-91 SB ramp

07/09/2019














Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	374	354	403	425	34	107
Future Volume (vph)	374	354	403	425	34	107
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Fr _t				0.850	0.898	
Fl _t Protected	0.950				0.988	
Satd. Flow (prot)	1770	1863	1863	1583	1653	0
Fl _t Permitted	0.950				0.988	
Satd. Flow (perm)	1770	1863	1863	1583	1653	0
Link Speed (mph)		30	30		30	
Link Distance (ft)		306	850		481	
Travel Time (s)		7.0	19.3		10.9	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	407	385	438	462	37	116
Shared Lane Traffic (%)						
Lane Group Flow (vph)	407	385	438	462	153	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(ft)		12	12		12	
Link Offset(ft)		0	0		0	
Crosswalk Width(ft)		16	16		16	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15			9	15	9
Sign Control		Free	Free		Stop	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	60.4%
Analysis Period (min)	15
	ICU Level of Service B

















Lanes, Volumes, Timings
10: US Route 5 & Airport Dr

07/09/2019

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	34	30	417	35	30	295
Future Volume (vph)	34	30	417	35	30	295
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0	0		0	325	
Storage Lanes	1	0		0	1	
Taper Length (ft)	25				25	
Lane Util. Factor	1.00	1.00	0.95	0.95	1.00	0.95
Frt	0.936		0.988			
Flt Protected	0.974				0.950	
Satd. Flow (prot)	1698	0	3497	0	1770	3539
Flt Permitted	0.974				0.950	
Satd. Flow (perm)	1698	0	3497	0	1770	3539
Link Speed (mph)	30		30			30
Link Distance (ft)	782		482			2055
Travel Time (s)	17.8		11.0			46.7
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	37	33	453	38	33	321
Shared Lane Traffic (%)						
Lane Group Flow (vph)	70	0	491	0	33	321
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(ft)	12		12			12
Link Offset(ft)	0		0			0
Crosswalk Width(ft)	16		16			16
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15	9		9	15	
Sign Control	Stop		Free			Free
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	29.7%			ICU Level of Service A		
Analysis Period (min)	15					

Lanes, Volumes, Timings
 12: Dunkin Donuts/Veterans Dr & US Route 5

07/09/2019

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	2	451	10	34	407	39	5	0	41	189	5	18
Future Volume (vph)	2	451	10	34	407	39	5	0	41	189	5	18
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Fr _t		0.997			0.989			0.878			0.988	
Fl _t Protected					0.996			0.995			0.957	
Satd. Flow (prot)	0	1857	0	0	1835	0	0	1627	0	0	1761	0
Fl _t Permitted					0.996			0.995			0.957	
Satd. Flow (perm)	0	1857	0	0	1835	0	0	1627	0	0	1761	0
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		906			287			190			542	
Travel Time (s)		20.6			6.5			4.3			12.3	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	2	490	11	37	442	42	5	0	45	205	5	20
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	503	0	0	521	0	0	50	0	0	230	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Sign Control		Free			Free			Stop			Stop	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	74.2%
ICU Level of Service	D
Analysis Period (min)	15

Lanes, Volumes, Timings
15: US Route 5 & VA Cutoff Rd

07/09/2019



Lane Group	WBL	WBR	SEL	SER	NEL	NER
Lane Configurations						
Traffic Volume (vph)	318	76	177	64	35	241
Future Volume (vph)	318	76	177	64	35	241
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.974		0.964		0.882	
Flt Protected	0.961		0.965		0.994	
Satd. Flow (prot)	1744	0	1733	0	1633	0
Flt Permitted	0.961		0.965		0.994	
Satd. Flow (perm)	1744	0	1733	0	1633	0
Link Speed (mph)	30		30		30	
Link Distance (ft)	906		2012		1510	
Travel Time (s)	20.6		45.7		34.3	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	346	83	192	70	38	262
Shared Lane Traffic (%)						
Lane Group Flow (vph)	429	0	262	0	300	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Right
Median Width(ft)	12		12		12	
Link Offset(ft)	0		0		0	
Crosswalk Width(ft)	16		16		16	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15	9	15	9	15	9
Sign Control	Free		Stop		Free	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	62.8%
ICU Level of Service	B
Analysis Period (min)	15

Lanes, Volumes, Timings
 18: Store Driveway/US Route 4 & US Route 5

07/09/2019

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	170	348	5	2	353	172	2	1	2	105	0	89
Future Volume (vph)	170	348	5	2	353	172	2	1	2	105	0	89
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	380		0	0		150	0		0	0		0
Storage Lanes	1		0	0		1	0		0	0		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.95	0.95	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.998				0.850		0.946				0.850
Flt Protected	0.950							0.980			0.950	
Satd. Flow (prot)	1770	3532	0	0	3539	1583	0	1727	0	0	1770	1583
Flt Permitted	0.950							0.980			0.950	
Satd. Flow (perm)	1770	3532	0	0	3539	1583	0	1727	0	0	1770	1583
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		2055			1824			609			1803	
Travel Time (s)		46.7			41.5			13.8			41.0	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	185	378	5	2	384	187	2	1	2	114	0	97
Shared Lane Traffic (%)												
Lane Group Flow (vph)	185	383	0	0	386	187	0	5	0	0	114	97
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Sign Control		Free			Free			Stop			Stop	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	42.1%
ICU Level of Service	A
Analysis Period (min)	15

Lanes, Volumes, Timings

24: Ballardvale Dr/Windsor Dr & US Route 5

07/09/2019



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕		↖	↗		↖	↗			↕	
Traffic Volume (vph)	4	618	19	56	362	4	14	4	53	1	6	1
Future Volume (vph)	4	618	19	56	362	4	14	4	53	1	6	1
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Fr _t		0.996			0.998			0.860			0.985	
Fl _t Protected				0.950			0.950				0.994	
Satd. Flow (prot)	0	1855	0	1770	1859	0	1770	1602	0	0	1824	0
Fl _t Permitted				0.950			0.950				0.994	
Satd. Flow (perm)	0	1855	0	1770	1859	0	1770	1602	0	0	1824	0
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		287			306			926			699	
Travel Time (s)		6.5			7.0			21.0			15.9	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	4	672	21	61	393	4	15	4	58	1	7	1
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	697	0	61	397	0	15	62	0	0	9	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Sign Control		Free			Free			Stop			Stop	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	53.3%
ICU Level of Service	A
Analysis Period (min)	15

Lanes, Volumes, Timings
 27: Beswick Dr & Sykes Mountain Ave

07/09/2019



Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	433	35	35	621	32	22
Future Volume (vph)	433	35	35	621	32	22
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt	0.990			0.945		
Flt Protected				0.997	0.971	
Satd. Flow (prot)	1844	0	0	1857	1709	0
Flt Permitted				0.997	0.971	
Satd. Flow (perm)	1844	0	0	1857	1709	0
Link Speed (mph)	30			30	30	
Link Distance (ft)	230			250	275	
Travel Time (s)	5.2			5.7	6.3	
Confl. Peds. (#/hr)	5					
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	471	38	38	675	35	24
Shared Lane Traffic (%)						
Lane Group Flow (vph)	509	0	0	713	59	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(ft)	0			0	12	
Link Offset(ft)	0			0	0	
Crosswalk Width(ft)	16			16	16	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	9		15	15		9
Sign Control	Free			Free	Stop	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	71.3%
Analysis Period (min)	15
	ICU Level of Service C

Lanes, Volumes, Timings
 30: Ralph Lehman Dr & Sykes Mountain Ave

07/09/2019



Lane Group	EBR	EBR2	NBL	NBR	NWL2	NWL
Lane Configurations						
Traffic Volume (vph)	449	6	6	6	6	650
Future Volume (vph)	449	6	6	6	6	650
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.865		0.932			
Flt Protected			0.976			0.950
Satd. Flow (prot)	1611	0	1694	0	0	1770
Flt Permitted			0.976			0.950
Satd. Flow (perm)	1611	0	1694	0	0	1770
Link Speed (mph)	30		30			30
Link Distance (ft)	250		271			704
Travel Time (s)	5.7		6.2			16.0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	488	7	7	7	7	707
Shared Lane Traffic (%)						
Lane Group Flow (vph)	495	0	14	0	0	714
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Right	Right	Left	Right	Left	Left
Median Width(ft)	0		12			12
Link Offset(ft)	0		0			0
Crosswalk Width(ft)	16		16			16
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	9	9	15	9	15	15
Sign Control	Free		Stop			Free

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	46.3%
Analysis Period (min)	15
	ICU Level of Service A

Lanes, Volumes, Timings
33: Beswick Dr

07/09/2019



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	3	15	39	0	16	54
Future Volume (vph)	3	15	39	0	16	54
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.886					
Flt Protected	0.992					0.989
Satd. Flow (prot)	1637	0	1863	0	0	1842
Flt Permitted	0.992					0.989
Satd. Flow (perm)	1637	0	1863	0	0	1842
Link Speed (mph)	30		30			30
Link Distance (ft)	248		265			275
Travel Time (s)	5.6		6.0			6.3
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	3	16	42	0	17	59
Shared Lane Traffic (%)						
Lane Group Flow (vph)	19	0	42	0	0	76
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(ft)	12		0			0
Link Offset(ft)	0		0			0
Crosswalk Width(ft)	16		16			16
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15	9		9	15	
Sign Control	Stop		Stop			Stop

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	20.4%
Analysis Period (min)	15
	ICU Level of Service A

Lanes, Volumes, Timings
34: Ralph Lehman Dr

07/09/2019



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	12	5	0	0	3	3
Future Volume (vph)	12	5	0	0	3	3
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.962			0.932		
Flt Protected	0.965					
Satd. Flow (prot)	1729	0	0	1863	1736	0
Flt Permitted	0.965					
Satd. Flow (perm)	1729	0	0	1863	1736	0
Link Speed (mph)	30			30	30	
Link Distance (ft)	248			305	271	
Travel Time (s)	5.6			6.9	6.2	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	13	5	0	0	3	3
Shared Lane Traffic (%)						
Lane Group Flow (vph)	18	0	0	0	6	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(ft)	12			0	0	
Link Offset(ft)	0			0	0	
Crosswalk Width(ft)	16			16	16	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15	9	15			9
Sign Control	Stop			Stop	Stop	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	13.3%
Analysis Period (min)	15
	ICU Level of Service A

Lanes, Volumes, Timings
37: Holiday Dr & Sykes Mountain Ave

07/09/2019



Lane Group	NBL	NBR	SET	SER	NWL	NWT
Lane Configurations						
Traffic Volume (vph)	71	71	313	142	63	579
Future Volume (vph)	71	71	313	142	63	579
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.932		0.958			
Flt Protected	0.976					0.995
Satd. Flow (prot)	1694	0	1785	0	0	1853
Flt Permitted	0.976					0.995
Satd. Flow (perm)	1694	0	1785	0	0	1853
Link Speed (mph)	30		30			30
Link Distance (ft)	1534		704			683
Travel Time (s)	34.9		16.0			15.5
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	77	77	340	154	68	629
Shared Lane Traffic (%)						
Lane Group Flow (vph)	154	0	494	0	0	697
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(ft)	12		0			0
Link Offset(ft)	0		0			0
Crosswalk Width(ft)	16		16			16
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15	9		9	15	
Sign Control	Stop		Free			Free

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	77.4%
Analysis Period (min)	15
	ICU Level of Service D

Lanes, Volumes, Timings
40: Sykes Mountain Ave & Lowery hyde Park

07/09/2019



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	0	0	0	0	0	0
Future Volume (vph)	0	0	0	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Fr						
Flt Protected						
Satd. Flow (prot)	0	1863	1863	0	1863	0
Flt Permitted						
Satd. Flow (perm)	0	1863	1863	0	1863	0
Link Speed (mph)		30	30		30	
Link Distance (ft)		683	208		871	
Travel Time (s)		15.5	4.7		19.8	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	0	0	0
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	0	0	0	0	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(ft)		0	0		12	
Link Offset(ft)		0	0		0	
Crosswalk Width(ft)		16	16		16	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15			9	15	9
Sign Control		Free	Free		Stop	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	0.0%
ICU Level of Service	A
Analysis Period (min)	15

Lanes, Volumes, Timings
42: Bowling Ave & Sykes Mountain Ave

07/09/2019



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Volume (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Future Volume (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt												
Flt Protected												
Satd. Flow (prot)	0	1863	0	0	1863	0	0	1863	0	0	1863	0
Flt Permitted												
Satd. Flow (perm)	0	1863	0	0	1863	0	0	1863	0	0	1863	0
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		208			1172			999			796	
Travel Time (s)		4.7			26.6			22.7			18.1	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Sign Control		Stop			Stop			Stop			Stop	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	0.0%
ICU Level of Service	A
Analysis Period (min)	15

Intersection: 1: N Main St & US Route 5

Movement	EB	EB	WB	WB	NW	NW	NW
Directions Served	UT	TR	L	T	L	L	R
Maximum Queue (ft)	111	122	67	129	74	77	34
Average Queue (ft)	47	68	27	69	36	33	1
95th Queue (ft)	77	109	55	115	68	67	11
Link Distance (ft)	1741	1741	932	932	1053	1053	
Upstream Blk Time (%)							
Queuing Penalty (veh)							
Storage Bay Dist (ft)							150
Storage Blk Time (%)							
Queuing Penalty (veh)							

