

TABLE OF CONTENTS OF SPECIAL PROVISIONS

Note: This Table of Contents has been prepared for the convenience of those using this contract with the sole express purpose of locating quickly the information contained herein; and no claims shall arise due to omissions, additions, deletions, etc., as this Table of Contents shall not be considered part of the contract.

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FEBRUARY 5, 2020
STATE PROJECT NO. 0172-0494

2020 PAVEMENT PRESERVATION PROGRAM
ULTRA-THIN BONDED PMA
DISTRICT 2

Towns of Montville & Norwich
Federal Aid Project No. N/A

The State of Connecticut, Department of Transportation, Standard Specifications for Roads, Bridges, Facilities and Incidental Construction, Form 817, 2016, as revised by the Supplemental Specifications dated July 2019 (otherwise referred to collectively as "ConnDOT Form 817") is hereby made part of this contract, as modified by the Special Provisions contained herein. Form 817 is available at the following DOT website link <http://www.ct.gov/dot/cwp/view.asp?a=3609&q=430362>. The current edition of the State of Connecticut Department of Transportation's "Construction Contract Bidding and Award Manual" ("Manual"), is hereby made part of this contract. If the provisions of this Manual conflict with provisions of other Department documents (not including statutes or regulations), the provisions of the Manual will govern. The Manual is available at the following DOT website link <http://www.ct.gov/dot/cwp/view.asp?a=2288&q=259258>. The Special Provisions relate in particular to the 2020 Pavement Preservation Program Ultra-Thin Bonded PMA in the Towns of Montville & Norwich.

CONTRACT COMPLETION DATE AND LIQUIDATED DAMAGES

In order to minimize the hazard, cost and inconvenience to the traveling public and pollution of the environment, it is necessary to limit the time of construction work, which interferes with traffic as specified in Article 1.08.04 of the Special Provisions.

For this project, the Contract Completion Date (CCD) shall be no later than October 30, 2020.

There will be two assessments for liquidated damages and they will be addressed in the following manner:

1. For this contract, an assessment per day for liquidated damages, at a rate of Two Thousand Four Hundred Dollars (\$2,400.00) per day shall be applied to each calendar day the work runs beyond October 30, 2020 (Contract Completion Date (CCD)).
2. For this contract, an assessment per hour for liquidated damages shall be applied to each hour, or any portion thereof, in which the Contractor interferes with normal

traffic operations during the restricted hours given in Article 1.08.04 of the Special Provisions. The liquidated damages shall be as shown in the following tables entitled "Liquidated Damages Per Hour" for each hour, or any portion thereof, in which the Contractor interferes with normal traffic operations during the restricted hours.

For the purpose of administering this contract, normal traffic operations are considered interfered with when:

1. Any portion of the travel lanes or shoulders is occupied by any personnel, equipment, materials, or supplies including signs.
2. The transition between the planes of pavement surfaces is at a rate of one inch in less than fifteen feet longitudinally.

LIQUIDATED DAMAGES PER HOUR
PROJECT 0172-0494

Interstate 395 NORTHBOUND (MP 5.48-MP 17.88) 2 Lane Section		
If Working Period Results in Additional Number of Lanes Closed	AM Additional 1 Lane Closure	PM Additional 1 Lane Closure
1st Hour of Restriction Violation	\$ 500	\$10,000
2 nd Hour of Restriction Violation	\$ 500	\$30,000
3rd Hour or any Subsequent Hour of Restriction Violation	\$ 500	\$40,000
Interstate 395 SOUTHBOUND (MP 5.48-MP 17.86) 2 Lane Section		
If Working Period Results in Additional Number of Lanes Closed	AM Additional 1 Lane Closure	PM Additional 1 Lane Closure
1st Hour of Restriction Violation	\$ 5,000	\$ 500
2 nd Hour of Restriction Violation	\$ 10,000	\$ 500
3rd Hour or any Subsequent Hour of Restriction Violation	\$ 15,000	\$ 500

The above liquidated damages apply to those hours shown on the Limitation of Operations charts designated with a “0”, “S” or “1”

The above liquidated damages shall be applied when the actual number of lanes closed exceeds the number of lanes allowed to be closed, as dictated in the Limitation of Operations Chart.

If all available shoulder widths or gore areas are not available to traffic for each hour designated with a “0” on the Limitation of Operations Charts, then liquidated damages of \$500 shall apply for each hour, or part thereof.

LIQUIDATED DAMAGES PER HOUR
PROJECT 0172-0494

Interstate 395 NORTHBOUND (MP 17.88-MP 24.13) 2 Lane Section		
If Working Period Results in Additional Number of Lanes Closed	AM Additional 1 Lane Closure	PM Additional 1 Lane Closure
1st Hour of Restriction Violation	\$ 500	\$ 500
2 nd Hour of Restriction Violation	\$ 500	\$ 500
3rd Hour or any Subsequent Hour of Restriction Violation	\$ 500	\$ 500

The above liquidated damages apply to those hours shown on the Limitation of Operations charts designated with a “0”, “S” or “1”

The above liquidated damages shall be applied when the actual number of lanes closed exceeds the number of lanes allowed to be closed, as dictated in the Limitation of Operations Chart.

If all available shoulder widths or gore areas are not available to traffic for each hour designated with a “0” on the Limitation of Operations Charts, then liquidated damages of \$500 shall apply for each hour, or part thereof.

NOTICE TO CONTRACTOR – SITE NO. ASSOCIATIONS

The Contractor is hereby notified that the below table shows the Site No. and corresponding Intersections pertaining to the installation of new signals and maintenance of traffic signal operations are required when relevant, as part of this contract.

Site No.	Intersection No.	Description
1	103-229	ROUTE 82 (SALEM TURNPIKE) AT I-395 S.B. OFF RAMP AND HOTEL DRIVE - NORWICH
2	103-247	S.R. 642 (WEST TOWN ST.) AT I-395 NB RAMPS AND CASE STREET - NORWICH
3	103-249	S.R. 642 (WEST TOWN ST.) AT I-395 SB RAMPS AND WAWECUS STREET
4	103-271	ROUTE 82 (SALEM TURNPIKE) AT I-395 NB. RAMPS - NORWICH

NOTICE TO CONTRACTOR – POTENTIAL MODIFIED AWARD SCHEDULE

The contractor is hereby given notice that this contract will not be awarded until all State and Federal funding approvals have been received. If funding approvals are not received, this Contract award may be delayed or the Contract may be withdrawn and re-advertised at the discretion of the Department, per section XIII of the Construction Contract Bidding and Award Manual. Any delay to the Contract award or failure to award shall not be the basis for any claims by any bidder.

NOTICE TO CONTRACTOR - PRE-BID QUESTIONS AND ANSWERS

Questions pertaining to DOT advertised construction projects must be presented through the CTDOT Pre-Bid Q and A Website. The Department cannot guarantee that all questions will be answered prior to the bid date. **PLEASE NOTE - at 9:00 am Monday (i.e. typical Wednesday Bid Opening) the project(s) being bid will be closed for questions, at which time questions can no longer be submitted through the Q and A Website.**

Answers may be provided by the Department up to 12:00 noon, the day before the bid. At this time, the Q and A for those projects will be considered final, unless otherwise stated and/or the bid is postponed to a future date and time to allow for further questions and answers to be posted.

If a question needs to be asked the day before the bid date, please contact the Contracts Unit staff and email your question to dotcontracts@ct.gov immediately.

Contractors must identify their company name, contact person, contact email address and phone number when asking a question. The email address and phone number will not be made public.

The questions and answers (if any) located on the Q and A Website are hereby made part of the bid/contract solicitation documents (located on the State Contracting Portal), and resulting contract for the subject project(s). It is the bidder's responsibility to monitor, review, and become familiar with the questions and answers, as with all bid requirements and contract documents, prior to bidding. By signing the bid proposal and resulting contract, the bidder acknowledges receipt of, and agrees to the incorporation of the final list of Q and A, into the contract document.

Contractors will not be permitted to file a future claim based on lack of receipt, or knowledge of the questions and answers associated with a project. All bidding requirements and project information, including but not limited to contract plans, specifications, addenda, Q and A, Notice to Contractors, etc., are made public on the State Contracting Portal and/or the CTDOT website.

NOTICE TO CONTRACTOR – STANDARD DETAIL SHEETS

It shall be made known to the Contractor that the Standard Detail Sheets within the Contract have been printed out on 8.5” x 11” sheets. These full size PDF Standard Detail Sheets can be found online at the following addresses and printed out at full size as needed by the Contractor:

Highway Standard Drawings:

<https://portal.ct.gov/DOT/Highway-Standard-Drawings/Highway-Standard-Details>

Traffic Engineering Standard Drawings:

<https://portal.ct.gov/DOT/Traffic-Standard-Drawings/REV--TRAFFIC-STANDARD--GUIDE-SHEETS--DETAILS>

Structure/Bridge Design Standard Drawings:

<https://portal.ct.gov/DOT/State-Bridge-Design/Guide-Sheets>

Please contact Mathew Calkins with any technical problems at:

Phone: 860-594-2988

Email: Mathew.Calkins@ct.gov

NOTICE TO CONTRACTOR – USE OF STATE POLICE OFFICERS

The Department will reimburse services of State Police Officers as a direct payment to the Department of Emergency Services and Public Protection. Payment for State Police Officers must be approved by the Engineer. Any State Police Officers used by the Contractor for its convenience is the responsibility of the Contractor. A separate payment item for State Police Officers is not included in this Contract.

Any costs associated with coordination and scheduling of State Police Officers shall be included in the lump sum bid price for Item No. 0971001A – Maintenance and Protection of Traffic.

NOTICE TO CONTRACTOR - COORDINATION WITH CONCURRENT CONSTRUCTION PROJECTS

The Contractor is hereby made aware that other on-going and/or future Connecticut Department of Transportation (CTDOT) construction projects are in the vicinity of this Contract and coordination is required in accordance with “Section 1.05.07 – Coordination with Work by Other Parties.” The Contractor will be required to coordinate work activities, lane closures, and traffic operations with the following projects:

- 0103-0272 REPLACEMENT OF MEDIAN GUIDERAIL ALONG I-395 (TOWN OF MONTVILLE AND CITY OF NORWICH)

The Contractor is hereby advised that he may be required to attend coordination meetings with CTDOT District 2 for the aforementioned project as deemed necessary.

The construction Notice to Proceed of State Project No. 0103-0272 was issued on November 14, 2019 with anticipated construction completion by October 13, 2020. These dates are not final and are subject to change.

In addition to the above, the Contractor shall review and fully comply with the special provisions for “Section 1.08.04 – Limitation of Operations” located elsewhere within this Contract.

The Contractor shall schedule and arrange his work to minimize conflicts with the adjacent project. The Contractor shall prepare two-week and two-month lookahead schedules as needed to share with the adjacent project’s contractor(s) to assist in coordination of lane closures and traffic operations.

NOTICE TO CONTRACTOR – ULTRA-THIN BONDED PMA

The following table identifies the routes and approximate locations where Ultra Thin Bonded PMA shall be placed. Refer to the project details for specific guidance at termini, intersections, shoulders, ramps, and bridges.

ULTRA THIN BONDED PMA										
DISTRICT 2										
ROUTE	DIRECTION	TOWN	LOG TERMINI	START MILE POINT	END MILE POINT	CENTERLINE MILES	LANE MILES	ADT	MAINLINE PAVEMENT TREATMENT SCOPE	RAMP PAVEMENT TREATMENT SCOPE
395	N	MONTVILLE	.02 MI S/O UP GALLIVAN LA TO MONTVILLE - NORWICH TL	9.26	10.44	8.27	65800		<ul style="list-style-type: none"> • Surface Patching (with mill) • Mill Transitions (at limits and under bridges) • Remove Line Striping • Crack Sealing (include shoulders) • Place Treatments <ul style="list-style-type: none"> - Travel Lanes: 5/8" Ultra Thin Bonded PMA - Shoulders: Seal Coat (include rumble strip) 	<ul style="list-style-type: none"> • Surface Patching (with mill) • Mill Transitions (at ramp ends) • Remove Line Striping • Crack Sealing (include shoulders) • Place 5/8" Ultra Thin Bonded PMA (curb-to-curb, include paved gore) • Included Ramps <ul style="list-style-type: none"> - NB EXIT TO EB RTE 2A (TR 801) EXIT 9 - NB EX FR RTE 2A WB (RT 2A TR 802) - NB EXIT TO EB RTES 2 & 32 (TR 802) EXIT 13A - NB EXIT TO SR 642 (W TOWN ST) (015) EXIT 14 - NB ACC FR SR 642 (W TOWN ST) (017) - NB EXIT TO RTE 97 (020) EXIT 18 - SB EXIT TO SR 642 (WEST TOWN ST) (018) EXIT 14 - SB-JCT EB RTE 2 EXIT 28S - SB EXIT TO RTE 82 (013) EXIT 11 - SB ACC FR RTE 82 (010)
		NORWICH	MONTVILLE - NORWICH TL TO BGN OP RTE 97 & SHETUCKET RV	10.44	18.17					
	S	MONTVILLE	.02 MI S/O UP GALLIVAN LA TO MONTVILLE - NORWICH TL	9.26	10.44		65800			<ul style="list-style-type: none"> • Fine mill 3/4" (curb-to-curb) • Surface Patching (with mill) • Crack Sealing • Place 5/8" Ultra Thin Bonded PMA (curb-to-curb, include paved gore) • Included Ramps <ul style="list-style-type: none"> - NB ACC FR RTES 2 & 32 EB (RT 2 TR 804) - NB EXIT TO RTES 2 & 32 WB (TR 804) EXIT 13B - NB ACC FR RTE 97 (022) - SB EXIT FR WB RTES 2 & 32 (RT 2 TR 803) - SB EXIT TO EB RTES 2 & 32 (TR 803) EXIT 13 - SB ACC FR SR 642 (W TOWN ST) (016) - SB ACC FR RTE 82 (011) - SB-JCT EB RTE 2A EXIT 9 - SB EXIT FR WB RTE 2A (RT 2A TR 801)
		NORWICH	MONTVILLE - NORWICH TL TO .12 MI S/O UP LAWLER LA	10.44	16.88		<ul style="list-style-type: none"> • Fine Mill 2" (curb-to-curb) • Surface Patching (with mill) • Crack Filling • Place 5/8" Ultra Thin Bonded PMA (curb-to-curb, include paved gore), on 2" PMA 50.5 Traffic Level 3 (curb-to-curb) • Included Ramps <ul style="list-style-type: none"> - NB EXIT TO RTE 82 (009) EXIT 11 - NB ACC FR RTE 82 (084) - SB EXIT TO RTE 82 (013) EXIT 11 			
PROJECT TOTALS						8.27	39.58			

NOTICE TO CONTRACTOR – RECENT REVISIONS

The Contractor is hereby notified that the following Traffic Engineering Special Provisions have been revised:

- 1112286A – 360 Degree Camera Assembly
- 1112288A – IP Video Detection Camera Assembly
 - Added installation best practices guide

The Contractor is hereby notified that Traffic Engineering’s following guide sheets are included:

GS_Light Standard and Foundation

- Added J-Hook Mounting Detail.
- Added Aluminum Light Standard Base showing Grounding Lug Detail.

GS_Trenching and Backfilling

- Revised Pavement – Bituminous Concrete or Overlaid Portland Cement Concrete
- Revised granular fill and overlay requirements.

NOTICE TO CONTRACTOR - CONSTRUCTION CONTRACTOR
DIGITAL SUBMISSIONS

Upon execution of the Contract, the Contractor acknowledges and agrees that contractual submittals for this Project shall be submitted and handled through a system of paperless electronic means as outlined in the special provision for Section 1.05 herein.

Shop drawings, working drawings, and product data shall be created, digitally signed and delivered by the Contractor in accordance with the Department's [Contractor Digital Submission Manual](#) (CDSM). Other deliverables that are required by other special provisions shall be similarly submitted.

Access credentials will be provided to the Contractor by the Department.

The Department will provide the Contractor with a list of email addresses that are to be used for each submittal type.

The Department shall not be held responsible for delays, lack of processing or response to submittals that do not follow the specified guidelines in the CDSM.

NOTICE TO CONTRACTOR - ALL-INCLUSIVE DRAINAGE

ADDED SECTIONS:

2.86 – DRAINAGE TRENCH EXCAVATION

ROCK IN DRAINAGE TRENCH EXCAVATION

5.86 – CATCH BASINS, MANHOLES AND DROP INLETS

6.86 – DRAINAGE PIPES

DRAINAGE PIPE ENDS

This Contract contains the above-noted Special Provisions for all-inclusive drainage, developed to replace the following Sections in their entireties:

- Section 5.07 – *Catch Basins, Manholes and Drop Inlets*
- Section 6.51 – *Culverts*
- Section 6.52 – *Culvert Ends*

The Section 5.86 and 6.86 items include excavation and bedding material in the drainage structure, pipe and pipe end unit prices.

Section 2.05 *Trench Excavation* may be included for miscellaneous trenching, where necessary, but will not be used with all-inclusive drainage items.

Other Standard Specifications, Supplemental Specifications or Special Provisions may contain references to Articles or Subarticles from previous versions of Sections 5.07, 6.51 and 6.52 which are no longer valid.

The following Standard Specifications Sections or Supplements contain references to Articles or Subarticles from Section 2.05 which shall remain in effect:

- Section 2.06 – *Ditch Excavation*
- Section 5.06 – *Retaining Walls, Endwalls and Steps*
- Section 7.51 – *Underdrains and Outlets*
- Section 10.01 – *Trenching and Backfilling*

‘Rock in Drainage Trench Excavation’ is now defined in Section 2.86. ‘Rock in Trench Excavation’ will remain in Section 2.05 and may be used with trenching not associated with all-inclusive drainage items.

Any references to Articles beginning with “5.07,” “6.51,” or “6.52” shall refer to the pertinent topic or materials in the new Special Provisions contained herein.

NOTICE TO CONTRACTOR - ARCHITECTURAL AND INDUSTRIAL MAINTENANCE COATINGS

This Contract includes the application of materials subject to the Volatile Organic Compounds (VOC) content limits stated in the Regulations of Connecticut State Agencies (RCSA) Sections 22a-174-41 and -41a. All architectural and industrial maintenance (AIM) coatings and applications of such coatings must comply with these regulations.

The Contractor shall submit a Material Safety Data Sheet/Safety Data Sheet or Product Technical Data Sheet developed by the manufacturer of each material that may be subject to the Regulations. The submittal must verify both the type of AIM and its VOC Content. VOC content shall be determined based on the formulation data supplied by the materials manufacturer.

The Contractor may only use AIM coatings that contain VOCs below the respective coating category Phase II limits specified in Table 1 if either:

- a) the coating was manufactured on or after May 1, 2018, **or**
- b) the coating is being applied after April 30, 2021.

The Contractor may use AIM coatings that contain VOCs exceeding the respective coating category Phase II limits specified in Table 1 only if all of the following four conditions are met:

- a) the coating is being applied on or before April 30, 2021,
- b) the coating contains VOCs below the applicable Phase I limits specified in Table 1,
- c) the coating was manufactured prior to May 1, 2018, **and**
- d) the coating container(s) are dated (or date coded) as such.

For any coating that is not categorized within Table 1, the Contractor shall classify the coating as follows and apply corresponding limits in Table 1.

- Registers gloss <15 on an 85-degree meter or <5 on a 60-degree meter) – Flat Coating,
- Registers gloss of ≥ 15 on an 85-degree meter and ≥ 5 on a 60-degree meter) - Nonflat Coating,
- Registers gloss of ≥ 70 on a 60-degree meter - Nonflat-High Gloss Coating.

The Contractor must close all containers of coating and solvent when not in use.

Coating container labels must display the date the coating was manufactured, the manufacturer's recommendation regarding thinning with solvent, and the coating's VOC content in grams per liter (g/L) of coating. Certain coating categories as noted in Table 1 have additional labeling requirements.

The Contractor may add additional solvent to a coating only if such addition does not cause the coating to exceed the applicable VOC limit specified Table 1. The Contractor must adhere to type(s) of solvent and maximum amount of solvent recommended by coating manufacturer. VOC content of a thinned coating shall be the VOC content as listed by the manufacturer after thinning in accordance with its recommendation.

TABLE 1		
Coating Category	Phase I	Phase II
	manufactured prior to May 1, 2018 VOC content limit (g/L)	manufactured on or after May 1, 2018 VOC content limit (g/L)
Aluminum roof coating	--- ¹	450
Antenna coating	530	--- ¹
Antifouling coating	400	--- ¹
Basement specialty coating	--- ¹	400
Bituminous roof coating	300	270
Bituminous roof primer	350	350
Bond breaker	350	350
Calcimine recoater	475	475
Clear wood coating - Clear brushing lacquer ²	680	275
Clear wood coating - Lacquer ^{2,3}	550	275
Clear wood coating - Sanding sealer ^{2,4}	350	275
Clear wood coating - Varnish ²	350	275
Concrete curing compound	350	350
Concrete or masonry sealer/ Waterproofing concrete or masonry sealer	400	100
Concrete surface retarder	780	780
Conjugated oil varnish	--- ¹	450
Conversion varnish	725	725
Driveway sealer	--- ¹	50
Dry fog coating	400	150
Faux finishing coating ²	350	350
Fire resistive coating	350	350
Fire retardant coating - Clear	650	--- ¹
Fire retardant coating - Opaque	350	--- ¹
Flat coating	100	50
Floor coating	250	100
Flow coating	420	--- ¹
Form-release compound	250	250
Graphic arts coating (sign paint)	500	500
High temperature coating	420	420
Impacted immersion coating	780	780
Industrial maintenance coating ²	340	250
Industrial maintenance coating	340	250
Low solids coating	120	120
Magnesite cement coating	450	450
Mastic texture coating	300	100
Metallic pigmented coating	500	500

TABLE 1		
Coating Category	Phase I	Phase II
	manufactured prior to May 1, 2018 VOC content limit (g/L)	manufactured on or after May 1, 2018 VOC content limit (g/L)
Multi-color coating	250	250
Nonflat coating	150	100
Nonflat high gloss coating²	250	150
Nuclear coating	450	450
Pre-treatment wash primer	420	420
Primer, sealer and undercoater	200	100
Quick-dry enamel	250	--- ¹
Quick-dry primer, sealer and undercoater	200	--- ¹
Reactive penetrating carbonate stone sealer²	--- ¹	500
Reactive penetrating sealer²	--- ¹	350
Recycled coating	250	250
Roof coating	250	250
Rust preventive coating²	400	250
Shellac Clear	730	730
Shellac Opaque	550	550
Specialty primer, sealer and undercoater²	350	100
Stain	250	250
Stone consolidant²	--- ¹	450
Swimming pool coating	340	340
Thermoplastic rubber coating and mastic	550	550
Traffic marking coating	150	100
Traffic marking coating	150	100
Tub and tile refinish	--- ¹	420
Waterproofing membrane	--- ¹	250
Waterproofing sealer	250	--- ¹
Wood coating²	--- ¹	275
Wood preservative	350	350
Zinc-rich primer²	--- ¹	340

1 Classify as follows and apply corresponding limits in Table 1.

- Registers gloss <15 on an 85-degree meter or <5 on a 60-degree meter) – Flat Coating,
- Registers gloss of ≥15 on an 85-degree meter and ≥5 on a 60-degree meter) – Nonflat Coating
- Registers gloss of ≥70 on a 60-degree meter – Nonflat-High Gloss Coating

2 Container must be appropriately labeled. See RCSA 22a-174-41a

3 “Clear Wood Coating – Lacquer” includes lacquer sanding sealer

4 “Clear Wood Coating - Sanding Sealer” does not include lacquer sanding sealer

-END-

NOTICE TO CONTRACTOR - 1.05 CONTROL OF THE WORK

1.05.03 - CONFORMITY WITH PLANS AND SPECIFICATIONS (INCLUDING QUALITY CONTROL)

The Contractor is hereby notified that a Quality Management Plan will be required for this Project in conformance with Standard Specifications (Supplemented July 2017) Article 1.05.03 – “Conformity with Plans and Specifications (including Quality Control).”

NOTICE TO CONTRACTOR - QUALITY CONTROL PROGRAM

ITEM #0969054A CONTRACTOR QUALITY CONTROL PROGRAM LEVEL 1

This Contract includes the above-noted item and special provision for Contractor Quality Control Program, developed to supplement Article 1.05.03 of the standard specifications.

A minimum lump sum bid amount is included within the special provision.

The Contractor must be aware that the special provision requires that a Quality Control Manager (QCM) be proposed to the Department within thirty (30) days after Contract Award and that the written QC Program be submitted to the Department within forty-five (45) days after Contract Award.

The Contractor must also be aware of the staffing, inspection, reporting and all other requirements of the special provision.

SECTION 1.02 – PROPOSAL REQUIREMENTS AND CONDITIONS

Article 1.02.04 – Examination of Plans, Specifications, Special Provisions and Site of Work:

Replace the third sentence of the last paragraph with:

The Department cannot ensure a response to inquiries received later than ten (10) days prior to the original scheduled opening of the related bid.

SECTION 1.03 - AWARD AND EXECUTION OF CONTRACT

Article 1.03.02 - Award and Execution of Contract:

After the second sentence of the only paragraph add the following:

The successful bidder is hereby notified of the Department's intent to award this contract within **Thirty (30)** days of the bid opening.

Article 1.03.08 - Notice to Proceed and Commencement of Work:

Change the first paragraph to read as follows:

The Contractor shall commence and proceed with the Contract work on the date specified in a written Notice to Proceed issued by the Engineer to the Contractor. The date specified will be no later than **Forty Five (45)** calendar days after the date of the execution of the Contract by the Department, however, the contractor is hereby put on notice that it is the Department's intent to issue the Notice to Proceed no later than **Twenty Six (26)** calendar days after the date of the execution of the Contract by the Department.

SECTION 1.05 - CONTROL OF THE WORK

Replace Article 1.05.02 with the following:

1.05.02—Contractor Submittals, Working Drawings, Shop Drawings, Product Data, Submittal Preparation and Processing - Review Timeframes, Department’s Action:

1. Contractor Submittals: The plans provided by the Department show the details necessary to give a comprehensive idea of the construction contemplated under the Contract. The plans will generally show the location, character, dimensions, and details necessary to complete the Project. If the plans do not show complete details, they will show the necessary dimensions and details, which when used along with the other Contract documents, will enable the Contractor to prepare working drawings, shop drawings or product data necessary to complete the Project.

The Contractor shall prepare submittals as Portable Document Format (PDF) files. The Contractor is also required to acquire, maintain access and use the Department’s document management system for delivery of submittals. The format, digital signing requirements, delivery processes and document tracking procedures shall be performed in accordance with this specification and the [Contractor’s Digital Submission Manual](#) (CDSM).

The submittals shall be sent to the Department’s reviewer(s), sufficiently in advance of the work detailed, to allow for their review in accordance with the review periods as specified herein (including any necessary revisions, resubmittal, and final review), and acquisition of materials, without causing a delay of the Project.

2. Working Drawings: When required by the Contract or when ordered to do so by the Engineer, the Contractor shall prepare and submit the working drawings, signed, sealed and dated by a qualified Professional Engineer licensed to practice in the State of Connecticut, for review. The drawings shall be delivered sufficiently in advance of the work detailed, to allow for their review in accordance with the review periods specified herein (including any necessary revisions, resubmittal, and final review).

There will be no direct payment for furnishing any working drawings, procedures or supporting calculations, but the cost thereof shall be considered as included in the general cost of the work.

a. Working Drawings for Permanent Construction: The Contractor shall supply to the Assistant District Engineer a certificate of insurance in accordance with 1.03.07 at the time that the working drawings for the Project are submitted.

The Contractor’s designer, who prepares the working drawings, shall secure and maintain at no direct cost to the State a Professional Liability Insurance Policy for errors and omissions in the minimum amount of \$2,000,000 per error or omission. The Contractor’s designer may elect to obtain a policy containing a maximum \$250,000 deductible clause, but if the Contractor’s designer should obtain a policy containing such a clause, they shall be liable to the extent of at

least the deductible amount. The Contractor's designer shall obtain the appropriate and proper endorsement of its Professional Liability Policy to cover the indemnification clause in this Contract, as the same relates to negligent acts, errors or omissions in the Project work performed by them. The Contractor's designer shall continue this liability insurance coverage for a period of

- (i) 3 years from the date of acceptance of the work by the Engineer, as evidenced by a State of Connecticut, Department of Transportation form entitled "Certificate of Acceptance of Work," issued to the Contractor; or
- (ii) 3 years after the termination of the Contract, whichever is earlier, subject to the continued commercial availability of such insurance.

b. Working Drawings for Temporary Construction: The Contractor shall submit drawings, calculations, procedures and other supporting data to the Assistant District Engineer.

3. Shop Drawings: When required by the Contract, or when ordered to do so by the Engineer, the Contractor shall prepare and deliver shop drawings to the Designer for review. Review timeframes and submission locations are as specified herein.

There will be no direct payment for furnishing any shop drawings, but the cost thereof shall be considered as included in the general cost of the work.

4. Product Data: When required by the Contract, or when ordered to do so by the Engineer, the Contractor shall prepare and deliver product data.

The Contractor shall submit the product data in a single submittal for each element or group of elements of construction.

The Contractor shall mark each copy of the product data submittal to show applicable choices and options. Where product data includes information on several products that are not required, copies shall be marked to indicate the applicable information. Product data shall include the following information and confirmation of conformance with the Contract to the extent applicable: manufacturer's printed recommendations, compliance with recognized trade association standards, compliance with recognized testing agency standards, application of testing agency labels and seals, notation of coordination requirements, Contract item number, and any other information required by the individual Contract provisions.

There will be no direct payment for furnishing any product data, but the cost thereof shall be considered as included in the general cost of the work.

5. Contract Items:

- a. **Traffic Signal Items:** When required by the Contract or when ordered by the Engineer, the Contractor shall prepare and submit product data sheets, working drawings and/or shop drawings for all traffic signal items, except Steel Span Poles and Mast Arm Assemblies when applicable, to the Division of Traffic Engineering for approval before fabrication. The packaged set of product data sheets, working drawings or shop drawings shall be submitted

in an electronic portable document format (PDF).

The PDF packaged set shall be in an individual file with appropriate bookmarks for each item. The electronic files for product data sheets shall be created on ANSI A (8 1/2 inch × 11 inch, letter) sheets. Working drawings and shop drawings shall be created on ANSI B (11 inch × 17 inch, ledger/tabloid) sheets.

The PDF documents for Traffic Signal items shall be sent via email to:

DOT.TrafficElectrical@ct.gov

- b. **Steel Span Poles and Mast Arm Assembly Items:** When these items are included in the Contract, the submission for Steel Span Poles and Mast Arm Assemblies shall follow the Traffic Signal Items format and be sent to the “Engineer of Record” as described in the Steel Span Pole and Steel Mast Arm Assembly Guide Sheets and special provisions in the Contract.

6. Submittal Preparation and Processing – Review Timeframes:

a. Shop Drawings and Product Data: The Contractor shall allow 30 calendar days for submittal review by the Department, from the date receipt is acknowledged by the Department’s reviewer. For any submittals marked with “Revise and Resubmit” or “Rejected,” the Department is allowed an additional 20 calendar days for review of any resubmissions.

An extension of Contract time will not be authorized due to the Contractor’s failure to transmit submittals sufficiently in advance of the work to permit processing.

The furnishing of shop drawings, working drawings or product data, or any comments or suggestions by the Designer or Engineer concerning shop drawings, working drawings or product data, shall not relieve the Contractor of any of its responsibility for claims by the State or by third parties, as per 1.07.10.

The furnishing of the shop drawings, working drawings and product data shall not serve to relieve the Contractor of any part of its responsibility for the safety or the successful completion of the Project construction.

7. Department’s Action: The Designer or Engineer will review each submittal, mark each with a self-explanatory action stamp, and return the stamped submittal promptly to the Contractor. The Contractor shall not proceed with the part of the Project covered by the submittal until the submittal is marked “No Exceptions Noted” or “Exceptions as Noted” by the Designer or Engineer. The Contractor shall retain sole responsibility for compliance with all Contract requirements. The stamp will be marked as follows to indicate the action taken:

- a. If submittals are marked “No Exceptions Noted,” the Designer or Engineer has not observed any statement or feature that appears to deviate from the Contract requirements. This disposition is contingent on being able to execute any manufacturer’s written warranty in

- compliance with the Contract provisions.
- b. If submittals are marked “Exceptions as Noted” the considerations or changes noted by the Department’s Action are necessary for the submittal to comply with Contract requirements. The Contractor shall review the required changes and inform the Designer or Engineer if they feel the changes violate a provision of the Contract or would lessen the warranty coverage.
 - c. If submittals are marked “Revise and Resubmit,” the Contractor shall revise the submittals to address the deficiencies or provide additional information as noted by the Designer or Engineer. The Contractor shall allow an additional review period as specified in 1.05.02-5.
 - d. If submittals are marked “Rejected,” the Contractor shall prepare and submit a new submittal in accordance with the Designer’s or Engineer’s notations. The resubmissions require an additional review and determination by the Designer or Engineer. The Contractor shall allow an additional review period as specified in 1.05.02-5.

SECTION 1.06 - CONTROL OF MATERIALS

Article 1.06.01 - Source of Supply and Quality:

Add the following:

Traffic Signal Items:

For the following traffic signal items the contractor shall submit a complete description of the item, shop drawings, product data sheets and other descriptive literature which completely illustrates such items presented for formal review. Such review shall not change the requirements for a certified test report and materials certificate as may be called for. All documents shall be grouped into one separate file for each group of items as indicated by the Roman numerals below (for example, one pdf file for all of the pedestal items). The documents for all of the traffic signal items shall be submitted at one time, unless otherwise allowed by the engineer.

- I. 1003206 – Light Standard (15' Bracket, 30' Mounting Height)
- II. 10080XX – Rigid Metal Conduit
- III. 11122XXA – Vehicle Detection - Camera Assembly, Processor and Monitor
- IV. 1113XXXA – Cable - CAT6, VC

SECTION 1.07 - LEGAL RELATIONS AND RESPONSIBILITIES

Article 1.07.13 - Contractor's Responsibility for Adjacent Property, Facilities and Services is supplemented as follows:

The following company and representative shall be contacted by the Contractor to coordinate the protection of their utilities on this project 30 days prior to the start of any work on this project involving their utilities:

Mr. Richard Russo
District 2 Electrical Supervisor
Department of Transportation
Colchester, Connecticut
(860) 537-8942/8943

SECTION 1.08 – PROSECUTION AND PROGRESS

Article 1.08.03 – Prosecution of Work – Add the following:

Project limits for this project (State Project No. 0172-0494) extend along I-395 from mile marker (MM) 9.26 - MM 18.17, NB and from MM 9.26 – MM 16.88, SB. It is anticipated that State Project No. 0103-0272, Median Guiderail Replacement along I-395, will take place during the same timeframe and within the limits of this project (between MM 9.49 - MM 14.65 [approximately 5.16 miles], both NB and SB). Under the terms of this contract, Project No. 0172-0494 will have to work around the planned and scheduled construction staging of Project No. 0103-0272. Under Project No. 0103-0272, each stage of construction can utilize up to 5,500 feet of Temporary Precast Concrete Barrier Curb (TPCBC) in both directions of travel to create a protected work zone within the median. It is anticipated that Project No. 0103-0272 will construct the new beam rail in five to six separate stages over the course of the 2020 construction season. Project No. 0103-0272 is required to complete all of the work required within each 5,500 foot stage before work can proceed to the next stage. For Project No. 0103-0272, it is anticipated that the total work zone for each stage of construction will consist of 5,500 feet (max allowed) plus 1,300 feet (minimum distance) of lead-in signs to occupy the high speed lane during each work shift, resulting in a maximum estimated nightly work zone length of 6,800 feet. For Project No. 0103-0272, there is also a one mile (5,280 feet) no work buffer zone on the trailing end of any work zone pattern that is placed on the roadway where no work will be allowed. Taking this into consideration, the estimated total effective work zone length for Project No. 0103-0272 is 6,800 feet plus a 5,280 feet trailing buffer zone, or 12,080 feet total (approximately 2.3 miles of total effective work zone). For Project No. 0103-0272, it is also anticipated that a work zone pattern may be installed in both directions of travel in order to complete the median guiderail work on a daily/nightly basis. The aforementioned work zone lengths are estimates only. Exact work zone lengths will need to be verified with the Engineer once Project No. 0103-0272 begins construction field operations.

As noted in the Notice to Contractor – Coordination with Concurrent Construction Projects within this Contract, the Contractor will be required to coordinate with Project 0103-0272. The Contractor will be required to work around the schedule and staging for Project 0103-0272 throughout the duration of construction of the project. It is anticipated that as a result of this, the Contractor for Project No. 0172-0494 will be required to mobilize its construction operations more than once. Any additional mobilizations required will be performed by the Project No. 0172-0494 Contractor, as needed to complete the work, at no additional cost to the Department. Prior to starting any work, the Contractor for Project No. 0172-0494 will contact the appropriate person(s) associated with Project No. 0103-0272 to obtain that project’s planned staging schedule for the entire 2020 construction season. The Contractor for Project 0172-0494 will coordinate, stage, and perform all work outside of any and all work zones (including required buffers between work zones) established by Project No. 0103-0272. This will include, but not be limited to, performing as many mobilizations as necessary by Project No. 0172-0494 in order to work around the planned and staged work zones required for Project No. 0103-0272. Under no circumstances will the work associated with Project No. 0172-0494 interfere with the planned work for Project No. 0103-0272.

In all cases, work zone requirements for Project No. 0103-0272 will take precedence over work zone requirements for Project No. 0172-0494.

The Contractor is required to perform the work according to the following sequence of operations:

- Reset and Replace catch basin tops, perform milling, paving and replacement of curbing
- Perform surface patching
- Remove existing pavement markings
- Install temporary hot-applied pavement markings
- Perform crack sealing
- Place Ultra-Thin Bonded PMA Install temporary hot-applied pavement markings
- Install temporary hot-applied pavement markings
- Install permanent epoxy resin pavement markings
- Placement processed aggregate for backing

Any modifications to the above sequence of operations shall be proposed to the Engineer for approval.

Article 1.08.04 – Limitation of Operations – Add the following:

In order to provide for traffic operations as outlines in the Special Provision “Maintenance and Protection of Traffic,” the Contractor will not be permitted to perform any work which will interfere with the described traffic operations on all project roadways as follows:

Interstate 395

On the following State observed Legal Holidays:

New Year's Day	Labor Day
Good Friday	Thanksgiving Day
Memorial Day	Christmas Day
Independence Day	

The following Legal Holiday restrictions also apply:

- When an above Legal Holiday is celebrated on a Sunday or Monday: From 6 AM the immediately preceding Friday to 6 AM the immediately following Tuesday.
- When an above Legal Holiday is celebrated on a Tuesday, Wednesday, or Thursday: From 6 AM the day before to 6 AM the day after, except Thanksgiving (see below for restrictions).
- When an above Legal Holiday is celebrated on a Friday or Saturday: From 6 AM the immediately preceding Thursday to 6 AM the immediately following Monday.
- Thanksgiving: From 6 AM the Wednesday before to 6:00 AM the Monday after.