Intersection: 3: US Route 5 & Ryder Drive/Sykes Mountain Ave

Movement	EB	WB	WB	SB	SB	SB	NE	NE	NE
Directions Served	LTR	LT	R	L	R	R>	<	L	LR
Maximum Queue (ft)	30	160	96	160	133	147	27	240	297
Average Queue (ft)	5	144	40	88	57	65	1	138	206
95th Queue (ft)	22	183	72	145	111	124	9	231	283
Link Distance (ft)	202	153	153		405	405		390	390
Upstream Blk Time (%)		19							
Queuing Penalty (veh)		61							
Storage Bay Dist (ft)				220			100		
Storage Blk Time (%)								14	
Queuing Penalty (veh)								0	

Intersection: 6: US Route 5 & I-91 NB off Ramp/I-91 NB on ramp

Movement	NB	NB	NE	SW
Directions Served	LT	R	L	R
Maximum Queue (ft)	283	175	77	21
Average Queue (ft)	89	86	31	1
95th Queue (ft)	179	154	60	7
Link Distance (ft)	1112			
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)		150	110	250
Storage Blk Time (%)	1	2		
Queuing Penalty (veh)	6	4		

Intersection: 9: US Route 5 & I-91 SB ramp

Movement	EB	EB	WB	WB	SB
Directions Served	L	T	T	R	LR
Maximum Queue (ft)	265	256	41	52	263
Average Queue (ft)	123	9	2	27	105
95th Queue (ft)	216	84	15	56	206
Link Distance (ft)	245	245	799	799	407
Upstream Blk Time (%)	1	0			
Queuing Penalty (veh)	4	1			
Storage Bay Dist (ft)					
Storage Blk Time (%)					
Queuing Penalty (veh)					

Intersection: 10: US Route 5 & Airport Dr

Movement	WB	NB	SB
Directions Served	LR	TR	L
Maximum Queue (ft)	70	22	55
Average Queue (ft)	28	1	13
95th Queue (ft)	56	7	44
Link Distance (ft)	730	405	
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)			325
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 12: Dunkin Donuts/Veterans Dr & US Route 5

Movement	WB	NB	SB
Directions Served	LTR	LTR	LTR
Maximum Queue (ft)	93	53	271
Average Queue (ft)	21	23	90
95th Queue (ft)	62	41	190
Link Distance (ft)	218	157	511
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 15: US Route 5 & VA Cutoff Rd

Movement	WB	SE	NE
Directions Served	LR	LR	LR
Maximum Queue (ft)	31	153	53
Average Queue (ft)	6	71	8
95th Queue (ft)	25	118	36
Link Distance (ft)	839	1973	1487
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 18: Store Driveway/US Route 4 & US Route 5

Movement	EB	WB	NB	SB
Directions Served	L	R	LTR	LT
Maximum Queue (ft)	96	16	24	96
Average Queue (ft)	29	1	4	48
95th Queue (ft)	66	9	19	81
Link Distance (ft)			530	1755
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)	380	150		
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 24: Ballardvale Dr/Windsor Dr & US Route 5

Movement	EB	WB	NB	NB	SB
Directions Served	LTR	L	L	TR	LTR
Maximum Queue (ft)	72	76	45	50	30
Average Queue (ft)	4	26	8	22	8
95th Queue (ft)	28	55	30	47	28
Link Distance (ft)	218	245	879	879	660
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (ft)					
Storage Blk Time (%)					
Queuing Penalty (veh)					

Intersection: 27: Beswick Dr & Sykes Mountain Ave

Movement	WB	NB
Directions Served	LT	LR
Maximum Queue (ft)	208	114
Average Queue (ft)	127	37
95th Queue (ft)	257	73
Link Distance (ft)	194	224
Upstream Blk Time (%)	4	
Queuing Penalty (veh)	27	
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 30: Ralph Lehman Dr & Sykes Mountain Ave

Movement	NB	NW
Directions Served	LR	<L
Maximum Queue (ft)	49	132
Average Queue (ft)	14	27
95th Queue (ft)	39	97
Link Distance (ft)	202	647
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 33: Beswick Dr

Movement	WB	NB	SB
Directions Served	LR	TR	LT
Maximum Queue (ft)	31	54	79
Average Queue (ft)	13	24	29
95th Queue (ft)	38	49	56
Link Distance (ft)	190	232	224
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 34: Ralph Lehman Dr

Movement	EB	SB
Directions Served	LR	TR
Maximum Queue (ft)	31	31
Average Queue (ft)	15	5
95th Queue (ft)	40	23
Link Distance (ft)	190	202
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 37: Holiday Dr & Sykes Mountain Ave

Movement	NB	SE	NW
Directions Served	LR	TR	LT
Maximum Queue (ft)	139	22	325
Average Queue (ft)	65	1	54
95th Queue (ft)	120	10	171
Link Distance (ft)	1506	647	
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 40: Sykes Mountain Ave & Lowery hyde Park

Movement
Directions Served
Maximum Queue (ft)
Average Queue (ft)
95th Queue (ft)
Link Distance (ft)
Upstream Blk Time (%)
Queuing Penalty (veh)
Storage Bay Dist (ft)
Storage Blk Time (%)
Queuing Penalty (veh)

Intersection: 42: Bowling Ave & Sykes Mountain Ave

Movement

Directions Served

Maximum Queue (ft)

Average Queue (ft)

95th Queue (ft)

Link Distance (ft)

Upstream Blk Time (%)

Queuing Penalty (veh)

Storage Bay Dist (ft)

Storage Blk Time (%)

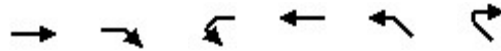
Queuing Penalty (veh)

Network Summary

Network wide Queuing Penalty: 102

Lanes, Volumes, Timings
1: N Main St & US Route 5

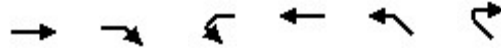
07/09/2019



Lane Group	EBT	EBR	WBL	WBT	NWL	NWR
Lane Configurations						
Traffic Volume (vph)	303	114	68	216	65	108
Future Volume (vph)	303	114	68	216	65	108
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)		680	0		0	150
Storage Lanes		0	1		2	1
Taper Length (ft)			25		25	
Lane Util. Factor	0.95	0.95	1.00	1.00	0.97	1.00
Frt	0.959					0.850
Flt Protected			0.950		0.950	
Satd. Flow (prot)	3394	0	1770	1863	3433	1583
Flt Permitted			0.491		0.950	
Satd. Flow (perm)	3394	0	915	1863	3433	1583
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)	124					117
Link Speed (mph)	30			30	30	
Link Distance (ft)	1824			983	1114	
Travel Time (s)	41.5			22.3	25.3	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	329	124	74	235	71	117
Shared Lane Traffic (%)						
Lane Group Flow (vph)	453	0	74	235	71	117
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(ft)	12			12	24	
Link Offset(ft)	0			0	0	
Crosswalk Width(ft)	16			16	16	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)		9	15		15	9
Number of Detectors	2		1	2	1	1
Detector Template	Thru		Left	Thru	Left	Right
Leading Detector (ft)	100		20	100	20	20
Trailing Detector (ft)	0		0	0	0	0
Detector 1 Position(ft)	0		0	0	0	0
Detector 1 Size(ft)	6		20	6	20	20
Detector 1 Type	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0		0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0		0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0		0.0	0.0	0.0	0.0
Detector 2 Position(ft)	94			94		
Detector 2 Size(ft)	6			6		
Detector 2 Type	Cl+Ex			Cl+Ex		
Detector 2 Channel						
Detector 2 Extend (s)	0.0			0.0		
Turn Type	NA		Perm	NA	Prot	Perm
Protected Phases	4			8	2	
Permitted Phases			8			2

Lanes, Volumes, Timings
1: N Main St & US Route 5

07/09/2019

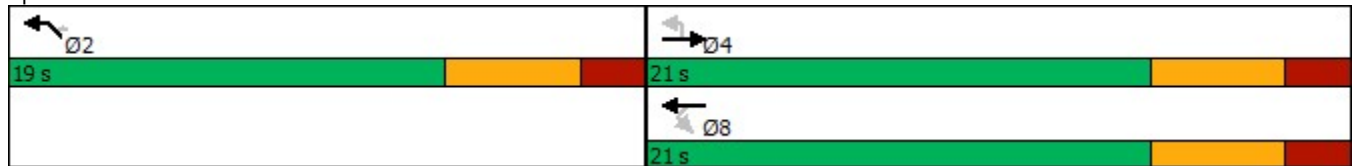


Lane Group	EBT	EBR	WBL	WBT	NWL	NWR
Detector Phase	4		8	8	2	2
Switch Phase						
Minimum Initial (s)	10.0		10.0	10.0	10.0	10.0
Minimum Split (s)	16.0		16.0	16.0	16.0	16.0
Total Split (s)	21.0		21.0	21.0	19.0	19.0
Total Split (%)	52.5%		52.5%	52.5%	47.5%	47.5%
Maximum Green (s)	15.0		15.0	15.0	13.0	13.0
Yellow Time (s)	4.0		4.0	4.0	4.0	4.0
All-Red Time (s)	2.0		2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0		0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0		6.0	6.0	6.0	6.0
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0		3.0	3.0	3.0	3.0
Recall Mode	None		None	None	Min	Min
Act Effect Green (s)	10.8		10.8	10.8	10.0	10.0
Actuated g/C Ratio	0.33		0.33	0.33	0.30	0.30
v/c Ratio	0.38		0.25	0.38	0.07	0.21
Control Delay	7.0		10.3	10.5	8.8	3.8
Queue Delay	0.0		0.0	0.0	0.0	0.0
Total Delay	7.0		10.3	10.5	8.8	3.8
LOS	A		B	B	A	A
Approach Delay	7.0			10.5	5.7	
Approach LOS	A			B	A	

Intersection Summary

Area Type: Other
 Cycle Length: 40
 Actuated Cycle Length: 32.8
 Natural Cycle: 40
 Control Type: Actuated-Uncoordinated
 Maximum v/c Ratio: 0.38
 Intersection Signal Delay: 7.8
 Intersection LOS: A
 Intersection Capacity Utilization 46.7%
 ICU Level of Service A
 Analysis Period (min) 15

Splits and Phases: 1: N Main St & US Route 5



Lanes, Volumes, Timings
 3: US Route 5 & Ryder Drive/Sykes Mountain Ave

07/09/2019



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	SBL	SBR	NEL2	NEL	NER
Lane Configurations		↕		↖	↗		↖	↗	↖	↗	
Traffic Volume (vph)	1	0	1	272	0	129	109	186	7	317	420
Future Volume (vph)	1	0	1	272	0	129	109	186	7	317	420
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	115		0	245	0		70	0
Storage Lanes	0		0	1		0	1	1		1	0
Taper Length (ft)	25			25			25			25	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.932			0.850			0.850		0.915	
Flt Protected		0.976		0.950			0.950		0.950	0.979	
Satd. Flow (prot)	0	1694	0	1770	1583	0	1770	1583	1770	1669	0
Flt Permitted		0.906		0.757			0.202		0.631	0.979	
Satd. Flow (perm)	0	1573	0	1410	1583	0	376	1583	1175	1669	0
Right Turn on Red			Yes			Yes					Yes
Satd. Flow (RTOR)		47			492					154	
Link Speed (mph)		30			30		30			30	
Link Distance (ft)		264			230		482			463	
Travel Time (s)		6.0			5.2		11.0			10.5	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	1	0	1	296	0	140	118	202	8	345	457
Shared Lane Traffic (%)											
Lane Group Flow (vph)	0	2	0	296	140	0	118	202	8	802	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Right	Left	Left	Right
Median Width(ft)		12			12		12			24	
Link Offset(ft)		0			0		0			0	
Crosswalk Width(ft)		16			16		16			16	
Two way Left Turn Lane											
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15	9	15	15	9
Number of Detectors	1	2		1	2		1	1	1	1	
Detector Template	Left	Thru		Left	Thru		Left	Right	Left	Left	
Leading Detector (ft)	20	100		20	100		20	20	20	20	
Trailing Detector (ft)	0	0		0	0		0	0	0	0	
Detector 1 Position(ft)	0	0		0	0		0	0	0	0	
Detector 1 Size(ft)	20	6		20	6		20	20	20	20	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel											
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	
Detector 2 Position(ft)		94			94						
Detector 2 Size(ft)		6			6						
Detector 2 Type		Cl+Ex			Cl+Ex						
Detector 2 Channel											
Detector 2 Extend (s)		0.0			0.0						
Turn Type	Perm	NA		Perm	NA		Perm	Prot	Perm	Prot	
Protected Phases		4			8			6		2	
Permitted Phases	4			8			6		2		

Lanes, Volumes, Timings
 3: US Route 5 & Ryder Drive/Sykes Mountain Ave

07/09/2019



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	SBL	SBR	NEL2	NEL	NER
Detector Phase	4	4		8	8		6	6	2	2	
Switch Phase											
Minimum Initial (s)	10.0	10.0		10.0	10.0		10.0	10.0	10.0	10.0	
Minimum Split (s)	16.0	16.0		16.0	16.0		16.0	16.0	16.0	16.0	
Total Split (s)	25.0	25.0		25.0	25.0		45.0	45.0	45.0	45.0	
Total Split (%)	35.7%	35.7%		35.7%	35.7%		64.3%	64.3%	64.3%	64.3%	
Maximum Green (s)	19.0	19.0		19.0	19.0		39.0	39.0	39.0	39.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0	2.0	2.0	
Lost Time Adjust (s)		0.0		0.0	0.0		0.0	0.0	0.0	0.0	
Total Lost Time (s)		6.0		6.0	6.0		6.0	6.0	6.0	6.0	
Lead/Lag											
Lead-Lag Optimize?											
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	
Recall Mode	None	None		None	None		C-Min	C-Min	C-Min	C-Min	
Act Effct Green (s)		17.7		17.7	17.7		40.3	40.3	40.3	40.3	
Actuated g/C Ratio		0.25		0.25	0.25		0.58	0.58	0.58	0.58	
v/c Ratio		0.00		0.83	0.18		0.55	0.22	0.01	0.78	
Control Delay		0.0		45.8	0.5		22.5	8.5	7.1	16.7	
Queue Delay		0.0		0.0	0.0		0.0	0.0	0.0	0.8	
Total Delay		0.0		45.8	0.5		22.5	8.5	7.1	17.5	
LOS		A		D	A		C	A	A	B	
Approach Delay					31.2			13.7			17.4
Approach LOS					C			B			B

Intersection Summary

Area Type:	Other
Cycle Length:	70
Actuated Cycle Length:	70
Offset:	58 (83%), Referenced to phase 2:NEL and 6:SBL, Start of Yellow
Natural Cycle:	60
Control Type:	Actuated-Coordinated
Maximum v/c Ratio:	0.83
Intersection Signal Delay:	20.5
Intersection LOS:	C
Intersection Capacity Utilization:	88.4%
ICU Level of Service:	E
Analysis Period (min):	15


















Splits and Phases: 3: US Route 5 & Ryder Drive/Sykes Mountain Ave



Lanes, Volumes, Timings

6: I-91 NB off Ramp/I-91 NB on ramp & US Route 5

07/09/2019

												
Lane Group	EBL2	EBL	EBR	NBL	NBT	NBR	SBL	SBT	SBR	SWL	SWR	SWR2
Lane Configurations												
Traffic Volume (vph)	66	270	0	436	15	429	0	0	0	0	397	58
Future Volume (vph)	66	270	0	436	15	429	0	0	0	0	397	58
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)		110	0	0		150	0		0	0	250	
Storage Lanes		1	0	0		1	0		0	0	0	
Taper Length (ft)		25		25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt						0.850						0.865
Flt Protected	0.950	0.950			0.954							
Satd. Flow (prot)	1770	1770	0	0	1777	1583	0	0	0	0	1611	0
Flt Permitted	0.282	0.950			0.954							
Satd. Flow (perm)	525	1770	0	0	1777	1583	0	0	0	0	1611	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)						405						60
Link Speed (mph)		30			30			30		30		
Link Distance (ft)		847			1151			400		463		
Travel Time (s)		19.3			26.2			9.1		10.5		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	72	293	0	474	16	466	0	0	0	0	432	63
Shared Lane Traffic (%)												
Lane Group Flow (vph)	72	293	0	0	490	466	0	0	0	0	495	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Right	Right
Median Width(ft)		24			0			0		12		
Link Offset(ft)		0			0			0		0		
Crosswalk Width(ft)		16			16			16		16		
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15	15	9	15		9	15		9	15	9	9
Number of Detectors	1	1		1	2	1						1
Detector Template	Left	Left		Left	Thru	Right						Right
Leading Detector (ft)	20	20		20	100	20						20
Trailing Detector (ft)	0	0		0	0	0						0
Detector 1 Position(ft)	0	0		0	0	0						0
Detector 1 Size(ft)	20	20		20	6	20						20
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex						Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	0.0						0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	0.0						0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	0.0						0.0
Detector 2 Position(ft)					94							
Detector 2 Size(ft)					6							
Detector 2 Type					Cl+Ex							
Detector 2 Channel												
Detector 2 Extend (s)					0.0							
Turn Type	Perm	Prot		Perm	NA	Perm						Prot
Protected Phases		4			2							8
Permitted Phases	4			2		2						8

Lanes, Volumes, Timings

6: I-91 NB off Ramp/I-91 NB on ramp & US Route 5

07/09/2019

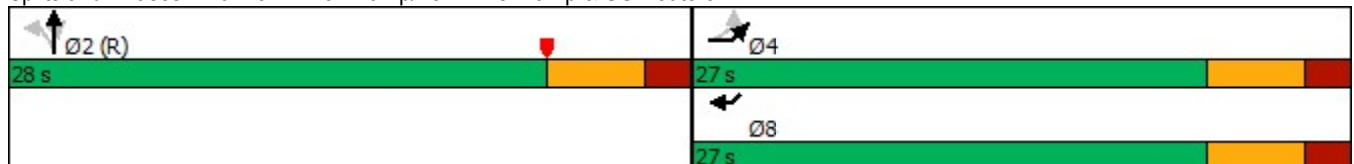


Lane Group	EBL2	EBL	EBR	NBL	NBT	NBR	SBL	SBT	SBR	SWL	SWR	SWR2
Detector Phase	4	4		2	2	2						8
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0	10.0						10.0
Minimum Split (s)	16.0	16.0		16.0	16.0	16.0						16.0
Total Split (s)	27.0	27.0		28.0	28.0	28.0						27.0
Total Split (%)	49.1%	49.1%		50.9%	50.9%	50.9%						49.1%
Maximum Green (s)	21.0	21.0		22.0	22.0	22.0						21.0
Yellow Time (s)	4.0	4.0		4.0	4.0	4.0						4.0
All-Red Time (s)	2.0	2.0		2.0	2.0	2.0						2.0
Lost Time Adjust (s)	0.0	0.0			0.0	0.0						0.0
Total Lost Time (s)	6.0	6.0			6.0	6.0						6.0
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0						3.0
Recall Mode	None	None		C-Max	C-Max	C-Max						None
Act Effect Green (s)	18.7	18.7			24.3	24.3						18.7
Actuated g/C Ratio	0.34	0.34			0.44	0.44						0.34
v/c Ratio	0.40	0.49			0.62	0.50						0.84
Control Delay	20.6	16.8			17.3	4.6						29.3
Queue Delay	0.0	0.0			0.0	0.0						0.0
Total Delay	20.6	16.8			17.3	4.6						29.3
LOS	C	B			B	A						C
Approach Delay		17.5			11.1						29.3	
Approach LOS		B			B						C	

Intersection Summary

Area Type:	Other
Cycle Length:	55
Actuated Cycle Length:	55
Offset:	0 (0%), Referenced to phase 2:NBTL and 6:, Start of Yellow
Natural Cycle:	55
Control Type:	Actuated-Coordinated
Maximum v/c Ratio:	0.84
Intersection Signal Delay:	17.4
Intersection LOS:	B
Intersection Capacity Utilization:	63.1%
ICU Level of Service:	B
Analysis Period (min):	15

Splits and Phases: 6: I-91 NB off Ramp/I-91 NB on ramp & US Route 5



Lanes, Volumes, Timings
 9: US Route 5 & I-91 SB ramp

07/09/2019














Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	215	276	521	220	44	159
Future Volume (vph)	215	276	521	220	44	159
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Fr _t				0.850	0.894	
Fl _t Protected	0.950				0.989	
Satd. Flow (prot)	1770	1863	1863	1583	1647	0
Fl _t Permitted	0.950				0.989	
Satd. Flow (perm)	1770	1863	1863	1583	1647	0
Link Speed (mph)		30	30		30	
Link Distance (ft)		306	847		512	
Travel Time (s)		7.0	19.3		11.6	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	234	300	566	239	48	173
Shared Lane Traffic (%)						
Lane Group Flow (vph)	234	300	566	239	221	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(ft)		12	12		12	
Link Offset(ft)		0	0		0	
Crosswalk Width(ft)		16	16		16	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15			9	15	9
Sign Control		Free	Free		Stop	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	61.6%
Analysis Period (min)	15
	ICU Level of Service B

Lanes, Volumes, Timings
10: US Route 5 & Airport Dr

07/09/2019

















						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	30	29	417	30	30	295
Future Volume (vph)	30	29	417	30	30	295
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0	0		0	345	
Storage Lanes	1	0		0	1	
Taper Length (ft)	25				25	
Lane Util. Factor	1.00	1.00	0.95	0.95	1.00	1.00
Frt	0.934		0.990			
Flt Protected	0.975				0.950	
Satd. Flow (prot)	1696	0	3504	0	1770	1863
Flt Permitted	0.975				0.950	
Satd. Flow (perm)	1696	0	3504	0	1770	1863
Link Speed (mph)	30		30			30
Link Distance (ft)	782		482			2055
Travel Time (s)	17.8		11.0			46.7
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	33	32	453	33	33	321
Shared Lane Traffic (%)						
Lane Group Flow (vph)	65	0	486	0	33	321
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(ft)	12		12			12
Link Offset(ft)	0		0			0
Crosswalk Width(ft)	16		16			16
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15	9		9	15	
Sign Control	Stop		Free			Free

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	29.3%
ICU Level of Service	A
Analysis Period (min)	15

Lanes, Volumes, Timings
 12: Dunkin Donuts/Veterans Dr & US Route 5

07/09/2019

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	14	319	41	88	320	261	23	18	79	34	1	11
Future Volume (vph)	14	319	41	88	320	261	23	18	79	34	1	11
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.985			0.947			0.911			0.968	
Flt Protected		0.998			0.993			0.991			0.964	
Satd. Flow (prot)	0	1831	0	0	1752	0	0	1682	0	0	1738	0
Flt Permitted		0.998			0.993			0.991			0.964	
Satd. Flow (perm)	0	1831	0	0	1752	0	0	1682	0	0	1738	0
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		906			287			190			542	
Travel Time (s)		20.6			6.5			4.3			12.3	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	15	347	45	96	348	284	25	20	86	37	1	12
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	407	0	0	728	0	0	131	0	0	50	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Sign Control		Free			Free			Stop			Stop	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	75.5%
ICU Level of Service	D
Analysis Period (min)	15

Lanes, Volumes, Timings
 15: US Route 5 & VA Cutoff Rd

07/09/2019






















Lane Group	WBL	WBR	SEL	SER	NEL	NER
Lane Configurations						
Traffic Volume (vph)	258	64	85	52	41	292
Future Volume (vph)	258	64	85	52	41	292
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.973		0.948		0.882	
Flt Protected	0.962		0.970		0.994	
Satd. Flow (prot)	1744	0	1713	0	1633	0
Flt Permitted	0.962		0.970		0.994	
Satd. Flow (perm)	1744	0	1713	0	1633	0
Link Speed (mph)	30		30		30	
Link Distance (ft)	906		2012		1510	
Travel Time (s)	20.6		45.7		34.3	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	280	70	92	57	45	317
Shared Lane Traffic (%)						
Lane Group Flow (vph)	350	0	149	0	362	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Right
Median Width(ft)	12		12		12	
Link Offset(ft)	0		0		0	
Crosswalk Width(ft)	16		16		16	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15	9	15	9	15	9
Sign Control	Free		Stop		Free	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	56.4%
ICU Level of Service	B
Analysis Period (min)	15

Lanes, Volumes, Timings
 18: Store Driveway/US Route 4 & US Route 5

07/09/2019

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	93	335	2	3	220	66	1	0	1	88	1	92
Future Volume (vph)	93	335	2	3	220	66	1	0	1	88	1	92
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	380		0	0		150	0		0	0		0
Storage Lanes	1		0	0		1	0		0	0		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.95	0.95	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.999				0.850		0.932				0.850
Flt Protected	0.950				0.999			0.976			0.953	
Satd. Flow (prot)	1770	3536	0	0	3536	1583	0	1694	0	0	1775	1583
Flt Permitted	0.950				0.999			0.976			0.953	
Satd. Flow (perm)	1770	3536	0	0	3536	1583	0	1694	0	0	1775	1583
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		2055			1824			609			1803	
Travel Time (s)		46.7			41.5			13.8			41.0	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	101	364	2	3	239	72	1	0	1	96	1	100
Shared Lane Traffic (%)												
Lane Group Flow (vph)	101	366	0	0	242	72	0	2	0	0	97	100
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Sign Control		Free			Free			Stop			Stop	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	34.1%
ICU Level of Service	A
Analysis Period (min)	15

Lanes, Volumes, Timings
 24: Ballardvale Dr/Windsor Dr & US Route 5

07/09/2019



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕		↗	↘		↗	↘			↕	
Traffic Volume (vph)	0	436	13	35	621	0	18	0	70	1	0	1
Future Volume (vph)	0	436	13	35	621	0	18	0	70	1	0	1
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Fr _t		0.996						0.850			0.932	
Fl _t Protected				0.950			0.950				0.976	
Satd. Flow (prot)	0	1855	0	1770	1863	0	1770	1583	0	0	1694	0
Fl _t Permitted				0.950			0.950				0.976	
Satd. Flow (perm)	0	1855	0	1770	1863	0	1770	1583	0	0	1694	0
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		287			306			926			699	
Travel Time (s)		6.5			7.0			21.0			15.9	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	474	14	38	675	0	20	0	76	1	0	1
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	488	0	38	675	0	20	76	0	0	2	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Sign Control		Free			Free			Stop			Stop	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	43.7%
ICU Level of Service	A
Analysis Period (min)	15