During all other times

The Contractor shall maintain and protect traffic as shown on the accompanying "Limitation of Operations" charts, which dictate the maximum number of lanes allowed to be closed for each day of the week.

Ramps and Turning Roadways

Monday through Friday between 6:00 a.m. and 9:00 a.m. & between 3:00 p.m. and 6:00 p.m.

The Contractor will be allowed to close the ramps and turning roadways within the limits of the project and detour traffic to perform milling and paving operations on said ramps between 8:00 p.m. and 6:00 a.m. the following morning. The detours shall not take place during a Holiday week.

The Contractor shall notify the Engineer at least 14 days in advance of the start of each ramp closure.

All Other Roadways

Monday through Friday between 6:00 a.m. and 9:00 a.m. & between 3:00 p.m. and 6:00 p.m.
Saturday and Sunday between 10:00 a.m. and 6:00 p.m.

Additional Lane Closure Restrictions

It is anticipated that work on adjacent projects will be ongoing simultaneously with this project. The Contractor shall be aware of those projects and anticipate that coordination will be required to maintain proper traffic flow at all times on all project roadways, in a manner consistent with these specifications and acceptable to the Engineer.

The Contractor will not be allowed to perform any work that will interfere with traffic operations on a roadway when traffic operations are being restricted on that same roadway, unless there is at least a one mile clear area length where the entire roadway is open to traffic or the closures have been coordinated and are acceptable to the Engineer. The one mile clear area length shall be measured from the end of the first work area to the beginning of the signing pattern for the next work area.

**Limitation of Operations Chart
Maximum Number of Lanes Allowed to be Closed**

I-395 NB (Montville & Norwich) Number of Through Lanes: 2								I-395 SB (Montville & Norwich) Number of Through Lanes: 2							
Hour Beginning	Mon	Tue	Wed	Thu	Fri	Sat	Sun	Hour Beginning	Mon	Tue	Wed	Thu	Fri	Sat	Sun
Mid	1	1	1	1	1	1	1	Mid	1	1	1	1	1	1	1
1 AM	1	1	1	1	1	1	1	1 AM	1	1	1	1	1	1	1
2 AM	1	1	1	1	1	1	1	2 AM	1	1	1	1	1	1	1
3 AM	1	1	1	1	1	1	1	3 AM	1	1	1	1	1	1	1
4 AM	1	1	1	1	1	1	1	4 AM	1	1	1	1	1	1	1
5 AM	1	1	1	1	1	1	1	5 AM	1	1	1	1	1	1	1
6 AM	0	0	0	0	0	1	1	6 AM	0	0	0	0	0	1	1
7 AM	0	0	0	0	0	1	1	7 AM	0	0	0	0	0	1	1
8 AM	0	0	0	0	0	1	1	8 AM	0	0	0	0	0	S	1
9 AM	S	S	S	S	S	1	1	9 AM	S	S	S	S	S	S	S
10 AM	S	S	S	S	S	S	1	10 AM	S	S	S	S	S	S	S
11 AM	S	S	S	S	S	S	S	11 AM	S	S	S	S	S	S	S
Noon	S	S	S	S	S	S	S	Noon	S	S	S	S	S	S	S
1 PM	S	S	S	S	S	S	S	1 PM	S	S	S	S	S	S	S
2 PM	S	S	S	S	S	S	S	2 PM	S	S	S	S	S	S	S
3 PM	0	0	0	0	0	S	S	3 PM	0	0	0	0	0	S	S
4 PM	0	0	0	0	0	S	S	4 PM	0	0	0	0	0	S	S
5 PM	0	0	0	0	0	S	S	5 PM	0	0	0	0	0	S	S
6 PM	S	S	S	S	S	S	S	6 PM	1	S	S	S	S	S	1
7 PM	1	1	1	1	1	S	S	7 PM	1	1	1	S	S	1	1
8 PM	1	1	1	1	1	S	1	8 PM	1	1	1	1	1	1	1
9 PM	1	1	1	1	1	S	1	9 PM	1	1	1	1	1	1	1
10 PM	1	1	1	1	1	S	1	10 PM	1	1	1	1	1	1	1
11 PM	1	1	1	1	1	1	1	11 PM	1	1	1	1	1	1	1

On Holidays and within Holiday Periods, all Hours shall be '0.'

“0” = No lanes are allowed to be closed = all available travel lanes, including exit only lanes, climbing lanes, gore areas, and all available shoulder widths shall be open to traffic during this time period.

“S” = Shoulders are allowed to be closed = all available travel lanes, including exit only lanes, climbing lanes, and gore areas shall be open to traffic during this time period.

“1” = One lane closure is allowed. Adjacent shoulder(s) and/or gore areas can also be closed as necessary.

SECTION 1.10 - ENVIRONMENTAL COMPLIANCE

In Article 1.10.03--Water Pollution Control: REQUIRED BEST MANAGEMENT PRACTICES

Add the following after Required Best Management Practices Number 13:

14. The Contractor is hereby notified that the locations of the Project occurs within a public watershed, well head protection area, aquifer protection area (APA), or sole source aquifer (SSA). The Contractor is hereby notified that the locations under Project No. 172-494 occurs within one of these sensitive areas. The protected areas encompass the area of contribution and recharge for the protected resource, as depicted on the graphical map. Please note that the Office of Environmental Planning will provide the graphical map to the District after the Project has been awarded as this information is considered proprietary. As a result of these locations, special requirements must be followed for cleaning machinery, storage of materials, and servicing/fueling equipment.

- a. For I-395 in Norwich, all Contractors and their employees must be informed of the sensitive area that they are working in. No pollutants may be discharged that could have adverse effects on the public drinking water supply. Any fuel or other hazardous chemical spills must be reported immediately to the Norwich Public Utilities at 860-823-4173, **no exceptions.**

For all locations, any fuel or other hazardous chemical spills must be reported immediately to the DEEP Oil and Chemical Spills Unit at (860) 424-3338 and the Department of Public Health's Drinking Water Division at 860-509-7333, **no exceptions.**

- b. Contractors must adhere to specialized cleanup procedures while working within the watershed, well head protection area, APA or SSA. No cleaning of any machinery shall be performed within one hundred (100) feet of any water body within the sensitive area.
 - i. Specifically for cleanup associated with pavers, material transfer vehicles (MTV) and concrete mixers, the Contractor must move the equipment off line onto a tarp. The tarp must be in an acceptable condition so as to prevent liquids and solids from passing through to the ground beneath, when the area is used for paving operations. The cleanup area shall have oil absorbent pads placed on the tarp. The equipment shall be cleaned over the absorbent pads in a manner that will allow the pads to collect any liquids that are used for cleanup.
 - ii. Specifically for cleanup associated with dump trucks, a liquid tight five gallon pail shall be placed at each corner of the dump body below the lower hinges to capture any materials generated during the cleanup.

- c. All materials generated during the cleanup procedures shall be removed off-Site at the end of each day and disposed of in a manner consistent with all applicable laws and regulations. These materials shall not be buried outside of the roadway limits.
- d. Servicing and fueling of equipment shall be conducted outside of a public watershed area, APA, SSA, and/or well head protection area.
 - i. If equipment cannot be serviced and refueled outside of the watershed area, well head protection area, APA, or SSA then the Contractor shall utilize the proper spoils handling areas that are identified on the plans.
 - ii. Servicing and fueling of equipment is not permitted within a 500 foot radius of a non-community well and within a 1000 foot radius of a community well.
 - iii. Any fuel and/or hazardous materials that must be kept within these sensitive areas during working hours shall be stored in an enclosed spill proof container.
 - iv. Spill containment systems must be utilized during fueling operations, and shall be manufactured by Sentry Lite Berms, Collapse-a-tainer, or approved equal. It shall have a minimum capacity of 80-gallons and shall be made of plastic or vinyl which is inert to all fuel types.
 - v. Fuel spill remediation kits shall be stored on-site so that spills may be contained and cleaned quickly.
- e. Construction staging and laydown areas are prohibited within a watershed area, APA, SSA, and/or well head protection area. The Contractor shall submit to the Engineer the desired location of trailer(s), construction staging/laydown areas, containment systems, and sedimentation control systems for review and approval prior to the start of construction.
- f. Millings may be re-used as asphalt material. Disposal of excess millings must be performed off-site in a manner consistent with all applicable laws and regulations. At no time can millings be dumped or buried outside of the roadway limits.

SECTION 2.86 - DRAINAGE TRENCH EXCAVATION, ROCK IN DRAINAGE TRENCH EXCAVATION

2.86.01—Description

2.86.03—Construction Methods

2.86.04—Method of Measurement

2.86.05—Basis of Payment

2.86.01—Description: Drainage trench excavation consists of the excavation necessary for the proper installation of drainage structures, pipes, pipe ends and any other incidental drainage items.

It shall include earth and rock excavation, removal of existing pipes, dewatering, backfill, and disposal of materials; to the trench limits described herein, to the dimensions shown on the plans, or as directed by the Engineer.

Classifications:

- (1) **Drainage Trench Excavation** will include only the excavation necessary for the construction of the drainage items and the removals specified above.
- (2) **Rock in Drainage Trench Excavation**, insofar as it applies to drainage trench excavation, shall be defined as **1/2 cubic yard or more** in volume of the following obstructions removed from the limits of the drainage trench:
 - (a) rock in definite ledge formation
 - (b) boulders, or portions of boulders
 - (c) cement masonry structures
 - (d) concrete or reinforced concrete structures
 - (e) reinforced concrete pipe
 - (f) subsurface concrete pavement or concrete base

The removal shall be as indicated or directed from within the limits defined in 2.86.03 for drainage trench excavation.

2.86.03—Construction Methods:

(1) Drainage Trench Excavation Limits:

Horizontal Limits: Trench widths for pipes, pipe ends, pipe-arches, and drainage structures shall be as follows:

- (a) 2 feet greater than the nominal inside diameter of circular pipe or nominal inside span of elliptical pipe or pipe-arch for such diameters or spans of less than 30 inches
- (b) 3 feet greater than the nominal inside diameter of circular pipe or the nominal inside span of elliptical pipe or pipe-arch for such diameters or spans that are 30 inches or greater
- (c) 4 feet greater than the nominal inside diameter or nominal horizontal inside span for pipe-arches fabricated from structural plates
- (d) 2 feet beyond the neat lines of all exterior or foundation walls of drainage structures

Vertical Limits: Trench depths shall extend vertically as follows:

- (a) From the bottom of the trench to the bottom of the roadway excavation, or in areas away from roadway excavation, to the top of existing ground surface.

(b) Where drainage pipe is to be laid in a fill area, the embankment shall be placed and compacted to a minimum elevation 12 inches above the top of the proposed pipe, whereupon the drainage trench excavation shall be performed and the pipe installed.

- (2) **Drainage Trench Excavation:** Drainage trench excavation shall be made in conformity with the requirements of the plans, or as directed by the Engineer. The Contractor shall furnish and employ such shores, braces, pumps, or ancillary equipment as needed for the proper protection of property, proper completion of the work, as well as safety of the public and employees of both the Contractor and the Department. All bracing and shoring shall be removed when no longer required for the construction or safety of the work. When required, the Contractor shall provide or have on the Site at all times any OSHA certification for equipment to be used, per 1.07.07. For support of trenches greater than 10 feet in depth, working drawings shall be submitted, in accordance with 1.05.02. The Contractor shall control erosion and sedimentation at trench locations and ensure that pumped water from the drainage excavation is discharged in accordance with the requirements of 1.10.

Where a firm foundation is not encountered at the grades established due to unsuitable material, such as soft, spongy, or unstable soil, the unsuitable material shall be removed and replaced with approved backfill, thoroughly compacted in lifts not to exceed 6 inches, for the full trench width. The Engineer shall be notified prior to removal of the unsuitable material in order to determine the depth of removal necessary.

After the excavation is complete, the Contractor shall notify the Engineer and no drainage structure or material shall be placed in the excavated area until the Engineer has approved the depth of excavation and the character of the foundation material.

- (3) **Rock in Drainage Trench Excavation:**

(a) Rock in Drainage Trench Excavation - Ledge: When rock in definite ledge form is encountered, the Contractor shall excavate a minimum of 12 inches below the bottom of the proposed pipe or drainage structure; and this depth shall be filled with bedding material (as specified in M.08.03-1) below the proposed pipe; or granular fill (as specified in M.02.01) below the proposed drainage structure, which shall be thoroughly compacted in lifts not to exceed 6 inches.

(b) Rock in Drainage Trench Excavation - Boulders: When boulders are encountered, the Contractor shall remove them from the trench and if backfill is required, the void shall be filled with bedding material, surplus excavated material (as specified in 2.02.03-8) or granular fill which shall be thoroughly compacted in lifts not to exceed 6 inches.

(c) Rock in Drainage Trench Excavation –Structures: When cement masonry, concrete or reinforced concrete structures are encountered within the drainage trench limits, the Contractor shall remove the structure in its entirety or as directed by the Engineer, and if backfill is required, the void shall be filled with bedding material, surplus excavated material or granular fill which shall be thoroughly compacted in lifts not to exceed 6 inches.

- (4) **Backfill:** Suitable material excavated from the drainage trench shall be used as backfill material prior to consideration of using any other source of backfill. Backfill material used shall be of a quality satisfactory to the Engineer and shall be free from large or frozen lumps, wood and other extraneous material. Rock fill or stones larger than 5 inches shall not be placed within 1 foot of the drainage structure or pipe. The grading shall be

completed to the lines shown on the plans, or as ordered, by refilling to the required elevation with approved material, placed in layers not to exceed 6 inches in depth after compaction, which shall be thoroughly compacted with equipment approved by the Engineer.

All surplus or unsuitable material shall be removed and disposed of as directed. Should additional material be required for backfilling, it may be obtained from the Project surplus excavation in accordance with 2.02.03-8 or from borrow pits, gravel pits, or elsewhere as directed by the Engineer.

2.86.04—Method of Measurement:

Drainage Trench Excavation: Drainage trench excavation will not be measured for payment.

If granular fill or borrow is required to replace unsuitable material it will be measured for payment as directed by the Engineer.

Rock in Drainage Trench Excavation: If any material meeting the definition of Rock in Drainage Trench Excavation is encountered, the Contractor shall strip it of sufficient overlying material to allow for proper measurement and shall then notify the Engineer that the rock surface is ready for measurement. If the Contractor fails to give such notice, the Engineer will presume that the measurements taken at the time the Engineer first saw the material in question will give the true quantity of excavation.

Rock in Drainage Trench Excavation will be measured according to the classification provided in 2.86.01 and within the drainage trench excavation limits provided in 2.86.03.

For the removal of underground obstructions, as classified in 2.86.01-2, the measurement shall be the actual volume of rock removed (1/2 cubic yard or more) as approved by the Engineer.

Rock in Drainage Trench Excavation will not be measured for payment in fills.

Bedding Material or other suitable fill, as specified in 2.86.03(3), used to fill voids after rock is excavated will not be measured for payment.

2.86.05—Basis of Payment:

Drainage Trench Excavation: There will be no direct payment for drainage trench excavation required for the installation of drainage pipes, pipe ends, catch basins, drop inlets, manholes, and other drainage structures, or any other incidental drainage work including materials, tools, equipment and labor necessary to complete the drainage trench excavation in conformity with the plans or as directed by the Engineer.

There will be no direct payment for backfill or disposal of surplus material necessary for the satisfactory completion of this work.

There will be no direct payment made for shoring, bracing, dewatering, or for material or equipment necessary for the satisfactory completion of the work.

Where called for on the plans to install temporary earth retaining systems for the support of existing facilities, pavement, utilities, or for other constraints, payment will be made in accordance with such items in the Contract.

If granular fill or borrow is used to replace unsuitable material, payment will be made at the respective Contract unit prices, or in the absence of such items in the Contract, as Extra Work in accordance with 1.04.05.

Rock in Drainage Trench Excavation: When rock, conforming to the description in 2.86.01 is encountered within the limits of drainage trench excavation, its removal will be classified and

paid for at the Contract unit price per cubic yard for "Rock in Drainage Trench Excavation 0' – 10' Deep," or "Rock in Drainage Trench Excavation 0' – 20' Deep," as the case may be.

Those portions of drainage trench excavation classified and paid for as "Rock in Drainage Trench Excavation" of the various depths will be the actual volumes of rock excavated within the limits for drainage trench excavation, at the applicable bottom depth price.

Where no item or items for "Rock in Drainage Trench Excavation" at the applicable depth appear in the proposal and rock is encountered in drainage trench excavation, its removal will be paid for as Extra Work in accordance with 1.04.05.

When excavation is necessary in fill, no such excavation will be paid for as "Rock in Drainage Trench Excavation."

When excavation is necessary for any purpose other than drainage-related items, no such excavation will be paid under this item.

Bedding material or any other suitable material used to fill voids vacated by excavated rock will not be paid for but shall be included in the unit price per cubic yard for "Rock in Drainage Trench Excavation."

Pay Item	Pay Unit
Rock in Drainage Trench Excavation 0' - 10' Deep	c.y.
Rock in Drainage Trench Excavation 0' - 20' Deep	c.y.

SECTION 4.06 - BITUMINOUS CONCRETE

Section 4.06 is being deleted in its entirety and replaced with the following:

4.06.01—Description

4.06.02—Materials

4.06.03—Construction Methods

- 1. Material Documentation**
- 2. Transportation of Mixture**
- 3. Paving Equipment**
- 4. Test Section**
- 5. Transitions for Roadway Surface**
- 6. Spreading and Finishing of Mixture**
- 7. Longitudinal Joint Construction Methods**
- 8. Contractor Quality Control (QC) Requirements**
- 9. Temperature and Seasonal Requirements**
- 10. Field Density**
- 11. Acceptance Sampling and Testing**
- 12. Density Dispute Resolution Process**
- 13. Corrective Work Procedure**
- 14. Protection of the Work**
- 15. Cut Bituminous Concrete Pavement**

4.06.04—Method of Measurement

4.06.05—Basis of Payment

4.06.01—Description: Work under this Section shall include the production, delivery, placement and compaction of a uniform textured, non-segregated, smooth bituminous concrete pavement to the grade and cross section shown on the plans.

The following terms as used in this specification are defined as:

Bituminous Concrete: A composite material consisting of prescribed amounts of asphalt binder and aggregates. Asphalt binder may also contain additives engineered to modify specific properties and/or behavior of the composite material. References to bituminous concrete apply to all of its forms, such as those identified as hot-mix asphalt (HMA) or polymer-modified asphalt (PMA).

Bituminous Concrete Plant (Plant): A structure where aggregates and asphalt binder are combined in a controlled fashion into a bituminous concrete mixture suitable for forming pavements and other paved surfaces.

Course: A continuous layer (a lift or multiple lifts) of the same bituminous concrete mixture placed as part of the pavement structure.

Density Lot: The total tonnage of all bituminous concrete placed in a single lift which are:

PWL density lots = When the project total estimated quantity per mixture is larger than 3,500 tons

Simple Average density lots = When the project total estimated quantity per mixture is 3,500 tons or less

Disintegration: Erosion or fragmentation of the pavement surface which can be described as

polishing, weathering-oxidizing, scaling, spalling, raveling, or formation of potholes.

Dispute Resolution: A procedure used to resolve conflicts between the Engineer and the Contractor's results that may affect payment.

Hot Mix Asphalt (HMA): A bituminous concrete mixture typically produced at 325°F.

Job Mix Formula (JMF): A recommended aggregate gradation and asphalt binder content to achieve the required mixture properties.

Lift: An application of a bituminous concrete mixture placed and compacted to a specified thickness in a single paver pass.

Percent Within Limits (PWL): The percentage of the lot falling between the Upper Specification Limit (USL) and the Lower Specification Limit (LSL).

Polymer Modified Asphalt (PMA): A bituminous concrete mixture containing a polymer-modified asphalt binder and using a qualified warm mix technology.

Production Lot: The total tonnage of a bituminous concrete mixture from a single source that may receive an adjustment.

Production Sub Lot: Portion of the production lot typically represented by a single sample.

Quality Assurance (QA): All those planned and systematic actions necessary to provide CTDOT the confidence that a Contractor will perform the work as specified in the Contract.

Quality Control (QC): The sum total of activities performed by the vendor (Producer, Manufacturer, and Contractor) to ensure that a product meets contract specification requirements.

Superpave: A bituminous concrete mix design used in mixtures designated as "S*" Where "S" indicates Superpave and * indicates the sieve related to the nominal maximum aggregate size of the mix.

Segregation: A non-uniform distribution of a bituminous concrete mixture in terms of gradation, temperature, or volumetric properties.

Warm Mix Asphalt (WMA) Technology: A qualified additive or technology that may be used to produce a bituminous concrete at reduced temperatures and/or increase workability of the mixture.

4.06.02—Materials: All materials shall meet the requirements of Section M.04.

1. Materials Supply: The bituminous concrete mixture must be from one source of supply and originate from one Plant unless authorized by the Engineer.

2. Recycled Materials: Reclaimed Asphalt Pavement (RAP), Crushed Recycled Container Glass (CRCG), Recycled Asphalt Shingles (RAS), or crumb rubber (CR) from recycled tires may be incorporated in bituminous concrete mixtures in accordance with Project Specifications.

4.06.03—Construction Methods

1. Material Documentation: All vendors producing bituminous concrete must have Plants with automated vehicle-weighting scales, storage scales, and material feeds capable of producing a delivery ticket containing the information below.

- a. State of Connecticut printed on ticket.
- b. Name of Producer, identification of Plant, and specific storage silo if used.
- c. Date and time.
- d. Mixture Designation, mix type and level. Curb mixtures for machine-placed curbing must state "curb mix only."

- e. If WMA Technology is used, “-W” must be listed following the mixture designation.
- f. Net weight of mixture loaded into the vehicle. (When RAP and/or RAS is used, the moisture content shall be excluded from mixture net weight.)
- g. Gross weight (equal to the net weight plus the tare weight or the loaded scale weight).
- h. Tare weight of vehicle (daily scale weight of the empty vehicle).
- i. Project number, purchase order number, name of Contractor (if Contractor other than Producer).
- j. Vehicle number - unique means of identification of vehicle.
- k. For Batch Plants: individual aggregate, recycled materials, and virgin asphalt max/target/min weights when silos are not used.
- l. For every mixture designation: the running daily and project total delivered and sequential load number.

The net weight of mixture loaded into the vehicle must be equal to the cumulative measured weights of its components.

The Contractor must notify the Engineer immediately if, during production, there is a malfunction of the weight recording system in the automated Plant. Manually written tickets containing all required information will be allowed for no more than 1 hour.

The State reserves the right to have an Inspector present to monitor batching and/or weighing operations.

2. Transportation of Mixture: The mixture shall be transported in vehicles that are clean of all foreign material, excessive coating or cleaning agents, and that have no gaps through which material might spill. Any material spilled during the loading or transportation process shall be quantified by re-weighing the vehicle. The Contractor shall load vehicles uniformly so that segregation is minimized. Loaded vehicles shall be tightly covered with waterproof covers acceptable to the Engineer. Mesh covers are prohibited. The cover must minimize air infiltration. Vehicles found not to be in conformance shall not be loaded

Vehicles with loads of bituminous concrete being delivered to State projects must not exceed the statutory or permitted load limits referred to as gross vehicle weight (GVW). The Contractor shall furnish a list and allowable weights of all vehicles transporting mixture. The State reserves the right to check the gross and tare weight of any vehicle. If the gross or tare weight varies from that shown on the delivery ticket by more than 0.4%, the Engineer will recalculate the net weight. The Contractor shall correct the discrepancy to the satisfaction of the Engineer.

If a vehicle delivers mixture to the Project and the delivery ticket indicates that the vehicle is overweight, the load may not be rejected but a “Measured Weight Adjustment” will be taken in accordance with Article 4.06.04.

Vehicle body coating and cleaning agents must not have a deleterious effect on the mixture. The use of solvents or fuel oil, in any concentration, is prohibited for the coating of vehicle bodies.

For each delivery, the Engineer shall be provided a clear, legible copy of the delivery ticket.

3. Paving Equipment: The Contractor shall have the necessary paving and compaction equipment at the Project Site to perform the work. All equipment shall be in good working order and any equipment that is worn, defective, or inadequate for performance of the work shall be repaired or replaced by the Contractor to the satisfaction of the Engineer. During the paving operation, the use of solvents or fuel oil, in any concentration, is strictly prohibited as a release agent or cleaner on any paving equipment (i.e., rollers, pavers, transfer devices, etc.).

Refueling or cleaning of equipment is prohibited in any location on the Project where fuel or solvents might come in contact with paved areas or areas to be paved. Solvents used in cleaning mechanical equipment or hand tools shall be stored clear of areas paved or to be paved. Before any such equipment and tools are cleaned, they shall be moved off of areas paved or to be paved.

Pavers: Each paver shall have a receiving hopper with sufficient capacity to provide for a uniform spreading operation and a distribution system that places the mix uniformly, without segregation. The paver shall be equipped with and use a vibratory screed system with heaters or burners. The screed system shall be capable of producing a finished surface of the required evenness and texture without tearing, shoving, or gouging the mixture. Pavers with extendible screed units as part of the system shall have auger extensions and tunnel extenders as necessary. Automatic screed controls for grade and slope shall be used at all times unless otherwise authorized by the Engineer. The controls shall automatically adjust the screed to compensate for irregularities in the preceding course or existing base. The controls shall maintain the proper transverse slope and be readily adjustable, and shall operate from a fixed or moving reference such as a grade wire or floating beam (minimum length 20 feet).

Rollers: All rollers shall be self-propelled and designed for compaction of bituminous concrete. Roller types shall include steel wheeled, pneumatic, or a combination thereof. Rollers that operate in a dynamic mode shall have drums that use a vibratory or oscillatory system or combination. Vibratory rollers shall be equipped with indicators for amplitude, frequency, and speed settings/readouts to measure the impacts per foot during the compaction process. Oscillatory rollers shall be equipped with frequency indicators. Rollers can operate in the dynamic mode using the oscillatory system on concrete structures such as bridges and catch basins if at the lowest frequency setting.

Pneumatic tire rollers shall be equipped with wide-tread compaction tires capable of exerting an average contact pressure from 60 to 90 psi uniformly over the surface. The Contractor shall furnish documentation to the Engineer regarding tire size, pressure and loading to confirm that the proper contact pressure is being developed and that the loading and contact pressure are uniform for all wheels.

Lighting: For paving operations which will be performed during hours of darkness the paving equipment shall be equipped with lighting fixtures as described below or with an approved equal. Lighting shall minimize glare to passing traffic. The lighting options and minimum number of fixtures are listed in Tables 4.06-1 and 4.06-2.

TABLE 4.06-1: Minimum Paver lighting

Option	Fixture Configuration	Fixture Quantity	Requirement
1	Type A	3	Mount over screed area
	Type B (narrow) or Type C (spot)	2	Aim to auger and guideline
	Type B (wide) or Type C (flood)	2	Aim 25feet behind paving machine
2	Type D Balloon	2	Mount over screed area

TABLE 4.06-2: Minimum Roller Lighting

Option	Fixture Configuration	Fixture Quantity	Requirement
1	Type B (wide)	2	Aim 50 feet in front of and behind roller
	Type B (narrow)	2	Aim 100 feet in front of and behind roller
2	Type C (flood)	2	Aim 50 feet in front of and behind roller
	Type C (spot)	2	Aim 100 feet in front of and behind roller
3	Type D Balloon	1	Mount above the roller

*All fixtures shall be mounted above the roller.

Type A: Fluorescent fixture shall be heavy duty industrial type. Each fixture shall have a minimum output of 8,000 lumens. The fixtures shall be mounted horizontally and be designed for continuous row installation.

Type B: Each floodlight fixture shall have a minimum output of 18,000 lumens.

Type C: Each fixture shall have a minimum output of 19,000 lumens.

Type D: Balloon light – each balloon light fixture shall have minimum output of 50,000 lumens and emit light equally in all directions.

Material Transfer Vehicle (MTV): A MTV shall be used when placing bituminous concrete surface course (a lift or multiple lifts) as indicated in the Contract except as noted on the plans or as directed by the Engineer. In addition, continuous paving lengths of less than 500 feet may not require the use of a MTV as determined by the Engineer.

The MTV must be a vehicle specifically designed for the purpose of delivering the bituminous concrete mixture from the delivery vehicle to the paver. The MTV must continuously remix the bituminous concrete mixture throughout the placement process.

The use of a MTV will be subject to the requirements stated in Article 1.07.05 Load Restrictions. The Engineer may limit the use of the vehicle if it is determined that the use of the MTV may damage highway components, utilities, or bridges. The Contractor shall submit to the Engineer at time of pre-construction the following information:

1. The make and model of the MTV.
2. The individual axle weights and axle spacing for each piece of paving equipment (haul vehicle, MTV and paver).
3. A working drawing showing the axle spacing in combination with all pieces of equipment that will comprise the paving echelon.

4. Test Section: The Engineer may require the Contractor to place a test section whenever the requirements of this specification or Section M.04 are not met.

The Contractor shall submit the quantity of mixture to be placed and the location of the test section for review and approval by the Engineer. The same equipment used in the construction of a passing test section shall be used throughout production.

If a test section fails to meet specifications, the Contractor shall stop production, make necessary adjustments to the job mix formula, Plant operations, or procedures for placement and compaction. The Contractor shall construct test sections, as allowed by the Engineer, until all the required specifications are met. All test sections shall also be subject to removal as set forth in Article 1.06.04.

5. Transitions for Roadway Surface: Transitions shall be formed at any point on the roadway where the pavement surface deviates, vertically, from the uniform longitudinal profile as specified on the plans. Whether formed by milling or by bituminous concrete mixture, all transition lengths shall meet the criteria below unless otherwise specified.

Permanent Transitions: Defined as any gradual change in pavement elevation that remains as a permanent part of the work.

A transition shall be constructed no closer than 75 feet from either side of a bridge expansion joint or parapet. All permanent transitions, leading and trailing ends shall meet the following length requirements:

Posted Speed Limit	Permanent Transition Length Required
> 35 mph	30 feet per inch of elevation change
35 mph or less	15 feet per inch of elevation change

In areas where it is impractical to use the above-described permanent transition lengths, the use of a shorter permanent transition length may be permitted when approved by the Engineer.

Temporary Transitions: Defined as a transition that does not remain a permanent part of the work.

All temporary transitions shall meet the following length requirements:

Posted Speed Limit	Temporary Transition Length Required
> 50 mph	Leading Transition: 15 feet per inch of vertical change (thickness) Trailing Transition: 6 feet per inch of vertical change (thickness)
40, 45 or 50 mph	Leading and Trailing: 4 feet per inch of vertical change (thickness)
35 mph or less	Leading and Trailing: 3 feet per inch of vertical change (thickness)

Note: Any temporary transition to be in place over the winter shutdown period or during extended periods of inactivity (more than 14 calendar days) shall meet the greater than 50 mph requirements shown above.

6. Spreading and Finishing of Mixture: Prior to the placement of the mixture, the underlying base course shall be brought to the plan grade and cross section within the allowable tolerance.

Immediately before placing a bituminous concrete lift, a uniform coating of tack coat shall be applied to all existing underlying pavement surfaces and on the exposed surface of a wedge joint. Such surfaces shall be clean and dry. Sweeping or other means acceptable to the Engineer shall be used.

The mixture shall not be placed whenever the surface is wet or frozen.

Tack Coat Application: The tack coat shall be applied by a pressurized spray system that results in uniform overlapping coverage at an application rate of 0.03 to 0.05 gal./s.y. for a non-milled surface and an application rate of 0.05 to 0.07 gal./s.y. for a milled surface. For areas

where both milled and un-milled surfaces occur, the tack coat shall be an application rate of 0.03 to 0.05 gal /s.y. The Engineer must approve the equipment and the method of measurement prior to use. The material for tack coat shall be heated to 160°F ± 10°F and shall not be further diluted.

Tack coat shall be allowed sufficient time to break prior to any paving equipment or haul vehicles driving on it.

The Contractor may request to omit the tack coat application between bituminous concrete layers that have not been exposed to traffic and are placed during the same work shift. Requests to omit tack coat application on the upper and lower surfaces of a wedge joint will not be considered.

Placement: The mixture shall be placed and compacted to provide a smooth, dense surface with a uniform texture and no segregation at the specified thickness and dimensions indicated in the plans and specifications.

When unforeseen weather conditions prevent further placement of the mixture, the Engineer is not obligated to accept or place the bituminous concrete mixture that is in transit from the Plant.

In advance of paving, traffic control requirements shall be set up, maintained throughout placement, and shall not be removed until all associated work including density testing is completed.

The mixture temperature will be verified by means of a probe or infrared type of thermometer. The placement temperature range shall be listed in the quality control plan (QCP) for placement and meet the requirements of Table M.04.03-4. Any HMA material that falls outside the specified temperature range as measured by a probe thermometer may be rejected.

The Contractor shall inspect the newly placed pavement for defects in mixture or placement before rolling is started. Any deviation from standard crown or section shall be immediately remedied by placing additional mixture or removing surplus mixture. Such defects shall be corrected to the satisfaction of the Engineer.

Where it is impracticable due to physical limitations to operate the paving equipment, the Engineer may permit the use of other methods or equipment. Where hand spreading is permitted, the mixture shall be placed by means of suitable shovels and other tools, and in a uniformly loose layer at a thickness that will result in a completed pavement meeting the designed grade and elevation.

Placement Tolerances: Each lift of bituminous concrete placed at a specified thickness shall meet the following requirements for thickness and area. Any pavement exceeding these limits shall be subject to an adjustment or removal. Lift tolerances will not relieve the Contractor from meeting the final designed grade. Lifts of specified non-uniform thickness, i.e. wedge or shim course, shall not be subject to thickness and area adjustments.

- a) Thickness: Where the average thickness of the lift exceeds that shown on the plans beyond the tolerances shown in Table 4.06-3, the Engineer will calculate the thickness adjustment in accordance with Article 4.06.04.

TABLE 4.06-3: Thickness Tolerances

Mixture Designation	Lift Tolerance
S1	+/- 3/8 inch
S0.25, S0.375, S0.5	+/- 1/4 inch

Where the thickness of the lift of mixture is less than that shown on the plans beyond the

tolerances shown in Table 4.06-3, the Contractor, with the approval of the Engineer, shall take corrective action in accordance with this Section.

- b) Area: Where the width of the lift exceeds that shown on the plans by more than the specified thickness, the Engineer will calculate the area adjustment in Article 4.06.04.
- c) Delivered Weight of Mixture: When the delivery ticket shows that the truck exceeds the allowable gross weight for the vehicle type, the Engineer will calculate the weight adjustment in accordance with Article 4.06.04.

Transverse Joints: All transverse joints shall be formed by saw-cutting to expose the full thickness of the lift. Tack coat shall be applied to the sawn face immediately prior to additional mixture being placed.

Compaction: The Contractor shall compact the mixture to meet the density requirements as stated in Article 4.06.04 and eliminate all roller marks without displacement, shoving cracking, or aggregate breakage.

When placing a lift with a specified thickness less than 1 1/2 inches, or a wedge course, the Contractor shall provide a minimum rolling pattern as determined by the development of a compaction curve. The procedure to be used shall be documented in the Contractor's QCP for placement and demonstrated on the first day of placement.

The use of the vibratory system on concrete structures is prohibited. When approved by the Engineer, the Contractor may operate a roller using an oscillatory system at the lowest frequency setting.

If the Engineer determines that the use of compaction equipment in the dynamic mode may damage highway components, utilities or adjacent property, the Contractor shall provide alternate compaction equipment.

Rollers operating in the dynamic mode shall be shut off when changing directions.

These allowances will not relieve the Contractor from meeting pavement compaction requirements.

Surface Requirements:

Each lift of the surface course shall not vary more than 1/4 inch from a Contractor-supplied 10 foot straightedge. For all other lifts of bituminous concrete, the tolerance shall be 3/8 inch. Such tolerance will apply to all paved areas.

Any surface that exceeds these tolerances shall be corrected by the Contractor at its own expense.

7. Longitudinal Joint Construction Methods: The Contractor shall use Method I - Notched Wedge Joint (see Figure 4.06-1) when constructing longitudinal joints where lift thicknesses are 1 1/2 inches to 3 inches. S1.0 mixtures shall be excluded from using Method I. Method II - Butt Joint (see Figure 4.06-2) shall be used for lifts less than 1 1/2 inches or greater than 3 inches. Each longitudinal joint shall maintain a consistent offset from the centerline of the roadway along its entire length. The difference in elevation between the two faces of any completed longitudinal joint shall not exceed 1/4 inch at any location.

Method I - Notched Wedge Joint:

A notched wedge joint shall be constructed as shown in Figure 4.06-1 using a device that is attached to the paver screed and is capable of independently adjusting the top and bottom vertical notches. The device shall have an integrated vibratory system. The top vertical notch must be located at the centerline or lane line in the final lift. The requirement for paving full width "curb to curb" as described in Method II may be waived if addressed in the QC plan and approved by

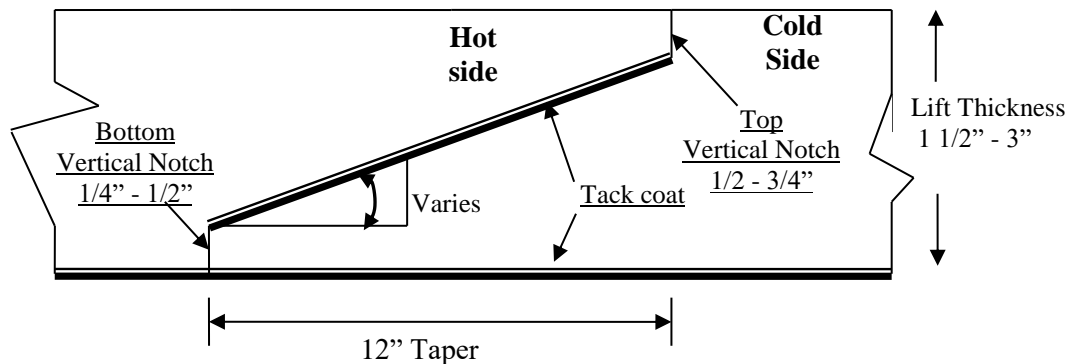
the Engineer.

The taper portion of the wedge joint shall be evenly compacted using equipment other than the paver or notch wedge joint device. The compaction device shall be the same width as the taper and not reduce the angle of the wedge or ravel the top notch of the joint during compaction.

When placed on paved surfaces, the area below the sloped section of the joint shall be treated with tack coat. The top surface of the sloped section of the joint shall be treated with tack coat prior to placing the completing pass.

The taper portion of the wedge joint shall not be exposed to traffic for more than 5 calendar days.

Figure 4.06-1: Notched Wedge Joint (Not to Scale)



Any exposed wedge joint must be located to allow for the free draining of water from the road surface.

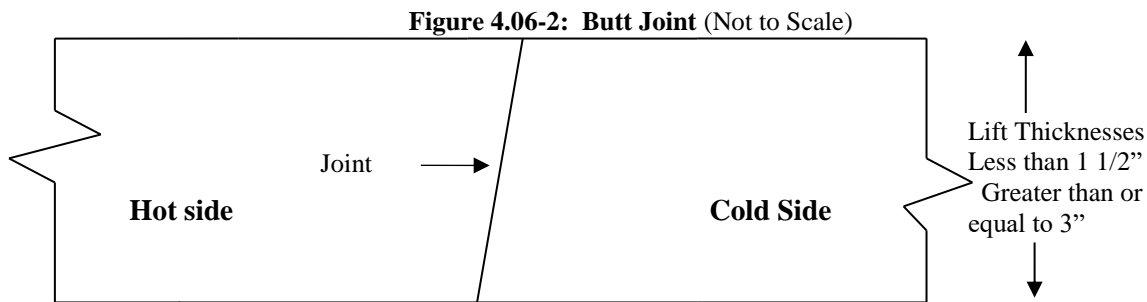
The Engineer reserves the right to define the paving limits when using a wedge joint that will be exposed to traffic.

If Method I cannot be used on those lifts which are 1 ½ inches to 3 inches, Method III may be substituted according to the requirements below for “Method III - Butt Joint with Hot Poured Rubberized Asphalt Treatment.”

Method II - Butt Joint:

When adjoining passes are placed, the Contractor shall use the end gate to create a near vertical edge (refer to Figure 4.06-2). The completing pass (hot side) shall have sufficient mixture so that the compacted thickness is not less than the previous pass (cold side). During placement of multiple lifts, the longitudinal joint shall be constructed in such a manner that it is located at least 6 inch from the joint in the lift immediately below. The joint in the final lift shall be at the centerline or at lane lines. The end gate on the paver should be set so there is an overlap onto the cold side of the joint.

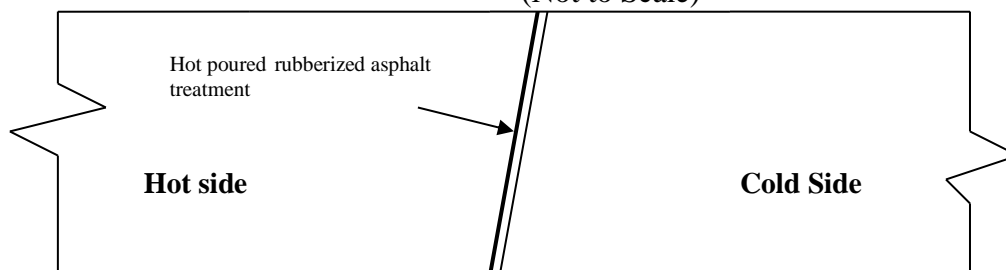
The Contractor shall not allow any butt joint to be incomplete at the end of a work shift unless otherwise allowed by the Engineer. When using this method, the Contractor is not allowed to leave a vertical edge exposed at the end of a work shift and must complete paving of the roadway full width “curb to curb.”



Method III - Butt Joint with Hot Poured Rubberized Asphalt Treatment:

If Method I cannot be used due to physical constraints in certain limited locations, the Contractor may submit a request in writing for approval by the Engineer to use Method III as a substitution in those locations. There shall be no additional measurement or payment made when Method III is substituted for Method I. When required by the Contract or approved by the Engineer, Method III (see Figure 4.06-3) shall be used.

Figure 4.06-3: Butt Joint with Hot Poured Rubberized Asphalt Treatment
(Not to Scale)



All of the requirements of Method II must be met with Method III. In addition, the longitudinal vertical edge must be treated with a rubberized joint seal material meeting the requirements of ASTM D6690, Type 2. The joint sealant shall be placed on the face of the “cold side” of the butt joint as shown above prior to placing the “hot side” of the butt joint. The joint seal material shall be applied in accordance with the manufacturer’s recommendation so as to provide a uniform coverage and avoid excess bleeding onto the newly placed pavement.

8. Contractor Quality Control (QC) Requirements: The Contractor shall be responsible for maintaining adequate quality control procedures throughout the production and placement operations. Therefore, the Contractor must ensure that the materials, mixture, and work provided by Subcontractors, Suppliers, and Producers also meet Contract specification requirements.

This effort must be documented in Quality Control Plans (QCP) and must address the actions, inspection, or sampling and testing necessary to keep the production and placement operations in control, to determine when an operation has gone out of control and to respond to correct the situation in a timely fashion.

The Standard QCP for production shall consist of the quality control program specific to the production facility.

There are 3 components to the QCP for placement: a Standard QCP, a Project Summary Sheet

that details Project-specific information, and, if applicable, a separate Extended Season Paving Plan as required in 4.06.03-9 “Temperature and Seasonal Requirements.”

The Standard QCP for both production and placement shall be submitted to the Department for approval each calendar year and at a minimum of 30 days prior to production or placement.

Production or placement shall not occur until all QCP components have been approved by the Engineer.

Each QCP shall include the name and qualifications of a Quality Control Manager (QCM). The QCM shall be responsible for the administration of the QCP, and any modifications that may become necessary.

The QCM shall have the ability to direct all Contractor personnel on the Project during paving operations.

The QCPs shall also include the name and qualifications of any outside testing laboratory performing any QC functions on behalf of the Contractor. The QC Technician performing in-place density testing shall be NETTCP certified as a paving inspector.

Approval of the QCP does not relieve the Contractor of its responsibility to comply with the Project specifications. The Contractor may modify the QCPs as work progresses and must document the changes in writing prior to resuming operations. These changes include but are not limited to changes in quality control procedures or personnel. The Department reserves the right to deny significant changes to the QCPs.

QCP for Production: Refer to M.04.03-1.

QCP for Placement: The Standard QCP, Project Summary Sheet, and Extended Season Paving Plan shall conform to the format provided by the Engineer. The format is available at http://www.ct.gov/dot/lib/dot/documents/dconstruction/pat/qcp_outline_hma_placement.pdf

The Contractor shall perform all quality control sampling and testing, provide inspection, and exercise management control to ensure that bituminous concrete placement conforms to the requirements as outlined in its QCP during all phases of the work. The Contractor shall document these activities for each day of placement.

The Contractor shall submit complete field density testing and inspection records to the Engineer within 48 hours in a manner acceptable to the Engineer.

The Contractor may obtain 1 mat core and 1 joint core per day for process control, provided this process is detailed in the QCP. The results of these process control cores shall not be used to dispute the Department’s determinations from the acceptance cores. The Contractor shall submit the location of each process control core to the Engineer for approval prior to taking the core. The core holes shall be filled to the same requirements described in Subarticle 4.06.03-10.

9. Temperature and Seasonal Requirements: Paving, including placement of temporary pavements, shall be divided into 2 seasons, “In-Season” and “Extended-Season.” In-Season paving occurs from May 1 to October 14, and Extended Season paving occurs from October 15 to April 30. The following requirements shall apply unless otherwise authorized or directed by the Engineer:

- Mixtures shall not be placed when the air or subbase temperature is less than 40°F regardless of the season.
- Should paving operations be scheduled during the Extended Season, the Contractor must submit an Extended Season Paving Plan for the Project that addresses minimum delivered mix temperature considering WMA, PMA, or other additives; maximum paver speed; enhanced rolling patterns; and the method to balance mixture delivery and placement

operations. Paving during Extended Season shall not commence until the Engineer has approved the plan.

10. Field Density The Contractor shall obtain cores for the determination of mat and longitudinal joint density of bituminous concrete pavements. Within five calendar days of placement, mat and joint cores shall be extracted on each lift with a specified thickness of 1 1/2 inches or more. Joint cores shall not be extracted on HMA S1.0 lifts.

The Contractor shall extract cores from random locations determined by the Engineer in accordance with ASTM D3665. Four (4) or six (6) inch diameter cores shall be extracted for S0.25, S0.375 and S0.5 mixtures; 6 inch diameter cores shall be required for S1.0 mixtures. The Contractor shall coordinate with the Engineer to witness the extraction, labeling of cores, and filling of the core holes.

Each lift will be separated into lots as follows:

- a. **Simple Average Density Lots:** For total estimated quantities below 2,000 tons, the lift will be evaluated in one lot which will include the total paved tonnage of the lift and all longitudinal joints between the curb lines.
For total estimated quantities between 2,000 and 3,500 tons, the lift will be evaluated in two lots in which each lot will include approximately half of the total tonnage placed for the full paving width of a lift including all longitudinal joints between the curb lines.
- b. **PWL Density Lots:** Mat density lots will include each 3,500 tons of mixture placed within 30 calendar days. Joint density lots will include 14,000 linear feet of constructed joints. Bridge density lots will always be analyzed using simple average lot methodology.
- c. **Partial Density Lot (For PWL only):** A mat density lot with less than 3,500 tons or a joint density lot with less than 14,000 linear feet due to:
 - completion of the course; or
 - a lot spanning 30 calendar days.

Prior to paving, the type and number of lot(s) will be determined by the Engineer.

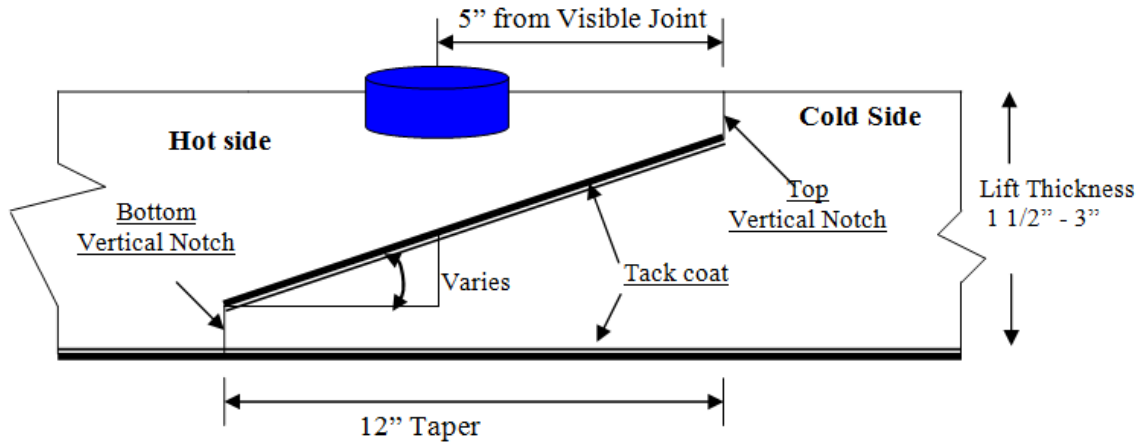
Noncontiguous areas such as highway ramps may be combined to create one lot.

After the lift has been compacted and cooled, the Contractor shall cut cores to a depth equal to or greater than the lift thickness and shall remove them without damaging the lift(s) to be tested. Any core that is damaged or obviously defective while being obtained will be replaced with a new core from a location within 2 feet measured in a longitudinal direction.

A mat core shall not be located any closer than 1 foot from the edge of a paver pass. If a random number locates a core less than 1 foot from any edge, the location will be adjusted by the Engineer so that the outer edge of the core is 1 foot from the edge of the paver pass.

Method I, Notched Wedge Joint cores shall be taken so that the center of the core is 5 inches from the visible joint on the hot mat side (Figure 4.06-4).

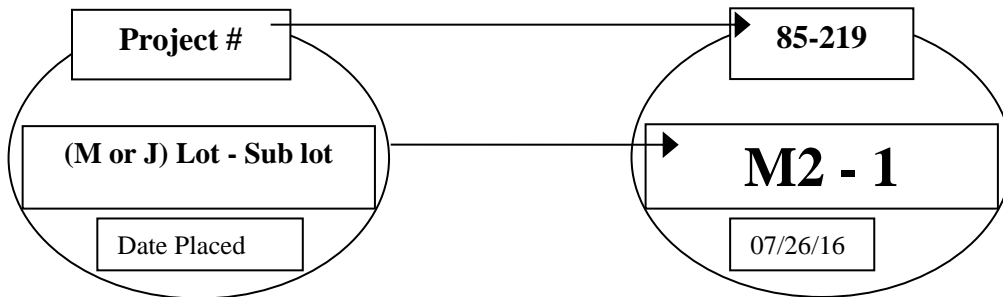
Figure 4.06-4: Notched Wedge Joint Cores (Not to Scale)



When Method II or Method III Butt Joint is used, cores shall be taken from the hot side so the edge of the core is within 1 inch of the longitudinal joint.

The cores shall be labeled by the Contractor with the Project number, date placed, lot number, and sub-lot number. The core’s label shall include “M” for a mat core and “J” for a joint core. For example, a mat core from the first lot and the first sub-lot shall be labeled with “M1 – 1.” A mat core from the second lot and first sub-lot shall be labeled “M2-1” (see Figure 4.06-5). The Engineer shall fill out a MAT-109 to accompany the cores. The Contractor shall deliver the cores and MAT-109 to the Department’s Central Lab. The Contractor shall use a container approved by the Engineer. The container shall have a lid capable of being locked shut and tamper proof. The Contractor shall use foam, bubble wrap, or another suitable material to prevent the cores from being damaged during handling and transportation. Once the cores and MAT-109 are in the container the Engineer will secure the lid using security seals at the removable hinges(s) and at the lid opening(s). The security seals’ identification number must be documented on the MAT-109. All sealed containers shall be delivered to the Department’s Central Lab within two working days from time of extraction. Central Lab personnel will break the security seal and take possession of the cores.

Figure 4.06-5: Labeling of Cores



Each core hole shall be filled within 4 hours upon core extraction. Prior to being filled, the hole shall be prepared by removing any free water and applying tack coat using a brush or other

means to uniformly cover the cut surface. The core hole shall be filled using a bituminous concrete mixture at a minimum temperature of 240°F containing the same or smaller nominal maximum aggregate size and compacted with a hand compactor or other mechanical means to the maximum compaction possible. The bituminous concrete shall be compacted to 1/8 inch above the finished pavement.

Simple Average Density Lots:

A standard simple average density lot is the quantity of material placed within the defined area excluding any bridge decks.

A combo simple average density lot is the quantity of material placed within the defined area including bridge decks less than or equal to 500 feet long.

A bridge simple average density lot is the quantity of material placed on a bridge deck longer than 500 feet.

The number of cores per lot shall be determined in accordance with Table 4.06-4. If a randomly selected mat or joint core location is on a bridge deck, the core is to be obtained on the bridge deck in addition to the core(s) required on the bridge deck.

The number of cores per lot shall be determined in accordance with Table 4.06-5. Multiple bridge decks can be combined into one lot if the paving and underlying conditions are comparable. If multiple bridge decks are combined into a single bridge lot, at least one mat and joint core shall be obtained on each bridge.

The longitudinal locations of mat cores within a standard, combo, or bridge lot containing multiple paving passes will be determined using the combined length of the paving passes within the lot.

TABLE 4.06-4: Number of Cores per Lot (Simple Average)

Lot Type	No. of Mat Cores		No. of Joint Cores	
Standard Lot < 500 Tons	3		3	
Standard Lot ≥ 500 Tons	4		4	
Combo Lot < 500 Tons	2 plus	1 per bridge (≤ 300')	2 plus	1 per bridge (≤ 300')
Combo Lot ≥ 500 Tons ⁽¹⁾	4 plus	2 per bridge (301' – 500')	4 plus	2 per bridge (301' – 500')

TABLE 4.06-5: Number of Core per Bridge Density Lot (Simple Average)

Length of Bridge(s) (Feet)	Minimum No. of Mat Cores	Minimum No. of Joint Cores
< 500	2	2
501 – 1,500	3	3
1,501 – 2,500	4	4
2,501 and greater	5	5

PWL Density Lots:

A PWL mat density lot is 3,500 tons of material placed within the defined area excluding any bridges. One mat core will be obtained per every 500 tons placed.

A PWL joint density lot is 14,000 linear feet of longitudinal joint excluding any joints on bridge decks. One joint core will be obtained per every 2,000 linear feet of joint.

Bridge density lots will always be analyzed as using the simple average lot methodology. The number of cores per lot shall be determined in accordance with Table 4.06-5. Multiple bridge decks can be combined into one lot if the paving and underlying conditions are comparable. If multiple bridge decks are combined into a single bridge lot, at least one mat and joint core shall be obtained on each bridge.

11. Acceptance Sampling and Testing: Sampling shall be performed in accordance with ASTM D3665 or a statistically-based procedure of stratified random sampling approved by the Engineer.

Plant Material Acceptance: The Contractor shall provide the required sampling and testing during all phases of the work in accordance with M.04. The Department will verify the Contractor's acceptance test results. Should any test results exceed the specified tolerances in the Department's current QA Program for Materials, the Contractor's test results for a subject lot or sub lot may be replaced with the Department's results for the purpose of calculating adjustments. The verification procedure is included in the Department's current QA Program for Materials.

Density Acceptance: The Engineer will perform all acceptance testing in accordance with AASHTO T 331. The density of each core will be determined using the daily production's average maximum theoretical specific gravity (Gmm) established during the testing of the parent material at the Plant. When there was no testing of the parent material or any Gmm exceeds the specified tolerances in the Department's current QA Program for Materials, the Engineer will determine the maximum theoretical density value to be used for density calculations.

12. Density Dispute Resolution Process: The Contractor and Engineer will work in partnership to avoid potential conflicts and to resolve any differences that may arise during quality control or acceptance testing for density. Both parties will review their sampling and testing procedures and results and share their findings. If the Contractor disputes the Engineer's test results, the Contractor must submit in writing a request to initiate the Dispute Resolution Process within five calendar days of the notification of the test results. No request for dispute resolution will be allowed unless the Contractor provides quality control results from samples taken prior to and after finish rolling, and within the timeframe described in 4.06.03-8 supporting its position. No request for dispute resolution will be allowed for a density lot in which any core was not taken within the required 5 calendar days of placement. Should the dispute not be resolved through evaluation of existing testing data or procedures, the Engineer may authorize the Contractor to obtain a new core or set of core samples per disputed lot. The core samples must be extracted no later than seven calendar days from the date of the Engineer's authorization. All such core samples shall be extracted and the core hole filled using the procedure outlined in 4.06.03-10.

a) **Simple Average Lots:** The Contractor may only dispute any simple average lot that is adjusted at or below 95 percent payment. The number and location (mat, joint, or structure) of the cores taken for dispute resolution must reflect the number and location of the original cores. The location of each core shall be randomly located within the respective original sub lot. The dispute resolution results shall be combined with the original results and averaged for determining the final in-place density value.

b) **PWL Lots:** The Contractor may dispute any PWL subplot when the PWL falls below 50%

calculated in accordance with section 4.06.04.2.b. An additional random core in the subplot may be taken to validate the accuracy of the core in question. The Department will verify the additional core test result and may average the original test result with the additional core result for purpose of calculating adjustments.

13. Corrective Work Procedure:

If pavement placed by the Contractor does not meet the specifications, and the Engineer requires its replacement or correction, the Contractor shall:

- a) Propose a corrective procedure to the Engineer for review and approval prior to any corrective work commencing. The proposal shall include:
 - Limits of pavement to be replaced or corrected, indicating stationing or other landmarks that are readily distinguishable.
 - Proposed work schedule.
 - Construction method and sequence of operations.
 - Methods of maintenance and protection of traffic.
 - Material sources.
 - Names and telephone numbers of supervising personnel.
- b) Any corrective courses placed as the final wearing surface shall match the specified lift thickness after completion.

14. Protection of the Work: The Contractor shall protect all sections of the newly finished pavement from damage that may occur as a result of the Contractor's operations for the duration of the Project.

15. Cut Bituminous Concrete Pavement: Work under this item shall consist of making a straight-line cut in the bituminous concrete pavement to the lines delineated on the plans or as directed by the Engineer. The cut shall provide a straight, clean, vertical face with no cracking, tearing or breakage along the cut edge.

4.06.04—Method of Measurement:

1. HMA S* or PMA S*: Bituminous concrete will be measured for payment as the amount of material in tons placed as determined by the net weight on the delivered tickets and adjusted by area, thickness and weight as follows:

Quantity Adjustments: Adjustments may be applied to the placed bituminous concrete quantities that will be measured for payment using the following formulas:

Yield Factor for Adjustment Calculation = 0.0575 tons/SY/inch

Actual Area (SY) = [(Measured Length (ft)) x (Avg. of width measurements (ft))] ÷ 9 s.f./SY

Actual Thickness (t) = Total tons delivered / [Actual Area (SY) x 0.0575 tons/SY/inch]

- a) Area: If the average width exceeds the allowable tolerance, an adjustment will be made using the following formula. The tolerance for width is equal to the specified thickness (inch) of the lift being placed.

Quantity Adjusted for Area (T_A) = [(L x W_{adj})/9] x (t) x 0.0575 Tons/SY/inch = (-) tons

Where: L = Length (ft)

(t) = Actual thickness (inches)

W_{adj} = (Designed width (ft) + tolerance /12) - Measured Width)

- b) Thickness: If the actual average thickness is less than the allowable tolerance, the Contractor shall submit a repair procedure to the Engineer for approval. If the actual thickness exceeds the allowable tolerance, an adjustment will be made using the following formula:

$$\text{Quantity Adjusted for Thickness (T}_T) = A \times t_{\text{adj}} \times 0.0575 = (-) \text{ tons}$$

Where: A = Area = $\{[L \times (\text{Design width} + \text{tolerance (lift thickness)/12})] / 9\}$
 t_{adj} = Adjusted thickness = $[(Dt + \text{tolerance}) - \text{Actual thickness}]$
 Dt = Designed thickness (inches)

- c) Weight: If the quantity of bituminous concrete representing the mixture delivered to the Project is in excess of the allowable gross vehicle weight (GVW) for each vehicle, an adjustment will be made using the following formula:

$$\text{Quantity Adjusted for Weight (T}_w) = \text{GVW} - \text{DGW} = (-) \text{ tons}$$

Where: DGW = Delivered gross weight as shown on the delivery ticket or measured on a certified scale

2. Bituminous Concrete Adjustment Cost:

- a) Production Lot Adjustment: An adjustment may be applied to each production lot as follows:
- i. Non-PWL Production Lot (less than 3,500 tons):
 The adjustment values in Tables 4.06-6 and 4.06-7 will be calculated for each sub lot based on the Air Void (AV) and Asphalt Binder Content (PB) test results for that sub lot. The total adjustment for each day's production (lot) will be computed as follows:

$$\text{Tons Adjusted for Superpave Design (T}_{\text{SD}}) = [(\text{AdjAV}_t + \text{AdjPB}_t) / 100] \times \text{Tons}$$

Where: AdjAV_t: Percent adjustment for air voids
 AdjPB_t: Percent adjustment for asphalt binder
 Tons: Weight of material (tons) in the lot adjusted by 4.06.4-1

$$\text{Percent Adjustment for Air Voids} = \text{AdjAV}_t = [\text{AdjAV}_1 + \text{AdjAV}_2 + \text{AdjAV}_i + \dots + \text{AdjAV}_n] / n$$

Where: AdjAV_t = Total percent air void adjustment value for the lot
 AdjAV_i = Adjustment value from Table 4.06-6 resulting from each sub lot or the average of the adjustment values resulting from multiple tests within a sub lot, as approved by the Engineer.
 n = number of sub lots based on Table M.04.03-2

TABLE 4.06-6: Adjustment Values for Air Voids

Adjustment Value (AdjAV _i) (%)	S0.25, S0.375, S0.5, S1 Air Voids (AV)
+2.5	3.8 - 4.2
+3.125*(AV-3)	3.0 - 3.7
-3.125*(AV-5)	4.3 - 5.0
20*(AV-3)	2.3 - 2.9
-20*(AV-5)	5.1 - 5.7
-20.0	≤ 2.2 or ≥ 5.8

Percent Adjustment for Asphalt Binder = AdjPB_t = [(AdjPB₁ + AdjPB₂ + AdjPB_i + ... + AdjPB_n)] / n

Where: AdjPB_t = Total percent liquid binder adjustment value for the lot
 AdjPB_i = Adjustment value from Table 4.06-7 resulting from each sub lot
 n = number of binder tests in a production lot

TABLE 4.06-7: Adjustment Values for Binder Content

Adjustment Value (AdjAV _i) (%)	<u>S0.25, S0.375, S0.5, S1</u> Pb
0.0	JMF Pb ± 0.3
- 10.0	≤ JMF Pb - 0.4 or ≥ JMF Pb + 0.4

ii. PWL Production Lot (3500 tons or more):

For each lot, the adjustment values will be calculated using PWL methodology based on AV, VMA, and PB test results. The results will be considered as being normally distributed and all applicable equations in AASHTO R 9 and AASHTO R 42 Appendix X4 will apply.

Only one test result will be considered for each sub lot. The specification limits are listed in M.04.

For AV, PB, and voids in mineral aggregate (VMA), the individual material quantity characteristic adjustment (Adj) will be calculated as follows:

For PWL between 50 and 90%: Adj(AV_t or PB_t or VMA_t) = (55 + 0.5 PWL) - 100

For PWL at and above 90%: Adj(AV_t or PB_t or VMA_t) = (77.5 + 0.25 PWL) - 100

Where: AdjAV_t = Total percent AV adjustment value for the lot

AdjPB_t = Total percent PB adjustment value for the lot

AdjVMA_t = Total percent VMA adjustment value for the lot

A lot with PWL less than 50% in any of the 3 individual material quality characteristics will be evaluated under 1.06.04.

The total adjustment for each production lot will be computed using the following formula:

Tons Adjusted for Superpave Design (T_{SD}) = [(0.5AdjAV_t + 0.25AdjPB_t + 0.25 AdjVMA_t) / 100] X Tons

Where Tons: Weight of material (tons) in the lot adjusted by 4.06.4-1

iii. Partial Lots:

Lots with less than 4 sub lots will be combined with the prior lot. If there is no prior lot with equivalent material or if the last test result of the prior lot is over 30 calendar days old, the adjustment will be calculated as indicated in 4.06.04-2.a)i.

Lots with 4 or more sub lots will be calculated as indicated in 4.06.04-2.a)ii.

Production Lot Adjustment: $T_{SD} \times \text{Unit Price} = \text{Est. (Pi)}$

Where: Unit Price = Contract unit price per ton per type of mixture

Est. (Pi)= Pay Unit in dollars representing incentive or disincentive per lot

b) Density Lot Adjustment: An adjustment may be applied to each density lot as follows:

i. Simple Average Density Lot (less than 3500 tons) and Bridge Lots:

The final lot quantity shall be the difference between the total payable tons for the Project and the sum of the previous lots. If either the Mat or Joint adjustment value is “remove and replace,” the density lot shall be removed and replaced (curb to curb).

No positive adjustment will be applied to a density lot in which any core was not taken within the required 5 calendar days of placement.

Tons Adjusted for Density (T_D) = $[(P_{AM} \times 0.50) + (P_{AJ} \times 0.50)] / 100 \times \text{Tons}$

Where: T_D = Total tons adjusted for density for each lot

P_{AM} = Mat density percent adjustment from Table 4.06-8

P_{AJ} = Joint density percent adjustment from Table 4.06-9

Tons: Weight of material (tons) in the lot adjusted by 4.06.4-1

TABLE 4.06-8: Adjustment Values for Pavement Mat density

Average Core Result Percent Mat Density	Percent Adjustment (Bridge and Non-Bridge) ⁽¹⁾⁽²⁾
97.1 - 100	-1.667*(ACRPD-98.5)
94.5 – 97.0	+2.5
93.5 – 94.4	+2.5*(ACRPD-93.5)
92.0 – 93.4	0
90.0 – 91.9	-5*(92-ACRPD)
88.0 – 89.9	-10*(91-ACRPD)
87.0 – 87.9	-30
86.9 or less	Remove and Replace (curb to curb)

Notes:

⁽¹⁾ ACRPD = Average Core Result Percent Density

⁽²⁾ All Percent Adjustments to be rounded to the second decimal place; for example round 1.667 to 1.67.

TABLE 4.06-9: Adjustment Values for Pavement Joint Density

Average Core Result	Percent Adjustment (Bridge and Non-Bridge) ⁽¹⁾⁽²⁾
Percent Joint Density	
97.1 – 100	-1.667*(ACRPD-98.5)
93.5 – 97.0	+2.5
92.0 – 93.4	+1.667*(ACRPD-92)
91.0 – 91.9	0
89.0 – 90.9	-7.5*(91-ACRPD)
88.0 – 88.9	-15*(90-ACRPD)
87.0 – 87.9	-30
86.9 or less	Remove and Replace (curb to curb)

Notes:

⁽¹⁾ ACRPD = Average Core Result Percent Density

⁽²⁾ All Percent Adjustments to be rounded to the second decimal place; for example round 1.667 to 1.67

Additionally, any subplot with a density result below 87% will be evaluated under 1.06.04.

ii. PWL Density Lot (3,500 tons or more):

For each lot, the adjustment values will be calculated using PWL methodology based on mat and joint density test results. Only one result will be included for each subplot. The results will be considered as being normally distributed and all applicable equations in AASHTO R 9 and AASHTO R 42 Appendix X4 will apply.

The specification limits for the PWL determination are as follows:

Mat Density: 91.5-98%

Joint Density: 90-98%

For mat and joint density, the individual percent adjustment (PA) will be calculated as follows:

For PWL between 50 and 90%: $PA_{(M \text{ or } J)} = 0.25 * PWL - 22.50$

For PWL at and above 90%: $PA_{(M \text{ or } J)} = 0.125 * PWL - 11.25$

Where: PA_M = Total percent mat density adjustment value for the PWL mat density lot

PA_J = Total percent joint density adjustment value for the PWL joint density lot

No positive adjustment will be applied to a density lot in which any core was not taken within the required 5 calendar days of placement.

A lot with PWL less than 50% will be evaluated under 1.06.04.

The total adjustment for each PWL mat density lot will be computed as follows:

Tons Adjusted for Mat Density (T_{MD}) = $(PA_M / 100) \times \text{Tons}$

Where: Tons= Weight of material (tons) in the lot adjusted by 4.06.4-1.

The total adjustment for each PWL joint density lot will be computed as follows:

Tons Adjusted for Joint Density (T_{JD}) = $(PA_J / 100) \times J_Tons$

Tons Adjusted for Joint Density will be calculated at the end of each project or project phase.

Where: $J_Tons = Tons\ in\ project\ or\ phase\ adjusted\ by\ 4.06.4 - 1 \times \frac{Lot\ joint\ length}{Joint\ length\ in\ project\ or\ phase}$

All bridge density lot adjustments will be evaluated in accordance with 4.06.04-2.b)i.

Additionally, any subplot with a density result below 87% will be evaluated under 1.06.04.

iii. Partial Lots:

Lots with less than 4 sub lots will be combined with the prior lot. If there is no prior lot with equivalent material and placement conditions or if the last test result of the prior lot is over 30 calendar days old, the mat and joint individual adjustments will be calculated in accordance to Tables 4.06-8 and 4.06-9. T_{MD} and T_{JD} will be calculated as indicated in 4.06.04-2.b)i.

Lots with 4 or more sub lots will be calculated as indicated in 4.06.04-2.b)ii.

Density Lot Adjustment (Simple Average Lots): $T_D \times Unit\ Price = Est.\ (Di)$

Density Lot Adjustment (PWL Lots): $(T_{MD}\ or\ T_{JD}) \times Unit\ Price = Est.\ (DMi\ or\ DJi)$

Where: Unit Price = Contract unit price per ton per type of mixture

Est. (Di)= Pay Unit in dollars representing incentive or disincentive per simple average density lot

Est. (DMi)= Pay Unit in dollars representing incentive or disincentive per PWL mat lot

Est. (DJi)= Pay Unit in dollars representing incentive or disincentive per PWL joint lot

Additionally, any subplot with a density result below 87% will be evaluated under 1.06.04.

3. Transitions for Roadway Surface: The installation of permanent transitions will be measured under the appropriate item used in the formation of the transition.

The quantity of material used for the installation of temporary transitions will be measured for payment under the appropriate item used in the formation of the transition. The installation and removal of a bond breaker and the removal and disposal of any temporary transition formed by milling or with bituminous concrete pavement is not measured for payment.

4. Cut Bituminous Concrete Pavement: The quantity of bituminous concrete pavement cut will be measured in accordance with 2.02.04.

5. Material for Tack Coat: The quantity of tack coat will be measured for payment by the number of gallons furnished and applied on the Project and approved by the Engineer. No tack coat material shall be included that is placed in excess of the tolerance described in 4.06.03.

- a. Container Method – Material furnished in a container will be measured to the nearest 1/2 gallon. The volume will be determined by either measuring the volume in the original container by a method approved by the Engineer or using a separate graduated container

capable of measuring the volume to the nearest 1/2 gallon. The container in which the material is furnished must include the description of material, including lot number or batch number and manufacturer or product source.

b. Vehicle Method

- i. Measured by Weight: The number of gallons furnished will be determined by weighing the material on calibrated scales furnished by the Contractor. To convert weight to gallons, one of the following formulas will be used:

Tack Coat (gallons at 60°F) = Measured Weight (pounds) / Weight per gallon at 60°F

Tack Coat (gallons at 60°F) = 0.996 x Measured Weight (pounds) / Weight per gallon at 77°F

- ii. Measured by automated metering system on the delivery vehicle:

Tack Coat (gallons at 60°F) = 0.976 x Measured Volume (gallons).

6. Material Transfer Vehicle (MTV): The furnishing and use of a MTV will be measured separately for payment based on the actual number of surface course tons delivered to a paver using the MTV.

4.06.05—Basis of Payment:

1. HMA S* or PMA S*: The furnishing and placing of bituminous concrete will be paid for at the Contract unit price per ton for " HMA S*" or " PMA S*."

All costs associated with providing illumination of the work area are included in the general cost of the work.

All costs associated with cleaning the surface to be paved, including mechanical sweeping, are included in the general cost of the work. All costs associated with constructing longitudinal joints are included in the general cost of the work.

All costs associated with obtaining cores for acceptance testing and dispute resolution are included in the general cost of the work.

2. Bituminous Concrete Adjustment Costs: This adjustment will be calculated using the formulas shown below if all of the measured adjustments in 4.06.04-2 are not equal to zero. A positive or negative adjustment will be applied to monies due the Contractor.

Production Lot: $\Sigma \text{ Est (Pi)} = \text{Est. (P)}$

Density Lot (Simple Average Lots): $\Sigma \text{ Est (Di)} = \text{Est. (D)}$

Density Lot (PWL): $\Sigma \text{ Est (DMi)} + \Sigma \text{ (DJi)} = \text{Est. (D)}$

Bituminous Concrete Adjustment Cost= Est. (P) + Est. (D)

Where: Est. ()= Pay Unit in dollars representing incentive or disincentive in each production or density lot calculated in 4.06.04-2

The Bituminous Concrete Adjustment Cost item, if included in the bid proposal or estimate, is not to be altered in any manner by the Bidder. If the Bidder should alter the amount shown, the altered figure will be disregarded and the original estimated cost will be used for the Contract.

3. Transitions for Roadway Surface: The installation of permanent transitions will be paid under the appropriate item used in the formation of the transition. The quantity of material used for the installation of temporary transitions will be paid under the appropriate pay item used in the formation of the transition. The installation and removal of a bond breaker, and the removal and disposal of any temporary transition formed by milling or with bituminous concrete

pavement is included in the general cost of the work.

4. The cutting of bituminous concrete pavement will be paid in accordance with 2.02.05.
5. Material for tack coat will be paid for at the Contract unit price per gallon at 60°F for "Material for Tack Coat."
6. The Material Transfer Vehicle (MTV) will be paid at the Contract unit price per ton for "Material Transfer Vehicle."

Pay Item	Pay Unit
HMA S*	ton
PMA S*	ton
Bituminous Concrete Adjustment Cost	est.
Material for Tack Coat	gal.
Material Transfer Vehicle	ton

SECTION 5.86 - CATCH BASINS, MANHOLES AND DROP INLETS

5.86.01—Description

5.86.02—Materials

5.86.03—Construction Methods

5.86.04—Method of Measurement

5.86.05—Basis of Payment

5.86.01—Description: The work under this Section shall consist of furnishing, preparing, and installing catch basins, manholes and drop inlets (and also the removal, abandonment, alteration, reconstruction, or conversion of such existing structures) in conformity with the lines, grades, dimensions and details shown on the plans.

This Section shall also include resetting or replacing catch basin tops as well as manhole frames and covers.

5.86.02—Materials: The materials for this work shall meet the following requirements:
 Drainage structures shall meet the requirements of M.08.02 and shall utilize concrete with a 28-day minimum compressive strength of 4000 psi.
 Galvanizing shall meet the requirements of M.06.03.
 Mortar shall meet the requirements of M.11.04.
 Butyl rubber joint seal shall meet the requirements of ASTM C990.

Granular fill, if necessary, shall meet the requirements of M.02.01.
 Protective compound material shall be a type appearing on the Department's Qualified Products List and be acceptable to the Engineer, as specified in M.03.09.

5.86.03—Construction Methods: Drainage trench excavation, including rock in drainage trench excavation and backfilling, shall be performed in accordance with 2.86.03 and the requirements of the plans.

Where a drainage structure is to be installed below the surface, a drainage trench shall be excavated to the required depth, the bottom of which shall be graded to the elevation of the bottom of the proposed drainage structure or to ensure a uniform foundation for the structure.

Where a firm foundation is not encountered at the grades established due to unsuitable material, such as soft, spongy, or unstable soil, the unsuitable material shall be removed and replaced with approved granular fill, thoroughly compacted in lifts not to exceed 6 inches. The Engineer shall be notified prior to removal of the unsuitable material in order to determine the depth of removal necessary.

When rock, as defined in 2.86.01-2, is encountered, work shall be performed in accordance with 2.86.03 and the requirements of the plans.

When a drainage structure outside of proposed drainage trench limits is to be removed, it shall be completely removed and all pipes shall be removed or plugged with cement masonry.

When a drainage structure is to be abandoned, the structure shall be removed to a depth 2 feet below the subgrade or as directed by the Engineer. The floor of the structure shall be broken and all pipes shall be plugged with cement masonry.

Drainage structures shall be constructed in accordance with the plans and the requirements contained herein for the character of the work involved. The provisions of 6.02.03 pertaining to bar reinforcement shall apply except that shop drawings need not be submitted for approval unless called for in the plans, Contract or directed by the Engineer. Welding shall be performed in accordance with the applicable sections of the AWS Structural Welding Code, D1.1.

When it becomes necessary to increase the horizontal dimensions of manholes, catch basins and drop inlets to sizes greater than those shown on the plans in order to provide for multiple pipe installations, large pipes or for other reasons, the Contractor shall construct such manholes, catch basins and drop inlets to modified dimensions as directed by the Engineer.