Lanes, Volumes, Timings
 27: Beswick Dr & Sykes Mountain Ave

07/09/2019



Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	497	32	32	369	32	32
Future Volume (vph)	497	32	32	369	32	32
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Fr _t	0.992			0.932		
Fl _t Protected				0.996	0.976	
Satd. Flow (prot)	1848	0	0	1855	1694	0
Fl _t Permitted				0.996	0.976	
Satd. Flow (perm)	1848	0	0	1855	1694	0
Link Speed (mph)	30			30	30	
Link Distance (ft)	230			250	275	
Travel Time (s)	5.2			5.7	6.3	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	540	35	35	401	35	35
Shared Lane Traffic (%)						
Lane Group Flow (vph)	575	0	0	436	70	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(ft)	12			12	12	
Link Offset(ft)	0			0	0	
Crosswalk Width(ft)	16			16	16	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	9		15	15		9
Sign Control	Free			Free	Stop	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	56.3%
Analysis Period (min)	15
	ICU Level of Service B

Lanes, Volumes, Timings
 30: Ralph Lehman Dr & Sykes Mountain Ave

07/09/2019



Lane Group	EBR	EBR2	NBL	NBR	NWL2	NWL
Lane Configurations						
Traffic Volume (vph)	521	8	8	8	8	393
Future Volume (vph)	521	8	8	8	8	393
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.865		0.932			
Flt Protected			0.976			0.950
Satd. Flow (prot)	1611	0	1694	0	0	1770
Flt Permitted			0.976			0.950
Satd. Flow (perm)	1611	0	1694	0	0	1770
Link Speed (mph)	30		30			30
Link Distance (ft)	250		271			704
Travel Time (s)	5.7		6.2			16.0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	566	9	9	9	9	427
Shared Lane Traffic (%)						
Lane Group Flow (vph)	575	0	18	0	0	436
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Right	Right	Left	Right	Left	Left
Median Width(ft)	0		12			12
Link Offset(ft)	0		0			0
Crosswalk Width(ft)	16		16			16
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	9	9	15	9	15	15
Sign Control	Free		Stop			Free

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	36.1%
Analysis Period (min)	15
	ICU Level of Service A

Lanes, Volumes, Timings
33: Beswick Dr

07/09/2019



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	5	11	55	0	16	54
Future Volume (vph)	5	11	55	0	16	54
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.905					
Flt Protected	0.986					0.989
Satd. Flow (prot)	1662	0	1863	0	0	1842
Flt Permitted	0.986					0.989
Satd. Flow (perm)	1662	0	1863	0	0	1842
Link Speed (mph)	30		30			30
Link Distance (ft)	248		265			275
Travel Time (s)	5.6		6.0			6.3
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	5	12	60	0	17	59
Shared Lane Traffic (%)						
Lane Group Flow (vph)	17	0	60	0	0	76
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(ft)	12		0			0
Link Offset(ft)	0		0			0
Crosswalk Width(ft)	16		16			16
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15	9		9	15	
Sign Control	Stop		Stop			Stop

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	20.4%
Analysis Period (min)	15
	ICU Level of Service A

Lanes, Volumes, Timings
34: Ralph Lehman Dr

07/09/2019



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	12	4	0	0	0	0
Future Volume (vph)	12	4	0	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.968					
Flt Protected	0.963					
Satd. Flow (prot)	1736	0	0	1863	1863	0
Flt Permitted	0.963					
Satd. Flow (perm)	1736	0	0	1863	1863	0
Link Speed (mph)	30			30	30	
Link Distance (ft)	248			305	271	
Travel Time (s)	5.6			6.9	6.2	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	13	4	0	0	0	0
Shared Lane Traffic (%)						
Lane Group Flow (vph)	17	0	0	0	0	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(ft)	12			0	0	
Link Offset(ft)	0			0	0	
Crosswalk Width(ft)	16			16	16	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15	9	15			9
Sign Control	Stop			Stop	Stop	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	6.7%
Analysis Period (min)	15
	ICU Level of Service A

Lanes, Volumes, Timings
37: Holiday Dr & Sykes Mountain Ave

07/09/2019



Lane Group	NBL	NBR	SET	SER	NWL	NWT
Lane Configurations						
Traffic Volume (vph)	63	63	458	63	63	338
Future Volume (vph)	63	63	458	63	63	338
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.932		0.984			
Flt Protected	0.976					0.992
Satd. Flow (prot)	1694	0	1833	0	0	1848
Flt Permitted	0.976					0.992
Satd. Flow (perm)	1694	0	1833	0	0	1848
Link Speed (mph)	30		30			30
Link Distance (ft)	1534		704			683
Travel Time (s)	34.9		16.0			15.5
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	68	68	498	68	68	367
Shared Lane Traffic (%)						
Lane Group Flow (vph)	136	0	566	0	0	435
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(ft)	12		0			0
Link Offset(ft)	0		0			0
Crosswalk Width(ft)	16		16			16
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15	9		9	15	
Sign Control	Stop		Free			Free

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	66.6%
Analysis Period (min)	15
	ICU Level of Service C

Lanes, Volumes, Timings
40: Sykes Mountain Ave & Lowery hyde Park

07/09/2019



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	0	0	0	0	0	0
Future Volume (vph)	0	0	0	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Fr						
Flt Protected						
Satd. Flow (prot)	0	1863	1863	0	1863	0
Flt Permitted						
Satd. Flow (perm)	0	1863	1863	0	1863	0
Link Speed (mph)		30	30		30	
Link Distance (ft)		683	208		871	
Travel Time (s)		15.5	4.7		19.8	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	0	0	0
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	0	0	0	0	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(ft)		0	0		12	
Link Offset(ft)		0	0		0	
Crosswalk Width(ft)		16	16		16	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15			9	15	9
Sign Control		Free	Free		Stop	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	0.0%
ICU Level of Service	A
Analysis Period (min)	15

Lanes, Volumes, Timings
42: Bowling Ave & Sykes Mountain Ave

07/09/2019



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Volume (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Future Volume (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt												
Flt Protected												
Satd. Flow (prot)	0	1863	0	0	1863	0	0	1863	0	0	1863	0
Flt Permitted												
Satd. Flow (perm)	0	1863	0	0	1863	0	0	1863	0	0	1863	0
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		208			1172			999			796	
Travel Time (s)		4.7			26.6			22.7			18.1	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Sign Control		Stop			Stop			Stop			Stop	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	0.0%
ICU Level of Service	A
Analysis Period (min)	15

Queuing and Blocking Report
 AM Traffic Control for TMP

07/09/2019

Intersection: 1: N Main St & US Route 5

Movement	EB	EB	WB	WB	NW	NW
Directions Served	UT	TR	L	T	L	L
Maximum Queue (ft)	90	115	106	85	53	53
Average Queue (ft)	42	58	35	44	23	11
95th Queue (ft)	75	89	79	75	48	37
Link Distance (ft)	1741	1741	932	932	1053	1053
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (ft)						
Storage Blk Time (%)						
Queuing Penalty (veh)						

Intersection: 3: US Route 5 & Ryder Drive/Sykes Mountain Ave

Movement	WB	WB	SB	SB	NE	NE
Directions Served	L	TR	L	R>	<	LR
Maximum Queue (ft)	139	187	152	98	29	399
Average Queue (ft)	103	76	67	49	3	222
95th Queue (ft)	150	171	117	93	17	377
Link Distance (ft)		152		401		391
Upstream Blk Time (%)	1	4				1
Queuing Penalty (veh)	0	15				9
Storage Bay Dist (ft)	115		245		70	
Storage Blk Time (%)	7	2				29
Queuing Penalty (veh)	9	5				2

Intersection: 6: I-91 NB off Ramp/I-91 NB on ramp & US Route 5

Movement	EB	EB	NB	NB	SW
Directions Served	<	L	LT	R	R>
Maximum Queue (ft)	109	182	299	175	400
Average Queue (ft)	32	106	137	107	204
95th Queue (ft)	68	167	231	182	327
Link Distance (ft)		799	1123		391
Upstream Blk Time (%)					0
Queuing Penalty (veh)					2
Storage Bay Dist (ft)	110			150	
Storage Blk Time (%)	1	7	3	1	
Queuing Penalty (veh)	2	4	12	5	

Queuing and Blocking Report
 AM Traffic Control for TMP

07/09/2019

Intersection: 9: US Route 5 & I-91 SB ramp

Movement	EB	WB	SB
Directions Served	L	R	LR
Maximum Queue (ft)	94	22	120
Average Queue (ft)	49	4	63
95th Queue (ft)	77	18	103
Link Distance (ft)	246	799	438
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 10: US Route 5 & Airport Dr

Movement	WB	SB
Directions Served	LR	L
Maximum Queue (ft)	61	31
Average Queue (ft)	28	7
95th Queue (ft)	52	29
Link Distance (ft)	730	
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		345
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 12: Dunkin Donuts/Veterans Dr & US Route 5

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (ft)	75	95	153	69
Average Queue (ft)	15	30	50	29
95th Queue (ft)	55	79	96	55
Link Distance (ft)	839	218	157	511
Upstream Blk Time (%)			0	
Queuing Penalty (veh)			0	
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 15: US Route 5 & VA Cutoff Rd

Movement	WB	SE	NE
Directions Served	LR	LR	LR
Maximum Queue (ft)	31	113	73
Average Queue (ft)	3	52	13
95th Queue (ft)	18	93	46
Link Distance (ft)	839	1973	1487
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 18: Store Driveway/US Route 4 & US Route 5

Movement	EB	NB	SB
Directions Served	L	LTR	LT
Maximum Queue (ft)	51	23	73
Average Queue (ft)	14	2	32
95th Queue (ft)	39	11	59
Link Distance (ft)		530	1758
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)	380		
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 24: Ballardvale Dr/Windsor Dr & US Route 5

Movement	WB	NB	NB	SB
Directions Served	L	L	TR	LTR
Maximum Queue (ft)	29	45	52	30
Average Queue (ft)	14	13	27	3
95th Queue (ft)	37	33	43	18
Link Distance (ft)	246	879	879	660
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 27: Beswick Dr & Sykes Mountain Ave

Movement	WB	NB
Directions Served	LT	LR
Maximum Queue (ft)	164	96
Average Queue (ft)	32	44
95th Queue (ft)	105	78
Link Distance (ft)	194	218
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 30: Ralph Lehman Dr & Sykes Mountain Ave

Movement	EB	NB
Directions Served	R>	LR
Maximum Queue (ft)	49	51
Average Queue (ft)	2	11
95th Queue (ft)	16	36
Link Distance (ft)	194	202
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 33: Beswick Dr

Movement	WB	NB	SB
Directions Served	LR	TR	LT
Maximum Queue (ft)	52	55	55
Average Queue (ft)	17	29	29
95th Queue (ft)	44	52	44
Link Distance (ft)		232	218
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 34: Ralph Lehman Dr

Movement	EB
Directions Served	LR
Maximum Queue (ft)	31
Average Queue (ft)	9
95th Queue (ft)	32
Link Distance (ft)	190
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 37: Holiday Dr & Sykes Mountain Ave

Movement	NB	NW
Directions Served	LR	LT
Maximum Queue (ft)	164	114
Average Queue (ft)	55	34
95th Queue (ft)	111	91
Link Distance (ft)	1506	
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 40: Sykes Mountain Ave & Lowery hyde Park

Movement
Directions Served
Maximum Queue (ft)
Average Queue (ft)
95th Queue (ft)
Link Distance (ft)
Upstream Blk Time (%)
Queuing Penalty (veh)
Storage Bay Dist (ft)
Storage Blk Time (%)
Queuing Penalty (veh)

Intersection: 42: Bowling Ave & Sykes Mountain Ave

Movement

Directions Served

Maximum Queue (ft)

Average Queue (ft)

95th Queue (ft)

Link Distance (ft)

Upstream Blk Time (%)

Queuing Penalty (veh)

Storage Bay Dist (ft)

Storage Blk Time (%)

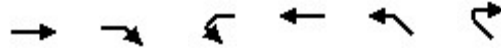
Queuing Penalty (veh)