The surfaces of the tops of all catch basins, and drop inlets shall be given a coat of protective compound material, at the manufacturer's recommended application rate, immediately upon completion of the concrete curing period.

All masonry units shall be laid in full mortar beds.

Metal fittings for catch basins, manholes or drop inlets shall be set in full mortar beds or otherwise secured as shown on the plans.

All inlet and outlet pipes shall be set flush with the inside face of the wall of the drainage structure as shown on the plans. The pipes shall extend through the walls for a sufficient distance beyond the outside surface to allow for satisfactory connections, and the concrete or masonry shall be constructed around them neatly to prevent leakage along their outer surfaces.

When constructing a new drainage structure within a run of existing pipe, the section of existing pipe disturbed by the construction shall be replaced with new pipe of identical type and size extending from the drainage structure to the nearest joint of the existing pipe in accordance with 6.86.03 or as directed by the Engineer.

Backfilling shall be performed in accordance with 2.86.03.

Frames, covers and tops which are to be reset shall be removed from their present beds, the walls or sides shall be rebuilt to conform to the requirements of the new construction and the frames, covers and tops shall be reset as shown on the plans or as directed by the Engineer.

5.86.04—Method of Measurement:

Drainage Trench Excavation: In accordance with 2.86.04, excavation for drainage trench will not be measured for payment but shall be included in the Contract unit price for the type of structure being installed.

Rock in Drainage Trench Excavation: Rock in Drainage Trench Excavation will be measured in accordance with the drainage trench excavation limits described in 2.86.03.

Manholes, Catch Basins and Drop Inlets will be measured as separate units.

Resetting of Manholes, Catch Basins and Drop Inlets will be measured as separate units.

Replacement of frames, covers, and tops will be measured as a unit for catch basin top or manhole frame and cover.

Conversion of drainage structures as specified on the plans, or as directed by the Engineer, including structure reconstruction will be measured for payment as a unit.

Removal or abandonment of drainage structures outside of drainage trench excavation limits, as defined in 2.86.03, will be measured as separate units.

There will be no measurement or direct payment for the application of the protective compound material, the cost of this work shall be considered as included in the general cost of the work.

Measurement for payment for work and materials involved with installing pipes to connect new drainage structures into a run of existing pipe will be as provided for under the applicable Contract items in accordance with 6.86.04.

There will be no measurement or direct payment for plugging existing pipes with cement masonry, the cost of this work will be considered as included in the general cost of the work.

5.86.05—Basis of Payment:

Drainage Trench Excavation for the installation of proposed structures described herein will be paid for under the respective drainage Contract item(s) for which the excavation is being performed, in accordance with the provisions of 2.86.05.

Rock in Drainage Trench Excavation will be paid for in accordance with the provisions of 2.86.05.

Manholes and Catch Basins will be paid for at the Contract unit price for each "Manhole," or "Catch Basin," of the type specified, at "0' to 10' Deep" or "0' to 20' Deep," complete in place, which price shall include all excavation, backfill, materials, equipment, tools and labor incidental thereto.

Drop Inlets will be paid for at the Contract unit price for each "Drop Inlet," of the type specified, complete in place, which price shall include all excavation, backfill, materials, equipment, tools and labor incidental thereto.

Manholes, Catch Basins and Drop Inlets constructed to modified dimensions as directed by the Engineer, will be paid for as follows:

Where the interior floor area has to be increased to accommodate existing field conditions, as measured horizontally at the top of the base of the completed structure, and does not exceed 125% of the interior floor area as shown on the plans for that structure, then the structure shall be paid for at the Contract unit price for each "Manhole," "Catch Basin," or "Drop Inlet" of the type specified. Where the floor area is greater than 125%, the increase in the unit price for the individual structure shall be in direct proportion to the increase of the completed structure interior floor area as compared to the interior floor area as shown on the plans for that structure. Such increased unit price shall include all excavation, materials, equipment, tools, and labor incidental to the completion of the structure.

Reset Units will be paid for at the Contract unit price each for "Reset Manhole," "Reset Catch Basin," or "Reset Drop Inlet," of the type specified, respectively, complete in place, which price shall include excavation, cutting of pavement, removal and replacement of pavement structure, and all materials, equipment, tools and labor incidental thereto, except when the work requires reconstruction greater than 3 feet, measured vertically, then the entire cost of resetting the unit will be paid for as Extra Work in accordance with the provisions of 1.04.05.

Frames, Covers, and Tops when required in connection with reset units, will be paid for at the Contract unit price each for such "Manhole Frame and Cover" or "(Type) Catch Basin Top," complete in place, including all incidental expense; or when no price exists, the furnishing and placing of such material will be paid for as Extra Work in accordance with the provisions of 1.04.05.

When the catch basin top has a stone or granite curb in its design, the curb or inlet shall be included in the cost of the "(Type) Catch Basin Top."

Conversion of drainage structures will be paid for at the Contract unit price each for "Convert Catch Basin to (Type) Catch Basin," "Convert Catch Basin to (Type) Manhole," or "Convert

Manhole to (Type) Catch Basin," complete in place, which price shall include excavation, cutting of pavement, removal and replacement of pavement, backfill, all alterations to existing structure, all materials including catch basin frame and grate of the type specified, or manhole frame and cover, all equipment, tools and labor incidental thereto.

The maximum change in elevation of frame under these items shall not exceed 3 feet. Greater depth changes, if required, shall be paid for as Extra Work, in accordance with 1.04.05.

Removal or abandonment of drainage structures outside of drainage trench excavation limits as defined in 2.86.03 will be paid for at the Contract unit price each for "Remove Drainage Structure – 0' to 10' Deep," "Remove Drainage Structure – 0' to 20' Deep," or "Abandon Drainage Structure," which price shall include excavation, cutting of pavement, removal and replacement of pavement, backfill, and all equipment, tools and labor incidental thereto.

Pay Item	Pay Unit
(Type) Catch Basin – 0' to 10' Deep	ea.
(Type) Catch Basin – 0' to 20' Deep	ea.
Manhole (Size) – 0' to 10' Deep	ea.
Manhole (Size) – 0' to 20' Deep	ea.
(Type) Drop Inlet	ea.
Reset Catch Basin	ea.
Reset Manhole	ea.
Reset Drop Inlet	ea.
Convert Catch Basin to (Type) Catch Basin	ea.
Convert Catch Basin to (Type) Manhole	ea.
Convert Manhole to (Type) Catch Basin	ea.
Manhole Frame and Cover	ea.
(Type) Catch Basin Top	ea.
Remove Drainage Structure – 0' to 10' Deep	ea.
Remove Drainage Structure – 0' to 20' Deep	ea.
Abandon Drainage Structure	ea.

SECTION 6.86 - DRAINAGE PIPES, DRAINAGE PIPE ENDS

6.86.01—Description

6.86.02—Materials

6.86.03—Construction Methods

6.86.04—Method of Measurement

6.86.05—Basis of Payment

6.86.01—Description: This work shall consist of furnishing, preparing and installing drainage pipes of the size and type specified, bedding material, joint sealant, rubber gaskets, clamps, collars, grout, grout collars, drainage trench excavation, backfilling or satisfactory disposal of all materials, the removal of which is necessary for the proper completion of the work, connecting proposed drainage systems to existing systems, plugging or abandoning existing pipes and removal of existing pipe within trench limits, as shown on the plans or as directed by the Engineer.

This Section shall also include removal of drainage pipes outside of drainage trench excavation limits, as defined in 2.86.03-1.

6.86.02—Materials: The materials for this work shall meet the following requirements: Drainage Pipe, Drainage Pipe Ends, Sealers, Gaskets and connection hardware shall meet the requirements of M.08.01.

Bedding Material shall meet the requirements of M.08.03-1.

Granular Fill, if necessary, shall meet the requirements of M.02.01.

Brick Masonry shall meet the requirements of M.11.03 and Mortar shall meet the requirements of M.11.04.

Concrete used for Concrete Pipe Connections shall be Class “F” Concrete meeting the requirements of M.03.

6.86.03—Construction Methods:

(1) Drainage Trench Excavation: Drainage trench excavation and backfilling shall be performed in accordance with 2.86.03 and the requirements of the plans.

Where drainage pipe is to be laid below the surface, a drainage trench shall be excavated to the required depth, the bottom of which shall be graded to the elevation of the bottom of the bedding material.

Where drainage pipe is to be laid in a fill area, the embankment shall be placed and compacted to a minimum elevation 12 inches above the top of the proposed pipe, whereupon the drainage trench excavation shall be performed and the pipe installed.

(2) Rock in Drainage Trench Excavation: When rock, as defined in 2.86.01-2, is encountered, work shall be performed in accordance with 2.86.03 and the requirements of the plans.

(3) Drainage Pipe Installation: New or re-laid drainage pipes shall be installed on 4 inches of bedding material (12 inches if over rock in ledge formation), the details as shown on the plans, or as directed by the Engineer. Prior to placement of the drainage pipe, in accordance with the plans, bedding material shall be pre-shaped to 10% of the total height

of the pipe in order to keep the pipe in the center of the trench. Following placement of the drainage pipe, bedding material backfill shall be placed in accordance with the following table:

Internal Pipe Diameter	Required Bedding Material Backfill
< 48 inches*	25% of total height of the pipe
≥ 48 inches*	12 inches above the top of the pipe
*Includes pipe arch of equivalent internal horizontal span See Standard Drawing	

The placement of the drainage pipe shall start at the downstream end and progress upstream or as shown on the plans, or as directed by the Engineer. All drainage pipes shall be carefully laid in the center of the drainage trench, true to the lines and grades given. Bell ends shall face upgrade and all joints shall be tight.

Joints in concrete pipe shall be sealed with cold-applied bituminous sealer, preformed plastic gaskets or flexible, watertight, rubber-type gaskets. Portland cement mortar shall not be used for sealing pipe joints except with permission of the Engineer.

When cold-applied bituminous sealer is used, the bell and spigot ends shall be wiped clean and dry before applying the bituminous sealer to the pipe ends. Before the drainage pipes are placed in contact with each other, the spigot or tongue end shall be completely covered with bituminous sealer; then the pipe shall be laid to line and grade so the inside surface of all abutting pipes are flush. Additional bituminous sealer shall be applied to the joint after the connection has been made to ensure a water tight connection.

Where the end of an existing drainage pipe is not compatible with the end of a proposed concrete pipe, the Contractor shall align the inner diameters of the pipes being connected, butt the pipe ends together, and construct a cast-in-place concrete pipe connection, as shown in the plans. Incompatible bell/spigot or tongue/groove ends shall be cut off as required to ensure the interior drainage pipe walls are aligned to provide a smooth transition between the pipes.

Metal pipe and pipe arches shall be carefully joined and firmly clamped together by approved connecting bands, which shall be properly bolted in place before any backfill is placed.

Newly installed drainage pipe which is not in true alignment, or which shows any settlement or distortion, shall be reinstalled in accordance with 1.05.03.

When drainage pipe outside of proposed drainage trench limits is to be removed, it shall be removed to the limits shown on the plans and all remaining pipes shall be plugged with cement masonry.

Where shown on the plans or directed by the Engineer, the Contractor shall plug abandoned existing pipes with cement masonry.

(4) Drainage Pipe End Installation: Reinforced concrete drainage pipe ends shall be placed on a prepared bed of the existing ground and accurately aligned as shown on the plans. The joints shall be sealed as specified in 6.86.03-3 and backfill shall be placed around both sides of the unit simultaneously to the elevation shown on the plans.

Metal drainage pipe ends shall be placed on a prepared bed of the existing ground and accurately aligned as shown on the plans. After the attachment of the drainage pipe end, backfill shall be placed around both sides of the unit up to the elevation shown on the plans, exercising caution to avoid displacement or deformation of the unit.

6.86.04—Method of Measurement: This work will be measured as follows:

Drainage Trench Excavation, in accordance with 2.86.04, will not be measured for payment.

Rock in Drainage Trench Excavation will be measured in accordance with 2.86.04.

Bedding Material will not be measured for payment.

New and Re-laid Pipes and Pipe Arches will be measured for payment by the actual number of linear feet of pipe or pipe arch of the various sizes and types, completed and accepted and measured in place along the invert. Coupling bands and fittings for pipes and pipe arches will not be measured for payment.

Reinforced Concrete Drainage Pipe Ends and Metal Drainage Pipe Ends will be measured for payment as separate units.

Corrugated Metal Pipe Elbows (of the Size and Type specified) will be measured for payment by the actual number of linear feet of pipe elbows completed and accepted, based on 6 linear feet per elbow, as shown on the plans. Coupling bands for elbows will not be measured for payment.

Concrete Pipe Connection will be measured for payment by the number of each concrete pipe connection constructed at locations where proposed concrete pipes tie into an existing pipe with an incompatible end, completed and accepted by the Engineer.

Removal of drainage pipe outside of drainage trench excavation limits, as defined in 2.86.03, will be measured for payment by the actual number of linear feet of drainage pipe removed.

There will be no measurement for plugging existing pipes with cement masonry.

6.86.05—Basis of Payment:

Drainage Trench Excavation for the installation of drainage pipes will not be paid separately but shall be included in the Contract unit price for the respective drainage pipe or pipe end item(s), in accordance with the provisions of 2.86.05.

Rock in Drainage Trench Excavation will be paid for in accordance with the provisions of 2.86.05.

Bedding Material necessary for the installation of drainage items described herein will be included in the Contract unit price for the respective drainage pipe or pipe end item(s). Bedding material required to fill voids when rock in drainage trench is encountered will not be measured for payment but shall be included in the Contract unit price for "Rock in Drainage Trench Excavation," in accordance with 2.86.05.

New Pipes and Pipe Arches will be paid for at the Contract unit price per linear foot for "(Size and Type) Pipe (Thickness) – 0' to 10' Deep," "(Size and Type) Pipe (Thickness) – 0' to 20' Deep," "(Size) Pipe Arch (Thickness) – 0' to 10' Deep" or "(Size) Pipe Arch (Thickness) – 0' to 20' Deep" complete in place, including materials, drainage trench excavation, bedding material, equipment, tools, and labor incidental thereto.

Relaid Pipes and Pipe Arches will be paid for at the Contract unit price per linear foot for "Relaid Pipe (Size and Type) – 0' to 10' Deep," "Re-laid Pipe (Size and Type) – 0' to 20' Deep," "Relaid Pipe Arch (Size and Type) – 0' to 10' Deep," or "Relaid Pipe Arch (Size and Type) – 0' to 20' Deep," complete in place, including all materials, drainage trench excavation, bedding material, equipment, tools, and labor incidental thereto.

Reinforced Concrete Drainage Pipe Ends and Metal Drainage Pipe Ends will be paid for at the Contract unit price for each drainage pipe end of the Size and Type specified, complete in place, including all excavation, materials, attachment systems, equipment, tools and labor incidental thereto.

Corrugated Metal Pipe Elbows will be paid for at the Contract unit price per linear foot for "(Size and Type) Corrugated Metal Pipe Elbow" including all materials, drainage trench excavation, bedding material, equipment, tools, and labor incidental thereto.

Concrete Pipe Connection will be paid for at the Contract unit price each for "Concrete Pipe Connection" complete in place, including all materials, equipment, tools and labor incidental thereto.

Removal of drainage pipes of all types and sizes, outside of drainage trench excavation limits, as defined in 2.86.03-1, will be paid for at the Contract unit price per linear foot for "Remove Existing Pipe – 0' to 10' Deep," or "Remove Existing Pipe – 0' to 20' Deep," which price shall include excavation, temporary trench protection, backfill, and all equipment, tools and labor incidental thereto.

There will be no direct payment for the plugging of existing drainage pipes, but the cost thereof shall be included in the respective drainage Contract item(s).

Pay Item	Pay Unit
(Size and Type) Pipe (Thickness) – 0' to 10' Deep	l.f.
(Size and Type) Pipe (Thickness) – 0' to 20' Deep	l.f.
(Size and Type) Pipe Arch (Thickness) – 0' to 10' Deep	l.f.
(Size and Type) Pipe Arch (Thickness) – 0' to 20' Deep	l.f.
Relaid (Size and Type) Pipe– 0' to 10' Deep	l.f.
Relaid (Size and Type) Pipe– 0' to 20' Deep	l.f.
(Size and Type) Relaid Pipe Arch – 0' to 10' Deep	l.f.
(Size and Type) Relaid Pipe Arch – 0' to 20' Deep	l.f.
(Size) Reinforced Concrete Drainage Pipe End	ea.
(Size) Metal Drainage Pipe End	ea.
(Size and Type) Corrugated Metal Pipe Elbow	l.f.
Concrete Pipe Connection	ea.
Remove Existing Pipe – 0' to 10' Deep	l.f.
Remove Existing Pipe – 0' to 20' Deep	l.f.

SECTION 10.00 - GENERAL CLAUSES FOR HIGHWAY ILLUMINATION AND TRAFFIC SIGNAL PROJECTS

Article 10.00.03 – Plans:

In the first paragraph, replace the 2nd, 3rd, and 4th sentences with the following:

The Contractor shall digitally mark, in red, any changes on the plan(s) using a pdf program.

The Contractor shall submit the digital pdf file(s) to the Engineer and to DOT.TrafficElectrical@ct.gov, for Traffic Signals, prior to requesting the Functional Inspection.

Also prior to requesting the Functional Inspection, the Contractor shall deliver to the Engineer the following:

In the first paragraph, last sentence, in item no. 1, replace “Four (4)” with “Digital PDF Files and Five (5)” [paper prints of schematics and wiring diagrams...].

Article 10.00.10 Section 3. Functional Inspection, first paragraph after the 2nd sentence: Add the following:

The Contractor shall have a bucket truck with crew on site during the Functional Inspection to make any necessary aerial signal adjustments as directed by the Engineer.

SECTION M.04 - BITUMINOUS CONCRETE MATERIALS

Section M.04 is being deleted in its entirety and replaced with the following:

M.04.01—Bituminous Concrete Materials and Facilities

M.04.02—Mix Design and Job Mix Formula (JMF)

M.04.03—Production Requirements

M.04.01—Bituminous Concrete Materials and Facilities: Each source of material, Plant, and laboratory used to produce and test bituminous concrete must be qualified on an annual basis by the Engineer. AASHTO or ASTM Standards noted with an (M) have been modified and are detailed in Table M.04.03-5.

Aggregates from multiple sources of supply must not be blended or stored in the same stockpile.

1. Coarse Aggregate: All coarse aggregate shall meet the requirements listed in M.01.

2. Fine Aggregate: All fine aggregate shall meet the requirements listed in M.01.

3. Mineral Filler: Mineral filler shall conform to the requirements of AASHTO M 17.

4. Performance Graded (PG) Asphalt Binder:

(a) General:

- i. PG asphalt binder shall be uniformly mixed and blended and be free of contaminants such as fuel oils and other solvents. Binder shall be properly heated and stored to prevent damage or separation.
- ii. The binder shall meet the requirements of AASHTO M 332 and shall be graded or verified in accordance with AASHTO R 29. The Contractor shall submit a Certified Test Report and bill of lading representing each delivery in accordance with AASHTO R 26(M). The Certified Test Report must also indicate the binder specific gravity at 77°F; rotational viscosity at 275°F and 329°F; and the mixing and compaction viscosity-temperature chart for each shipment.
- iii. The Contractor shall submit the name(s) of personnel responsible for receipt, inspection, and record keeping of PG binder. Contractor Plant personnel shall document specific storage tank(s) where binder will be transferred and stored until used and provide binder samples to the Engineer upon request. The person(s) shall assure that each shipment is accompanied by a statement certifying that the transport vehicle was inspected before loading was found acceptable for the material shipped and that the binder is free of contamination from any residual material, along with 2 copies of the bill of lading.
- iv. The blending or combining of PG binders in 1 storage tank at the Plant from different suppliers, grades, or additive percentages is prohibited.

(b) Basis of Approval: The request for approval of the source of supply shall list the location where the material will be manufactured, and the handling and storage methods, along with necessary certification in accordance with AASHTO R 26(M). Only suppliers/refineries that have an approved “Quality Control Plan for Performance Graded Binders” formatted in accordance with AASHTO R 26(M) may supply PG binders to Department projects.

(c) Standard Performance Grade (PG) Binder:

- i. Standard PG binder shall be defined as “Neat.” Neat PG binders shall be free from modification with: fillers, extenders, reinforcing agents, adhesion promoters,

thermoplastic polymers, acid modification and other additives such as re-refined motor oil, and shall indicate such information on each bill of lading and Certified Test Report.

- ii. The standard asphalt binder shall be PG 64S-22.

(d) Modified Performance Grade (PG) Binder: The modified asphalt binder shall be Performance Grade PG 64E-22 asphalt modified solely with a Styrene-Butadiene-Styrene (SBS) polymer. The polymer modifier shall be added at either the refinery or terminal and delivered to the bituminous concrete production facility as homogenous blend. The stability of the modified binder shall be verified in accordance with ASTM D7173 using the Dynamic Shear Rheometer (DSR). The DSR $G^*/\sin(\delta)$ results from the top and bottom sections of the ASTM D7173 test shall not differ by more than 10%. The results of ASTM D7173 shall be included on the Certified Test Report. The binder shall meet the requirements of AASHTO M 332 (including Appendix X1) and AASHTO R 29.

(e) Warm Mix Additive or Technology:

- i. The warm mix additive or technology must be listed on the North East Asphalt User Producer Group (NEAUPG) Qualified Warm Mix Asphalt (WMA) Technologies List at the time of bid, which may be accessed online at <http://www.neaupg.uconn.edu>.
- ii. The warm mix additive shall be blended with the asphalt binder in accordance with the manufacturer's recommendations.
- iii. The blended binder shall meet the requirements of AASHTO M 332 and shall be graded or verified in accordance with AASHTO R 29 for the specified binder grade. The Contractor shall submit a Certified Test Report showing the results of the testing demonstrating the binder grade. In addition, it must include the grade of the virgin binder, the brand name of the warm mix additive, the manufacturer's suggested rate for the WMA additive, the water injection rate (when applicable), and the WMA Technology manufacturer's recommended mixing and compaction temperature ranges.

5. Emulsified Asphalts:

(a) General:

- i. The emulsified asphalt shall meet the requirements of AASHTO M 140(M) or AASHTO M 208 as applicable.
- ii. The emulsified asphalts shall be free of contaminants such as fuel oils and other solvents.
- iii. The blending at mixing Plants of emulsified asphalts from different suppliers is prohibited.

(b) Basis of Approval:

- i. The request for approval of the source of supply shall list the location where the material is manufactured, the handling and storage methods, and certifications in accordance with AASHTO R 77. Only suppliers that have an approved "Quality Control Plan for Emulsified Asphalt" formatted in accordance with AASHTO R 77 and that submit monthly split samples per grade to the Engineer may supply emulsified asphalt to Department projects.
- ii. Each shipment of emulsified asphalt delivered to the Project site shall be accompanied with the corresponding Certified Test Report listing Saybolt viscosity, residue by evaporation, penetration of residue, and weight per gallon at 77°F and Material Certificate.
- iii. Anionic emulsified asphalts shall meet the requirements of AASHTO M-140. Materials

used for tack coat shall not be diluted and meet grade RS-1 or RS-1h. When ambient temperatures are 80°F and rising, grade SS-1 or SS-1h may be substituted if permitted by the Engineer.

- iv. Cationic emulsified asphalt shall meet the requirements of AASHTO M-208. Materials used for tack coat shall not be diluted and meet grade CRS-1. The settlement and demulsibility test will not be performed unless deemed necessary by the Engineer. When ambient temperatures are 80°F and rising, grade CSS-1 or CSS-1h may be substituted if permitted by the Engineer.

6. Reclaimed Asphalt Pavement (RAP):

(a) General: RAP is a material obtained from the cold milling or removal and processing of bituminous concrete pavement. RAP material shall be crushed to 100% passing the 1/2 inch sieve and free from contaminants such as joint compound, wood, plastic, and metals.

(b) Basis of Approval: The RAP material will be accepted on the basis of one of the following criteria:

- i. When the source of all RAP material is from pavements previously constructed on Department projects, the Contractor shall provide a Materials Certificate listing the detailed locations and lengths of those pavements and that the RAP is only from those locations listed.
- ii. When the RAP material source or quality is not known, the Contractor shall request approval from the Engineer at least 30 calendar days prior to the start of the paving operation. The request shall include a Material Certificate and applicable test results stating that the RAP consists of aggregates that meet the specification requirements of M.04.01-1 through M.04.01-3 and that the binder in the RAP is substantially free of solvents, tars and other contaminants. The Contractor is prohibited from using unapproved material on Department projects and shall take necessary action to prevent contamination of approved RAP stockpiles. Stockpiles of unapproved material shall remain separate from all other RAP materials at all times. The request for approval shall include the following:
 - 1. A 50-lb. sample of the RAP to be incorporated into the recycled mixture.
 - 2. A 25-lb. sample of the extracted aggregate from the RAP.

7. Crushed Recycled Container Glass (CRCG):

(a) Requirements: The Contractor may propose to use clean and environmentally-acceptable CRCG in an amount not greater than 5% by weight of total aggregate.

(b) Basis of Approval: The Contractor shall submit to the Engineer a request to use CRCG. The request shall state that the CRCG contains no more than 1% by weight of contaminants such as paper, plastic, and metal and conforms to the following gradation:

CRCG Grading Requirements	
<u>Sieve Size</u>	<u>Percent Passing</u>
3/8 inch	100
No. 4	35-100
No. 200	0.0-10.0

The Contractor shall submit a Material Certificate to the Engineer stating that the CRCG complies with all the applicable requirements in this Section.

8. Joint Seal Material: Joint seal material must meet the requirements of ASTM D6690 - Type 2. The Contractor shall submit a Material Certificate in accordance with 1.06.07 certifying that the joint seal material meets the requirements of this Section.

9. Recycled Asphalt Shingles (RAS): RAS shall consist of processed asphalt roofing shingles from post-consumer asphalt shingles or from manufactured shingle waste. The RAS material under consideration for use in bituminous concrete mixtures must be certified as being asbestos-free and shall be entirely free of whole, intact nails. The RAS material shall meet the requirements of AASHTO MP 23.

The Producer shall test the RAS material to determine the asphalt content and the gradation of the RAS material. The Producer shall take necessary action to prevent contamination of RAS stockpiles.

The Contractor shall submit a Material Certificate to the Engineer stating that the RAS complies with all the applicable requirements in this Section.

10. Plant Requirements:

(a) General: The Plant producing bituminous concrete shall comply with AASHTO M 156.

(b) Storage Silos: The Contractor may use silos for short-term storage with the approval of the Engineer. A storage silo must have heated cones and an unheated silo cylinder if it does not contain a separate internal heating system. When multiple silos are filled, the Contractor shall discharge 1 silo at a time. Simultaneous discharge of multiple silos for the same Project is not permitted.

Type of silo cylinder	Maximum storage time for all classes (hr)	
	<u>HMA</u>	<u>WMA/PMA</u>
Open Surge	4	Mfg Recommendations*
Unheated - Non-insulated	8	Mfg Recommendations*
Unheated - Insulated	18	Mfg Recommendations*
Heated - No inert gas	TBD by the Engineer	TBD by the Engineer

*Not to exceed HMA limits

(c) Documentation System: The mixing Plant documentation system shall include equipment for accurately proportioning the components of the mixture by weight and in the proper order, controlling the cycle sequence, and timing the mixing operations. Recording equipment shall monitor the batching sequence of each component of the mixture and produce a printed record of these operations on each Plant ticket, as specified herein.

If recycled materials are used, the Plant tickets shall include their dry weight, percentage, and daily moisture content.

If a WMA Technology is added at the Plant, the Plant tickets shall include the actual dosage rate.

For drum Plants, the Plant ticket shall be produced at 5 minute intervals and maintained by the vendor for a period of 3 years after the completion of the Project.

For batch Plants, the Plant ticket shall be produced for each bath and maintained by the vendor for a period of 3 years after the completion of the Project. In addition, an asterisk (*)

shall be automatically printed next to any individual batch weight(s) exceeding the following tolerances:

Each Aggregate Component	±1.5% of individual or cumulative target weight for each bin
Mineral Filler	±0.5% of the total batch
Bituminous Material	±0.1% of the total batch
Zero Return (Aggregate)	±0.5% of the total batch
Zero Return (Bituminous Material)	±0.1% of the total batch

The entire batching and mixing interlock cut-off circuits shall interrupt and stop the automatic batching operations when an error exceeding the acceptable tolerance occurs in proportioning.

The scales shall not be manually adjusted during the printing process. In addition, the system shall be interlocked to allow printing only when the scale has come to a complete rest. A unique printed character (m) shall automatically be printed on the truck and batch plant printout when the automatic batching sequence is interrupted or switched to auto-manual or full manual during proportioning.

(d) Aggregates: Aggregate stockpiles shall be managed to prevent segregation and cross contamination. For drum Plants only, the percent moisture content, at a minimum prior to production and half way through production, shall be determined.

(e) Mixture: The dry and wet mix times shall be sufficient to provide a uniform mixture and a minimum particle coating of 95% as determined by AASTO T 195(M).

Bituminous concrete mixtures shall contain no more than 0.5% moisture when tested in accordance with AASHTO T 329.

(f) RAP: RAP moisture content shall be determined a minimum of twice daily (prior to production and halfway through production).

(g) Asphalt Binder: A binder log shall be submitted to the Department's Central Lab on a monthly basis.

(h) Warm mix additive: For mechanically foamed WMA, the water injection rate shall be monitored during production and not exceed 2.0% by total weight of binder. For additive added at the Plant, the dosage rate shall be monitored during production.

(i) Testing Laboratory: The Contractor shall maintain a laboratory to test bituminous concrete mixtures during production. The laboratory shall have a minimum of 300 s.f., have a potable water source and drainage in accordance with the CT Department of Public Health Drinking Water Division, and be equipped with all necessary testing equipment as well as with a PC, printer, and telephone with a dedicated hard-wired phone line. In addition, the PC shall have a high speed internet connection and a functioning web browser with unrestricted access to <https://ctmail.ct.gov>. This equipment shall be maintained in working order at all times and be made available for use by the Engineer.

The laboratory shall be equipped with a heating system capable of maintaining a minimum temperature of 65°F. It shall be clean and free of all materials and equipment not associated with the laboratory. Sufficient light and ventilation must be provided. During summer months

adequate cooling or ventilation must be provided so the indoor air temperature shall not exceed the ambient outdoor temperature.

The laboratory testing apparatus, supplies, and safety equipment shall be capable of performing all the applicable tests in their entirety that are referenced in AASHTO R 35 and AASHTO M 323. The Contractor shall ensure that the Laboratory is adequately supplied at all times during the course of the Project with all necessary testing materials and equipment.

The Contractor shall maintain a list of laboratory equipment used in the acceptance testing processes including, but not limited to, balances, scales, manometer/vacuum gauge, thermometers, and gyratory compactor, clearly showing calibration and/or inspection dates, in accordance with AASHTO R 18. The Contractor shall notify the Engineer if any modifications are made to the equipment within the laboratory. The Contractor shall take immediate action to replace, repair, or recalibrate any piece of equipment that is out of calibration, malfunctioning, or not in operation.

M.04.02—Mix design and Job Mix Formula (JMF)

1. Curb Mix:

(a) Requirements: The Contractor shall use bituminous concrete that meets the requirements of Table M.04.02-1. RAP may be used in 5% increments by weight up to 30%.

(b) Basis of Approval: Annually, an approved JMF based on a mix design for curb mix must be on file with the Engineer prior to use.

The Contractor shall test the mixture for compliance with the submitted JMF and Table M.04.02-1. The maximum theoretical density (Gmm) will be determined by AASHTO T 209. If the mixture does not meet the requirements, the JMF shall be adjusted within the ranges shown in Table M.04.02-1 until an acceptable mixture is produced.

An accepted JMF from the previous operating season may be acceptable to the Engineer provided that there are no changes in the sources of supply for the coarse aggregate, fine aggregate, recycled material (if applicable) and the Plant operation had been consistently producing acceptable mixture.

Any change in component source of supply or consensus properties must be approved by the Engineer. A revised JMF shall be submitted prior to use.

**TABLE M.04.02-1:
Control Points for Curb Mix Mixtures**

Mix	Curb Mix	Production Tolerances from JMF Target
Grade of PG Binder content %	PG 64S-22 6.5 - 9.0	0.4
Sieve Size		
No. 200	3.0 - 8.0 (b)	2.0
No. 50	10 - 30	4
No. 30	20 - 40	5
No. 8	40 - 70	6
No. 4	65 - 87	7
1/4 inch		
3/8 inch	95 - 100	8
1/2 inch	100	8
3/4 inch		8
1 inch		
2 inch		
Additionally, the fraction of material retained between any 2 consecutive sieves shall not be less than 4%.		
Mixture Temperature		
Binder	325°F maximum	
Aggregate	280-350°F	
Mixtures	265-325°F	
Mixture Properties		
Air Voids (VA) %	0 – 4.0 (a)	
Notes: (a) Compaction Parameter 50 gyrations (N _{des}) (b) The percent passing the No. 200 sieve shall not exceed the percentage of bituminous asphalt binder.		

2. Superpave Design Method – S0.25, S0.375, S0.5, and S1:

(a) **Requirements:** All designated mixes shall be designed using the Superpave mix design method in accordance with AASHTO R 35. A JMF based on the mix design shall meet the requirements of Tables M.04.02-2 to M.04.02-5. Each JMF and component samples must be submitted no less than 7 days prior to production and must be approved by the Engineer prior to use. All JMFs expire at the end of the calendar year.

All aggregate component consensus properties and tensile strength ratio (TSR) specimens shall be tested at an AASHTO Materials Reference Laboratory (AMRL) by NETTCP Certified Technicians.

All bituminous concrete mixes shall be tested for stripping susceptibility by performing the TSR test procedure in accordance with AASHTO T 283(M) at a minimum every 36 months. The compacted specimens may be fabricated at the Plant and then tested at an AMRL accredited facility. A minimum of 45000 grams of laboratory or plant blended mixture and the

corresponding complete Form MAT-412s shall be submitted to the Division of Material Testing (DMT) for design TSR testing verification. The mixture submitted shall be representative of the corresponding mix design as determined by the Engineer.

- i. Superpave Mixtures with RAP: RAP may be used with the following conditions:
 - RAP amounts up to 15% may be used with no binder grade modification.
 - RAP amounts up to 20% may be used provided a new JMF is approved by the Engineer. The JMF submittal shall include the grade of virgin binder added. The JMF shall be accompanied by a blending chart and supporting test results in accordance with AASHTO M 323 Appendix X1, or by testing that shows the combined binder (recovered binder from the RAP, virgin binder at the mix design proportions, warm mix asphalt additive and any other modifier if used) meets the requirements of the specified binder grade.
 - Two (2) representative samples of RAP shall be obtained. Each sample shall be split, and 1 split sample shall be tested for binder content in accordance with AASHTO T 164 and the other in accordance with AASHTO T 308.
 - RAP material shall not be used with any other recycling option.
- ii. Superpave Mixtures with RAS: RAS may be used solely in HMA S1 mixtures with the following conditions:
 - RAS amounts up to 3% may be used.
 - RAS total binder replacement up to 15% may be used with no binder grade modification.
 - RAS total binder replacement up to 20% may be used provided a new JMF is approved by the Engineer. The JMF submittal shall include the grade of virgin binder added. The JMF shall be accompanied by a blending chart and supporting test results in accordance with AASHTO M 323 Appendix X1, or by testing that shows the combined binder (recovered binder from the RAP, virgin binder at the mix design proportions, warm mix asphalt additive and any other modifier if used) meets the requirements of the specified binder grade.
 - Superpave Mixtures with RAS shall meet AASHTO PP 78 design considerations.
- iii. Superpave Mixtures with CRCG: CRCG may be used solely in HMA S1 mixtures. One percent (1%) of hydrated lime, or other accepted non-stripping agent, shall be added to all mixtures containing CRCG. CRCG material shall not be used with any other recycling option.
- (b) Basis of Approval: The following information must be included in the JMF submittal:
 - i. Gradation, consensus properties and specific gravities of the aggregate, RAP or RAS.
 - ii. Average asphalt content of the RAP or RAS by AASHTO T 164.
 - iii. Source of RAP or RAS and percentage to be used.
 - iv. Warm mix Technology, manufacturer's recommended additive rate and tolerances, and manufacturer recommended mixing and compaction temperatures.
 - v. TSR test report and anti-strip manufacturer and recommended dosage rate if applicable.
 - vi. Mixing and compaction temperature ranges for the mix with and without the warm-mix technology incorporated.
 - vii. JMF ignition oven correction factor by AASHTO T 308.

With each JMF submittal, the following samples shall be submitted to the Division of Materials Testing:

- 4 - one (1) quart cans of PG binder, with corresponding Safety Data Sheet (SDS)
- 1 - 50 lbs. bag of RAP
- 2 - 50 lbs. bags of Plant-blended virgin aggregate

A JMF may not be approved if any of the properties of the aggregate components or mix do not meet the verification tolerances as described in the Department's current QA Program for Materials, Acceptance and Assurance Testing Policies and Procedures.

Any material based on a JMF, once approved, shall only be acceptable for use when it is produced by the designated Plant, it utilizes the same components, and the production of material continues to meet all criteria as specified in Tables M.04.02-2, M.04.02-3 and M.04.02-4. A new JMF must be submitted to the Engineer for approval whenever a new component source is proposed.

Only 1 mix with 1 JMF will be approved for production at a time. Switching between approved JMF mixes with different component percentages or sources of supply is prohibited.

TABLE M.04.02-2: Superpave Master Range for Bituminous Concrete Mixture Design Criteria

	S0.25		S0.375		S0.5		S1	
Sieve	Control Points		Control Points		Control Points		Control Points	
inches	Min (%)	Max (%)	Min (%)	Max (%)	Min (%)	Max (%)	Min (%)	Max (%)
2.0	-	-	-	-	-	-	-	-
1.5	-	-	-	-	-	-	100	-
1.0	-	-	-	-	-	-	90	100
3/4	-	-	-	-	100	-	-	90
1/2	100	-	100	-	90	100	-	-
3/8	97	100	90	100	-	90	-	-
No. 4	72	90	-	72	-	-	-	-
No. 8	32	67	32	67	28	58	19	45
No. 16	-	-	-	-	-	-	-	-
No. 30	-	-	-	-	-	-	-	-
No. 50	-	-	-	-	-	-	-	-
No. 100	-	-	-	-	-	-	-	-
No. 200	2.0	10.0	2.0	10.0	2.0	10.0	1.0	7.0
VMA (%)	16.5 ± 1		16.0 ± 1		15.0 ± 1		13.0 ± 1	
VA (%)	4.0 ± 1		4.0 ± 1		4.0 ± 1		4.0 ± 1	
Gse	JMF value		JMF value		JMF value		JMF value	
Gmm	JMF ± 0.030		JMF ± 0.030		JMF ± 0.030		JMF ± 0.030	
Dust / effective binder	0.6 - 1.2		0.6 - 1.2		0.6 - 1.2		0.6 - 1.2	
TSR	≥ 80%		≥ 80%		≥ 80%		≥ 80%	
T-283 Stripping	Minimal as determined by the Engineer							

(c) Mix Status: Each facility will have each type of bituminous concrete mixture rated based on the results of the previous year of production. Mix status will be provided to each bituminous concrete Producer prior to the beginning of the paving season.