Network Summary

Network wide Queuing Penalty: 65

Lanes, Volumes, Timings
1: N Main St & US Route 5

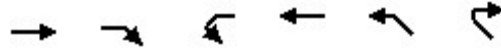
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Lane Group	EBT	EBR	WBL	WBT	NWL	NWR
Lane Configurations	↔↔		↔	↔	↔↔	↔
Traffic Volume (vph)	363	139	70	364	168	195
Future Volume (vph)	363	139	70	364	168	195
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)		680	0		0	200
Storage Lanes		0	1		2	1
Taper Length (ft)			25		25	
Lane Util. Factor	0.95	0.95	1.00	1.00	0.97	1.00
Frt	0.959					0.850
Flt Protected			0.950		0.950	
Satd. Flow (prot)	3394	0	1770	1863	3433	1583
Flt Permitted			0.448		0.950	
Satd. Flow (perm)	3394	0	835	1863	3433	1583
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)	151					212
Link Speed (mph)	30			30	30	
Link Distance (ft)	1824			983	1114	
Travel Time (s)	41.5			22.3	25.3	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	395	151	76	396	183	212
Shared Lane Traffic (%)						
Lane Group Flow (vph)	546	0	76	396	183	212
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(ft)	12			12	24	
Link Offset(ft)	0			0	0	
Crosswalk Width(ft)	16			16	16	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)		9	15		15	9
Number of Detectors	2		1	2	1	1
Detector Template	Thru		Left	Thru	Left	Right
Leading Detector (ft)	100		20	100	20	20
Trailing Detector (ft)	0		0	0	0	0
Detector 1 Position(ft)	0		0	0	0	0
Detector 1 Size(ft)	6		20	6	20	20
Detector 1 Type	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0		0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0		0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0		0.0	0.0	0.0	0.0
Detector 2 Position(ft)	94			94		
Detector 2 Size(ft)	6			6		
Detector 2 Type	Cl+Ex			Cl+Ex		
Detector 2 Channel						
Detector 2 Extend (s)	0.0			0.0		
Turn Type	NA		Perm	NA	Prot	Perm
Protected Phases	4			8	2	
Permitted Phases			8			2

Lanes, Volumes, Timings
1: N Main St & US Route 5

07/09/2019

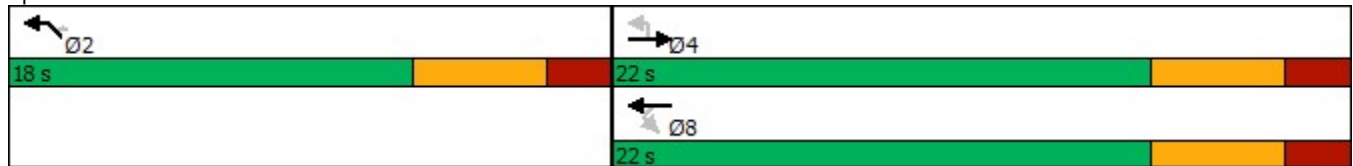


Lane Group	EBT	EBR	WBL	WBT	NWL	NWR
Detector Phase	4		8	8	2	2
Switch Phase						
Minimum Initial (s)	10.0		10.0	10.0	10.0	10.0
Minimum Split (s)	16.0		16.0	16.0	16.0	16.0
Total Split (s)	22.0		22.0	22.0	18.0	18.0
Total Split (%)	55.0%		55.0%	55.0%	45.0%	45.0%
Maximum Green (s)	16.0		16.0	16.0	12.0	12.0
Yellow Time (s)	4.0		4.0	4.0	4.0	4.0
All-Red Time (s)	2.0		2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0		0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0		6.0	6.0	6.0	6.0
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0		3.0	3.0	3.0	3.0
Recall Mode	None		None	None	Min	Min
Act Effect Green (s)	12.8		12.8	12.8	10.2	10.2
Actuated g/C Ratio	0.36		0.36	0.36	0.29	0.29
v/c Ratio	0.41		0.25	0.58	0.18	0.35
Control Delay	6.8		10.0	12.9	10.6	4.2
Queue Delay	0.0		0.0	0.0	0.0	0.0
Total Delay	6.8		10.0	12.9	10.6	4.2
LOS	A		B	B	B	A
Approach Delay	6.8			12.4	7.2	
Approach LOS	A			B	A	

Intersection Summary

Area Type: Other
 Cycle Length: 40
 Actuated Cycle Length: 35.1
 Natural Cycle: 40
 Control Type: Actuated-Uncoordinated
 Maximum v/c Ratio: 0.58
 Intersection Signal Delay: 8.8
 Intersection LOS: A
 Intersection Capacity Utilization 57.0%
 ICU Level of Service B
 Analysis Period (min) 15

Splits and Phases: 1: N Main St & US Route 5



Lanes, Volumes, Timings
 3: US Route 5 & Ryder Drive/Sykes Mountain Ave

07/09/2019



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	SBL	SBR	SBR2	NEL2	NEL	NER
Lane Configurations												
Traffic Volume (vph)	0	1	7	420	7	194	129	325	2	3	367	338
Future Volume (vph)	0	1	7	420	7	194	129	325	2	3	367	338
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	115		115	245	0			70	0
Storage Lanes	0		0	1		0	1	1			1	0
Taper Length (ft)	25			25			25				25	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.880				0.850		0.850				0.928
Flt Protected					0.953		0.950			0.950	0.975	
Satd. Flow (prot)	0	1639	0	0	1775	1583	1770	1583	0	1770	1685	0
Flt Permitted					0.724		0.153			0.496	0.975	
Satd. Flow (perm)	0	1639	0	0	1349	1583	285	1583	0	924	1685	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		8				211		41			83	
Link Speed (mph)		30			30		30				30	
Link Distance (ft)		264			230		482				463	
Travel Time (s)		6.0			5.2		11.0				10.5	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	1	8	457	8	211	140	353	2	3	399	367
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	9	0	0	465	211	140	355	0	3	766	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Right	Right	Left	Left	Right
Median Width(ft)		0			0		12				24	
Link Offset(ft)		0			0		0				0	
Crosswalk Width(ft)		16			16		16				16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15	9	9	15	15	9
Number of Detectors	1	2		1	2	1	1	1		1	1	
Detector Template	Left	Thru		Left	Thru	Right	Left	Right		Left	Left	
Leading Detector (ft)	20	100		20	100	20	20	20		20	20	
Trailing Detector (ft)	0	0		0	0	0	0	0		0	0	
Detector 1 Position(ft)	0	0		0	0	0	0	0		0	0	
Detector 1 Size(ft)	20	6		20	6	20	20	20		20	20	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 2 Position(ft)		94			94							
Detector 2 Size(ft)		6			6							
Detector 2 Type		Cl+Ex			Cl+Ex							
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0							
Turn Type		NA		Perm	NA	Perm	Perm	Prot		Perm	Prot	
Protected Phases		4			8			6				2
Permitted Phases	4			8		8	6			2		

Lanes, Volumes, Timings
 3: US Route 5 & Ryder Drive/Sykes Mountain Ave

07/09/2019



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	SBL	SBR	SBR2	NEL2	NEL	NER
Detector Phase	4	4		8	8	8	6	6		2	2	
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0	10.0	10.0	10.0		10.0	10.0	
Minimum Split (s)	16.0	16.0		16.0	16.0	16.0	16.0	16.0		16.0	16.0	
Total Split (s)	34.0	34.0		34.0	34.0	34.0	46.0	46.0		46.0	46.0	
Total Split (%)	42.5%	42.5%		42.5%	42.5%	42.5%	57.5%	57.5%		57.5%	57.5%	
Maximum Green (s)	28.0	28.0		28.0	28.0	28.0	40.0	40.0		40.0	40.0	
Yellow Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0	2.0	2.0	2.0		2.0	2.0	
Lost Time Adjust (s)		0.0			0.0	0.0	0.0	0.0		0.0	0.0	
Total Lost Time (s)		6.0			6.0	6.0	6.0	6.0		6.0	6.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None	None	Min	Min		Min	Min	
Act Effect Green (s)		28.0		28.0	28.0	28.0	40.0	40.0		40.0	40.0	
Actuated g/C Ratio		0.35		0.35	0.35	0.35	0.50	0.50		0.50	0.50	
v/c Ratio		0.02		0.99	0.31	0.99	0.44	0.44		0.01	0.87	
Control Delay		10.8		66.5	4.2	98.7	13.3	13.3		10.0	28.3	
Queue Delay		0.0		0.0	0.0	0.0	0.0	0.0		0.0	6.3	
Total Delay		10.8		66.5	4.2	98.7	13.3	13.3		10.0	34.6	
LOS		B		E	A	F	B	B		A	C	
Approach Delay		10.8		47.1		37.4					34.5	
Approach LOS		B		D		D					C	

Intersection Summary

Area Type:	Other
Cycle Length:	80
Actuated Cycle Length:	80
Natural Cycle:	80
Control Type:	Semi Act-Uncoord
Maximum v/c Ratio:	0.99
Intersection Signal Delay:	39.5
Intersection LOS:	D
Intersection Capacity Utilization:	94.7%
ICU Level of Service:	F
Analysis Period (min):	15


















Splits and Phases: 3: US Route 5 & Ryder Drive/Sykes Mountain Ave



Lanes, Volumes, Timings

6: I-91 NB off Ramp/I-91 NB on ramp & US Route 5

07/09/2019

												
Lane Group	EBL2	EBL	EBR	NBL	NBT	NBR	SBL	SBT	SBR	SWL	SWR	SWR2
Lane Configurations												
Traffic Volume (vph)	82	308	0	199	1	443	0	0	0	0	555	73
Future Volume (vph)	82	308	0	199	1	443	0	0	0	0	555	73
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)		110	0	0		150	0		0	0	250	
Storage Lanes		1	0	0		1	0		0	0	0	
Taper Length (ft)		25		25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt						0.850						0.865
Flt Protected	0.950	0.950			0.953							
Satd. Flow (prot)	1770	1770	0	0	1775	1583	0	0	0	0	1611	0
Flt Permitted	0.190	0.950			0.953							
Satd. Flow (perm)	354	1770	0	0	1775	1583	0	0	0	0	1611	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)						350						60
Link Speed (mph)		30			30			30		30		
Link Distance (ft)		849			1151			400		463		
Travel Time (s)		19.3			26.2			9.1		10.5		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	89	335	0	216	1	482	0	0	0	0	603	79
Shared Lane Traffic (%)												
Lane Group Flow (vph)	89	335	0	0	217	482	0	0	0	0	682	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Right	Right
Median Width(ft)		24			0			0		12		
Link Offset(ft)		0			0			0		0		
Crosswalk Width(ft)		16			16			16		16		
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15	15	9	15		9	15		9	15	9	9
Number of Detectors	1	1		1	2	1						1
Detector Template	Left	Left		Left	Thru	Right						Right
Leading Detector (ft)	20	20		20	100	20						20
Trailing Detector (ft)	0	0		0	0	0						0
Detector 1 Position(ft)	0	0		0	0	0						0
Detector 1 Size(ft)	20	20		20	6	20						20
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex						Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	0.0						0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	0.0						0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	0.0						0.0
Detector 2 Position(ft)					94							
Detector 2 Size(ft)					6							
Detector 2 Type					Cl+Ex							
Detector 2 Channel												
Detector 2 Extend (s)					0.0							
Turn Type	Perm	Prot		Perm	NA	Perm						Prot
Protected Phases		4			2							8
Permitted Phases	4			2		2						8

Lanes, Volumes, Timings

6: I-91 NB off Ramp/I-91 NB on ramp & US Route 5

07/09/2019

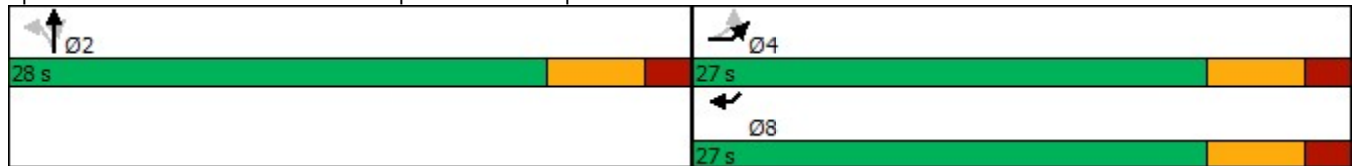


Lane Group	EBL2	EBL	EBR	NBL	NBT	NBR	SBL	SBT	SBR	SWL	SWR	SWR2
Detector Phase	4	4		2	2	2						8
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0	10.0						10.0
Minimum Split (s)	16.0	16.0		16.0	16.0	16.0						16.0
Total Split (s)	27.0	27.0		28.0	28.0	28.0						27.0
Total Split (%)	49.1%	49.1%		50.9%	50.9%	50.9%						49.1%
Maximum Green (s)	21.0	21.0		22.0	22.0	22.0						21.0
Yellow Time (s)	4.0	4.0		4.0	4.0	4.0						4.0
All-Red Time (s)	2.0	2.0		2.0	2.0	2.0						2.0
Lost Time Adjust (s)	0.0	0.0			0.0	0.0						0.0
Total Lost Time (s)	6.0	6.0			6.0	6.0						6.0
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0						3.0
Recall Mode	None	None		Max	Max	Max						None
Act Effect Green (s)	21.0	21.0			22.0	22.0						21.0
Actuated g/C Ratio	0.38	0.38			0.40	0.40						0.38
v/c Ratio	0.66	0.50			0.31	0.57						1.05
Control Delay	43.2	16.1			12.8	6.8						67.8
Queue Delay	0.0	0.0			0.0	0.0						0.0
Total Delay	43.2	16.1			12.8	6.8						67.8
LOS	D	B			B	A						E
Approach Delay		21.8			8.7					67.8		
Approach LOS		C			A					E		

Intersection Summary

Area Type:	Other
Cycle Length:	55
Actuated Cycle Length:	55
Natural Cycle:	55
Control Type:	Actuated-Uncoordinated
Maximum v/c Ratio:	1.05
Intersection Signal Delay:	34.1
Intersection LOS:	C
Intersection Capacity Utilization:	60.0%
ICU Level of Service:	B
Analysis Period (min):	15