The rating criteria are based on compliance with Air Voids and Voids in Mineral Aggregate (VMA) as indicated in Table M.04.03-4 and are calculated as follows:

Criteria A: Percentage of acceptance test results with compliant air voids.

Criteria B: The average of the percentage of acceptance results with compliant VMA and the percentage of acceptance results with compliant air voids.

The final rating assigned will be the lower of the rating obtained with Criteria A or Criteria B. Mix status is defined as:

“A” – Approved: Assigned to each mixture type from a production facility with a current rating of 70% or greater, or to each mixture type completing a successful PPT.

“PPT” – Pre-Production Trial: Temporarily assigned to each mixture type from a production facility when:

1. there are no compliant acceptance production test results submitted to the Department from the previous year;
2. there is a source change in one or more aggregate components;
3. there is a component percentage change of more than 5% by weight;
4. there is a change in RAP percentage;
5. the mixture has a rating of less than 70% from the previous season;
6. it is a new JMF not previously submitted; or
7. the average of 10 consecutive acceptance results for VFA, Density to N_{ini} or dust to effective binder ratio does not meet the criteria in tables M.04.02-2 and M.04.02-4.

Bituminous concrete mixtures rated with a “PPT” status cannot be used on Department projects. Testing shall be performed by the Producer with NETTCP certified personnel on material under this status. Test results must confirm that specification requirements in Tables M.04.02-2 through M.04.02-4 are met and the binder content (Pb) meets the requirements in Table M.04.03-2 before material can be used. One of the following methods must be used to verify the test results:

Option A: Schedule a day when a Department Inspector can be at the facility to witness testing

Option B: When the Contractor or their representative performs testing without being witnessed by an Inspector, the Contractor shall submit the test results and a split sample including 2 gyratory molds, 5,000 grams of boxed bituminous concrete, and 5,000 grams of cooled loose bituminous concrete for verification testing and approval

Option C: When the Contractor or their representative performs testing without being witnessed by a Department Inspector, the Engineer may verify the mix in the Contractor’s laboratory

Witnessing or verifying by the Department of compliant test results will change the mix’s status to “A”

The differences between the Department’s test results and the Contractor’s must be within the “C” tolerances included in the [Department’s QA Program for Materials, Acceptance and Assurance Testing Policies and Procedures](#) in order to be verified.

“U” – Not Approved: Status assigned to a type of mixture that does not have an approved JMF. Bituminous concrete mixtures with a “U” status cannot be used on Department projects.

**TABLE M.04.02-3:
Superpave Consensus Properties Requirements for Combined Aggregate**

Traffic Level	Design ESALs (80kN) Millions	Coarse Aggregate Angularity ⁽¹⁾	Fine Aggregate Angularity AASHTO T 304, Method A Minimum %	Flat and Elongated Particles ⁽²⁾ ASTM D4791, Maximum %	Sand Equivalent AASHTO T 176, Minimum %
		ASTM D5821, Minimum %			
1	< 0.3	55/- -	40	10	40
2	0.3 to < 3.0	75/- -	40	10	40
3	≥ 3.0	95/90	45	10	45

Notes:
⁽¹⁾ 95/90 denotes that a minimum of 95% of the coarse aggregate, by mass, shall have one fractured face and that a minimum of 90% shall have two fractured faces.
⁽²⁾ Criteria presented as maximum Percent by mass of flat and elongated particles of materials retained on the No. 4 sieve, determined at 5:1 ratio.

TABLE M.04.02-4: Superpave Traffic Levels and Design Volumetric Properties

Traffic Level	Design ESALs (million)	Number of Gyration by Superpave Gyratory Compactor			Percent Density of Gmm from HMA/WMA Specimen			Voids Filled with Asphalt (VFA) Based on Nominal Mix Size - Inch			
		N _{ini}	N _{des}	N _{max}	N _{ini}	N _{des}	N _{max}	0.25	0.375	0.5	1
1	<0.3	6	50	75	≤91.5	96.0	≤98.0	70-80	70-80	70-80	67-80
2	0.3 to <3.0	7	75	115	≤90.5	96.0	≤98.0	65-78	65-78	65-78	65-78
3	≥3.0	7	75	115	≤90.0	96.0	≤98.0	65-77	65-76	65-75	65-75

**TABLE M.04.02-5:
Superpave Minimum Binder Content by Mix Type and Level**

Mix Type	Level	Binder Content Minimum
S0.25	1	5.80
S0.25	2	5.70
S0.25	3	5.70
S0.375	1	5.70
S0.375	2	5.60
S0.375	3	5.60
S0.5	1	5.10
S0.5	2	5.00
S0.5	3	5.00
S1	1	4.60
S1	2	4.50
S1	3	4.50

M.04.03—Production Requirements:

1. Standard Quality Control Plan (QCP) for Production: The QCP for production shall describe the organization and procedures, which the Contractor shall use to administer quality control. The QCP shall include the procedures used to control the production process, to determine when immediate changes to the processes are needed, and to implement the required changes. The QCP must detail the inspection, sampling and testing protocols to be used, and the frequency for each.

Control Chart(s) shall be developed and maintained for critical aspect(s) of the production process as determined by the Contractor. The control chart(s) shall identify the material property, applicable upper and lower control limits, and be updated with current test data. As a minimum, the following quality characteristics shall be included in the control charts:

- percent passing No. 4 sieve
- percent passing No. 200 sieve
- binder content
- air voids
- Gmm
- Gse
- VMA

The control chart(s) shall be used as part of the quality control system to document variability of the bituminous concrete production process. The control chart(s) shall be submitted to the Engineer the first day of each month.

The QCP shall also include the name and qualifications of a Quality Control Manager. The Quality Control Manager shall be responsible for the administration of the QCP, including compliance with the plan and any plan modifications.

The Contractor shall submit complete production testing records to the Engineer within 24 hours in a manner acceptable to the Engineer.

The QCP shall also include the name and qualifications of any outside testing laboratory performing any QC functions on behalf of the Contractor. The QCP must also include a list of sampling and testing methods and frequencies used during production, and the names of all Quality Control personnel and their duties.

Approval of the QCP does not imply any warranty by the Engineer that adherence to the plan will result in production of bituminous concrete that complies with these specifications. The Contractor shall submit any changes to the QCP as work progresses.

2. Acceptance Requirements:

(a) General:

For those mixes with a total estimated project tonnage over 500 tons, a NETTCP HMA Paving Inspector certified Contractor representative shall obtain a field sample of the material placed at the project site in accordance with AASHTO T 168 using the procedure indicated in Section 5.2.3 or an alternate procedure approved by the Engineer. Sampling from the truck at the Plant in accordance with AASHTO T 168 using the procedure indicated in Section 5.2.2 will be allowed for those mixes with a total estimated project tonnage equal to or less than 500 tons. Regardless of sampling location, the sample shall be quartered by the Contractor in accordance with AASHTO R 47 and placed in an approved container. The container shall be sealed with a security tape provided by the Department and labelled to include the project number, date of paving, mix type, lot and subplot numbers and daily tonnage. The minimum weight of each quartered sample shall be 14000 grams. The Contractor shall transport one of the containers to the Departments Central Laboratory in Rocky Hill, retain one of the sealed containers for potential use in dispute resolution and test the remaining samples for acceptance in accordance with past practice.

The Contractor shall submit all acceptance tests results to the Engineer within 24 hours or prior to the next day's production. All acceptance test specimens and supporting documentation must be retained by the Contractor and may be disposed of with the approval of the Engineer. All quality control specimens shall be clearly labeled and separated from the acceptance specimens.

Contractor personnel performing QC and acceptance testing must be present at the facility prior to, during, and until completion of production, and be certified as a NETTCP HMA Plant Technician or Interim HMA Plant Technician and be in good standing. Production of material for use on State projects must be suspended by the Contractor if such personnel are not present. Technicians found by the Engineer to be non-compliant with NETTCP policies and procedures or Department policies may be removed by the Engineer from participating in the acceptance testing process for Department projects until their actions can be reviewed.

Verification and dispute resolution testing will be performed by the Engineer in accordance with the Department's QA Program for Materials.

Should the Department be unable to validate the Contractor's acceptance test result(s) for a lot of material, the Engineer will use results from verification testing and re-calculate the pay adjustment for that lot. The Contractor may request to initiate the dispute resolution process in writing within 24 hours of receiving the adjustment and must include supporting documentation or test results to justify the request.

(b) Curb Mix Acceptance Sampling and Testing Procedures: Curb Mixes shall be tested by the Contractor at a frequency of 1 test per every 250 tons of cumulative production, regardless of the day of production.

When these mix designs are specified, the following acceptance procedures and AASHTO test methods shall be used:

TABLE M.04.03-1: Curb Mix Acceptance Test Procedures

Protocol	Reference	Description
1	AASHTO T 30(M)	Mechanical Analysis of Extracted Aggregate
2	AASHTO T 168	Sampling of Bituminous Concrete
3	AASHTO T 308	Binder Content by Ignition Oven Method (adjusted for aggregate correction factor)
4	AASHTO T 209(M)⁽²⁾	Theoretical Maximum Specific Gravity and Density of Bituminous Paving Mixtures
5	AASHTO T 312⁽²⁾	⁽¹⁾ Superpave Gyrotory Molds Compacted to N _{des}
6	AASHTO T 329	Moisture Content of Hot-Mix Asphalt (HMA) by Oven Method

Notes: ⁽¹⁾ One (1) set equals 2 each of 6-inch molds. Molds to be compacted to 50 gyrations.
⁽²⁾ Once per year or when requested by the Engineer.

- i. Determination of Off-Test Status:
 1. Curb Mix is considered “off test” when the test results indicate that any single value for bitumen content or gradation are not within the tolerances shown in Table M.04.02-1 for that mixture. If the mix is “off test,” the Contractor must take immediate actions to correct the deficiency and a new acceptance sample shall be tested on the same day or the following day of production.
 2. When multiple silos are located at 1 site, mixture supplied to 1 project is considered as coming from 1 source for the purpose of applying the “off test” status.
 3. The Engineer may cease supply from the Plant when test results from 3 consecutive samples are not within the JMF tolerances or the test results from 2 consecutive samples not within the control points indicated in Table M.04.02-1 regardless of production date.
 - ii. JMF Revisions
 1. If a test indicates that the bitumen content or gradation are outside the tolerances, the Contractor may make a single JMF revision as allowed by the Engineer prior to any additional testing. Consecutive test results outside the requirements of Table M.04.02-1 JMF tolerances may result in rejection of the mixture.
 2. Any modification to the JMF shall not exceed 50% of the JMF tolerances indicated in Table M.04.02-1 for any given component of the mixture without approval of the Engineer. When such an adjustment is made to the bitumen, the corresponding production percentage of bitumen shall be revised accordingly.
- (c) Superpave Mix Acceptance:
- i. Sampling and Testing Procedures

Production Lot: The lot will be defined as one of the following types:

 - Non-PWL Production Lot for total estimated Project quantities per mixture less than 3500 tons: All mixture placed during a single continuous paving operation.
 - PWL Production Lot for total estimated Project quantities per mixture of 3500 tons or more: Each 3500 tons of mixture produced within 30 calendar days.

Production Sub Lot:

 - For Non-PWL: As defined in Table M.04.03-2
 - For PWL: 500 tons (The last sub lot may be less than 500 tons.)

Partial Production Lots (For PWL only): A Lot with less than 3500 tons due to:

- completion of the course;
- a Job Mix Formula revision due to changes in:
 - o cold feed percentages over 5%,
 - o target combined gradation over 5%,
 - o target binder over 0.15%,
 - o any component specific gravity; or
- a lot spanning 30 calendar days.

The acceptance sample(s) location(s) shall be selected using stratified - random sampling in accordance with ASTM D3665 based on:

- the total daily estimated tons of production for non-PWL lots, or
- the total size for PWL lots.

One (1) acceptance sample shall be obtained and tested per sub lot with quantities over 125 tons. The Engineer may direct that additional acceptance samples be obtained. For non-PWL lots, one (1) acceptance test shall always be performed in the last sub lot based on actual tons of material produced.

For non-PWL lots, quantities of the same mixture per Plant may be combined daily for multiple State projects to determine the number of sub lots.

The payment adjustment will be calculated as described in 4.06.

TABLE M.04.03-2:

Superpave Acceptance Testing Frequency per Type/Level/Plant for Non-PWL Lots

Daily Quantity Produced in Tons (Lot)	Number of Sub Lots/Tests
0 to 125	0, Unless requested by the Engineer
126 to 500	1
501 to 1,000	2
1,001 to 1,500	3
1,500 or greater	1 per 500 tons or portions thereof

The following test procedures shall be used for acceptance:

TABLE M.04.03-3: Superpave Acceptance Testing Procedures

Protocol	Procedure	Description
1	AASHTO T 168	Sampling of bituminous concrete
2	AASHTO R 47	Reducing samples to testing size
3	AASHTO T 308	Binder content by ignition oven method (adjusted for aggregate correction factor)
4	AASHTO T 30(M)	Gradation of extracted aggregate for bituminous concrete mixture
5	AASHTO T 312	⁽¹⁾ Superpave gyratory molds compacted to N _{des}
6	AASHTO T 166	⁽²⁾ Bulk specific gravity of bituminous concrete
7	AASHTO R 35	⁽²⁾ Air voids, VMA
8	AASHTO T 209(M)	Maximum specific gravity of bituminous concrete (average of 2 tests)
9	AASHTO T 329	Moisture content of bituminous concrete

Notes: ⁽¹⁾ One (1) set equals 2 each of 6-inch molds. Molds to be compacted to N_{max} for PPTs and to N_{des} for production testing. The first sub lot of the year shall be compacted to N_{max}.

⁽²⁾ Average value of 1 set of 6-inch molds.

If the average ignition oven corrected binder content differs by 0.3% or more from the average of the Plant ticket binder content in 5 consecutive tests regardless of the production date (moving average), the Contractor shall immediately investigate, determine an assignable cause, and correct the issue. When 2 consecutive moving average differences are 0.3% or more and no assignable cause has been established, the Engineer may require a new ignition oven aggregate correction factor to be performed or to adjust the current factor by the average of the differences between the corrected binder content and production Plant ticket for the last 5 acceptance results.

The Contractor shall perform TSR testing within 30 days after the start of production for all design levels of HMA- and PMA- S0.5 Plant-produced mixtures, in accordance with AASHTO T 283(M). The TSR test shall be performed at an AMRL certified laboratory by NETTCP certified technicians. The compacted specimens may be fabricated at the Plant and then tested at an AMRL accredited facility. A minimum of 45000 grams of plant blended mixture and the corresponding complete Form MAT-412s shall be submitted to the DMT for production TSR testing verification. The mixture submitted shall be representative of the corresponding mix design as determined by the Engineer. Additionally, the TSR test report and tested specimens shall be submitted to the Engineer for review. Superpave mixtures that require anti-strip additives (either liquid or mineral) shall continue to meet all requirements specified herein for binder and bituminous concrete. The Contractor shall submit the name, manufacturer, percent used, technical datasheet and SDS for the anti-strip additive (if applicable) to the Engineer.

i. Determination of Off-Test Status:

1. Superpave mixes shall be considered “*off test*” when any control point sieve, binder content, VA, VMA, and Gmm value is outside of the limits specified in Table M.04.03-4 or the target binder content at the Plant is below the minimum binder

content stated in Table M.04.02-5. Note that further testing of samples or portions of samples not initially tested for this purpose cannot be used to change the status.

2. Any time the bituminous concrete mixture is considered off-test:
 - A. The Contractor shall notify the Engineer when the Plant is “*off test*” for any mix design that is delivered to the Project in any production day. When multiple silos are located at 1 site, mixture supplied to 1 project is considered as coming from 1 source for the purpose of applying the “*off test*” determination.
 - B. The Contractor must take immediate actions to correct the deficiency, minimize “*off test*” production to the Project, and obtain an additional Process Control (PC) test after any corrective action to verify production is in conformance with the specifications. A PC test will not be used for acceptance and is solely for the use of the Contractor in its quality control process.

ii. Cessation of Supply for Superpave Mixtures in Non-PWL Lots:

A mixture **shall not be used** on Department projects when it is “off test” for:

1. four (4) consecutive tests in any combination of VA, VMA or Gmm, regardless of date of production, or
2. two (2) consecutive tests in the control point sieves in 1 production shift.

As a result of cessation of supply, the mix status will be changed to PPT

iii. JMF revisions:

JMF revisions are only permitted prior to or after a production shift. A JMF revision is effective from the time it was submitted and is not retroactive to the previous test(s).

JMF revisions shall be justified by a documented trend of test results.

Revisions to aggregate or RAP specific gravities are only permitted when testing is performed at an AMRL certified laboratory by NETTCP certified technicians.

A JMF revision is required when the Plant target RAP or bin percentage deviates by more than 5% or the Plant target binder content deviates by more than 0.15% from the active JMF.

TABLE M.04.03-4: Superpave Mixture Production Requirements

	S0.25		S0.375		S0.5		S1		Tolerances
Sieve	Control Points		Control Points		Control Points		Control Points		From JMF Targets ⁽²⁾
inches	Min (%)	Max (%)	Min (%)	Max (%)	Min (%)	Max (%)	Min (%)	Max (%)	+/- Tolerance
1.5	-	-	-	-	-	-	100	-	
1.0	-	-	-	-	-	-	90	100	
3/4	-	-	-	-	100	-	-	90	
1/2	100	-	100	-	90	100	-	-	
3/8	97	100	90	100	-	90	-	-	
No. 4	72	90	-	72	-	-	-	-	
No. 8	32	67	32	67	28	58	19	45	
No. 16	-	-	-	-	-	-	-	-	
No. 200	2.0	10.0	2.0	10.0	2.0	10.0	1.0	7.0	
Pb	JMF value		JMF value		JMF value		JMF value		0.3 ⁽³⁾
VMA (%)	16.5		16.0		15.0		13.0		1.0 ⁽⁴⁾
VA (%)	4.0		4.0		4.0		4.0		1.0 ⁽⁵⁾
Gmm	JMF value		JMF value		JMF value		JMF value		0.030
Mix Temp. – HMA ⁽⁶⁾	265-325°F ⁽¹⁾		265-325°F ⁽¹⁾		265-325°F ⁽¹⁾		265-325°F ⁽¹⁾		
Mix Temp. – PMA ⁽⁶⁾	285-335°F ⁽¹⁾		285-335°F ⁽¹⁾		285-335°F ⁽¹⁾		285-335°F ⁽¹⁾		
Prod. TSR	N/A		N/A		≥80%		N/A		
T-283 Stripping	N/A		N/A		Minimal TBD by the Engineer		N/A		

Notes: ⁽¹⁾ 300°F minimum after October 15.

⁽²⁾ JMF tolerances shall be defined as the limits for production compliance.

⁽³⁾ 0.4 for PWL lots

⁽⁴⁾ 1.3 for all PWL lots except S/P 0.25 mixes. 1.1 for S/P 0.25 Non-PWL lots. 1.4 for S/P 0.25 PWL lots

⁽⁵⁾ 1.2 for PWL lots

⁽⁶⁾ Also applies to placement

**Table M.04.03-5:
Modifications to Standard AASHTO and ASTM Test Specifications and Procedures**

AASHTO Standard Method of Test	
Reference	Modification
T 30	Section 7.2 through 7.4 Samples are not routinely washed for production testing
T 209	Section 7.2 The average of 2 bowls is used proportionally in order to satisfy minimum mass requirements. 8.3 Omit Pycnometer method.
T 283	When foaming technology is used, the material used for the fabrication of the specimens shall be cooled to room temperature, and then reheated to the manufacturer’s recommended compaction temperature prior to fabrication of the specimens.
AASHTO Standard Recommended Practices	
Reference	Modification
R 26	<p>All laboratory technician(s) responsible for testing PG binders shall be certified or Interim Qualified by NETTCP as a PG Asphalt Binder Lab Technician.</p> <p>All laboratories testing binders for the Department are required to be accredited by the AMRL.</p> <p>Sources interested in being approved to supply PG binders to the Department by use of an “in-line blending system” must record properties of blended material and additives used.</p> <p>Each source of supply of PG binder must indicate that the binders contain no additives used to modify or enhance their performance properties. Binders that are manufactured using additives, modifiers, extenders, etc., shall disclose the type of additive, percentage and any handling specifications or limitations required.</p> <p>All AASHTO M 320 references shall be replaced with AASHTO M 332.</p> <p>Once a month, 1 split sample and test results for each asphalt binder grade and each lot shall be submitted by the PG binder supplier to the Department’s Central Lab. Material remaining in a certified lot shall be re-certified no later than 30 days after initial certification. Each April and September, the PG binder supplier shall submit test results for 2 BBR tests at 2 different temperatures in accordance with AASHTO R 29.</p>

ON-THE-JOB TRAINING (OJT) WORKFORCE DEVELOPMENT PILOT

Description

To provide construction industry related job opportunities to minorities, women and economically disadvantaged individuals; and to increase the likelihood of a diverse and inclusive workforce on Connecticut Department of Transportation (ConnDOT) projects.

All contractors (existing and newcomers) will be automatically placed in the Workforce Development Pilot. Standard OJT requirements typically associated with individual projects will no longer be applied at the project level for new projects. Instead, these requirements will be applicable on an annual basis for each contractor performing work on ConnDOT projects.

The OJT Workforce Development Pilot will allow a contractor to train employees on Federal, State and privately funded projects located in Connecticut. However, contractors should give priority to training employees on ConnDOT Federal-Aid funded projects.

Funding

The Department will establish an OJT fund annually from which contractors may bill the Department directly for eligible trainee hours. The funds for payment of trainee hours on federal-aid projects will be allocated from the ½ of 1% provided for OJT funding, and will be based on hours trained, not to exceed a maximum of \$25,000.00 per year; per contractor.

Minorities and Women

Developing, training and upgrading of minorities, women and economically disadvantaged individuals toward journeyman level status is the primary objective of this special training provision. Accordingly, the Contractor shall make every effort to enroll minority, women and economically disadvantaged individuals as trainees to the extent that such persons are available within a reasonable area of recruitment. This training commitment is not intended, and shall not be used, to discriminate against any applicant for training whether a member of a minority group or not.

Assigning Training Goals

The Department, through the OJT Program Coordinator, will assign training goals for a calendar year based on the contractor's past two year's activities and the contractor's anticipated upcoming year's activity with the Department. At the beginning of each year, all contractors eligible will be contacted by the Department to determine the number of trainees that will be assigned for the upcoming calendar year. At that time, the Contractor shall enter into an agreement with the Department to provide a self-imposed on-the-job training program for the calendar year. This agreement will include a specific number of annual training goals agreed to by both parties. The number of training assignments may range from one (1) to six (6) per

contractor per calendar year. Each January, a summary of the trainees required and the OJT Workforce Development Pilot package will be sent to participating contractors. The number of trainees assigned to each contractor in the summary will increase proportionately not to exceed 6, as shown in the following table. This package will also be provided to contractors as they become newly eligible for the OJT Workforce Development Pilot throughout the remainder of the year. Projects awarded after September 30 will be included in the following year's Program.

The dollar thresholds for training assignments are as follows:

\$4.5 – 8 million=	1 trainee
\$ 9 – 15 million=	2 trainees
\$16 – 23 million=	3 trainees
\$24 – 30 million=	4 trainees
\$31 – 40 million=	5 trainees
\$41 – and above=	6 trainees

Training Classifications

Preference shall be given to providing training in the following skilled work classifications. However, the classifications established are not all-inclusive:

Equipment Operators	Electricians
Laborers	Painters
Carpenters	Iron / Reinforcing Steel Workers
Concrete Finishers	Mechanics
Pipe Layers	Welders

The Department has on file common training classifications and their respective training requirements; that may be used by the contractors. Contractors shall submit new classifications for specific job functions that their employees are performing. The Department will review and recommend for acceptance the new classifications proposed by contractors, if applicable. New classifications shall meet the following requirements:

Proposed training classifications are reasonable and realistic based on the job skill classification needs, and the number of training hours specified in the training classification is consistent with common practices and provides enough time for the trainee to obtain journeyman level status.

Where feasible, 25% percent of apprentices or trainees in each occupation shall be in their first year of apprenticeship or training. The number of trainees shall be distributed among the work classifications on the basis of the contractor's needs and the availability of journeymen in the various classifications within a reasonable area of recruitment.

No employee shall be employed as a trainee in any classification in which they have successfully completed a training course leading to journeyman level status or in which they have been employed as a journeyman.

Records and Reports

The Contractor shall maintain enrollment in the program and submit all required reports documenting company compliance under these contract requirements. These documents and any other information shall be submitted to the OJT Program Coordinator as requested.

Upon the trainee's completion and graduation from the program, the Contractor shall provide each trainee with a certification Certificate showing the type and length of training satisfactorily completed.

Trainee Interviews

In order to determine the continued effectiveness of the OJT Program in Connecticut, the department will periodically conduct personal interviews with current trainees and may survey recent graduates of the program. This enables the OJT Program Coordinator to modify and improve the program as necessary. Trainee interviews are generally conducted at the job site to ensure that the trainees' work and training is consistent with the approved training program.

Trainee Wages

Contractors shall compensate trainees on a graduating pay scale based upon a percentage of the prevailing minimum journeyman wages (Davis-Bacon Act). Minimum pay shall be as follows:

60 percent	of the journeyman wage for the first half of the training period
75 percent	of the journeyman wage for the third quarter of the training period
90 percent	of the journeyman wage for the last quarter of the training period

In no case, will the trainee be paid less than the prevailing rate for general laborer as shown in the contract wage decision (must be approved by the Department of Labor).

Achieving or Failing to Meet Training Goals

The Contractor will be credited for each trainee currently enrolled or who becomes enrolled in the approved training program and providing they receive the required training under the specific training program. Trainees will be allowed to be transferred between projects if required by the Contractor's schedule and workload. The OJT Program Coordinator must be notified of transfers within five (5) days of the transfer or reassignments by e-mail (Phylisha.Coles@ct.gov).

Where a contractor does not or cannot achieve its annual training goal with female or minority trainees, they must produce adequate Good Faith Efforts documentation. Good Faith Efforts are those designed to achieve equal opportunity through positive, aggressive, and continuous result-oriented measures. 23 CFR § 230.409(g) (4). Contractors should request minorities and females from unions when minorities and females are under-represented in the contractor's workforce.

Whenever a contractor requests ConnDOT approval of someone other than a minority or female, the contractor must submit documented evidence of its Good Faith Efforts to fill that position with a minority or female. When a non-minority male is accepted, a contractor must continue to attempt to meet its remaining annual training goals with females and minorities.

Where a contractor has neither attained its goal nor submitted adequate Good Faith Efforts documentation, ConnDOT will issue a letter of non-compliance. Within thirty (30) days of receiving the letter of non-compliance, the contractor must submit a written Corrective Action Plan (CAP) outlining the steps that it will take to remedy the non-compliance. The CAP must be approved by ConnDOT. Failure to comply with the CAP may result in your firm being found non-responsive for future projects.

Measurement and Payment

Optional reimbursement will be made to the contractor for providing the required training under this special provision on ConnDOT Federal-Aid funded projects only.

Contractor will be reimbursed at \$0.80 for each hour of training given to an employee in accordance with an approved training or apprenticeship program. This reimbursement will be made even though the Contractor receives additional training program funds from other sources, provided such other source does not specifically prohibit the contractor from receiving other reimbursement.

Reimbursement for training is made annually or upon the trainees completion and not on a monthly basis. No payment shall be made to the Contractor if either the failure to provide the required training, or the failure to hire the trainee as a journeyman, is caused by the Contractor.

Program reimbursements will be made directly to the prime contractor on an annual basis. To request reimbursement, prime contractors must complete the Voucher for OJT Workforce Development Pilot Hourly Reimbursement for each trainee in the OJT Program. This form is included in the OJT Workforce Development Pilot package and is available on the Department's web site at:

www.ct.gov/dot

The completed form must be submitted to the Office of Contract Compliance for approval. The form is due on the 15th day of January for each trainee currently enrolled and for hours worked on ConnDOT Federal-Aid funded projects only.

SMALL CONTRACTOR AND SMALL CONTRACTOR MINORITY BUSINESS ENTERPRISES (SET-ASIDE)

March, 2001

NOTE: Certain of the requirements and procedures stated in this "Special Provision" are applicable prior to the execution of the Contract.

I. GENERAL

- A. The Contractor shall cooperate with the Connecticut Department of Transportation (CONNDOT) in implementing the required contract obligations concerning "Small Contractor" and "Small Contractor Minority Business Enterprise" use on this Contract in accordance with Section 4a-60g of the Connecticut General Statutes as revised. References, throughout this "Special Provision", to "Small Contractors" are also implied references to "Small Contractor Minority Business Enterprises" as both relate to Section IIA of these provisions. The Contractor shall also cooperate with CONNDOT in reviewing the Contractor's activities relating to this provision. This "Special Provision" is in addition to all other equal opportunity employment requirements of this Contract.
- B. For the purpose of this "Special Provision", the "Small Contractor(s)" and "Minority Business Enterprise(s)" named to satisfy the set-aside requirement must be certified by the Department of Administrative Services, Business Connections/ Set-Aside Unit [(860) 713-5236 www.das.state.ct.us/busopp.htm] as a "Small Contractor" and "Minority Business Enterprises" as defined by Section 4a-60g Subsections (1) and (3) of the Connecticut General Statutes as revised and is subject to approval by CONNDOT to do the work for which it is nominated pursuant to the criteria stipulated in Section IIC-3.
- C. Contractors who allow work which they have designated for "Small Contractor" participation in the pre-award submission required under Section IIC to be performed by other than the approved "Small Contractor" organization and prior to concurrence by CONNDOT, will not be paid for the value of the work performed by organizations other than the "Small Contractor" designated.
- D. If the Contractor is unable to achieve the specified contract goals for "Small Contractor" participation, the Contractor shall submit written documentation to CONNDOT's Manager of Construction Operations indicating his/her good faith efforts to satisfy goal requirements. Documentation is to include but not be limited to the following:

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1. A detailed statement of the efforts made to select additional subcontract opportunities for work to be performed by each "Small Contractor" in order to increase the likelihood of achieving the stated goal.
 2. A detailed statement, including documentation of the efforts made to contact and solicit contracts with each "Small Contractor", including the names, addresses, dates and telephone numbers of each "Small Contractor" contacted, and a description of the information provided to each "Small Contractor" regarding the scope of services and anticipated time schedule of items proposed to be subcontracted and the nature of response from firms contacted.
 3. For each "Small Contractor" that placed a subcontract quotation which the Contractor considered not to be acceptable, provide a detailed statement of the reasons for this conclusion.
 4. Documents to support contacts made with CONNDOT requesting assistance in satisfying the contract specified or adjusted "Small Contractor" dollar requirements.
 5. Document other special efforts undertaken by the Contractor to meet the defined goal.
- E. Failure of the Contractor to have at least the specified dollar amount of this contract performed by "Small Contractor" as required in Section IIA of this "Special Provision" will result in the reduction in contract payment to the Contractor by an amount equivalent to that determined by subtracting from the specific dollar amount required in Section IIA, the dollar payments for the work actually performed by each "Small Contractor". The deficiency in "Small Contractor" achievement, will therefore, be deducted from the final contract payment. However, in instances where the Contractor can adequately document or substantiate its good faith efforts made to meet the specified or adjusted dollar amount to the satisfaction of CONNDOT, no reduction in payments will be imposed.
- F. All records must be retained for a period of three (3) years following completion of the contract and shall be available at reasonable times and places for inspection by authorized representatives of CONNDOT.
- G. Nothing contained herein, is intended to relieve any contractor or subcontractor or material supplier or manufacturer from compliance with all applicable Federal and State legislation or provisions concerning equal employment opportunity, affirmative action, nondiscrimination and related subjects during the term of this Contract.

II. SPECIFIC REQUIREMENTS

In order to increase the participation of "Small Contractors", CONNDOT requires the following:

A. Not less than **Six (6%)** percent of the **final** value of this Contract shall be subcontracted to and performed by, and/or supplied by, manufactured by and paid to "Small Contractors" and/or "Small Contractors Minority Business Enterprises".

If the above percentage is zero (0%) AND an asterisk () has been entered in the adjacent brackets [], this Contract is 100% solely set-aside for participation by "Small Contractors" and/or "Small Contractors Minority Business Enterprises".*

B. The Contractor shall assure that each "Small Contractor" will have an equitable opportunity to compete under this "Special Provision", particularly by arranging solicitations, time for the preparation of Quotes, Scope of Work, and Delivery Schedules so as to facilitate the participation of each "Small Contractor".

C. The Contractor shall provide to CONNDOT's Manager of Contracts within Seven (7) days after the bid opening the following items:

1. An affidavit (Exhibit I) completed by each named "Small Contractor" subcontractor listing a description of the work and indicating the dollar amount of all contract(s) and/or subcontract(s) that have been awarded to him/her for the current State Fiscal Year (July 1 - June 30) does not exceed the Fiscal Year limit of \$10,000,000.00.
2. A certification of work to be subcontracted (Exhibit II) signed by both the Contractor and the "Small Contractor" listing the work items and the dollar value of the items that the nominated "Small Contractor" is to perform on the project to achieve the minimum percentage indicated in Section IIA above.
3. A certification of past experience (Exhibit III) indicating the scope of work the nominated "Small Contractor" has performed on all projects, public and private, for the past two (2) years.
4. In instances where a change from the originally approved named "Small Contractor" (see Section IB) is proposed, the Contractor is required to submit, in a reasonable and expeditious manner, a revised submission, comprised of the documentation required in Section IIC, Paragraphs 1, 2 and 3 and Section E together with documentation to substantiate and

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justify the change, (i.e., documentation to provide a basis for the change) to CONNDOT's Manager of Construction Operations for its review and approval prior to the implementation of the change. The Contractor must demonstrate that the originally named "Small Contractor" is unable to perform in conformity to specifications, or unwilling to perform, or is in default of its contract, or is overextended on other jobs. The Contractor's ability to negotiate a more advantageous contract with another "Small Contractor" is not a valid basis for change. Documentation shall include a letter of release from the originally named "Small Contractor" indicating the reason(s) for the release.

- D. After the Contractor signs the Contract, the Contractor will be required to meet with CONNDOT's Manager of Construction Operations or his/her designee to review the following:
1. What is expected with respect to the "Small Contractor" set aside requirements.
 2. Failure to comply with and meet the requirement can and will result in monetary deductions from payment.
 3. Each quarter after the start of the "Small Contractor" the Contractor shall submit a report to CONNDOT's Manager of Construction Operations indicating the work done by, and the dollars paid to each "Small Contractor" to date.
 4. What is required when a request to sublet to a "Small Contractor" is submitted.
- E. The Contractor shall submit to CONNDOT's Manager of Construction Operations all requests for subcontractor approvals on standard forms provided by the Department.

If the request for approval is for a "Small Contractor" subcontractor for the purpose of meeting the contract required "Small Contractor" percentage stipulated in Section IIA, a copy of the legal contract between the Contractor and the "Small Contractor" subcontractor must also be submitted at the same time. Any subsequent amendments or modifications of the contract between the Contractor and the "Small Contractor" subcontractor must also be submitted to CONNDOT's Manager of Construction Operations with an explanation of the change(s). The contract must show items of work to be performed, unit prices and, if a partial item, the work involved by both parties.

In addition, the following documents are to be attached:

- (1) A statement explaining any method or arrangement for renting equipment. If rental is from a Contractor, a copy of Rental Agreement must be submitted.
- (2) A statement addressing any special arrangements for manpower.
- (3) A statement addressing who will purchase material.

F. Contractors subcontracting with a "Small Contractor" to perform work or services as required by this "Special Provision" shall not terminate such firms without advising CONNDOT, in writing, and providing adequate documentation to substantiate the reasons for termination if the designated "Small Contractor" firm has not started or completed the work or the services for which it has been contracted to perform.

G. Material Suppliers or Manufacturers

If the Contractor elects to utilize a "Small Contractor" supplier or manufacturer to satisfy a portion or all of the specified dollar requirements, the Contractor must provide the Department with:

1. An executed Affidavit Small Contractor (Set-Aside) Connecticut Department of Transportation Affidavit Supplier or Manufacturer (sample attached), and
2. Substantiation of payments made to the supplier or manufacturer for materials used on the project.

Brokers and packagers shall not be regarded as material Suppliers or manufacturer.

H. Non-Manufacturing or Non-Supplier "Small Contractor" Credit

Contractors may count towards its "Small Contractor" goals the following expenditures with "Small Contractor" firms that are not manufacturers or suppliers:

1. Reasonable fees or commissions charged for providing a bona fide service such as professional, technical, consultant or managerial services and assistance in the procurement of essential personnel, facilities, equipment, material or supplies necessary for the performance of the contract provided that the fee or commission is determined by the Department of Transportation to be reasonable and consistent with fees customarily allowed for similar services.

2. The fees charged for delivery of materials and supplies required on a job site (but not the cost of the materials and supplies themselves) when the hauler, trucker, or delivery service is not also the manufacturer of or a regular dealer in the materials and supplies, provided that the fee is determined by the Department of Transportation to be reasonable and not excessive as compared with fees customarily allowed for similar services.
3. The fees or commissions charged for providing any bonds or insurance specifically required for the performance of the Contract, provided that the fee or commission is determined by the Department of Transportation to be reasonable and not excessive as compared with fees customarily allowed for similar services.

III. **BROKERING**

For the purpose of this "Special Provision", a "Broker" is one who acts as an agent for others in negotiating contracts, purchases, sales, etc., in return for a fee or commission. Brokering of work by a "Small Contractor" is not allowed and is a contract violation.

IV. **PRE-AWARD WAIVERS:**

If the Contractor's submission of the "Small Contractor" listing, as required by Section IIC indicates that it is unable, by subcontracting to obtain commitments which at least equal the amount required by Section IIA, it may request, in writing, a waiver of up to 50% of the amount required by Section IIA. To obtain such a waiver, the Contractor must submit a completed "Application for Waiver of Small Contractor Minority Business Enterprise Goals" to CONNDOT's Manager of Contracts which must also contain the following documentation:

1. Information described in Section ID.
2. For each "Small Contractor" contacted but unavailable, a statement from each "Small Contractor" confirming its unavailability.

Upon receipt of the submission requesting a waiver, the CONNDOT's Manager of Contracts shall submit the documentation to the Director of the Office of Contract Compliance who shall review it for completeness. After completion of the Director of Contract Compliance's review, she/he should write a narrative of his/her findings of the application for a waiver, which is to include his/her recommendation. The Director of Contract Compliance shall submit the written narrative to the Chairperson of the DBE Screening Committee at least five (5) working days before the scheduled meeting. The Contractor shall be invited to attend the meeting and present his/her position. The DBE Screening Committee shall render a decision on the waiver request within five (5)

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working days after the meeting. The DBE Screening Committee's decision shall be final. Waiver applications are available from the CONNDOT Manager of Contracts.

SMALL CONTRACTOR/*MINORITY BUSINESS ENTERPRISE
(* Delete if not Applicable)
SET-ASIDE PROGRAM
(QUALIFICATION AFFIDAVIT)

PROJECT(s) _____
(INCLUDING TOWN & DESCRIPTION)

STATE OF _____ CONNECTICUT _____

COUNTY OF _____

I _____, ACTING IN BEHALF
NAME OF PARTY SIGNING AFFIDAVIT

OF _____, DO HEREBY CERTIFY
PERSON FIRM OR ORGANIZATION

AND AFFIRM THAT THE INFORMATION SET FORTH BELOW IS TRUE AND ACCURATE TO THE BEST OF MY
KNOWLEDGE. AS OF THIS DATE _____ THE LIST OF SMALL CONTRACTOR SET-ASIDE
PROGRAM - CONTRACTS AND/OR SUBCONTRACTS AWARDED DURING THE CURRENT FISCAL YEAR (JULY 1 -
JUNE 30) 20 _____ IS AS FOLLOWS:

Table with 5 columns: Col. 1 TOWN AND PROJECT NUMBER, Col. 2 STATE AGENCY WHICH AWARDED CONTRACT, Col. 3 CONTRACT AMOUNT AWARDED UNDER THIS PROGRAM, Col. 4 AMOUNT OF WORK SUBCONTRACTED FROM OTHER FIRMS UNDER THIS PROGRAM, Col. 5 TOTAL AMOUNT OF ALL WORK UNDER THIS PROGRAM Col. 3 Plus Col. 4. Includes a 'TOTALS' row at the bottom.

NAME OF PERSON, FIRM OR ORGANIZATION

(FIRM SEAL)

SIGNATURE & TITLE OF OFFICIAL

SWORN TO AND SUBSCRIBED BEFORE ME BY _____

WHO IS PERSONALLY KNOWN TO ME, THIS _____ DAY OF _____, 20 _____

(NOTARY PUBLIC)

MY COMMISSION EXPIRES _____ SEAL

PLEASE NOTE THAT ALL THE WORK AWARDED OR SUBCONTRACTED TO YOUR FIRM UNDER THE SET-ASIDE
PROGRAM IN A FISCAL YEAR (JULY 1-JUNE 30) INCLUDING THIS PROJECT, CANNOT BE MORE THAN \$10,000,000.00

EXHIBIT III

CERTIFICATION
PAST CONSTRUCTION EXPERIENCE

Mar. 01

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SMALL CONTRACTOR / * MINORITY BUSINESS ENTERPRISES

* Delete if not applicable

PLEASE LIST ALL CONSTRUCTION PROJECTS YOUR ORGANIZATION HAS WORKED ON IN THE PAST TWO FISCAL YEARS

PROJECT LOCATION NUMBER AND DESCRIPTION APPLICABLE	CONTRACT AMOUNT	IF WORK PERFORMED AS PRIME GIVE OWNERS NAME IF WORK PERFORMED AS SUBCONTRACTOR GIVE CONTRACTORS NAME	START DATE	ACTUAL OR ESTIMATED COMPLETION DATE	NAME AND PHONE OF OWNER OR PRIME CONTRACTOR AS

SIGNED BY: _____

SMALL BUSINESS CONTRACTOR
*MINORITY BUSINESS ENTERPRISES

D.O.T. PROJECT NO. _____

* Delete if not applicable

MARCH, 2001

**SMALL CONTRACTOR/SMALL CONTRACTOR MINORITY BUSINESS ENTERPRISE
(MBE) (SET-ASIDE) CONNECTICUT DEPARTMENT OF TRANSPORTATION
AFFIDAVIT – SUPPLIER OR MANUFACTURER**

This affidavit must be completed by the State Contractor's designated Small Contractor/ Small Contractor Minority Business Enterprise (MBE), notarized and attached to the contractor's request to utilize a Small Contractor/Small Contractor Minority Business Enterprise (MBE) supplier or manufacturer as a credit towards its Small Contractor/Small Contractor Minority Business Enterprise (MBE) contract requirement; failure to do so will result in not receiving credit towards the contract Small Contractor/Small Contractor Minority Business Enterprise (MBE) requirement.

State Project No. _____
Federal Aid Project No. _____
Description of Project _____

I, _____, acting in behalf of _____
(Name of person signing Affidavit) (Small Contractor/Small Contractor MBE contractor person,
_____ of which I am the _____ affirm that _____
firm, association or certify and corporation) (Title of Person) (Small
Contractor/Small Contractor MBE person, firm, association or corporation)
_____ is a certified Small Contractor/Small
Contractor Minority Business Enterprise, as defined by Section 4a-60g of the Connecticut General
Statutes, as revised.

I further certify and affirm that _____
(Small Contractor/Small Contractor MBE person, firm, association or corporation)
will assume the actual and contractual responsibility for the provision of the materials and/or supplies
sought by _____. If a manufacturer, I produce goods from raw
(State Contractor)
materials or substantially alter them before resale, or if a supplier, I perform a commercially useful
function in the supply process.

I understand that false statements made herein are punishable at Law (Sec. 53a-157, CGS, as revised).

(Name of Small Contractor/Small Contractor MBE person, firm, association or corporation)

(Signature and Title of Official making the Affidavit)

Subscribed and sworn to before me, the _____ day of _____ 200_____.

Notary Public (Commissioner of the Superior Court)

My Commission Expires _____

CERTIFICATE OF CORPORATION

I, _____, certify that I am the _____
(Official) of the Corporation named in the foregoing instrument; that I have been duly authorized to affix
the seal of the Corporation to such papers as require the seal; that _____, who
signed said instrument on behalf of the Corporation, was then _____ of
said corporation; that said instrument was duly signed for and in behalf of said Corporation by authority
of its governing body and is within the scope of its corporation powers.

(Signature of Person Certifying)

(Date)

(Corporate Seal)

ITEM #0406125A – BITUMINOUS CONCRETE SURFACE PATCH

Description:

This work shall consist of milling out deteriorated bituminous concrete pavement to a depth between 1.5 to 2.5 inches, disposing of pavement millings, sweeping and cleaning, application of tack coat on all surfaces within the milled area, and placement of Hot-Mix Asphalt (HMA) or an equivalent Polymer Modified Asphalt (PMA) to match the elevation of the surrounding pavement.

For road sections being milled and paved, all patching operations must be completed after milling is complete and before paving begins. All patching operations shall be completed within one working day following milling and shall be completed before traffic is permitted to resume on the exposed roadway.

Materials:

Materials for this work shall meet the requirements of Section M.04 and shall consist of the following:

1. HMA S0.375 or an equivalent PMA. All HMA or PMA shall be Traffic Level 2 unless indicated otherwise on the plans.
2. Tack coat.

Construction Methods:

Equipment for this work shall include, but is not limited to, the following:

1. Milling machine: A milling machine designed and built for milling flexible pavements. It shall be self-propelled with sufficient power, traction, and stability to maintain depth and slope and shall be capable of removing the existing bituminous concrete pavement.

The rotary drum of the machine shall use carbide tip tools spaced not more than 5/8 inches apart. The forward speed of the milling machine shall be a maximum of 45 feet/minute. The tools on the revolving cutting drum must be continually maintained and shall be replaced as warranted to provide a uniform pavement texture.

The machine shall be equipped with an integral pickup and conveying device to immediately remove milled material from the surface of the roadway and discharge the millings into a truck in one operation. The machine shall also be equipped with a means of effectively limiting the amount of dust escaping from the milling and removal operation. When milling smaller areas or areas where it is impractical to use the above described equipment, the Contractor may be permitted to use a lesser equipped milling machine, if approved by the Engineer.

The minimum milling width shall be 20 inches, making the minimum achievable patch size 20 inches by 20 inches, or 0.30 square yards.

2. 10-foot straight edge.
3. Sweeper: A sweeper, equipped with a water tank, capable of remove millings and loose debris.
4. Air compressor: An air compressor capable of producing 100 psi oil free compressed air for cleaning the milled pavement surface.
5. Hot air lance: A hot air lance that can deliver 100 psi oil free heated air to clean and dry the pavement surface. The compressed air emitted from the tip of the lance shall achieve a temperature of at least 1500°F.
6. Paving and compaction equipment: Paving and compaction equipment meeting the requirements of Section 4.06. It is expected that much of the placement will require hand work or a mixture of equipment and hand tools to achieve the required results. Smaller compaction equipment, including vibratory plate compactors, will be allowed by the Engineer to achieve the required results. At all times the Contractor is required to meet the density and compaction and all other requirements specified in Sections 4.06 and M.04.
7. Portable lighting equipment: If the work is performed at night a truck towed light tower and driver shall be provided for use by the Engineer for all marking, installation, and inspection of the patches.
8. Tack Coat Distributor: A minimum 150-gallon capacity tank that is trailer mounted or self-propelled and capable of applying tack coat meeting the requirements of Section 4.06.

The work shall include, but is not limited to, the following:

1. Demarcating: The Engineer will mark out areas for patching and will determine the appropriate milling depth between 1.5 inches and 2.5 inches. The minimum length and width dimensions of the patch shall be 20 inches. Any area to be patched shall completely encompass the entire distressed pavement area and extend at least 6 inches beyond into the surrounding pavement wherever possible.
2. Milling: Mill marked out areas to the specified depths.
3. Sweeping, Cleaning, and Drying: Sweep the milled surface clean, and allow milled areas to dry. Any moisture in or on the milled areas must be allowed to evaporate or be removed with the assistance of the hot air lance. When the milled area is dry to the satisfaction of the Engineer, it shall be blown clean of any residual dust or debris using compressed air.

4. Applying Tack Coat: Apply tack coat to the entire clean and dry milled area, including the sides/walls of the area to be patched, in accordance with the requirements of Section 4.06.
5. Placing Patch Material: After the tack coat has had sufficient time to cure or break, HMA S0.375 or equivalent PMA shall be placed and compacted to the requirements above and in Section 4.06. The Contractor shall confirm that the surface elevation of the finished patch matches the elevation of the surrounding pavement surface to within 1/4 inch using the 10-foot straightedge. The Contractor shall confirm that all patch material placed is uniform in appearance without segregation.

Method of Measurement:

This work will be measured by the number of square yards of patched bituminous concrete completed and accepted.

Basis of Payment:

This work will be paid for at the Contract unit price per square yard of “Bituminous Concrete Surface Patch.” The price shall include all tools, materials, labor and equipment; milling, removing, and disposing of pavement millings; sweeping and cleaning of the milled area; drying the milled area; applying tack coat to the milled area; and placement and compaction of HMA or PMA.

Pay Item	Pay Unit
Bituminous Concrete Surface Patch	s.y.

ITEM #0406192A – POLYMER MODIFIED ASPHALT EMULSION (TYPE 1)
ITEM #0406193A – ULTRA-THIN BONDED PMA PAVEMENT (TYPE B)
ITEM #0406600A – MATERIAL TRANSFER VEHICLE

Description: Work under these items shall include the production and placement of an ultra-thin polymer modified asphalt (PMA) mixture consisting of a warm polymer-modified asphalt emulsion tack coat followed immediately by an ultra-thin (0.625 inch) lift of PMA. Gradation “Type B” shall be used. “Polymer Modified Asphalt Emulsion (Type 1)” will be referred to herein as “polymer modified emulsion.” “Ultra-Thin Bonded PMA Pavement (Type B)” will be referred to herein as “ultra-thin PMA” or “ultra-thin PMA, material/mixture.” The abbreviation PMA (polymer modified asphalt) applies to the PMA mixture that specifies a polymer-modified binder with warm-mix technology incorporated. These items shall be constructed in conformance with the lines, grades, thicknesses, and typical cross sections shown on the plans or established by the Engineer.

Materials:

- A. Polymer Modified Emulsion:** This material shall meet the requirements of CRS-1P as shown in Table 1 - Polymer Modified Emulsion Material Properties, shall be tested by the supplier, and shall be submitted to the Engineer with a Certified Test Report. The polymer modifier shall be milled or blended into the asphalt emulsion base or the emulsifying agent prior to the emulsification process.

Table 1 – Polymer Modified Emulsion Material Properties

Emulsion Properties	Method	Minimum	Maximum
Polymer Content, % by Weight of Total Residue	AASHTO T 59	3.0	--
Viscosity, Saybolt Furol, 77°F (25°C), second	AASHTO T 59	20	100
Sieve Test, %	AASHTO T 59	--	0.10
Demulsibility, %	AASHTO T 59	40	--
Storage Stability Test, 1 Day (Difference in % Residue)	AASHTO T 59	--	1.0
Classification Test	AASHTO T 59	Passes	--
Particle Charge Test	AASHTO T 59	Positive ⁽¹⁾	--
Residue by Distillation, % ⁽²⁾	AASHTO T 59	63	--
Oil Distillate, Volume of Total Emulsion, %	AASHTO T 59	--	3

Table 1 – Polymer Modified Emulsion Material Properties (continued)

Residue from Distillation Properties	Method	Minimum	Maximum
Penetration at 77°F (25°C), 100 g, 5 second	AASHTO T 49	60	150
Ductility at 77°F (25°C), 5 cm/minute (2 in./min), cm	AASHTO T 51	40	--
Solubility in Organic Solvent, % ⁽³⁾	AASHTO T 44	97.0	--
Elastic Recovery at 50°F (10°C), % ⁽⁴⁾	ASTM D6084	58	--
Ash Content, %	AASHTO T 111	--	1 max

Notes:

- (1) If the Particle Charge Test result is inconclusive, material having a minimum pH value of 6.7 will be acceptable.
- (2) Perform according to AASHTO T 59 except as follows:
 - a. When the lower temperature reaches approximately 275°F (135°C) move the ring burner approximately level with the bottom of the still.
 - b. Increase the temperature to a maximum 350°F±11°F (177°C ± 5.5°C), maintaining this temperature for 15 minutes.
 - c. Use an ASTM 16c thermometer to monitor the temperature of the emulsion. Distillation on field samples shall show no more than trace amounts of oil.
- (3) Any organic solvent used shall be demonstrated and proven to work under the above testing protocols. The type and brand of solvent used shall be recorded and submitted as part of the required testing information.
- (4) Use ASTM D6084 Testing Procedure “A.” Samples shall be tested at 50°F (10°C).

B. Ultra-Thin PMA: The materials for the ultra-thin PMA mixture, source(s) of supply, Job Mix Formula (JMF), mix tolerances, approval of JMF, and the control of the mixture shall meet the requirements of Section M.04. The JMF shall also meet the requirements in Table 2 - Ultra-Thin PMA Mixture Requirements (Type B), and must be submitted to the Engineer for approval at least 30 days before production. Any JMF change must be submitted to the Engineer for approval at least 24 hours in advance of manufacturing any ultra-thin PMA mixture using the new JMF.

Table 2 – Ultra-Thin PMA Mixture Requirements (Type B)

Sieve Sizes	Design Limits % Passing ⁽¹⁾	Production Tolerance % ⁽¹⁾
1/2 inch	100	
3/8 inch	85-100	+/- 5
No. 4	24-40	+/- 4
No. 8	21-32	+/- 4
No. 16	16-26	+/- 4
No. 30	12-20	+/- 3
No. 50	8-16	+/- 3
No. 100	5-10	+/- 2
No. 200	4.0-7.0	+/- 1.5
% PGB	4.8 – 5.4	
Moisture Sensitivity, AASHTO T 283 ⁽²⁾	80% minimum	
Film Thickness ⁽³⁾	0.35 mils (9.0 µm (microns)) minimum	
Draindown, AASHTO T 305	0.1% maximum	

Notes:

- (1) All aggregate percentages are based on total mass of aggregate.
- (2) Specimens for AASHTO T 283 testing are to be compacted using the Superpave gyratory compactor. The mixtures shall be compacted using 100 gyrations to produce specimens approximately 3.7 inches in height. Use mixture and compaction temperatures recommended by the binder supplier. When necessary, an anti-stripping agent shall be added to provide resistance to stripping.
- (3) Film thickness to be obtained using effective binder content. Surface area to be calculated according to Asphalt Institute MS-2 methodology.

1. **Asphalt Binder:** A PG 64E-22 binder shall be used meeting the requirements of Section M.04 in the Contract, with the following additional requirement: The binder shall incorporate warm-mix technology listed on the Northeast Asphalt User-Producer Group Qualified WMA technologies list at the time of bidding, under headings A (Organic (Waxes) Additives) or B (Chemical Additives) only, available online at http://www.neaupg.uconn.edu/?attachment_id=345. The PG 64E-22 binder with warm-mix technology shall be selected to meet the recommended mix application temperature of 300 - 350°F and the compaction cessation temperature of 200°F, as specified in Construction Methods, (C) Application and (E) Compaction. The dosage of warm-mix additive shall be as recommended by the binder supplier and shall be submitted to the Engineer for approval at least seven (7) days prior to commencing any ultra-thin PMA paving under this Contract.

2. **Coarse Aggregate:** Coarse aggregates that are from more than one source or of more than one type of material shall have all constituents proportioned and blended to provide a uniform mixture. Crushed stone from an approved source meeting the following requirements of (a) or (b) and Table 3 shall be used:

- (a) Sandstone, granite, chert, traprock, or other similar non-carbonate material.
- (b) Gravel, or a natural or manufactured blend of the following types of material: limestone, dolomite, gravel, sandstone, granite, chert, traprock or other similar materials meeting the following requirements:
- 0.5 inch Nominal Maximum Size Aggregate Mixes
 - A minimum of 20% of plus 0.375 inch particles must be non-carbonate.
 - 0.375 inch Nominal Maximum Size Aggregate Mixes
 - A minimum of 20% of plus 0.1875 inch particles must be non-carbonate.

Note: Non-carbonate particles are defined as having a minimum acid insoluble residue content of 80%.

Table 3 – Coarse Aggregate Properties

Property	Method	Requirement
LA Abrasion Coefficient, maximum % loss	AASHTO T 96	30
Maximum percent passing #200 sieve, %	AASHTO T 11, T 27	2
Soundness, maximum % loss	AASHTO T 104	10
Fractured particles, %	AASHTO T 335	100

Table 4 – Recommended Coarse Aggregate Gradation

Sieve Size	Type B (% Passing)
3/4 inch	100
1/2 inch	100
3/8 inch	85-100
1/4 inch	0-15
No. 4	0-3
No. 8	0

3. **Fine Aggregate:** Fine aggregate shall be 100% crushed stone having a minimum sand equivalent of 60%, as determined by AASHTO T 176, “Plastic fines in Graded Aggregates and Soils by Use of the Sand Equivalent Test.” Table 5 shows the recommended fine aggregate gradation.

Table 5 – Fine Aggregate Gradation

Sieve Size	Percent Passing
No. 4	100
No. 8	90-100
No. 16	60-80
No. 30	45-60
No. 50	30-40
No. 100	20-30
No. 200	15-25

4. **Mineral Filler:** Mineral Filler shall meet the requirements of Article M.04.01.

Construction Methods:

A. Equipment:

1. **Paver:** The self-priming spray paver must be capable of spraying the polymer modified emulsion, applying the PMA overlay and smoothing the surface of the mat in one pass at a rate of at least 30 ft/min. The self-priming spray paver must be equipped with a receiving hopper, feed conveyor, emulsion storage tank, metered high-pressure emulsion spray bar(s) and a variable width, heated, extendable ironing-type screed. The spray bar system must be capable of applying the polymer modified emulsion across the entire width of the screed, including the full width of the variable width screed extensions.

The paver shall be equipped with a microprocessor and controls which shall control the flow of the polymer modified emulsion and shall vary the application rate of the emulsion to ensure a uniform application rate of the polymer modified emulsion at the desired application rate, plus or minus 0.02 gallons/square yard based on speed and paving width. The paver must be able to apply the specified polymer modified emulsion rate at all speeds, including all stops and starts of the paver, uniformly across the full width of the mat being placed. The screed must have the ability to produce a crown at the center both positively and negatively and be vertically adjustable and shall have horizontal extensions to accommodate the desired pavement profile.

2. **Rollers:** All rollers shall be self-propelled, ten (10) ton double drum rollers designed for compaction of PMA. The Contractor shall furnish a minimum of three (3) rollers for each paving machine to properly seat the ultra-thin PMA. The rollers shall only operate in the static mode and additional rollers may be required to meet production needs.
3. **Infrared Thermometers:** The Contractor shall supply for the Engineer's use a minimum of two (2) new, unused handheld digital infrared laser sighted thermometers for the duration of each Project. The infrared thermometers supplied shall meet the certification requirements of EN61326-1, EN61010, and EN60825-1 maintained by the European Committee for Electrotechnical Standardization (CENELEC). The thermometers shall

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have a minimum distance-to-spot ratio of 50:1 and shall have adjustable emissivity control. The thermometers shall have a minimum accuracy value of $\pm 1\%$ of reading or $\pm 2^{\circ}\text{F}$, whichever is greater. The thermometers shall be used in accordance with the manufacturer's written directions. All thermometers supplied must be in agreement within 5°F of each other at all times at any temperature between 0°F and 500°F . If at any time any of the thermometers supplied are found to be in noncompliance with any of the above criteria, the Contractor shall dispose of them and provide the Engineer with a minimum of two (2) new unused thermometers meeting the above requirements. Immediately at the completion of the ultra-thin PMA work, the thermometers supplied by the Contractor shall become the property of the State and shall be delivered to the Engineer, with a signed letter of transmission acknowledging the formal transfer of ownership of the infrared thermometers to the Engineer.

4. **Material Transfer Vehicle (MTV):** An MTV shall be used when placing ultra-thin PMA material. The MTV must be a self-propelled vehicle, specifically designed for the purpose of delivering the bituminous concrete mixture from the delivery truck to the paver. The MTV must continuously remix the bituminous concrete mixture throughout the placement process. The use of a MTV will be subject to the requirements stated in Article 1.07.05 - Load Restrictions. The Engineer may limit the use of the vehicle if it is determined that the use of the MTV may damage highway components, utilities, or bridges. The Contractor shall submit to the Engineer at pre-construction the following information:
 - (a) The make and model of the MTV to be used.
 - (b) The individual axle weights and axle spacing for each separate piece of paving equipment (haul vehicle, MTV and paver).
 - (c) A working drawing showing the axle spacing in combination with all three (3) pieces of equipment that will comprise the paving echelon.
5. **Power Broom/ Sweeper:** A motorized broom or sweeper shall be provided that is capable of cleaning the road surface prior to application of polymer modified emulsion.

- B. **Surface Preparation:** The work to remove pavement markings, seal cracks and patch areas of distress shall have been completed (under other items) prior to application of polymer modified emulsion and ultra-thin PMA. Immediately prior to the application of polymer modified emulsion and ultra-thin PMA, the roadway surface shall be cleaned by the Contractor using a motorized sweeper and any other equipment or means necessary to remove all foreign debris and material (leaves, branches, dirt, sand, garbage, etc) from the pavement surface. All foreign debris and material shall be removed and disposed of by the Contractor.

The pavement surface shall be dry immediately prior to the application of the emulsion.

The Contractor shall protect all manhole covers, water boxes, catch basins and other utility structures with plastic or building felt, which shall be removed upon completion of the paving operation.

- C. **Temperature Determinations and Requirements:** The infrared thermometers provided by the Contractor shall be used to determine all specified temperature requirements. Only one (1)

thermometer shall be used to determine and record a temperature. If there is any question about the accuracy of any recorded temperature, an additional Contractor-supplied infrared thermometer shall be used to confirm the temperature. As long as two (2) or more thermometers are in agreement within 5°F, the first temperature shall be officially recorded by the Engineer. This temperature will be used, as necessary, to enforce any and all specified temperature requirements, including rejection of materials and halting or shutdown of the work as stated herein.

Note: A probe type thermometer may be used only at the asphalt plant manufacturing facility to test the PMA during production and plant testing. If a probe type thermometer is used at an asphalt plant, it shall comply with the probe type thermometer requirements contained in Section 4.06 of the Contract. Probe type thermometers shall not be used in the field once the mix is delivered to the Site.

- D. Application:** The pavement surface temperature for application of the polymer modified emulsion and placement of the ultra-thin PMA shall be at least 50°F. The ambient temperature shall be at least 50°F and rising. Artificial heating of the pavement surface is not allowed. The finished in-place ultra-thin PMA shall be a minimum thickness of 0.625 inches and a maximum thickness of 0.875 inches. In no case shall the ultra-thin PMA be placed in a permanent condition creating a “drop-off” or vertical deviation in the direction of travel. Transition requirements of Section 4.06.03-5 shall apply to areas in the direction of travel and be paid for under separate items. In no case shall the ultra-thin PMA exceed the minimum thickness of 0.625 inches along the longitudinal edge of the treatment at the shoulders.

The application temperature of the polymer modified emulsion shall be 130°F – 190°F and a uniform application across the entire width to be overlaid shall be at a rate of 0.15 to 0.25 gal./s.y. The polymer modified emulsion shall extend one (1) to two (2) inches beyond the longitudinal edge of the ultra-thin PMA. The Contractor shall submit in writing the Project-specific rate(s) of application to the Engineer for approval prior to commencement of the work under this item. The submittal shall include backup details for the proposed polymer modified emulsion rates for each distinct surface type such as, but not limited to, milled vs. unmilled surfaces, new vs. aged or raveling pavement. A “distinct area” shall have a minimum length of 100 feet and minimum width of eight (8) feet. The Engineer may direct the Contractor to pre-apply additional emulsion to any area that requires a higher emulsion application rate within a paver pass so that the proper emulsion application rate for each surface texture type can be achieved in a single paving pass. The Contractor shall continuously monitor the spray rate.

The ultra-thin PMA material shall be placed on the polymer modified emulsion as soon as possible to ensure that the ultra-thin PMA is placed on the polymer modified emulsion before it breaks or migrates (runs) along the pavement surface. Prolonged stops of the paver are not allowed. If a prolonged stop results in improper application or breaking of the polymer modified emulsion, or the inability to meet the compaction requirements stated herein, the Engineer shall stop the operation until the Contractor can demonstrate that all emulsion application and mix compaction requirements can, and are, being met.

Note: The emulsion target application rate will depend on the macro texture of the surface on

which the emulsion will be placed. Projects where the emulsion will be placed on milled or high (open) texture existing pavements will require emulsion application rates toward the high end of the 0.15 to 0.25 gal./s.y. range, while applications over pavements with a particularly tight texture (small-aggregate leveling courses and/or polished, flushed, or bled pavement surfaces) will require application rates at the lower end of the specification range.

No equipment shall come in contact with the polymer modified emulsion before the ultra-thin PMA wearing course is applied.

The ultra-thin PMA wearing course shall be applied across the full width of the emulsion at a temperature of 300°F – 350°F. The mix delivery temperature will be checked for conformance using the infrared thermometers provided. The Engineer will check the mix delivery temperature at the back of the haul truck. The Engineer may also check the mix delivery temperature in the hopper of the paver or in the hopper of the material transfer vehicle machine if warranted. When checking the mix in the back of the haul truck, at least the top 6 inches of the surface of the load will be removed prior to checking the mix temperature. This will be accomplished by either using a shovel to remove at least the top 6 inches of the load or the load shall be allowed to “break” when beginning the dumping process, exposing PMA material that is at least 6 inches below the surface of the load. When checking mix in the hopper of the paver or the material transfer vehicle, the Engineer will use the infrared thermometer to record the temperature of the mix in several areas of the hopper and use a shovel, if necessary, to remove any mix from the surface to expose mix in the hopper that is representative of the overall temperature of the truck load. The Engineer will record the highest temperature found when multiple infrared temperature readings are taken in the hopper. Truckloads of PMA material not meeting the minimum temperature requirement will be rejected by the Engineer.

- E. Testing of Materials:** The Engineer will conduct acceptance sampling and testing of the ultra-thin PMA mixture at the PMA facility, in accordance with Section M.04, for gradation and binder content. The Engineer may allow the Contractor to conduct acceptance testing, following the sampling and testing procedures herein and shall retain a 2500-gram split sample for verification testing. Verification testing will be performed by the Engineer on the retained samples in accordance with the Department’s current [Quality Assurance \(QA\) Program for Materials, Acceptance and Assurance Testing](#). Should gradation or binder content exceed the specified tolerances, the Department will investigate to determine an assignable cause. Contractor test results for a subject subplot may be replaced with the Department’s results. The split sample shall be stored in an appropriate container, sealed, and labeled with the Project number, PMA plant name, date, time obtained, sequential truckload number, subplot, and name of the person obtaining the sample. The sample will be stored and disposed of at the discretion of the Engineer following the completion of the Project.

Passing Test: Ultra-thin PMA material meeting all tolerances for gradation and binder content shown in Table 2 as determined by sampling and testing in accordance with these requirements is defined as a Passing Test.

Failing Test: A Failing Test is defined as ultra-thin PMA material exceeding one or more of the tolerances in gradation and binder content shown in Table 2 as determined by sampling

and testing in accordance with these requirements.

Lot: For ultra-thin PMA mixture sampling and testing purposes, a lot is defined as one planned production run or 24-hour period, whichever is shorter. An additional lot will be created every 24 hours of a multiple-day production run.

Each lot shall be subdivided into equal sublots based on planned quantity of PMA mixture for the production run as outlined in Table 6 so that each lot is represented by a minimum of two or three sublots.

Table 6 – Minimum Sampling and Testing Schedule at PMA Facility

Planned Production Run Quantity (tons)	Number of Sublots
1-400	1
401-800	2
801-1200	3
1201+	4

The Contractor shall submit to the Engineer the planned production quantity for a lot at least four (4) hours prior to commencement of production of the ultra-thin PMA mixture. The planned quantity of production for each subplot shall be converted to a sequential, ordinal number of truckloads (i.e. 1, 2, 3, etc.). For each lot, the first subplot shall be randomly selected from the first five (5) truckloads. A random-selection procedure will be used to sample the truckload of material representing each remaining subplot.

At any time, the Contractor may obtain additional samples for Quality Control (QC) purposes. The Contractor shall designate a sample as a QC sample prior to conducting its sampling. No QC samples will be included in the acceptance of the produced material.

- F. Compaction:** The compaction process used is meant to seat the PMA mixture into the sprayed polymer modified emulsion rather than to obtain density. Compaction shall start immediately after application of the wearing course and be completed before the mix falls below the compaction cessation temperature of 200°F. Compaction shall be obtained by use of the paver screed and by the use of three (3) double drum rollers in static mode. A minimum of four (4) static roller passes must be made over any given area prior to cooling of the ultra-thin PMA material below 200°F.

The ultra-thin PMA mixture shall be placed and rolled to provide a continuous and smooth surface with uniform texture. The roller(s) shall not be allowed to stop on the freshly placed wearing course. The wearing course shall be protected from traffic until the rolling operation is complete and the material has cooled sufficiently to resist damage.

A 10 foot straightedge shall be made available to the Engineer during all paving operations, inspection, and testing. If milling is specified as part of the work, or in any other areas where the ultra-thin PMA is required to be placed flush with adjacent pavement surfaces, structures,

or other surrounding appurtenances, the pavement surface shall be tested with the straightedge to ensure that the pavement surface does not deviate by more than 1/4 inch in any direction. When matching irregular surfaces or structures, the Engineer will use discretion when enforcing this rule.

- G. Corrective Work Procedures:** Any portion of the completed pavement that the Engineer determines to not meet these specifications, or is determined to be defective or non-homogeneous in surface texture, shall be corrected at the Contractor's expense.

If at any time the Engineer determines that the polymer modified emulsion supplied does not meet any of these specifications, the Engineer will stop the entire paving operation until the Contractor demonstrates "re-conformance" with these specifications.

If the specified application rate of the polymer modified emulsion is determined by the Engineer to fall outside the allowable tolerances, the Engineer will stop the paving operation until such time the Contractor can demonstrate compliance with these specifications. In all cases, if the Contractor continues to place material unacceptable to the Engineer, the Engineer reserves the right to withhold payment for, or call for the removal and replacement of, all material placed in non-conformance with these specifications.

If any of the individual specified ultra-thin PMA material production tolerances are not met more than once in four tests, the production of the ultra-thin PMA material shall be stopped until the Contractor runs a trial test demonstrating compliance within the production tolerances listed herein. In such a case, the Engineer reserves the right to withhold payment for, or call for the removal and replacement of, all ultra-thin PMA material placed between the rendering of the first out of tolerance test and ceasing mix production operations due to the second out of tolerance test.

Any ultra-thin PMA material placed at less than 0.625 inches thick, or greater than 0.875 inch thick, shall be subject to removal as determined by the Engineer. In no case shall the ultra-thin PMA exceed the minimum thickness of 0.625 inches along the longitudinal edge of the treatment at the shoulders. Any longitudinal edge or "drop-off" formed showing a thickness of greater than 0.625 inch shall be removed immediately by the Contractor.

Any flushing of the polymer modified emulsion to the surface of the ultra-thin PMA material shall be considered and treated as a deviation in texture and shall be analyzed and treated according to the texture requirements herein.

If the Engineer determines that any full width travel lane area or full width shoulder area that is at least 100 feet long contains any change or deviation in texture occurring in 1.5% (or greater) of the surface, that area shall be replaced at the Contractor's expense.

Unless otherwise determined by the Engineer, all corrective work shall be done with the ultra-thin PMA material. Any corrective ultra-thin PMA placed shall be placed by the spray paver as specified herein and shall be placed at a minimum width equal to the width of the main screed of the paver for no less than 100 feet in length. Corrective work shall not be performed

exclusively by hand with the ultra-thin PMA material. Small isolated areas or defects, with the permission of the Engineer, may be repaired with material other than the ultra-thin PMA material required to be placed with the spray paver specified herein.

Note: “Small isolated areas or defects” are defined as: One area of 25 square feet or less per full width lane or full width shoulder for any given continuous 200 foot lane or shoulder section that was placed by the spray paver.

If pavement placed by the Contractor is deemed unacceptable, and the Engineer requires its replacement or correction, the Contractor shall:

1. Propose a corrective procedure to the Engineer for review and approval prior to any corrective work commencing. The proposal shall include:
 - (a) Limits of pavement to be replaced or corrected, indicating stationing or other landmarks.
 - (b) Anticipated schedule.
 - (c) Construction method and sequence of operations.
 - (d) Methods of maintenance and protection of traffic.
 - (e) Material sources.
 - (f) Names and telephone numbers of supervising personnel.
2. Perform all corrective work in accordance with the Contract and the approved corrective procedure.

H. Material Documentation: All vendors producing ultra-thin PMA must have their truck-weighing scales, storage scales, and mixing plant automated to provide a detailed ticket. Delivery tickets must include the following information:

1. State of Connecticut printed on ticket.
2. Name of producer, identification of plant, and specific storage bin (silo) if used.
3. Date and time of day.
4. Net weight (tons) of material loaded into truck.
5. Gross weight or tare weight of truck.
6. Project number, purchase order number, name of contractor (if contractor other than producer).
7. Sequential Truck number for specific identification of truck. Sequential number shall use natural numbers and be ordered beginning with the first truck for a production lot on the basis of time truck is loaded (i.e. 1, 2, 3, etc.)
8. Individual aggregate and asphalt high/target/low weights shall be printed on batch plant tickets. (For drum plants and silo loadings, the plant printouts shall be maintained by the vendor for a period of three (3) years after the completion of the Project).

The Contractor must notify the Engineer immediately if, during the production day, there is a malfunction of the recording system in the automated plant or truck-weighing scales. Manually written tickets containing all required information will be allowed for one (1) hour, but for no longer, provided that each load is weighed on State-approved scales. At the Engineer’s sole discretion, trucks may be approved to leave the plant if a State inspector is present to monitor weighing. If such a malfunction is not fixed within forty-eight (48) hours, material will not be

approved to leave the plant until the system is fixed to the Engineer's satisfaction. No damages will be considered should the State be unable to provide an inspector at the plant.

The State reserves the right to have an inspector present to monitor batching or weighing operations.

- I. Cessation of Supply:** The production plant providing ultra-thin PMA shall cease supplying materials to this Project under any of the following conditions:
1. If the supplied ultra-thin PMA material exceeds one or more of the tolerances shown in Table 2 on two (2) samples out of the latest consecutive three (3) samples tested for gradation or binder content, delivery of material to the Site shall not resume until a passing test is performed.
 2. If the supplied polymer modified emulsion fails to meet any of the specified requirements. Supply of material to the Site may resume once the Contractor demonstrates, in writing to the Engineer, that the requirements herein are met.
 3. If the resulting surface texture fails to meet any of the specified requirements. Supply of material to the Site shall not resume until the Contractor determines the cause of the deficient or non-homogeneous surface texture, proposes corrective measures in a submittal to the Engineer for acceptance or approval.
 4. If the final compacted thickness requirements/tolerances stated herein are not met. Supply of the material shall not resume until the Contractor determines why the final compacted thickness placed specified herein was not met, proposes/demonstrates a change in the placement operations, and institutes said change to assure conformance with this specification.
 5. If the compaction requirements stated herein are not met, Supply may not resume until the Contractor submits, in writing to the Engineer, the cause of the inability to meet the compaction requirements within this specification. In addition, the Contractor shall submit, in writing to the Engineer, proposed changes to address the identified cause of the problem and a proposed revised compaction plan to meet this specification.

Cessation of Supply shall occur as many times as necessary until the Contractor completes the work properly according to all the requirements within this specification.

All ultra-thin PMA material in non-conformance with this specification, as described above, which is not subject to non-payment or removal and replacement by the Engineer, shall be considered deficient material (DM).

Method of Measurement:

1. **Polymer Modified Asphalt Emulsion (Type 1):** The quantity of Polymer Modified Asphalt Emulsion (Type 1) will be measured for payment by the number of gallons furnished and applied on the Project and accepted by the Engineer.
2. **Ultra-Thin Bonded PMA Pavement (Type B):** The quantity of Ultra-Thin Bonded PMA Pavement (Type B) will be measured for payment by the documented area covered, measured

in square yards, at the thickness shown on the plans and will be subject to the following adjustment:

Material Deficiency Adjustment (MDA): Ten percent (10%) of the total quantity of material determined by the Engineer that exceeds one or more of the tolerances shown in Table 2 for Ultra-Thin PMA, Type B will be used for purposes of determining MDA.

For deficient material due to failing tests of the PMA mixture at the plant, the entire quantity of produced PMA in each of the two (2) failing sublots leading to each instance of Cessation of Supply delivered to the Site will be included in the DW term of the MDA calculation.

The adjustment in square yards will be calculated as follows:

$$\text{MDA in square yards (s.y.)} = \text{DM} \times 0.10$$

Where:

DM = square yards (s.y.) of deficient ultra-thin PMA, Type B material, calculated as follows:

$$\text{DM} = \text{TA} \times [\text{DW} / \text{TW}]$$

Where:

TA = Total documented area covered and measured in square yards (s.y.)