Splits and Phases: 6: I-91 NB off Ramp/I-91 NB on ramp & US Route 5



Lanes, Volumes, Timings
 9: US Route 5 & I-91 SB ramp

07/09/2019













Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	374	354	403	425	34	107
Future Volume (vph)	374	354	403	425	34	107
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Fr _t				0.850	0.898	
Fl _t Protected	0.950				0.988	
Satd. Flow (prot)	1770	1863	1863	1583	1653	0
Fl _t Permitted	0.950				0.988	
Satd. Flow (perm)	1770	1863	1863	1583	1653	0
Link Speed (mph)		30	30		30	
Link Distance (ft)		306	849		617	
Travel Time (s)		7.0	19.3		14.0	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	407	385	438	462	37	116
Shared Lane Traffic (%)						
Lane Group Flow (vph)	407	385	438	462	153	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(ft)		12	12		12	
Link Offset(ft)		0	0		0	
Crosswalk Width(ft)		16	16		16	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15			9	15	9
Sign Control		Free	Free		Stop	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	60.4%
Analysis Period (min)	15
	ICU Level of Service B

















Lanes, Volumes, Timings
10: US Route 5 & Airport Dr

07/09/2019

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	34	30	417	35	30	295
Future Volume (vph)	34	30	417	35	30	295
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.936		0.990			
Flt Protected	0.974				0.950	
Satd. Flow (prot)	1698	0	1844	0	1770	1863
Flt Permitted	0.974				0.950	
Satd. Flow (perm)	1698	0	1844	0	1770	1863
Link Speed (mph)	30		30			30
Link Distance (ft)	782		482			2055
Travel Time (s)	17.8		11.0			46.7
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	37	33	453	38	33	321
Shared Lane Traffic (%)						
Lane Group Flow (vph)	70	0	491	0	33	321
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(ft)	12		24			24
Link Offset(ft)	0		0			0
Crosswalk Width(ft)	16		16			16
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15	9		9	15	
Sign Control	Stop		Free			Free
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	35.3%			ICU Level of Service A		
Analysis Period (min)	15					

Lanes, Volumes, Timings
 12: Dunkin Donuts/Veterans Dr & US Route 5

07/09/2019

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	2	451	10	34	407	39	5	0	41	189	5	18
Future Volume (vph)	2	451	10	34	407	39	5	0	41	189	5	18
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Fr _t		0.997			0.989			0.878			0.988	
Fl _t Protected					0.996			0.995			0.957	
Satd. Flow (prot)	0	1857	0	0	1835	0	0	1627	0	0	1761	0
Fl _t Permitted					0.996			0.995			0.957	
Satd. Flow (perm)	0	1857	0	0	1835	0	0	1627	0	0	1761	0
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		906			287			190			542	
Travel Time (s)		20.6			6.5			4.3			12.3	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	2	490	11	37	442	42	5	0	45	205	5	20
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	503	0	0	521	0	0	50	0	0	230	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Sign Control		Free			Free			Stop			Stop	
Intersection Summary												
Area Type:	Other											
Control Type:	Unsignalized											
Intersection Capacity Utilization	74.2%						ICU Level of Service D					
Analysis Period (min)	15											

Lanes, Volumes, Timings
15: US Route 5 & VA Cutoff Rd

07/09/2019






















Lane Group	WBL	WBR	SEL	SER	NEL	NER
Lane Configurations						
Traffic Volume (vph)	318	76	177	64	35	241
Future Volume (vph)	318	76	177	64	35	241
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.974		0.964		0.882	
Flt Protected	0.961		0.965		0.994	
Satd. Flow (prot)	1744	0	1733	0	1633	0
Flt Permitted	0.961		0.965		0.994	
Satd. Flow (perm)	1744	0	1733	0	1633	0
Link Speed (mph)	30		30		30	
Link Distance (ft)	906		2012		1510	
Travel Time (s)	20.6		45.7		34.3	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	346	83	192	70	38	262
Shared Lane Traffic (%)						
Lane Group Flow (vph)	429	0	262	0	300	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Right
Median Width(ft)	12		12		12	
Link Offset(ft)	0		0		0	
Crosswalk Width(ft)	16		16		16	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15	9	15	9	15	9
Sign Control	Free		Stop		Free	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	62.8%
Analysis Period (min)	15
	ICU Level of Service B

Lanes, Volumes, Timings
 18: Store Driveway/US Route 4 & US Route 5

07/09/2019

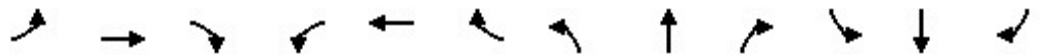
												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	170	348	5	2	353	172	2	1	2	105	0	89
Future Volume (vph)	170	348	5	2	353	172	2	1	2	105	0	89
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	380		0	0		150	0		0	0		0
Storage Lanes	1		0	0		1	0		0	0		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.95	0.95	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.998				0.850		0.946				0.850
Flt Protected	0.950							0.980			0.950	
Satd. Flow (prot)	1770	3532	0	0	3539	1583	0	1727	0	0	1770	1583
Flt Permitted	0.950							0.980			0.950	
Satd. Flow (perm)	1770	3532	0	0	3539	1583	0	1727	0	0	1770	1583
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		2055			1824			609			1803	
Travel Time (s)		46.7			41.5			13.8			41.0	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	185	378	5	2	384	187	2	1	2	114	0	97
Shared Lane Traffic (%)												
Lane Group Flow (vph)	185	383	0	0	386	187	0	5	0	0	114	97
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Sign Control		Free			Free			Stop			Stop	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	42.1%
ICU Level of Service	A
Analysis Period (min)	15

Lanes, Volumes, Timings
 24: Ballardvale Dr/Windsor Dr & US Route 5

07/09/2019



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕		↗	↘		↗	↘			↕	
Traffic Volume (vph)	4	618	19	56	362	4	14	4	53	1	6	1
Future Volume (vph)	4	618	19	56	362	4	14	4	53	1	6	1
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Fr _t		0.996			0.998			0.860			0.985	
Fl _t Protected				0.950			0.950				0.994	
Satd. Flow (prot)	0	1855	0	1770	1859	0	1770	1602	0	0	1824	0
Fl _t Permitted				0.950			0.950				0.994	
Satd. Flow (perm)	0	1855	0	1770	1859	0	1770	1602	0	0	1824	0
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		287			306			926			699	
Travel Time (s)		6.5			7.0			21.0			15.9	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	4	672	21	61	393	4	15	4	58	1	7	1
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	697	0	61	397	0	15	62	0	0	9	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Sign Control		Free			Free			Stop			Stop	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	53.3%
ICU Level of Service	A
Analysis Period (min)	15

Lanes, Volumes, Timings
27: Beswick Dr & Sykes Mountain Ave

07/09/2019



Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	433	35	35	621	32	22
Future Volume (vph)	433	35	35	621	32	22
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt	0.990				0.945	
Flt Protected				0.997	0.971	
Satd. Flow (prot)	1844	0	0	1857	1709	0
Flt Permitted				0.997	0.971	
Satd. Flow (perm)	1844	0	0	1857	1709	0
Link Speed (mph)	30			30	30	
Link Distance (ft)	230			250	275	
Travel Time (s)	5.2			5.7	6.3	
Confl. Peds. (#/hr)		5				
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	471	38	38	675	35	24
Shared Lane Traffic (%)						
Lane Group Flow (vph)	509	0	0	713	59	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(ft)	12			12	12	
Link Offset(ft)	0			0	0	
Crosswalk Width(ft)	16			16	16	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)		9	15		15	9
Sign Control	Free			Free	Stop	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	71.3%
Analysis Period (min)	15
	ICU Level of Service C

Lanes, Volumes, Timings
 30: Ralph Lehman Dr & Sykes Mountain Ave

07/09/2019



Lane Group	EBR	EBR2	NBL	NBR	NWL2	NWL
Lane Configurations						
Traffic Volume (vph)	449	6	6	6	6	650
Future Volume (vph)	449	6	6	6	6	650
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.865		0.932			
Flt Protected			0.976			0.950
Satd. Flow (prot)	1611	0	1694	0	0	1770
Flt Permitted			0.976			0.950
Satd. Flow (perm)	1611	0	1694	0	0	1770
Link Speed (mph)	30		30			30
Link Distance (ft)	250		271			704
Travel Time (s)	5.7		6.2			16.0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	488	7	7	7	7	707
Shared Lane Traffic (%)						
Lane Group Flow (vph)	495	0	14	0	0	714
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Right	Right	Left	Right	Left	Left
Median Width(ft)	0		12			12
Link Offset(ft)	0		0			0
Crosswalk Width(ft)	16		16			16
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	9	9	15	9	15	15
Sign Control	Free		Stop			Free

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	46.3%
Analysis Period (min)	15
	ICU Level of Service A

Lanes, Volumes, Timings
33: Beswick Dr

07/09/2019



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	3	15	39	0	16	54
Future Volume (vph)	3	15	39	0	16	54
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.886					
Flt Protected	0.992					0.989
Satd. Flow (prot)	1637	0	1863	0	0	1842
Flt Permitted	0.992					0.989
Satd. Flow (perm)	1637	0	1863	0	0	1842
Link Speed (mph)	30		30			30
Link Distance (ft)	248		265			275
Travel Time (s)	5.6		6.0			6.3
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	3	16	42	0	17	59
Shared Lane Traffic (%)						
Lane Group Flow (vph)	19	0	42	0	0	76
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(ft)	12		0			0
Link Offset(ft)	0		0			0
Crosswalk Width(ft)	16		16			16
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15	9		9	15	
Sign Control	Stop		Stop			Stop

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	20.4%
Analysis Period (min)	15
	ICU Level of Service A

Lanes, Volumes, Timings
34: Ralph Lehman Dr

07/09/2019



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	12	5	0	0	3	3
Future Volume (vph)	12	5	0	0	3	3
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.962			0.932		
Flt Protected	0.965					
Satd. Flow (prot)	1729	0	0	1863	1736	0
Flt Permitted	0.965					
Satd. Flow (perm)	1729	0	0	1863	1736	0
Link Speed (mph)	30			30	30	
Link Distance (ft)	248			305	271	
Travel Time (s)	5.6			6.9	6.2	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	13	5	0	0	3	3
Shared Lane Traffic (%)						
Lane Group Flow (vph)	18	0	0	0	6	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(ft)	12			0	0	
Link Offset(ft)	0			0	0	
Crosswalk Width(ft)	16			16	16	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15	9	15			9
Sign Control	Stop			Stop	Stop	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	13.3%
Analysis Period (min)	15
	ICU Level of Service A

Lanes, Volumes, Timings
37: Holiday Dr & Sykes Mountain Ave

07/09/2019



Lane Group	NBL	NBR	SET	SER	NWL	NWT
Lane Configurations						
Traffic Volume (vph)	71	71	313	142	63	579
Future Volume (vph)	71	71	313	142	63	579
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.932		0.958			
Flt Protected	0.976					0.995
Satd. Flow (prot)	1694	0	1785	0	0	1853
Flt Permitted	0.976					0.995
Satd. Flow (perm)	1694	0	1785	0	0	1853
Link Speed (mph)	30		30			30
Link Distance (ft)	1534		704			683
Travel Time (s)	34.9		16.0			15.5
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	77	77	340	154	68	629
Shared Lane Traffic (%)						
Lane Group Flow (vph)	154	0	494	0	0	697
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(ft)	12		0			0
Link Offset(ft)	0		0			0
Crosswalk Width(ft)	16		16			16
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15	9		9	15	
Sign Control	Stop		Free			Free

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	77.4%
Analysis Period (min)	15
	ICU Level of Service D

Lanes, Volumes, Timings
 40: Sykes Mountain Ave & Lowery hyde Park

07/09/2019



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	0	0	0	0	0	0
Future Volume (vph)	0	0	0	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt						
Flt Protected						
Satd. Flow (prot)	0	1863	1863	0	1863	0
Flt Permitted						
Satd. Flow (perm)	0	1863	1863	0	1863	0
Link Speed (mph)		30	30		30	
Link Distance (ft)		683	208		871	
Travel Time (s)		15.5	4.7		19.8	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	0	0	0
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	0	0	0	0	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(ft)		0	0		12	
Link Offset(ft)		0	0		0	
Crosswalk Width(ft)		16	16		16	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15			9	15	9
Sign Control		Free	Free		Stop	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	0.0%
ICU Level of Service	A
Analysis Period (min)	15

Lanes, Volumes, Timings
42: Bowling Ave & Sykes Mountain Ave

07/09/2019



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Volume (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Future Volume (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt												
Flt Protected												
Satd. Flow (prot)	0	1863	0	0	1863	0	0	1863	0	0	1863	0
Flt Permitted												
Satd. Flow (perm)	0	1863	0	0	1863	0	0	1863	0	0	1863	0
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		208			1172			999			796	
Travel Time (s)		4.7			26.6			22.7			18.1	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Sign Control		Stop			Stop			Stop			Stop	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	0.0%
ICU Level of Service	A
Analysis Period (min)	15