DW = Total weight of deficient ultra-thin PMA, Type B material exceeding one or more of the tolerances shown in Table 2 for ultra-thin PMA, Type B, as determined by the Engineer from delivery tickets

TW = Total weight of ultra-thin PMA, Type B material determined by the Engineer from the delivery tickets

3. **Material Transfer Vehicle:** The furnishing and use of a MTV will be measured for payment based on the actual number of tons of ultra-thin PMA Pavement (Type B) delivered to a paver using the MTV. The number of tons will be obtained from delivery tickets.

Basis of Payment:

1. **Polymer Modified Asphalt Emulsion (Type 1):** Material for asphalt emulsion will be paid at the Contract unit price per gallon for “Polymer Modified Asphalt Emulsion (Type 1).”
2. **Ultra-Thin Bonded PMA Pavement (Type B):** The furnishing and placing of the PMA mixture will be paid at the Contract unit price per square yard for “Ultra-Thin Bonded PMA Pavement (Type B).”

The cost for all equipment, tools, and work required to place and compact the polymer modified emulsion and the ultra-thin PMA shall be included in the respective unit prices. These prices shall also include cleaning the existing pavement surface prior to placement of the ultra-thin PMA

material with rotary power sweeping and vacuuming equipment if required and the cost for providing lighting for the purpose of illuminating the work area and equipment during placement operations.

The work to remove pavement markings, seal cracks and patch areas of distress will be paid under other items.

- 3. **Material Transfer Vehicle:** The Material Transfer Vehicle (MTV) will be paid at the Contract unit price per ton for a “Material Transfer Vehicle.”
- 4. **Adjustments:** Any adjustments will be incorporated by construction order for material deficiencies documented by the Engineer.

Material Deficiency Adjustment (MDA): The quantity of MDA in square yards will be used to determine the adjustment value which will be deducted from the total Contract amount.

$$\text{MDA Adjustment} = \text{MDA (s.y.)} \times \text{Contract price per square yard (\$/s.y.)}$$

No separate or additional payment will be made for any work related to the replacement or correction of defective pavement as determined by the Engineer. Related work includes, but is not limited to, items such as the removal and replacement of ultra-thin PMA, maintenance and protection of traffic, pavement repairs, replacement of bridge joints, pavement markings and any other work that is deemed necessary by the Engineer to provide and produce acceptable corrective or replacement work to the pavement.

Payment will be for the items completed and accepted by the Engineer, the price of which shall include all labor, materials and equipment incidentals thereto.

Pay Item	Pay Unit
Polymer Modified Asphalt Emulsion (Type 1)	gal.
Ultra-Thin Bonded PMA Pavement (Type B)	s.y.
Material Transfer Vehicle	ton

ITEM #0406196A – JOINT AND CRACK FILLING OF BITUMINOUS CONCRETE PAVEMENT

Description: This work consists of furnishing and applying a hot-applied mixture of Performance Graded (PG) asphalt binder and polyester fibers into bituminous concrete pavement joints and cracks. It shall be constructed in close conformity with the lines, grades, thicknesses, and typical cross sections shown on the plans or established by the Engineer. Joint and Crack Filling in Bituminous Concrete Pavement may be used in conjunction with other repair treatments including joint and crack sealing or patching, in which case the sequence of treatments will be provided in the Plans or directed by the Engineer.

For the purposes of this document, the word “crack” includes all longitudinal (along the direction of travel) and transverse (perpendicular to the direction of travel) cracks and joints. All work specified for “crack(s)” herein shall apply to all types of cracks and joints unless otherwise specified.

Materials: The hot-applied crack filling material shall be composed of a mixture of Performance Graded Asphalt Binder and polyester fibers blended to provide $3\% \pm 0.5\%$ fibers by weight. No field mixing of the fibers is allowed. The crack filling material (with fibers) shall be prepackaged, labeled, and arrive on Site ready to be placed in the melter applicator. The component materials shall meet the following requirements:

1. Polyester Fibers: A Materials Certificate shall be provided by the manufacturer for this material. The polyester fibers must meet the following requirements:

Property	Test Method	Requirement
Length	N/A	0.25 inch \pm 2 mils (6.4mm \pm 0.05mm)
Crimps	ASTM D3937	None
Tensile Strength*	ASTM D2256	69,600 psi (480 MPa), minimum
Denier*	ASTM D1577	3.0 – 6.0
Specific Gravity	N/A	1.32 – 1.40
Melting Temperature	N/A	473°F (245°C), minimum
Ignition Temperature	N/A	1000°F (540°C), minimum

* This data must be obtained prior to cutting the fibers.

2. Performance Graded (PG) Asphalt Binder: The Performance Graded (PG) Asphalt Binder shall be PG 64E-22 (PG 76-22) and shall meet the requirements of AASHTO M 320(M) and AASHTO R 29(M). The Contractor shall submit a Certified Test Report and bill of lading representing each delivery in accordance with AASHTO R 26(M). The Certified Test Report must also indicate the asphalt binder specific gravity at 77°F, rotational viscosity at 275°F and 329°F, and a mixing and compaction viscosity-temperature chart as if the asphalt binder were to be used as binder for the construction of hot mix asphalt. The blending of PG asphalt binder from different suppliers is strictly prohibited. Contractors who blend PG asphalt

binders will be classified as a "Supplier" and will be required to certify the asphalt binder in accordance with AASHTO R 26(M).

3. Optional Barrier Material - Clean, Dry Sand: Sand shall conform to the requirements of Standard Specification Article M.01.03, Fine Aggregates, except that the gradation requirements shall be replaced with the following:

Square Mesh Sieve	Percent Passing by Weight
No. 8	100
No. 50	10 – 40
No. 100	0 – 10
No. 200	0 – 3

The Contractor must submit to the Engineer all Material Safety Data Sheet and Certified Test Report documents from the material manufacturer(s) prior to the commencement of work. During work progress, the Contractor must submit to the Engineer the manufacturer's Material Certificate for compliance to applicable specifications for each batch or lot of material used on the Contract.

Construction Methods: The crack filling operation shall proceed in accordance with the requirements of the "Maintenance and Protection of Traffic" and "Prosecution and Progress" specifications.

1. Equipment: The equipment used by the Contractor shall include, but not be limited to, the following:
- a. **Melter Applicator:** The unit shall consist of a boiler kettle equipped with pressure pump, hose, and applicator wand; the boiler kettle may be a combination melter and pressurized applicator of a double-boiler type with space between the inner and outer shells filled with heat transfer oil. Heat transfer oil shall have a flash point of not less than 600°F. The kettle shall include a temperature control indicator. The kettle shall be capable of maintaining the crack fill material at the manufacturer's specified application temperature range. The kettle shall include an insulated applicator hose and application wand. The hose shall be equipped with a shutoff control. The kettle shall include a mechanical fullsweep agitator to provide continuous blending. The unit shall be equipped with thermometers to monitor the material temperature and the heating oil temperature. The unit shall be equipped with thermostatic controls that allow the operator to regulate material temperature up to at least 425°F.
 - b. **Application Wand and Squeegee Applicator:** The material shall be applied with a wand followed by a squeegee applicator. The squeegee applicator shall be of commercial/industrial quality designed with a "U" shaped configuration. It shall be of a size adequate to strike off, flush with the surrounding pavement surface and without overflow around the sides, all crack fill material placed. This tool shall be either attached to the applicator wand or used separately as its own long handled tool.

- c. Hot Air Lance: The unit shall be designed for cleaning and drying the pavement surface cracks. Minimum compressed air capacity shall be 100 psi. The compressed air emitted from the tip of the lance shall be capable of achieving a temperature of at least 1500°F.
 - d. Vertically Mounted Power Driven Wire Brush: This tool shall be used to remove any dirt, debris, or vegetation to the depths specified that cannot be removed by the hot air lance. It shall be of adequate size and power to remove all material from cracks as specified.
2. Weather Requirements: Work shall not be performed unless the pavement is dry. No frost, snow, ice, or standing water may be present on the roadway surface or within the cracks. The ambient temperature must be 40°F and rising during field application operations for work to proceed.
 3. Material Mixing Procedure: The prepackaged material shall be added to the melter applicator in the presence of the Engineer. It shall then be mixed and heated to the recommended application temperature. The crack fill material shall never exceed 400°F.
 4. Determination of Cracks to be Filled: The width and depth requirements for cracks to be filled are as follows:

All crack width determinations shall be made by measuring the crack width flush at the surface of the pavement prior to being filled. A straightedge shall be used whenever necessary to establish the location or limits of the flush surface of the pavement.

All cracks from ¼ inch up to 1.5 inches wide shall be prepared and filled as stated below. Cracks that are between ¼ inch and 1.5 inches wide, but eventually taper in width below the minimum ¼ inch, shall also be prepared and filled as stated below. Only cracks that are less than ¼ inch wide throughout their entire length shall be excluded.

Transverse cracks, where a portion of the crack (50% or less) exceeds a width of 1.5 inches, up to 2 inches, shall also be prepared and filled as stated below.

All joints to be filled that are raveled (loss of the pavement surface material) shall be at least ½ inch in depth at the joint's deepest point. The minimum width of a raveled joint must be ½ inch. The maximum width of a raveled joint to be filled is 3 inches.

Any cracks exceeding the width and depth requirements specified above shall be repaired using separate items.

5. Crack Preparation: Cracks to be filled shall be treated with a hot air lance prior to application of the crack fill material. Two (2) passes minimum shall be made with the hot air lance. The hot air lance operation shall proceed at a rate no greater than 120 feet per minute. There shall

be no more than 10 minutes between the second hot air lance treatment and the material application. Should this time be exceeded, additional pass(es) shall be made with the hot air lance.

The use of the hot air lance is not intended to heat the crack. It is to be used to blow all debris from the crack to the depths specified below and to remove any latent moisture from the crack until the inside of the crack is completely dry as determined by the Engineer. "Moisture" does not include standing water. The hot air lance is not to be used to boil off or blow standing water from the bottom of a crack. If standing water is present in the bottom of any crack, the filling operation shall be postponed until such time that the standing water evaporates naturally. The Contractor may use compressed, oil-free air (not heated) to blow standing water from a crack to help accelerate the natural evaporation process. If standing water remains after using compressed air, the crack shall be allowed to dry naturally until remaining standing water evaporates. The hot air lance may be used after visible water has evaporated. If a crack is already completely dry as determined by the Engineer, the hot air lance shall be operated at its lowest temperature possible.

The hot air lance shall be used to blow all debris from cracks (not including raveled joints) to a depth of at least $\frac{3}{4}$ inch for cracks between $\frac{1}{4}$ inch and $\frac{3}{4}$ inch wide, and to a depth of 1.25 inches for cracks between $\frac{3}{4}$ inch and 2 inches wide. The hot air lance shall be used to blow all debris from raveled joints to a depth of 1 inch or the full depth of the joint, whichever is smaller.

In the event that cracks are packed tightly with debris, dirt, vegetation, or other material, except previously placed sealant or filler, the Contractor shall use a vertically mounted power driven wire brush to remove all material and burnish the sides of the crack to the depths specified above. Cracks treated with the power driven wire brush shall subsequently be treated with a hot air lance as described in this section. The use of both the power driven wire brush and the hot air lance shall result in the complete removal of all material in the crack (except previously placed sealant or filler) to the depths specified above such that the sides of the crack are completely free and clean of any debris and moisture.

In the event that cracks have depths greater than 2 inches below the pavement surface, the Contractor may place a barrier composed of clean, dry sand as specified herein. The barrier material shall be placed in a manner leaving 1.25 inches below the elevation of the pavement surface for crack filling material. A barrier will not be allowed for cracks wider than 1.5 inches or less than $\frac{1}{2}$ inch wide.

6. Crack Filling: As soon as cracks have been prepared, they shall be filled to refusal along their entire length. The treatment material shall be maintained at the manufacturer's specified/recommended application temperature range at all times. The filling operation shall be suspended if the temperature of the crack filling material falls outside the specified temperature range and shall remain suspended until the crack filling material is brought within the specified temperature range. Filled cracks are to be squeegeed immediately following application of the crack filling material, striking excess filler flat to the adjacent

pavement surface. There shall be no build-up of treatment material above or adjacent to the crack at any time. If the initial application of crack fill material fails to fill the crack or shrinks upon cooling such that there is a depression formed of at least ¼ inch or greater, a second application of filler shall be placed over the first application.

7. Protection of Filled Cracks: Traffic shall not be permitted on the pavement until the crack fill material is set so that the material does not track and is not deformed or pulled out by tires. If the work under this item is being performed prior to placing a hot mix overlay or other surface treatment, a detackifier or blotting agent will not be allowed. If work under this item is not followed by placement of an overlay of any kind, a detackifier or blotting agent may be used. If a detackifier or blotting agent is used, it shall be one recommended by the supplier of the crack filling material and shall be used as recommended by the supplier, except that no paper, cotton, or other organic materials shall be allowed. Information on the type and usage of a detackifier or blotting agent shall be presented to the Engineer for their written acceptance prior to use.
8. Removal and Disposal of Material: All debris generated from the operations described above shall be removed from the roadway by the Contractor.

Treatment material remaining in the Contractor’s kettle at the close of the daily work session shall be discarded. At no time shall treatment material be re-heated for use in subsequent crack filling applications unless permitted by the Engineer following a review of specific circumstances.

All debris and surplus treatment material shall be properly disposed in accordance with Article 1.10.03 and State of Connecticut law.

9. Acceptance of Work: When the work is complete, an inspection shall be scheduled with the Engineer. The Engineer will note all deficiencies including, but not limited to, areas exhibiting adhesion failure, cohesion failure, tracking of filler material, and missed cracks. Work identified by the Engineer as not acceptable shall be repaired at the Contractor’s expense. The Contractor shall notify the Engineer upon completion of any corrective work performed.

Method of Measurement: This work will be measured by the total Project area in square yards of bituminous concrete roadway surface, as indicated in the Contract plans and as measured, verified, and accepted by the Engineer.

Basis of Payment: This work will be paid for at the Contract unit price per square yard for "Joint and Crack Filling in Bituminous Concrete Pavement" complete and accepted in place. The price shall include all submittals, materials, equipment, tools, and labor incidental thereto. No payment will be made to the Contractor prior to submittal of required documents.

Pay Item	Pay Unit
Joint and Crack Filling in Bituminous Concrete Pavement	s.y.

ITEM #0406198A – JOINT AND CRACK SEALING OF BITUMINOUS CONCRETE PAVEMENT

Description: This work consists of furnishing and applying hot-applied rubberized asphalt crack sealer to bituminous concrete pavement joints and cracks. It shall be constructed in close conformity with the lines, grades, thicknesses, and typical cross sections shown on the plans or established by the Engineer. Joint and Crack Sealing of Bituminous Concrete Pavement may be used in conjunction with other repair treatments including, but not limited to, joint and crack filling or patching, in which case the sequence of treatments will be provided in the Contract Documents or directed by the Engineer.

For the purposes of this document, the word “crack” includes all longitudinal (along the direction of travel) and transverse (perpendicular to the direction of travel) cracks and joints. All work specified for “crack(s)” herein shall apply to all types of cracks and joints unless otherwise specified.

Materials:

1. Crack Seal: The crack seal material shall be composed of a hot-applied, rubberized asphalt meeting AASHTO M 324 Type II requirements. The crack seal material will also contain a minimum of 10% crumb rubber by weight. The Contractor must submit to the Engineer all Material Safety Data Sheet documents from the material manufacturer prior to the commencement of work. During work progress, the Contractor must submit to the Engineer the manufacturer’s Material Certificate for compliance to AASHTO M 324 Type II requirements for each batch or lot of material utilized on the Contract.
2. Optional Barrier Material – Backer Rod: The backer rod shall be a heat resistant material compatible with the crack sealant and acceptable to the manufacturer of the sealant. No bond or reaction shall occur between the sealant and the rod. It shall be of a non-water absorbent material and shall not melt or shrink when hot sealant is poured on it.

The backer rod shall have a maximum of 5% absorption when immersed in water for 24 hours with the ends sealed. The backer rod shall be of such a size that compression is required for installation in the crack, so that it maintains its position during the sealing operation. Backer rod shall be dry.

3. Optional Barrier Material – Hot Mix Asphalt (HMA): Any HMA placed in the bottom of a crack between 1.5 and 2 inches wide shall be HMA S0.25 Traffic Level 2 and shall meet all requirements of Section 4.06 - Bituminous Concrete.

The Contractor must submit to the Engineer all Material Safety Data Sheet documents from the material manufacturer(s) prior to the commencement of work. During work progress, the Contractor must submit to the Engineer the manufacturer’s Material Certificate for compliance to applicable specifications for each batch or lot of material utilized on the Contract.

Construction Methods: The crack sealing operation shall proceed in accordance with the requirements of the “Maintenance and Protection of Traffic” and “Prosecution and Progress” specifications.

1. Equipment: The equipment used by the Contractor shall include, but not be limited to, the following:
 - a. **Melter Applicator:** The unit shall consist of a boiler kettle equipped with pressure pump, hose, and applicator wand; the boiler kettle may be a combination melter and pressurized applicator of a double-boiler type with space between the inner and outer shells filled with heat transfer oil. Heat transfer oil shall have a flash point of not less than 600°F. The kettle shall include a temperature control indicator. The kettle shall be capable of maintaining the crack seal material at the manufacturer’s specified application temperature range. The kettle shall include an insulated applicator hose and application wand. The hose shall be equipped with a shutoff control. The kettle shall include a mechanical full sweep agitator to provide continuous blending. The unit shall be equipped with thermometers to monitor the material temperature and the heating oil temperature. The unit shall be equipped with thermostatic controls that allow the operator to regulate material temperature up to at least 425°F.
 - b. **Application Wand and Squeegee Applicator:** The material shall be applied with a wand followed by a squeegee applicator. The squeegee applicator shall be of commercial/industrial quality designed with a “U” shaped configuration. It shall be of a size adequate to strike off, flush with the surrounding pavement surface and without overflow around the sides, all crack seal material placed. This tool shall be either attached to the applicator wand or used separately as its own long handled tool.
 - c. **Hot Air Lance:** The unit shall be designed for cleaning and drying the pavement surface cracks. Minimum compressed air capacity shall be 100 psi. The compressed air emitted from the tip of the lance shall be capable of achieving a temperature of at least 1500°F.
 - d. **Vertically Mounted Power Driven Wire Brush:** This tool shall be used to remove any dirt, debris, or vegetation to the depths specified that cannot be removed by the hot air lance. It shall be of adequate size and power to remove all material from cracks as specified.
2. Weather Requirements: Work shall not be performed unless the pavement is dry. No frost, snow, ice, or standing water may be present on the roadway surface or within the cracks. The ambient temperature must be 40°F and rising during the field application operations for work to proceed.

3. Material Mixing Procedure: The prepackaged material shall be added to the melter applicator in the presence of the Engineer. It shall then be mixed and heated to the recommended application temperature. The crack seal material shall never exceed 400°F.
4. Determination of Cracks to be Sealed: The width and depth requirements for cracks to be sealed are as follows:

All crack width determinations shall be made by measuring the crack width flush at the surface of the pavement prior to being sealed. A straightedge shall be used whenever necessary to establish the location or limits of the flush surface of the pavement.

All cracks from $\frac{1}{8}$ inch up to 1.5 inches wide shall be prepared and sealed as stated below. Cracks that are between $\frac{1}{8}$ inch and 1.5 inches wide, but eventually taper in width below the minimum $\frac{1}{8}$ inch, shall also be prepared and sealed as stated below. Only cracks that are less than $\frac{1}{8}$ inch wide throughout their entire length shall be excluded.

Transverse cracks, where a portion of the crack (50% or less) exceeds a width of 1.5 inches, up to 2 inches, shall also be prepared and sealed as stated below.

All joints to be sealed that are raveled (loss of the pavement surface material) shall be at least $\frac{1}{2}$ inch in depth at the joint's deepest point. The minimum width of a raveled joint must be $\frac{1}{2}$ inch. The maximum width of a raveled joint to be sealed is 3 inches.

Any cracks exceeding the width and depth requirements specified above shall be repaired using separate items.

5. Crack Preparation: Cracks to be sealed shall be treated with a hot air lance prior to application of the crack seal material. Two (2) passes minimum shall be made with the hot air lance. The hot air lance operation shall proceed at a rate no greater than 120 feet per minute. There shall be no more than 10 minutes between the second hot air lance treatment and the material application.

The use of the hot air lance is not intended to heat the crack. It is to be used to blow all debris from the crack to the depths specified below and to remove any latent moisture from the crack until the inside of the crack is completely dry as determined by the Engineer. "Moisture" does not include standing water. The hot air lance is not to be used to boil off or blow standing water from the bottom of a crack. If standing water is present in the bottom of any crack, the sealing operation shall be postponed until such time that the standing water evaporates naturally. The Contractor may use compressed, oil-free air (not heated) to blow standing water from a crack to help accelerate the natural evaporation process. If standing water remains after using compressed air, the crack shall be allowed to dry naturally until remaining standing water evaporates. The hot air lance shall be used after visible water has evaporated. If a crack is already completely dry as determined by the Engineer, the hot air lance shall be operated at its lowest temperature possible.

The hot air lance is to be used to blow all debris from cracks (not including raveled joints) to a depth of at least $\frac{3}{4}$ inch for cracks between $\frac{1}{8}$ inch and $\frac{3}{4}$ inch wide, and to a depth of 1.25 inches for cracks between $\frac{3}{4}$ inch and 2 inches wide. The hot air lance shall be used to blow all debris from raveled joints to a depth of 1 inch or the full depth of the joint, whichever is smaller.

In the event that cracks are packed tightly with debris, dirt, vegetation, or other material, except previously placed sealant or filler, the Contractor shall use a vertically mounted power driven wire brush to remove all material and burnish the sides of the crack to the depths specified above. Cracks treated with the power driven wire brush shall subsequently be treated with a hot air lance as described in this section. The use of both the power driven wire brush and the hot air lance shall result in the complete removal of all material in the crack (except previously placed sealant or filler) to the depths specified above such that the sides of the crack are completely free and clean of any debris and moisture.

In the event that cracks have depths greater than 2 inches below the pavement surface, the Contractor may place a barrier composed of backer rod as specified herein. The backer rod shall be placed in a manner leaving 1.25 inches below the elevation of the pavement surface for crack seal material. Use of backer rod will not be allowed for cracks wider than 1.5 inches or less than $\frac{1}{2}$ inch wide. For cracks between 1.5 and 2 inches wide, HMA S0.25 Traffic Level 2 may be placed in the bottom of the prepared crack. HMA shall be placed and compacted with a steel T-bar approved by the Engineer in a manner leaving 1.25 inches below the elevation of the pavement surface for crack seal material.

6. Crack Sealing: As soon as cracks have been prepared, they shall be filled to refusal along their entire length with the crack sealant material. The treatment material shall be maintained at the manufacturer's specified/recommended application temperature range at all times. The sealing operation shall be suspended if the temperature of the crack seal material falls outside the specified temperature range and shall remain suspended until the crack seal material is brought within the specified temperature range. Sealed cracks are to be squeegeed immediately following application of the crack seal material, striking excess sealer flat to the adjacent pavement surface. There shall be no build-up of treatment material above or adjacent to the crack at any time. If the initial application of crack sealant material fails to fill the crack or shrinks upon cooling such that there is a depression formed of at least $\frac{1}{4}$ inch or greater, a second application of sealant shall be placed over the first application.
7. Protection of Sealed Cracks: Traffic shall not be permitted on the pavement until the crack seal material is set so that the material does not track and is not deformed or pulled out by tires. If the work under this item is being performed prior to placing a hot mix overlay or other surface treatment, a detackifier or blotting agent will not be allowed. If work under this item is not followed by placement of an overlay of any kind, a detackifier or blotting agent may be used. If a detackifier or blotting agent is used, it shall be one recommended by the supplier of the crack seal material and shall be used as recommended by the supplier, except that no paper, cotton, or other organic materials shall be allowed. Information on the type and

usage of a detackifier or blotting agent shall be presented to the Engineer for their written acceptance prior to use.

- 8. Removal and Disposal of Material: All debris generated from the operations described above shall be removed from the roadway by the Contractor.

Treatment material remaining in the Contractor’s kettle at the close of the daily work session shall be discarded. At no time shall treatment material be re-heated for use in subsequent crack sealing applications unless permitted by the Engineer following a review of specific circumstances.

All debris and surplus treatment material shall be properly disposed in accordance with Article 1.10.03 and State of Connecticut law.

- 9. Acceptance of Work: When work is complete, an inspection shall be scheduled with the Engineer. The Engineer will note all deficiencies including, but not limited to, areas exhibiting adhesion failure, cohesion failure, tracking of sealant material, and missed cracks. Work identified by the Engineer as not acceptable shall be repaired at the Contractor’s expense. The Contractor shall notify the Engineer upon completion of any corrective work performed.

Method of Measurement: This work will be measured by the total Project area in square yards of bituminous concrete roadway surface, as indicated in the Contract plans and as measured, verified, and accepted by the Engineer.

Basis of Payment: This work will be paid for at the Contract unit price per square yard for “Joint and Crack Sealing of Bituminous Concrete Pavement” complete and accepted in place. The price shall include all submittals, materials, equipment, tools, and labor incidental thereto. No payment will be made to the Contractor prior to submittal of required documents.

Pay Item	Pay Unit
Joint and Crack Sealing of Bituminous Concrete Pavement	s.y.

ITEM #0406275A - FINE MILLING OF BITUMINOUS CONCRETE (0 TO 4 INCHES)

Description: This work shall consist of the milling, removal, and disposal of existing bituminous concrete pavement.

Construction Methods: The Contractor shall remove the bituminous concrete material using means acceptable to the Engineer. The pavement surface shall be removed to the line, grade, and existing or typical cross-section shown on the plans or as directed by the Engineer.

The bituminous concrete material shall be disposed of offsite by the Contractor at an approved disposal facility unless otherwise stated in the Contract.

Any milled surface, or portion thereof, that is exposed to traffic shall be paved within five (5) calendar days unless otherwise stated in the plans or Contract.

The equipment for milling the pavement surface shall be designed and built for milling bituminous concrete pavements. It shall be self propelled with sufficient power, traction, and stability to maintain depth and slope and shall be capable of removing the existing bituminous concrete pavement.

The milling machine shall be equipped with a built-in automatic grade averaging control system that can control the longitudinal profile and the transverse cross-slope to produce the specified results. The longitudinal controls shall be capable of operating from any longitudinal grade reference, including string line, contact ski (30 feet minimum), non-contact ski (20 feet minimum), or mobile string line (30 feet minimum). The transverse controls shall have an automatic system for controlling cross-slope at a given rate. The Engineer may waive the requirement for automatic grade or slope controls where the situation warrants such action.

The machine shall be able to provide a 0 to 4 inch deep cut in one pass. The rotary drum of the machine shall use carbide or diamond tipped tools spaced not more than $\frac{5}{16}$ inch apart. The forward speed of the milling machine shall be limited to no more than 45 feet/minute. The tools on the revolving cutting drum must be continually maintained and shall be replaced as warranted to provide a uniform pavement texture.

The machine shall be equipped with an integral pickup and conveying device to immediately remove material being milled from the surface of the roadway and discharge the millings into a truck, all in one operation. The machine shall also be equipped with a means of effectively limiting the amount of dust escaping from the milling and removal operation.

When milling smaller areas or areas where it is impractical to use the above described equipment, the use of a lesser equipped milling machine may be permitted when approved by the Engineer.

Protection shall be provided around existing catch basin inlets, manholes, utility valve boxes, and any similar structures. Any damage to such structures as a result of the milling operation is the Contractor's responsibility and shall be repaired at the Contractor's expense.

To prevent the infiltration of milled material into the storm drainage system, the Contractor shall take special care to prevent the milled material from falling into the inlet openings or inlet grates. Any milled material that has fallen into inlet openings or inlet grates shall be removed at the Contractor's expense.

Surface Tolerance: The milled surface shall provide a satisfactory riding surface with a uniform textured appearance. The milled surface shall be free from gouges, longitudinal grooves and ridges, oil film, and other imperfections that are a result of defective equipment, improper use of equipment, or poor workmanship. The Contractor, under the direction of the Inspector, shall perform random spot-checks with a Contractor supplied ten-foot straightedge to verify surface tolerances at a minimum of five (5) locations per day. The variation of the top of two ridges from the testing edge of the straightedge, between any two ridge contact points, shall not exceed ¼ inch. The variation of the top of any ridge to the bottom of the groove adjacent to that ridge shall not exceed ¼ inch. Any unsatisfactory surfaces produced are the responsibility of the Contractor and shall be corrected at the Contractor's expense and to the satisfaction of the Engineer.

The depth of removal will be verified by taking measurements every 250 feet per each pass of the milling machine, or as directed by the Engineer. These depth measurements shall be used to monitor the average depth of removal.

Where a surface delamination between bituminous concrete layers or a surface delamination of bituminous concrete on Portland cement concrete causes a non-uniform texture to occur, the depth of milling shall be adjusted in small increments to a maximum of +/- ½ inch to eliminate the condition.

When removing bituminous concrete pavement entirely from an underlying Portland cement concrete pavement, all of the bituminous concrete pavement shall be removed leaving a uniform surface of Portland cement concrete, unless otherwise directed by the Engineer.

Any unsatisfactory surfaces produced by the milling operation are the Contractor's responsibility and shall be corrected at the Contractor's expense and to the satisfaction of the Engineer.

No vertical faces, transverse or longitudinal, shall be left exposed to traffic unless the requirements below are met. This shall include roadway structures (catch basins, manholes, utility valve boxes, etc.). If any vertical face is formed in an area exposed to traffic, a temporary paved transition shall be established according to the requirements shown on the plans. If the milling machine is used to form a temporary transition, the length of the temporary transition shall conform to Special Provision Section 4.06 –Bituminous Concrete, "Transitions for Roadway Surface," the requirements shown on the plans, or as directed by the Engineer. At all

permanent limits of removal, a clean vertical face shall be established by saw cutting prior to paving.

Roadway structures shall not have a vertical face of greater than one (1) inch exposed to traffic as a result of milling. All structures within the roadway that are exposed to traffic and greater than one (1) inch above the milled surface shall receive a transition meeting the following requirements:

For roadways with a posted speed limit of 35 mph or less*:

1. Round structures with a vertical face of greater than 1 inch to 2.5 inches shall be transitioned with a hard rubber tapered protection ring of the appropriate inside diameter designed specifically to protect roadway structures.
2. Round structures with a vertical face greater than 2.5 inches shall receive a transition of bituminous concrete formed at a minimum 24 to 1 (24:1) taper in all directions.
3. All rectangular structures with a vertical face greater than 1 inch shall receive a transition of bituminous concrete formed at a minimum 24 to 1 (24:1) taper in all directions.

*Bituminous concrete tapers at a minimum 24 to 1 (24:1) taper in all directions may be substituted for the protection rings if approved by the Engineer.

For roadways with a posted speed limit of 40, 45 or 50 mph:

1. All structures shall receive a transition of bituminous concrete formed at a minimum 36 to 1 (36:1) taper in the direction of travel. Direction of travel includes both the leading and trailing side of a structure. The minimum taper shall be 24 to 1 (24:1) in all other directions.

For roadways with a posted speed limit of greater than 50 mph:

1. All structures shall receive a transition of bituminous concrete formed at a minimum 60 to 1 (60:1) taper in the direction of travel. Direction of travel includes both the leading and trailing side of a structure. The minimum taper shall be 24 to 1 (24:1) in all other directions.

All roadway structure edges and bituminous concrete tapers shall be clearly marked with fluorescent paint. The paint shall be maintained throughout the exposure to traffic.

The milling operation shall proceed in accordance with the requirements of the "Maintenance and Protection of Traffic" and "Prosecution and Progress" specifications, or other Contract requirements. The more stringent specification shall apply.

Prior to opening an area which has been milled to traffic, the pavement shall be thoroughly swept with a sweeper truck. The sweeper truck shall be equipped with a water tank and be capable of removing the millings and loose debris from the surface. The sweeper truck shall operate at a forward speed that allows for the maximum pickup of millings from the roadway surface. Other

sweeping equipment may be provided in lieu of the sweeper truck where acceptable by the Engineer.

Any milled area that will not be exposed to live traffic for a minimum of 48 hours prior to paving shall require a vacuum sweeper truck in addition to, or in lieu of, mechanical sweeping. The vacuum sweeper truck shall have sufficient power and capacity to completely remove all millings from the roadway surface including any fine particles within the texture of the milled surface. Vacuum sweeper truck hose attachments shall be used to clean around pavement structures or areas that cannot be reached effectively by the main vacuum. Compressed air may be used in lieu of vacuum attachments if approved by the Engineer.

Method of Measurement: This work will be measured for payment by the number of square yards of area from which the milling of asphalt has been completed and the work accepted. No area deductions will be made for minor unmilled areas such as catch basin inlets, manholes, utility boxes and any similar structures.

Basis of Payment: This work will be paid for at the Contract unit price per square yard for “Fine Milling of Bituminous Concrete (0 to 4 Inches).” This price shall include all equipment, tools, labor, and materials incidental thereto.

No additional payments will be made for multiple passes with the milling machine to remove the bituminous surface.

No separate payments will be made for cleaning the pavement prior to paving; providing protection and doing handwork removal of bituminous concrete around catch basin inlets, manholes, utility valve boxes and any similar structures; repairing surface defects as a result of the Contractors negligence; providing protection to underground utilities from the vibration of the milling operation; removal of any temporary milled or paved transition; removal and disposal of millings; furnishing a sweeper truck and sweeping after milling. The costs for these items shall be included in the Contract unit price.

Pay Item	Pay Unit
Fine Milling of Bituminous Concrete (0 to 4 Inches)	S.Y.

ITEM #0406287A - RUMBLE STRIPS - AUTOMATED

ITEM #0406288A - RUMBLE STRIPS - MANUAL

Description:

Work under this item shall consist of installing rumble strips on asphalt highway shoulders where shown on the plans or where directed by the Engineer, and in conformance with these specifications.

Construction Methods:

The Contractor shall pre-mark the location of the edge of the cut, and the beginning and ending points of the sections, prior to the installation of the rumble strips. The Engineer shall review and approve the locations.

The Contractor shall arrange for a technical representative, from the company which produces the milling machine to be used on the project, who will be required to be on-site from the beginning of the operation in order to ensure results that meet the requirements of the plans and specifications until such time the Engineer is satisfied.

Rumble strips should not be installed on bridge decks, in acceleration and deceleration lanes, at drainage structures, at loop detector sawcut locations, or in other areas identified by the Engineer.

Automated (Wide Shoulders):

The equipment shall be able to install the rumble strips in sections where the shoulder width from the edge line to an obstruction is greater than or equal to 4 feet. Where there are no obstructions, the equipment shall be used in sections where the shoulder width from the edge line is a minimum of 3 feet. The equipment shall consist of a rotary type cutting head with a maximum outside diameter of 24" and shall be a minimum of 16" long. The cutting head(s) shall have the cutting tips arranged in such a pattern as to provide a relatively smooth cut (approximately 1/16 of an inch between peaks and valleys) in one pass. The cutting head shall be on its own independent suspension from that of the power unit to allow the tool to self align with the slope of the shoulder or any irregularities in the shoulder surface. The equipment shall include suitable provisions for the application of water to prevent dusting. The Contractor shall use a machine capable of creating the finished pattern at a minimum output of 60 rumble strips per minute.

Manual (Narrow Shoulders):

The equipment shall be able to install the rumble strips in sections where the shoulder width from the edge line to an obstruction is between 3 feet and 4 feet. The cutting head(s) shall have the cutting tips arranged in such a pattern as to provide a relatively smooth cut (approximately 1/16 of an inch between peaks and valleys) in one pass. The equipment shall include suitable provisions for the application of water to prevent dusting.

Finished Cut (Automated or Manual)

The rumble strips shall have finished dimensions of 7" (+/- 1/2") wide in the direction of travel and shall be a 16" (+/- 1/2") long measured perpendicular to the direction of travel. The depressions shall have a concave circular shape with a minimum 1/2" depth at center (maximum allowable depth is 5/8" measured to a valley). The rumble strips shall be placed in relation to the roadway according to the patterns shown in the plans or on the Rumble Strip Details. Alignment of the edge of the cut shall be checked and verified by the Engineer.

The cutting tool shall be equipped with guides to provide consistent alignment of each cut in relation to the roadway.

The Contractor shall pick up any waste material resulting from the operation in a manner acceptable to the Engineer. This waste material shall be disposed of in accordance with Subarticle 2.02.03-10(a).

The work area shall be returned to a debris-free state prior to re-opening to traffic.

The Contractor shall provide all traffic control according to the Maintenance and Protection of Traffic Specification included elsewhere in the contract.

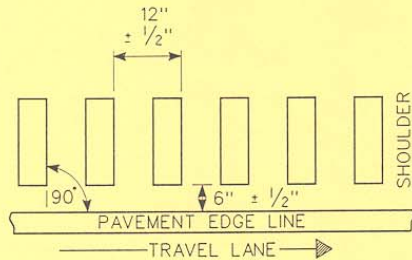
Method of Measurement:

This work will be measured for payment by the actual number of feet of shoulder where the rumble strips are placed and accepted. This distance shall be measured longitudinally along the edge of pavement with deductions for bridge decks, acceleration and deceleration lanes, drainage structures, loop detector sawcut locations, and other sections where the rumble strips were not installed.

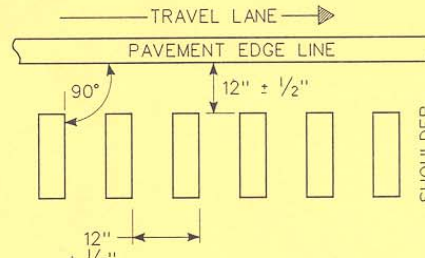
Basis of Payment:

This work will be paid for at the Contract unit price per foot for "Rumble Strips - Automated" or "Rumble Strips - Manual." The price shall include furnishing all equipment, tools, labor, a technical representative and work incidental thereto and also disposal of any waste material resulting from the operation. The Contractor will not be paid under the item "Rumble Strips - Manual" if the field conditions allow for the use of the "Rumble Strips - Automated" item, even if the manual method was used.