Queuing and Blocking Report
 PM Traffic Control for TMP

07/09/2019

Intersection: 1: N Main St & US Route 5

Movement	EB	EB	WB	WB	NW	NW
Directions Served	UT	TR	L	T	L	L
Maximum Queue (ft)	97	78	112	130	74	75
Average Queue (ft)	48	56	42	58	41	31
95th Queue (ft)	87	79	89	102	64	62
Link Distance (ft)	1741	1741	932	932	1053	1053
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (ft)						
Storage Blk Time (%)						
Queuing Penalty (veh)						

Intersection: 3: US Route 5 & Ryder Drive/Sykes Mountain Ave

Movement	EB	WB	WB	SB	SB	NE
Directions Served	LTR	LT	R	L	R>	LR
Maximum Queue (ft)	30	140	232	270	417	413
Average Queue (ft)	4	139	205	146	280	310
95th Queue (ft)	20	140	225	303	452	467
Link Distance (ft)	220		167		405	396
Upstream Blk Time (%)			52		3	5
Queuing Penalty (veh)			342		8	39
Storage Bay Dist (ft)		115		245		
Storage Blk Time (%)		71	4	2	37	47
Queuing Penalty (veh)		138	15	8	48	1

Intersection: 6: I-91 NB off Ramp/I-91 NB on ramp & US Route 5

Movement	EB	EB	NB	NB	SW
Directions Served	<	L	LT	R	R>
Maximum Queue (ft)	134	290	352	175	413
Average Queue (ft)	40	101	90	105	403
95th Queue (ft)	84	185	207	180	410
Link Distance (ft)		798	1122		396
Upstream Blk Time (%)					27
Queuing Penalty (veh)					207
Storage Bay Dist (ft)	110			150	
Storage Blk Time (%)		9	0	5	
Queuing Penalty (veh)		7	0	11	

Intersection: 9: US Route 5 & I-91 SB ramp

Movement	EB	WB	WB	SB
Directions Served	L	T	R	LR
Maximum Queue (ft)	266	22	50	390
Average Queue (ft)	106	1	20	130
95th Queue (ft)	195	7	44	296
Link Distance (ft)	246	798	798	543
Upstream Blk Time (%)	1			
Queuing Penalty (veh)	3			
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 10: US Route 5 & Airport Dr

Movement	WB	NB	SB	SB
Directions Served	LR	TR	L	T
Maximum Queue (ft)	56	20	31	52
Average Queue (ft)	29	1	10	7
95th Queue (ft)	55	7	34	31
Link Distance (ft)	730	405	2002	2002
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 12: Dunkin Donuts/Veterans Dr & US Route 5

Movement	WB	NB	SB
Directions Served	LTR	LTR	LTR
Maximum Queue (ft)	102	52	155
Average Queue (ft)	24	28	74
95th Queue (ft)	72	47	128
Link Distance (ft)	218	157	511
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 15: US Route 5 & VA Cutoff Rd

Movement	WB	SE	NE
Directions Served	LR	LR	LR
Maximum Queue (ft)	50	142	55
Average Queue (ft)	3	64	9
95th Queue (ft)	20	106	34
Link Distance (ft)	839	1973	1487
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 18: Store Driveway/US Route 4 & US Route 5

Movement	EB	WB	NB	SB
Directions Served	L	R	LTR	LT
Maximum Queue (ft)	75	55	24	113
Average Queue (ft)	28	3	3	47
95th Queue (ft)	60	20	17	76
Link Distance (ft)			530	1755
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)	380	150		
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 24: Ballardvale Dr/Windsor Dr & US Route 5

Movement	EB	WB	NB	NB	SB
Directions Served	LTR	L	L	TR	LTR
Maximum Queue (ft)	49	51	43	63	30
Average Queue (ft)	5	19	9	28	7
95th Queue (ft)	27	46	29	50	27
Link Distance (ft)	218	246	879	879	660
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (ft)					
Storage Blk Time (%)					
Queuing Penalty (veh)					

Intersection: 27: Beswick Dr & Sykes Mountain Ave

Movement	EB	WB	NB
Directions Served	TR	LT	LR
Maximum Queue (ft)	138	209	225
Average Queue (ft)	9	187	182
95th Queue (ft)	65	257	296
Link Distance (ft)	167	194	218
Upstream Blk Time (%)		44	75
Queuing Penalty (veh)		286	41
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 30: Ralph Lehman Dr & Sykes Mountain Ave

Movement	NB	NW
Directions Served	LR	<L
Maximum Queue (ft)	158	664
Average Queue (ft)	51	510
95th Queue (ft)	131	922
Link Distance (ft)	202	647
Upstream Blk Time (%)		22
Queuing Penalty (veh)		141
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 33: Beswick Dr

Movement	WB	NB	SB
Directions Served	LR	TR	LT
Maximum Queue (ft)	160	225	50
Average Queue (ft)	77	159	29
95th Queue (ft)	155	293	47
Link Distance (ft)	190	232	218
Upstream Blk Time (%)		61	
Queuing Penalty (veh)		0	
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 34: Ralph Lehman Dr

Movement	EB	SB
Directions Served	LR	TR
Maximum Queue (ft)	31	31
Average Queue (ft)	14	8
95th Queue (ft)	39	30
Link Distance (ft)	190	202
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 37: Holiday Dr & Sykes Mountain Ave

Movement	NB	SE	NW
Directions Served	LR	TR	LT
Maximum Queue (ft)	1266	22	373
Average Queue (ft)	567	1	204
95th Queue (ft)	1302	7	434
Link Distance (ft)	1506	647	
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 40: Sykes Mountain Ave & Lowery hyde Park

Movement
Directions Served
Maximum Queue (ft)
Average Queue (ft)
95th Queue (ft)
Link Distance (ft)
Upstream Blk Time (%)
Queuing Penalty (veh)
Storage Bay Dist (ft)
Storage Blk Time (%)
Queuing Penalty (veh)

Intersection: 42: Bowling Ave & Sykes Mountain Ave

Movement

Directions Served

Maximum Queue (ft)

Average Queue (ft)

95th Queue (ft)

Link Distance (ft)

Upstream Blk Time (%)

Queuing Penalty (veh)

Storage Bay Dist (ft)

Storage Blk Time (%)

Queuing Penalty (veh)

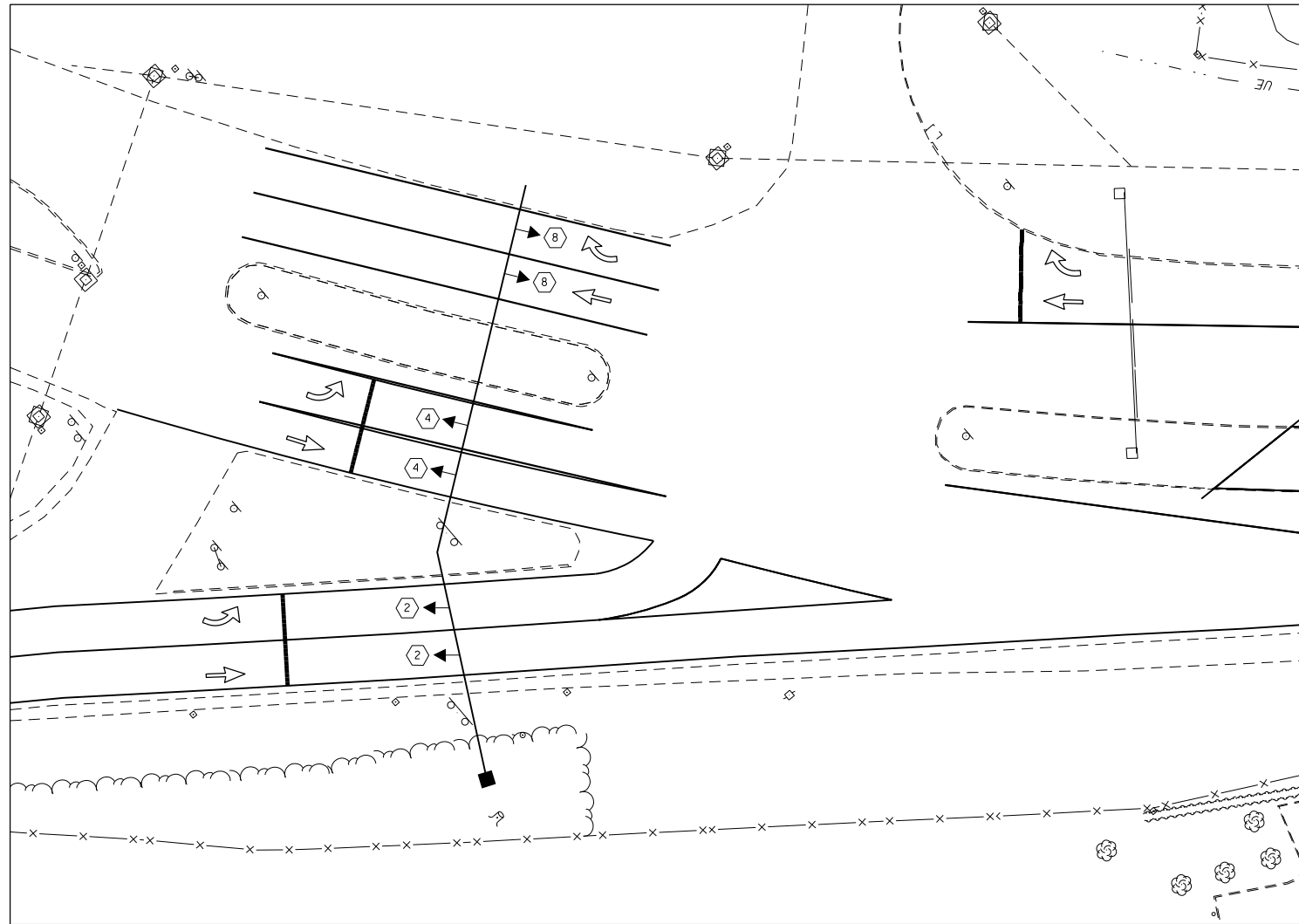
Network Summary

Network wide Queuing Penalty: 1296

APPENDIX D

Temporary Signal Timings

TEMPORARY TRAFFIC SYSTEM NOTES



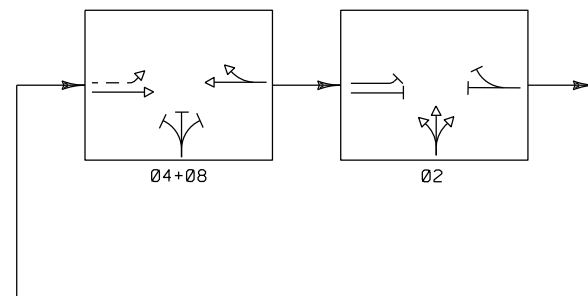
1. ALL MATERIALS AND CONSTRUCTION SHALL CONFORM TO THE STATE OF VERMONT AGENCY OF TRANSPORTATION'S (VTTRANS) "STANDARD SPECIFICATIONS FOR CONSTRUCTION", DATED 2018, WITH CURRENT MODIFICATIONS AND THE LATEST EDITION OF THE MUTCD.
2. TEMPORARY TRAFFIC SIGNAL SYSTEM SHALL BE DESIGNED AND INSTALLED IN ACCORDANCE WITH CONTRACT ITEM 678.40 - TEMPORARY TRAFFIC SIGNAL SYSTEM.
3. DESIGN OF THE SIGNAL SYSTEM, INCLUDING LAYOUT, TIMINGS, SIGNAL SUPPORTS, STREET LIGHTING AND ANY REQUIRED GUYING SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR.
4. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL MAINTENANCE COSTS, INCLUDING BUT NOT LIMITED TO TIMING ADJUSTMENTS, TROUBLE CALLS, POWER BILL AND ANY ADJUSTMENTS REQUIRED TO ACCOMMODATE CONSTRUCTION PHASING.
5. SIGNAL FACES SHALL BE L.E.D AND CONSIST OF 12" LENSES (RED, YELLOW AND GREEN).
6. THE BOTTOM OF THE HOUSING OF A SIGNAL FACE SUSPENDED OVER A ROADWAY SHALL NOT BE LESS THAN 16.5 FEET NOR MORE THAN 19.0 FEET ABOVE THE PAVEMENT GRADE AT THE CENTER OF THE ROADWAY. THE BOTTOM OF A SIGNAL FACE NOT MOUNTED OVER A ROADWAY SHALL NOT BE LESS THAN 8.0 FEET NOR MORE THAN 15.0 FEET ABOVE THE GROUND.
7. SIGNAL FACES FOR ANY ONE APPROACH SHALL NOT BE LESS THAN 8 FEET APART MEASURED HORIZONTALLY BETWEEN CENTER FACES.
8. SIGNAL HEADS MAY BE HUNG ON A SPAN WIRE OR ON A CANTILEVER MAST ARM. AT LEAST ONE SIGNAL HEAD SHALL BE UNMISTAKABLY IN LINE WITH THE CENTER OF APPROACHING TRAFFIC AT ALL TIMES. CONSULT THE LATEST EDITION OF THE MUTCD FOR ADDITIONAL INFORMATION CONCERNING SIGNAL PLACEMENT.
9. SIGNAL HEAD PLACEMENT IS CRITICAL. HEADS SHALL BE ADJUSTED TO REFLECT LANE LOCATION CHANGES.
10. THE SIGNAL SYSTEM SHALL CONSIST OF POLES, SIGNS AND POSTS, WARNING SIGNS, LUMINAIRES, VEHICLE DETECTION, ASSOCIATED PAVEMENT MARKINGS AND SIGNAL EQUIPMENT TO PROVIDE FOR AN ADEQUATE DESIGN. IT ALSO INCLUDES PERMITS AND COSTS ASSOCIATED WITH PROVIDING ELECTRICAL POWER.
11. THE TEMPORARY SIGNAL SHALL BE FULLY ACTUATED. DETECTION FOR ALL APPROACHES SHALL BE NON-INTRUSIVE. CUTTING OF PAVEMENT TO INSTALL LOOPS WILL NOT BE PERMITTED.
12. INSTALL WIRING BETWEEN SIGNAL POLES TO PROVIDE FOR A SAFE INSTALLATION. ATTACHMENT TO UTILITY POLES SHALL BE COORDINATED BY THE CONTRACTOR WITH THE UTILITY COMPANY.
13. PLACE TEMPORARY POLES BEHIND GUARDRAIL OR OUTSIDE OF THE CLEAR ZONE.
14. POLES SUPPORTING SPAN WIRES AND/OR MAST ARMS SHALL BE ADEQUATELY BRACED OR GUYED AND SHALL BE PLACED SO AS NOT TO CREATE A HAZARD TO THE TRAVELING PUBLIC.
15. LUMINAIRES SHALL BE INSTALLED TO ADEQUATELY ILLUMINATE THE STOP BAR AREAS OF ALL APPROACHES. 250 WATT HIGH PRESSURE SODIUM, 150 WATT MERCURY OR AN EQUIVILANT WATTAGE L.E.D. LAMP ARE ALL ACCEPTABLE FORMS OF LUMINAIRE. THE MOUNTING HEIGHT SHALL BE 30 FEET ABOVE THE CENTERLINE OR AS REQUIRED TO PROVIDE ADEQUATE ILLUMINATION. WHILE THE INTENT IS TO ILLUMINATE THE TEMPORARY SIGNAL SYSTEM, MEASURED NIGHTTIME ILLUMINANCE AT EACH STOP BAR SHALL NOT BE LESS THAN 1.0 FOOT-CANDLE. THE ENGINEER SHALL ORDER CHANGES TO THE LIGHTING COMPONENTS IF DETERMINED TO BE INSUFFICIENT. PAYMENT FOR LUMINAIRES WILL BE CONSIDERED INCIDENTAL TO THE TEMPORARY TRAFFIC SIGNAL SYSTEM.
16. THE TEMPORARY SIGNAL SHALL BE OPERATED IN FLASH MODE FOR A MINIMUM OF 48 HOURS PRIOR TO BEING PUT INTO FULL OPERATION.
17. ALL TRAFFIC SIGNS, INCLUDING STOP SIGNS, MADE IRRELEVANT DUE TO THE TEMPORARY SIGNAL SHALL BE COMPLETELY COVERED OR REMOVED DURING OPERATION OF THE TEMPORARY SIGNAL OR AT THE DISCRETION OF THE ENGINEER.
18. CONSTRUCTION APPROACH SIGNS SHALL BE PROVIDED ON EACH APPROACH PER THE ACCEPTED TRAFFIC CONTROL PLAN. ADDITIONAL SIGNS SHALL BE INSTALLED AS REQUIRED BY THE ENGINEER PER STANDARDS T-1, T-10 AND T-11.
19. ALL TEMPORARY SIGNAL EQUIPMENT, SIGNS, ETC., SHALL REMAIN THE PROPERTY OF THE CONTRACTOR AT THE END OF THE PROJECT AND THE CONTRACTOR SHALL BE RESPONSIBLE FOR THEIR REMOVAL INCLUDING ANY TEMPORARY PAVEMENT MARKINGS, UTILITY POLES, WIRES, ETC.

LOCAL PROGRAMMING	CONTROLLER TIMING CHART								
	PHASES								
	1	2	3	4	5	6	7	8	9
MINIMUM GREEN	--	10	--	10	--	--	--	10	--
EXTENSION	--	3	--	3	--	--	--	3	--
YELLOW CLEARANCE	--	4	--	4	--	--	--	4	--
ALL RED CLEARANCE	--	2	--	2	--	--	--	2	--
DHV	--	--	--	--	--	--	--	--	--
MAX GREEN I 6:00-9:00 AM	--	22	--	21	--	--	--	21	--
MAX GREEN II 3:00-6:00 PM	--	22	--	21	--	--	--	21	--
MAX GREEN (FREE)	--	20	--	20	--	--	--	20	--
WALK	--	--	--	--	--	--	--	--	--
FLASHING DON'T WALK	--	--	--	--	--	--	--	--	--
RECALL	--	SOFT	--	OFF	--	--	--	OFF	--

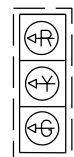
LIST OF MAJOR EQUIPMENT

EQUIPMENT ITEM 678.40 - TEMPORARY TRAFFIC SIGNAL SYSTEM, INTERSECTION (I-91NB OFF & US 5)	QUANTITY
NEW 12" POLYCARBONATE, 3-SECTION LED SIGNAL HEADS (ONE WAY) W/TUNNEL VISORS, LOUVERED BACKPLATES, AND MOUNTING HARDWARE	7

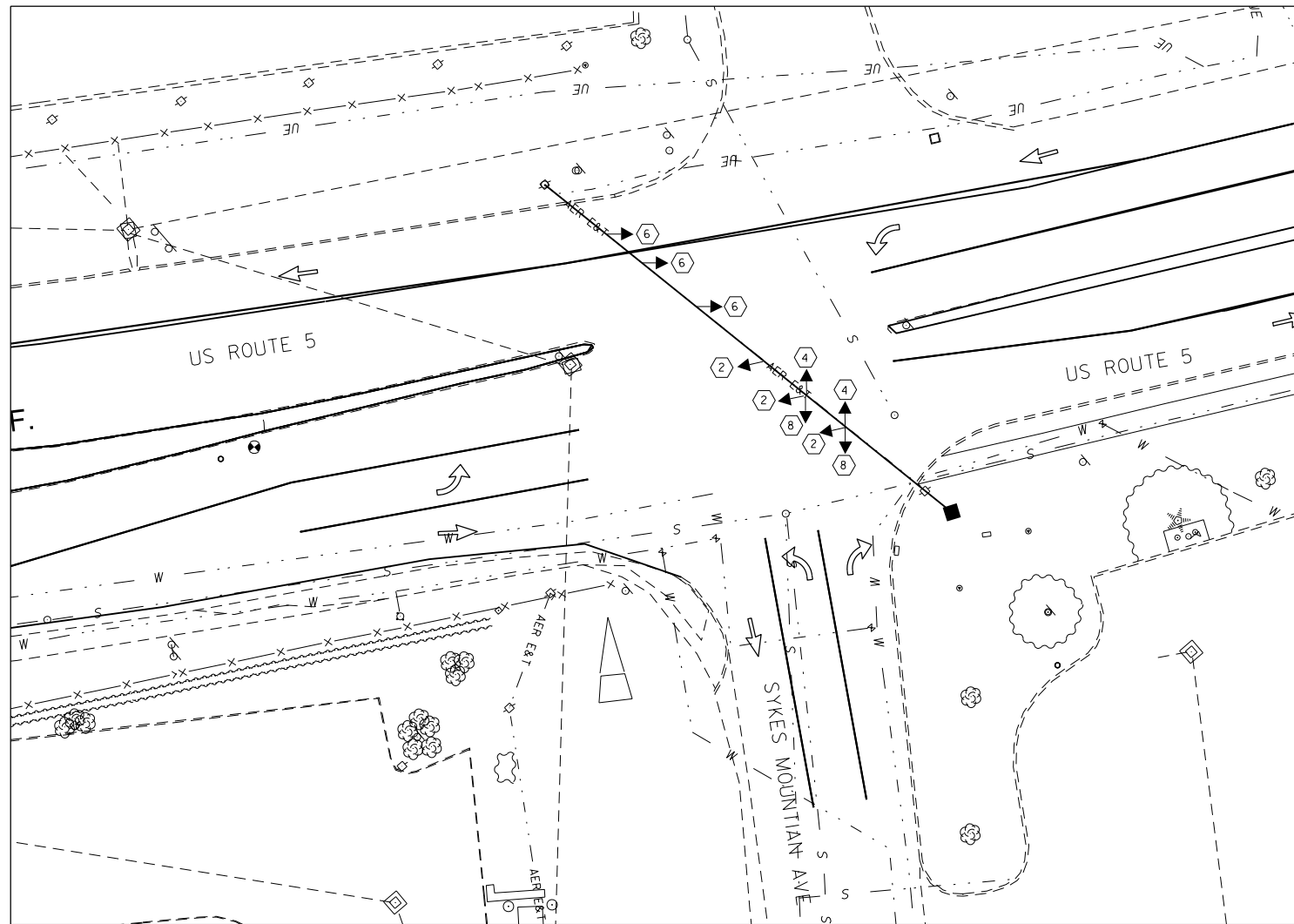
ALL OTHER WIRING AND INCIDENTALS REQUIRED TO PROVIDE A FULLY FUNCTIONAL TRAFFIC SIGNAL SYSTEM WILL BE CONSIDERED INCIDENTAL TO ITEM 900.645 SPECIAL PROVISION (TEMPORARY TRAFFIC SIGNAL, INTERSECTION) (I-91NB OFF & US 5)



SIGNAL FACE ARRANGEMENT
(12" LENSES)



--- = PERMISSIVE MOVEMENT



SIGNAL FACE ARRANGEMENT
(12" LENSES)



LOCAL PROGRAMMING	CONTROLLER TIMING CHART								
	PHASES								
	1	2	3	4	5	6	7	8	9
MINIMUM GREEN	--	10	--	10	--	10	--	10	--
EXTENSION	--	3	--	3	--	3	--	3	--
YELLOW CLEARANCE	--	4	--	4	--	4	--	4	--
ALL RED CLEARANCE	--	2	--	2	--	2	--	2	--
DHV	--	--	--	--	--	--	--	--	--
MAX GREEN I 6:00-9:00 AM	--	45	--	25	--	45	--	25	--
MAX GREEN II 3:00-6:00 PM	--	46	--	34	--	46	--	34	--
MAX GREEN (FREE)	--	30	--	20	--	30	--	20	--
WALK	--	--	--	--	--	--	--	--	--
FLASHING DON'T WALK	--	--	--	--	--	--	--	--	--
RECALL	--	SOFT	--	OFF	--	SOFT	--	OFF	--

NOTE: 09 IS AN EXCLUSIVE PEDESTRIAN PHASE

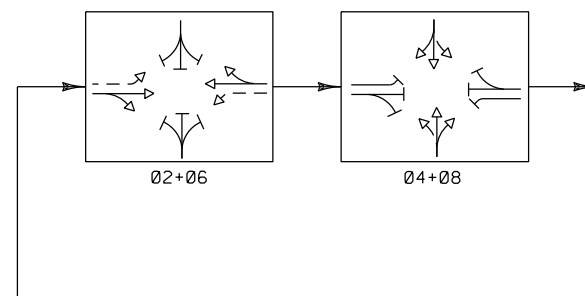
LIST OF MAJOR EQUIPMENT

EQUIPMENT ITEM 900.645 SPECIAL PROVISION (MODIFY EXISTING TRAFFIC SIGNAL, INTERSECTION) (US 5 AND SYKES MTN AVE)	QUANTITY
CONTRACTOR SHALL ADJUST TEMPORARY SIGNAL WITH EACH PHASE AS NEEDED.	1

ALL OTHER WIRING AND INCIDENTALS REQUIRED TO PROVIDE A FULLY FUNCTIONAL TRAFFIC SIGNAL SYSTEM WILL BE CONSIDERED INCIDENTAL TO ITEM 900.645 SPECIAL PROVISION (MODIFY EXISTING TRAFFIC SIGNAL, INTERSECTION) (US 5 AND SYKES MTN AVE)

NOTES:

1. THE WORK AT THIS LOCATION SHALL CONSIST OF CHANGING THE EXISTING EXCLUSIVE LEFT-TURN PHASING TO PERMITTED PHASING USING GREEN BALL SIGNAL HEADS.
2. WORK WILL INCLUDE REPLACING THE EXISTING 3-SECTION LEFT-TURN SIGNAL HEADS ON THE US 5 NORTHBOUND AND SOUTHBOUND APPROACHES (PHASE 2 & 6) AND REPLACING THEM WITH NEW 3-SECTION, POLYCARBONATE SIGNAL HEADS WITH LOUVERED BACKPLATES.
3. WORK SHALL ALSO CONSIST OF MAKING CHANGES TO THE EXISTING TIMING AND SIGNAL PHASING IN THE EXISTING TRAFFIC SIGNAL CONTROLLER TO ACCOMMODATE THE OPERATION AS SHOWN ON THIS SHEET.



--- = PERMISSIVE MOVEMENT

PROJECT NAME: HARTFORD
PROJECT NUMBER: STP 0113(59)S

FILE NAME: zc344sig02.dgn
PROJECT LEADER: S. IRELAND
DESIGNED BY: S. IRELAND
TRAFFIC SIGNAL LAYOUT SHEET 2

PLOT DATE: 8/8/2019
DRAWN BY: S. IRELAND
CHECKED BY: B. COLBURN
SHEET 2 OF 2