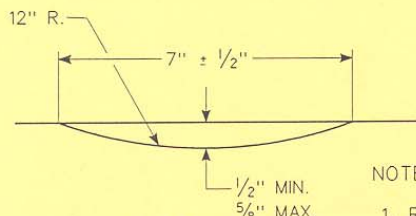
DETAILS AND SECTIONS OF RUMBLE STRIPS



LOCATION DETAIL (TYP.)
LEFT SHOULDER



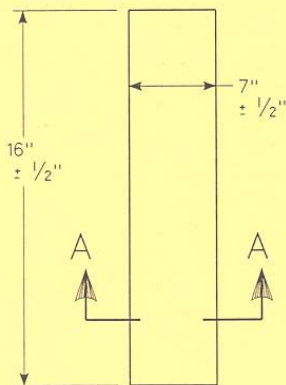
LOCATION DETAIL (TYP.)
RIGHT SHOULDER



SECTION A-A
NO SCALE

NOTES:

1. RUMBLE STRIP ALIGNMENT SHALL GENERALLY BE STRAIGHT AND OFFSET APPROXIMATELY 6" IN THE LEFT SHOULDER AND 12" IN THE RIGHT SHOULDER FROM THE OUTER EDGE OF THE EDGE LINE AND SHALL BE AT LEAST 12" FROM THE LONGITUDINAL JOINT IN COMPOSITE PAVEMENTS. THIS OFFSET MAY BE ADJUSTED TO ACCOMMODATE VARIATIONS IN THE EDGE LINE AND THE SHOULDER WIDTH.



PLAN DETAIL

FILE: RUMBLE.MDS

CONNECTICUT
DEPARTMENT OF TRANSPORTATION
BUR. OF ENGINEERING & HWY. OPERATIONS
DIVISION OF TRAFFIC ENGINEERING

RUMBLE STRIP DETAILS

ENGINEER *Erika B. Smith* DATE 10-18-99

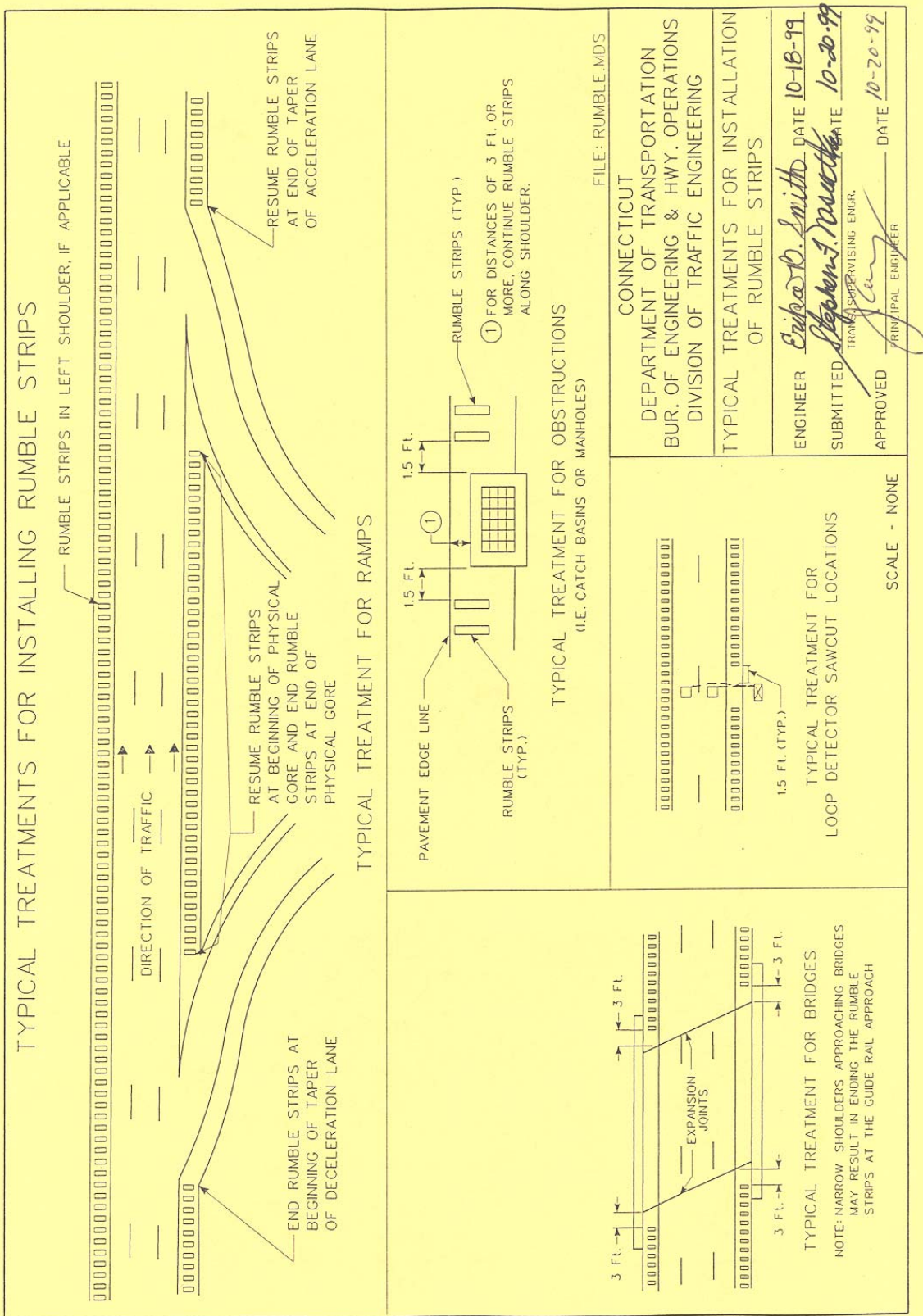
SUBMITTED *Stephen J. Masieko* DATE 10-20-99
TRANS. SUPERVISING ENGR.

APPROVED *J. Long* DATE 10-20-99
PRINCIPAL ENGINEER

SCALE - NONE

ITEM # 0406287A

ITEM # 0406288A



ITEM #0406314A – 80 MIL PAVEMENT MARKING GROOVE 5” WIDE

ITEM #0406315A – 80 MIL PAVEMENT MARKING GROOVE 7” WIDE

ITEM #0406316A – 80 MIL PAVEMENT MARKING GROOVE 9” WIDE

Description:

Work under this item shall consist of grooving the pavement surface in a continuous or regularly spaced fashion for the placement of recessed pavement markings. Unless otherwise noted, the groove shall be 1 inch wider than the anticipated pavement marking. The groove for double-yellow centerline markings shall consist of two grooves, each 5 inches wide.

Groove Width: 5 inches wide for 4-inch markings
7 inches wide for 6-inch markings
9 inches wide for 8-inch markings

Groove Depth: 0.080 inches ± 0.010 inches

The groove shall not be installed continuously for intermittent pavement markings, but only where markings are to be applied.

The groove shall not be installed on metal bridge decks, on bridge joints, at drainage structures, at loop detector sawcut locations, or in other areas identified by the Engineer.

Equipment:

The grooving equipment shall be equipped with a free-floating, depth-controlled head which provides a consistent groove depth over irregular pavement surfaces. The grooving head shall only be equipped with diamond saw blades. Any ridges in the bottom of the groove shall have a maximum height of 0.015 inches.

The grooving equipment shall be capable of installing a groove 6 inches away from any vertical or horizontal obstruction.

Construction Methods:

The pavement marking groove shall be installed in accordance with the current ConnDOT pavement marking standard drawings.

The Contractor shall establish control points for measuring offsets and pre-marks along the entire distance of pavement being grooved. Prior to installation of the groove, the Contractor shall verify the equipment is capable of installing the correct width and spacing of the groove. The control

points, pre-marks, and equipment will be reviewed by the Engineer prior to commencement of the work.

The groove will be considered defective if any edge of the groove varies more than 0.25 inch in a 10-foot length, or if the alignment of the groove visibly deviates from the normal alignment of the road.

Final Cleaning: The Contractor shall immediately collect all debris and dust resulting from the grooving operation by vacuuming the pavement groove and adjacent pavement surface. Collected debris and any waste material shall be properly disposed of by the Contractor.

The work area shall be returned to a debris-free state prior to re-opening to traffic.

Repair of Unacceptable Groove:

The Contractor shall repair any defective groove(s) to the satisfaction of the Engineer. All work in conjunction with this repair shall be performed at no additional cost to the State.

Pavement Marking Requirements:

The Contractor is required to install permanent epoxy resin pavement markings in the grooves before the lane or roadway is opened to live traffic. If the permanent pavement markings cannot be installed before the lane or roadway is opened to live traffic, temporary 0.005-inch hot-applied waterborne pavement markings without glass beads shall be installed before the lane or roadway is opened to live traffic at no additional cost to the State. Within 10 calendar days, permanent epoxy resin pavement markings shall be applied in the groove over the 0.005-inch hot-applied waterborne pavement markings.

Groove Depth Gauge:

The Contractor shall supply the Engineer with two accurate, easily readable gauges with which to verify groove depth for the duration of the project. The gauges shall be delivered no less than one week prior to the anticipated beginning of grooving operations. Gauges shall be accompanied by manufacturer's instructions for their use. The gauges will be returned to the Contractor at the conclusion of the project.

Method of Measurement:

This work will be measured for payment by the number of linear feet of groove installed in the pavement as ordered and accepted by the Engineer.

Basis of Payment:

This work will be paid for at the contract unit price per linear feet of "Pavement Marking Groove" installed in the pavement and accepted. This price shall include cleaning of the pavement, all

Item #0406314A, #0406315A, #0406316A

materials, equipment, tools, depth gauges, and labor incidental thereto, and disposal of any waste material resulting from the operation.

Pay Item

80 Mil Pavement Marking Groove 5" Wide
80 Mil Pavement Marking Groove 7" Wide
80 Mil Pavement Marking Groove 9" Wide

Pay Unit

L.F.
L.F.
L.F.

ITEM #0406702A – EMULSIFIED ASPHALT SEAL COAT, APPLIED

Description: This work consists of furnishing and applying an emulsified asphalt seal coat (fog seal) on existing bituminous concrete shoulders and covering the fog seal with an abrasive material (cover coat) at the locations shown in the plans or established by the Engineer.

The following terms as used in this specification are defined as:

Fog Seal: A light spray application of diluted emulsified asphalt.

Cover Coat: A thin layer of fine boiler slag abrasive.

Emulsified Asphalt Break: The initial separation of the water from the asphalt that can be detected by a marked color change of the emulsified asphalt from brown to black. This break results in the deposition of the base asphalt onto the surface.

Materials:

1. **Water:** The water used for dilution shall be clean, potable, and free from solids or salts.
2. **Emulsified Asphalt:** Emulsified asphalt grades for the fog seal treatment shall meet the requirements for RS-1h, SS-1h, CRS-1h, or CSS-1h in accordance with Article M.04.01-5.
The diluted emulsified asphalt must be produced by water-diluting an approved, tested, and certified emulsified asphalt at a 1:1 ratio; higher dilution ratios may be used upon the Engineer's approval. Each shipment shall be accompanied by two copies of the bill of lading listing the material supplier, emulsified asphalt grade, dilution rate, total quantity loaded, and a copy of the undiluted emulsified asphalt certification.
3. **Cover Coat:** The cover coat material shall be furnished from a source acceptable to the Engineer and shall be clean, durable boiler slag free from organic matter, clay lumps, and other deleterious materials. The Contractor may propose an alternative material for the cover coat, but will be required to demonstrate the material's compatibility with the fog seal prior to use on the project. The cover coat shall be free from moisture and meet the requirements in Tables 1 and 2.

Table 1 – Cover Coat Material Properties

<u>Property</u>	<u>Requirement</u>
Particle Shape	Angular, Sharp
Hardness	> 6 on the Mohs scale
Solubility	Insoluble
Color	Black

Table 2 – Cover Coat Material Gradation

<u>Sieve Size</u>	<u>% Passing</u>
No. 8	100
No. 200	0-3

The Contractor shall sample the emulsified asphalt in accordance with AASHTO R 66 and sample the cover coat material in accordance with AASHTO T 2. The Contractor shall test the emulsified asphalt according to AASHTO T 59 and the cover coat material according to AASHTO T 11 and AASHTO T 27. The Contractor shall submit a Certified Test Report (CTR) and a Materials Certificate for all supplied materials in accordance with Section 1.06.07. CTRs for emulsions shall

indicate results of testing done in accordance with either AASHTO M 140 for anionic emulsions or AASHTO M 208 for cationic emulsions.

Construction Methods:

1. Equipment:

- a. Emulsion Distributor and Hand Sprayer: An emulsion distributor or a hand sprayer, calibrated in accordance with ASTM D2995, shall be used for spraying emulsions. The distributor shall be free of any contaminants.
- b. Pump: A pump that produces a continuous flow of emulsion through the spray bar shall be provided by the Contractor. Pumps must have a minimum clearance of 0.030 inch to prevent over-shearing. Heat applied to the tank or spray bar shall not exceed 185°F at any time.
- c. Spray Nozzles: Spray nozzle sizes shall be between 1/8 and 3/16 inch. Spray nozzle angles shall be adjusted to produce correct overlap. A hand sprayer shall be used for applying small amounts of emulsion to cleaned potholes and utility cuts prior to filling or patching, as well as to other small remote areas.
- d. Sand Spreader: The sand spreader shall be capable of uniformly applying the sand product to the emulsion. Devices to control the volume and application rate shall be provided. The rate of application of the sand spreader shall be calibrated by an approved method determined by the Engineer. If the Engineer deems that the equipment applying the material is inadequate or fails to comply with all specifications, the Engineer will order the equipment to be removed from the site and require that another unit be provided. Each distributor shall meet the following requirements:
 - i. Variable Speed Controller (VSC): All sand spreader distributors shall be provided with an approved VSC, applying feet per minute with a tabulation of feet per load with adjustments. Each load tabulation shall start at zero. There shall also be a totaling tabulation by the Contractor.
 - ii. Rate Control System: All sand spreaders shall be equipped with an auger designed to maintain an even broadcast of sand product.
 - iii. Tests: Necessary tests shall be made to determine the accuracy of all VSC and auger efficiencies. The tests shall be made by the Contractor when and as required by the Engineer.
 - iv. Sand Spreader Hopper: The hopper shall have a minimum capacity of 11 cubic feet.

2. **Surface Preparation**: The work to remove pavement markings, seal cracks, and patch areas of distress shall have been completed (under other items) prior to the application of the fog seal and cover coat. Immediately before application of fog seal, the surface shall be thoroughly cleaned of all loose and foreign debris and material (leaves, branches, dirt, sand, garbage, etc.) from the pavement surface. The pavement surface must be clean and dry immediately before beginning application of the fog seal. All foreign debris and material shall be removed and disposed of by the Contractor. The Contractor shall be responsible for covering utility appurtenances and catch basins in the area just prior to application of fog seal and cover coat and shall remove the covers after application.

3. Weather and Time Limitations:

- a. Fog seal and cover coat shall be applied between the hours of 9 a.m. and 4 p.m.

- b. Fog seal and cover coat shall be applied when both ambient and pavement temperatures are at or above 60°F and rising.
 - c. Fog seal and cover coat shall not be applied when wet weather conditions are forecasted within a nine-hour period after application.
 - d. All traffic shall be kept off the treated areas for a minimum of 4 hours or until curing is complete. The surface will be considered cured when the fog seal and cover coat does not track off the treated surface as determined by the Engineer.
4. **Control Section:** A control section shall be established to verify the fog seal and cover coat application rates. The control section shall be of sufficient length, at minimum 500 linear feet, to verify the approximate fog seal application rate. The cover coat shall be a uniform coating sufficient to cover the fog seal. The Engineer will witness the control strip application.
5. **Fog Seal Application:** Fog seal shall be applied at a uniform, continuous application rate of 0.08 to 0.15 gallons per square yard and spread over the area to be treated without splattering or dripping from the spray bar. Fog seal shall be heated and applied at a temperature of 120° to 170°F.
- During fog seal application, adequate provisions shall be made to prevent impairing and discoloration of adjacent pavements, structures, vehicles, foliage, or personal property. The use of skirting or end panels may be required to control application widths and limit overspray.
- Areas found to lack the required rate of fog seal will require reapplication to meet these requirements as determined by the Engineer. Areas found in excess of the rate of fog seal application will require the use of additional cover coat material to the satisfaction of the Engineer.
6. **Cover Coat Application:** The cover coat shall be applied immediately and continuously after the fog seal application and prior to the emulsified asphalt break, at an application rate of 0.3 to 0.5 pounds per square yard as determined by the control section. The equipment used shall control the rate and speed of cover material application. Equipment or traffic shall not be allowed on the fog seal treated surface until the cover coat has been applied and cured.

Method of Measurement: This work will be measured for payment by the number of square yards of emulsified asphalt seal coat placed and accepted. Areas requiring reapplication of fog seal or additional cover coat will not be measured for payment.

Basis of Payment: This work will be paid for at the Contract unit price per square yard for “Emulsified Asphalt Seal Coat, Applied,” complete in place, which price shall include all materials, equipment, tools and labor incidental thereto.

Pay Item	Unit
Emulsified Asphalt Seal Coat, Applied	s.y.

ITEM #0406999A - ASPHALT ADJUSTMENT COST

Description: The Asphalt Adjustment Cost will be based on the variance in price for the performance-graded binder component of hot mix asphalt (HMA), Polymer Modified Asphalt (PMA), Ultra-Thin Bonded HMA (UTB-HMA), and Ultra-Thin Bonded PMA (UTB-PMA) mixtures completed and accepted during the Contract.

The Asphalt Price is available on the Department of Transportation website at:

<http://www.ct.gov/dot/asphaltadjustment>

Construction Methods:

An asphalt adjustment will be applied only if all of the following conditions are met:

I. For HMA and PMA mixtures:

- a. The HMA or PMA mixture for which the adjustment would be applied is listed as a Contract item with a pay unit of tons.
- b. *The total quantity for all HMA and PMA mixtures in the Contract or individual purchase order (Department of Administrative Service contract awards) exceeds 1000 tons or the Project duration is greater than 6 months.*
- c. The difference between the posted *Asphalt Base Price* and *Asphalt Period Price* varies by more than \$5.00 per ton.

II. For UTB-HMA and UTB-PMA mixtures:

- a. The UTB-HMA or UTB-PMA mixture for which the adjustment would be applied is listed as a Contract item.
- b. The total quantity for UTB-HMA or UTB-PMA mixture in the Contract exceeds:
 - i. 800 tons if the UTB-HMA or UTB-PMA item has a pay unit of tons.
 - ii. 30,000 square yards if the UTB-HMA or UTB-PMA item has a pay unit of square yards.

Note: The quantity of UTB-HMA or UTB-PMA measured in tons shall be determined from the material documentation requirements set forth in the UTB-HMA or UTB-PMA item Special Provision.

- c. The difference between the posted *Asphalt Base Price* and *Asphalt Period Price* varies by more than \$5.00 per ton.
- d. No Asphalt Adjustment Cost will be applied to the liquid emulsion that is specified as part of the UTB-HMA or UTB-PMA mixture system.

III. Regardless of the binder used in all HMA, PMA, UTB-HMA or UTB-PMA mixtures, the Asphalt Adjustment Cost will be based on PG 64-22.

The Connecticut Department of Transportation (CTDOT) will post on its website, the average per ton selling price (asphalt price) of the performance-graded binder. The average is based on the high and low selling price published in the most recent available issue of the **Asphalt Weekly Monitor®** furnished by Poten & Partners, Inc. under the “East Coast Market – New England, New Haven, Connecticut area,” F.O.B. manufacturer’s terminal.

The selling price furnished from the Asphalt Weekly Monitor ® is based on United States dollars per standard ton (US\$/ST).

Method of Measurement:

Formula: $HMA \times [PG\%/100] \times [(Period\ Price - Base\ Price)] = \$ \underline{\hspace{2cm}}$

where

- **HMA:**
 1. For HMA, PMA, UTB-HMA and UTB-PMA mixtures with pay units of tons:
The quantity in tons of accepted HMA, PMA, UTB-HMA or UTB-PMA mixture measured and accepted for payment.
 2. For UTB-HMA or UTB-PMA mixtures with pay units of square yards:
The quantity of UTB-HMA or UTB-PMA mixture delivered, placed, and accepted for payment, calculated in tons as documented according to the Material Documentation provision (Construction Methods, paragraph G) of the UTB-HMA or UTB-PMA Special Provision.
- **Asphalt Base Price:** The asphalt price posted on the CTDOT website 28 days before the actual bid opening posted.
- **Asphalt Period Price:** The asphalt price posted on the CTDOT website during the period the HMA or PMA mixture was placed.
- **PG%:** Performance-Graded Binder percentage
 1. For HMA or PMA mixes:
 - PG% = 4.5 for HMA S1 and PMA S1
 - PG% = 5.0 for HMA S0.5 and PMA S0.5
 - PG% = 6.0 for HMA S0.375, PMA S0.375, HMA S0.25 and PMA S0.25
 2. For UTB-HMA and UTB-PMA mixes:
PG% = Design % PGB (Performance Graded Binder) in the approved job mix formula, expressed as a percentage to the tenth place (e.g. 5.1%)

The asphalt adjustment cost shall not be considered as a changed condition in the Contract as result of this provision since all bidders are notified before submission of bids.

Basis of Payment: The "Asphalt Adjustment Cost" will be calculated using the formula indicated above. A payment will be made for an increase in costs. A deduction from monies due the Contractor will be made for a decrease in costs.

The sum of money shown on the Estimate and in the itemized proposal as "Estimated Cost" for this item will be considered the bid price although the adjustment will be made as described above. The estimated cost figure is not to be altered in any manner by the bidder. If the bidder should alter the amount shown, the altered figure will be disregarded and the original cost figure will be used to determine the amount of the bid for the Contract.

Pay Item	Pay Unit
Asphalt Adjustment Cost	est.

ITEM #0520036A - ASPHALTIC PLUG EXPANSION JOINT SYSTEM

Description: Work under this item shall consist of furnishing and installing an asphaltic plug expansion joint system (APJ) in conformance with ASTM D6297, as shown on the plans, and as specified herein.

Work under this item shall also consist of the removal and disposal of bituminous concrete, membrane waterproofing, existing joint components and sealing elements, cleaning and sealing median barrier joints, parapet joints, and sidewalk joints.

Work under this item excludes the removal of Portland cement concrete headers.

Materials: The APJ component materials shall conform to ASTM D6297 and the following:

Aggregate: The aggregate shall meet the following requirements:

- a) Loss on abrasion: The material shall show a loss on abrasion of not more than 25% using AASHTO Method T96.
- b) Soundness: The material shall not have a loss of more than 10% at the end of five cycles when tested with a magnesium sulfate solution for soundness using AASHTO Method T 104.
- c) Gradation: The aggregate shall meet the requirements of Table A below:
- d) Dust: aggregate shall not exceed 0.5% of dust passing the #200 sieve when tested in accordance with AASHTO T-11.

Table A

<u>Square Mesh Sieves</u>	1" (25.0 mm)	¾" (19.0 mm)	½" (12.5 mm)	⅜" (9.5 mm)	No. 4 (4.75 mm)
% passing	100	90 - 100	20 - 55	0 - 15	0 - 5

A sample of the aggregate shall be submitted to the Department with a Certified Test Report in accordance with Article 1.06.07 for each 20 tons of loose material or its equivalent number of bags delivered to the job site. The Certified Test report must include a gradation analysis resulting from a physical test performed on the actual material that accompanies the report.

Anti-Tacking Material: This material shall be a fine graded granular material with 100% passing the 3/16" sieve and no more than 5% passing the #200 when tested in accordance with AASHTO T-27.

Backer Rod: All backer rods shall satisfy the requirements of ASTM D5249, Type 1.

Bridging Plate: The bridging plates shall be steel conforming to the requirements of ASTM A36 and be a minimum ¼" thick and 8" wide. For joint openings in excess of 3" the minimum plate dimensions shall be ⅜" thick by 12" wide. Individual sections of plate shall not exceed

4' in length. Steel locating pins for securing the plates shall be size 16d minimum, hot-dip galvanized, and spaced no more than 12" apart.

Concrete Leveling Material: Shall be a cementitious-based material that conforms to ASTM C928 Standard Specification for Packaged, Dry, Rapid-Hardening Cementitious Materials for Concrete Repair, for R3 performance requirements in Table 1 and achieve the following:

- a. Final set in 45 Minutes
- b. 2500 psi compressive strength in 24 hours
- c. 5000 psi compressive strength in 7 days

Parapet Sealant: The sealant used in parapet joint openings shall be a single component non-sag silicone sealant that conforms to the requirements of ASTM D5893.

Sidewalk Sealant: The sealant used in sidewalk joint openings shall be a rapid cure, self-leveling, cold applied, two-component silicone sealant. The silicone sealant shall conform to the requirements listed in Table B:

Table B

Properties - As Supplied	Test Method	Requirement
Extrusion Rate	ASTM C1183	200-600 grams/min
Leveling	ASTM C639	Self-Leveling
Specific Gravity	ASTM D792	1.20 to 1.40
Properties - Mixed	Test Method	Requirement
Tack Free Time	ASTM C679	60 min. max.
Joint Elongation – Adhesion to concrete	ASTM D5329 ^{1,2,3}	600% min
Joint Modulus @ 100% elongation	ASTM D5329 ^{1,2,3}	15 psi max
Cure Evaluation	ASTM D5893	Pass @ 5 hours

1. Specimens cured at $77 \pm 3^{\circ}\text{F}$ and $50 \pm 5\%$ relative humidity for 7 days
2. Specimens size: $\frac{1}{2}$ " wide by $\frac{1}{2}$ " thick by 2" long
3. Tensile Adhesion test only

The date of manufacture shall be provided with each lot. No sealant shall be used beyond its maximum shelf-life date.

The two-part silicone sealants shown in Table C are known to have met the specified requirements:

Table C

Product	Supplier
Dow Corning 902RCS	Dow Corning Corporation 2200 W Salzburg Road Auburn, Michigan 48611
Wabo SiliconeSeal	BASF/Watson Bowman Acme Corporation 95 Pineview Drive Amherst, New York 14228

Other two-component silicone joint sealants expressly manufactured for use with concrete that conform to the aforementioned ASTM requirements will be considered for use provided they are submitted in advance for approval to the Engineer. Other joint sealants will be considered for use only if a complete product description is submitted, as well as documentation describing at least five installations of the product. These documented installations must demonstrate that the product has performed successfully for at least three years on similar bridge expansion joint applications.

A Materials Certificate and Certified Test Report for the asphaltic binder shall be submitted by the Contractor in accordance with the requirements of Article 1.06.07 certifying that the asphaltic binder satisfies the requirements of the most current version of ASTM D6297.

A Materials Certificate for all other components of the APJ, leveling material, backer rod and sealant used in sealing parapet and sidewalk joint openings, shall be submitted by the Contractor in accordance with the requirements of Article 1.06.07

Construction Methods: The APJ shall be installed at the locations shown on the plans and in stages in accordance with the traffic requirements in the special provisions “Maintenance and Protection of Traffic” and “Prosecution and Progress”.

At least 30 days prior to start of the work, the Contractor shall submit to the Engineer for approval a detailed Quality Control Plan for the installation of the APJ. The submittal shall include:

- a) A list of all manufactured materials and their properties to be incorporated in the joint system, including, but not limited to the asphaltic binder, anti-tack material, backer rod, sealant, leveling material, as well as the aggregate’s source.
- b) A detailed step by step installation procedure and a list of the specific equipment to be used for the installation. The Quality Control Plan must fully comply with the specifications and address all anticipated field conditions, including periods of inclement weather.

The APJ shall not be installed when bituminous concrete overlay or joint cutout is wet. The APJ shall only be installed when the bridge superstructure surface temperature is within the limits specified in Table D and when the ambient air temperature is within the range of 45⁰F to 95⁰F. The bridge superstructure surface temperature range is determined using the thermal movement

range provided on the contract plans for the proposed APJ deck installation location and the selected APJ product.

Table D

Installation Restrictions	
Designed Deck Joint Thermal Movement Range²	Bridge Superstructure Surface Temperature¹
0" to 1"	45° F to 95° F
1-1/8"	45° F to 90° F
1-1/4"	45° F to 80° F
1-3/8"	45° F to 70° F
1-1/2"	45° F to 65° F

- 1. The superstructure surface temperature shall be determined from the average of three or more surface temperature readings taken at different locations on the interior girder surfaces by the Contractor as directed by the Engineer. Temperature measurements of the superstructure shall be taken by the contractor with a calibrated hand held digital infrared laser-sighted thermometer on the surfaces of an interior steel girder, or interior concrete girder protected from direct sunlight. The infrared thermometer to be supplied by the Contractor for this purpose shall meet certification requirements of EN61326-1, EN61010-1, and EN60825-1 maintained by the European Committee for Electrotechnical Standardization (CENELEC). The thermometer shall have a minimum distance-to-spot ratio of 50:1 and shall have adjustable emissivity control. The thermometer shall have a minimum accuracy value of $\pm 1\%$ of reading or $\pm 2^{\circ}\text{F}$, whichever is greater. The thermometer shall be used in strict accordance with the manufacturer's written directions. An additional infrared thermometer satisfying the same standards to be used in this application shall also be provided to the Engineer for quality assurance purposes.*
- 2. Linear interpolation may be used to determine an allowable surface temperature range for thermal movement ranges in between values shown in the table, as approved by the Engineer.*

Prior to installing the APJ, the Contractor shall determine the exact location of the deck joint beneath the bituminous concrete overly.

The APJ shall be installed symmetrically about the deck joint opening to the dimensions shown on the plans or as directed by the Engineer; not to exceed 24 inches measured perpendicular to the deck joint. The proposed saw cut lines shall be marked on the bituminous concrete overlay by the Contractor and approved by the Engineer, prior to saw-cutting. The saw-cuts delineating the edges of the APJ shall extend full depth of the bituminous concrete overlay.

The existing bituminous concrete overlay, waterproofing membrane and/or existing expansion joint material, within the saw cut limits shall be removed and disposed of by the Contractor to create the joint cutout.

Concrete surfaces that will support the bridging plates shall be smooth and form a plane along and across the deck joint. Rough or damaged concrete surfaces shall be repaired with a leveling compound meeting the requirements of this specification. Deteriorated concrete areas within the joint limits shall be repaired as directed by the Engineer: such repairs, when deemed necessary by the Engineer, shall be compensated for under the applicable concrete deck repair items in the Contract. The existing and repaired concrete surfaces shall provide continuous uniform support for the bridging plate and prevent the plate from rocking and deflecting.

Prior to the installation of the backer rod, all horizontal and vertical surfaces of the joint cutout shall be abrasive blast cleaned using an oil-free, compressed air supply. The entire cutout shall then be cleared of all loose blast media, dust, debris and moisture using an oil-free, hot air lance capable of producing an air stream at 3,000°F with a velocity of 3,000 feet per second.

A single backer rod, with a diameter at least 25% greater than the existing joint opening at the time of installation, shall be installed at an inch below the bridging plate in the existing deck joint opening between the concrete edges.

Asphaltic binder shall be heated to a temperature within the manufacturer's recommended application temperature range which shall be provided in the Quality Control Plan. During application, the temperature of the binder shall be maintained within this range. In no case shall the temperature of the binder go below 350° F nor exceed the manufacturer's recommended maximum heating temperature.

Asphaltic binder shall then be poured into the joint opening until it completely fills the gap above the backer rod. A thin layer of binder shall next be applied to the all horizontal and vertical surfaces of the joint cutout.

Bridging plates shall be abrasive blast-cleaned on-site prior to installation and then placed over the deck joint opening in the joint cutout. The plates shall be centered over the joint opening and secured with locating pins along its centerline. The plates shall be placed end to end, without overlap, such that the gap between plates does not exceed ¼". The plates shall extend to the gutter line and be cut to match the joint's skew angle, where concrete support exists on both sides of the joint. Within APJ installation limits, where concrete support does not exist at both sides of the joint opening (such as where a bridge deck end abuts a bituminous concrete roadway shoulder), bridging plates shall not be installed. Installed bridging plates shall not rock or deflect in any way.

After installation of bridging plates, a thin layer of asphaltic binder shall be applied to all exposed surfaces of the plates.

The remainder of the joint cutout shall then be filled with a mixture of hot asphaltic binder and aggregate prepared in accordance with the submitted Quality Control Plan and the following requirements:

- The aggregate shall be heated in a vented, rotating drum mixer by the use of a hot-compressed air lance to a temperature of between 370° F. to 380° F. This drum mixer shall be dedicated solely for the heating and, if necessary, supplemental cleaning of the aggregate. Venting of the gas and loose dust particles shall be accomplished through ¼” drilled holes spaced no more than 3” on center in any direction along the entire outside surface of the drum
- Once the aggregate has been heated, it shall then be transferred to a secondary drum mixer where it shall be fully coated with asphaltic binder. A minimum of two gallons of binder per 100lbs of stone is required.
- The temperature of the aggregate and binder shall be monitored by the contractor with a calibrated digital infrared thermometer.
- The coated aggregate shall be loosely placed in the joint cutout in lifts not to exceed 2 inches.
- Each lift shall be leveled, compacted and then flooded with hot asphaltic binder to the level of the aggregate to fill all voids in the coated aggregate layer. The surface of each lift shall be flooded until only the tips of the aggregate protrude out of the surface.
- The final lift shall be placed such that no stones shall project above the level of the adjacent overlay surface following compaction of the coated aggregate.
- Following installation of the final lift, sufficient time and material shall be provided to allow all voids in the mixture to fill. This step may be repeated as needed.
- The joint shall then be top-dressed by heating the entire area with a hot-compressed air lance and applying binder. The final joint surface must be smooth with no protruding stones and be absent of voids.
- Once top-dressed, the joint shall have an anti-tack material spread evenly over the entire surface to prevent tracking.

The Contractor shall be responsible for removing all binder material that leaks through the joint and is deposited on any bridge component, including underside of decks, headers, beams, diaphragms, bearings, abutments and piers.

Traffic shall not be permitted over the joint until it has cooled to 130° F when measured with a digital infrared thermometer. Use of water to cool the completed joint is permitted.

Sidewalk, parapet, and/or curb joint openings

Before placement of any sealing materials in parapets, curbs, or sidewalks, the joints shall be thoroughly cleaned of all scale, loose concrete, dirt, dust, or other foreign matter by abrasive blast cleaning. Residual dust and moisture shall then be removed by blasting with oil free compressed

air using a hot air lance. Projections of concrete into the joint space shall also be removed. The backer rod shall be installed in the joint as shown on the plans. The joint shall be clean and dry before the joint sealant is applied. Under no circumstances is the binder material to be used as a substitute for the joint sealant.

Whenever abrasive blast cleaning is performed under this specification, the Contractor shall take adequate measures to ensure that the abrasive blast cleaning will not cause damage to adjacent traffic or other facilities.

The joint sealant shall be prepared and placed in accordance with the manufacturer's instructions and with the equipment prescribed by the manufacturer. Extreme care shall be taken to ensure that the sealant is placed in accordance with the manufacturer's recommended thickness requirements.

The joint sealant shall be tooled, if required, in accordance with the manufacturer's instructions.

Primer, if required, shall be supplied by the sealant manufacturer and applied in accordance with the manufacturer's instructions.

When the sealing operations are completed, the joints shall be effectively sealed against infiltration of water. Any sealant which does not effectively seal against water shall be removed and replaced at the Contractor's expense.

Any installed joint that exhibits evidence of failure, as determined by the Engineer, such as debonding, cracking, rutting, or shoving of the APJ mixture shall be removed and replaced full-width and full-depth to a length determined by the Engineer at no additional cost to the State.

Method of Measurement: This work will be measured for payment by the number of cubic feet of "Asphaltic Plug Expansion Joint System" installed and accepted within approved horizontal limits. No additional measurement will be made for furnishing and installing backer rod and joint sealant in the parapets, concrete medians, curbs and/or sidewalks.

Basis of Payment: This work will be paid for at the contract unit price per cubic foot for "Asphaltic Plug Expansion Joint System," complete in place, which price shall include the saw-cutting, removal and disposal of bituminous concrete, membrane waterproofing, existing joint components and sealing elements, the furnishing and placement of the leveling compound, cleaning of the joint surfaces, furnishing and installing bridging plates, the furnishing and installing of the asphaltic plug joint mixture, the cost of furnishing and installing joint sealant in the parapets, concrete medians, curbs and sidewalks, and all other materials, equipment including, but not limited to, portable lighting, tools, and labor incidental thereto. No additional payment shall be made for the 12" wide bridging plates that are required for deck joint openings with widths in excess of 3".

If directed by the Engineer, additional deck repairs will be addressed and paid for under the applicable concrete deck repair items in the Contract.

ITEM #0520041A - PREFORMED JOINT SEAL

Description: Work under this item consists of furnishing and installing a preformed joint seal as shown on the plans. Work also includes a pre-installation survey to measure the pavement depth at all locations where the joint meets the curb.

Materials: One of the following Preformed Joint Seals specified on the plans shall be supplied:

V-Shaped Silicone Seals:

1. Silicoflex:
RJ Watson, Inc.
11035 Walden Ave
Alden, New York 14004
Tel: (716) 901-7020
Website: <http://www.rjwatson.com>
2. V-Seal:
D.S. Brown Company
300 East Cherry Street
North Baltimore, Ohio 45872
Tel: (419) 257-3561
Website: <http://www.dsbrown.com>

Foam-Supported Silicone Seals:

3. Bridge Expansion Joint System (B.E.J.S.):
EMSEAL Joint Systems Ltd.
25 Bridle Lane,
Westborough, MA 01581
Tel: (508) 836-0280
Website: <http://www.emseal.com>
4. Wabo FS Bridge Seal
Watson Bowman Acme Corp.
95 Pineview Drive
Amherst, NY 14228
Tel: (716) 691-9239
Website: <https://wbacorp.com/products/bridge-highway/joint-seals/wabofsbridge/>

When foam-supported silicone joint seals are the only type allowed on the plans (such as at bridge joints that extend through sidewalks), the CTDOT will consider products from other foam-supported silicone joint manufacturers, if the products have been installed by another State Department of Transportation, are functioning successfully in a similar climate to Connecticut's for at least one year, and are deemed by

the CTDOT to be suitable for use in the specific application for which the Contractor is requesting. To be considered, the Contractor shall submit documentation indicating the product name, manufacturer, the contact information for a Department of Transportation official who can confirm the successful installation and continued success of the product, the date of installation and the nature of the installation, including thermal movement range and skew of the installed joint.

A Materials Certificate for all components of the selected preformed joint seal shall be submitted by the Contractor in accordance with the requirements of Article 1.06.07

Construction Methods: All work at each joint location shall be accomplished in accordance with “Maintenance and Protection of Traffic” and “Prosecution and Progress.”

Submittals:

Prior to ordering preformed joint seals, and prior to forming block-outs for the preformed joint seals in the headers, the Contractor shall submit the following to the Engineer:

- The Manufacturer and product information of the selected joint system;
- Material safety data sheets (MSDS) and technical product information;
- Name and credentials of a qualified technical representative supplied by the manufacturer and acceptable to the Engineer. This person shall be available to provide assistance at the beginning of the work and be available to provide training and guidance throughout the project.
- A detailed, step-by-step installation procedure, including surface preparation, splicing of the preformed joint seal, and a list of the specific equipment to be used for the installation.

Installation: The technical representative of the accepted joint system shall be notified of the scheduled installation a minimum of 2 weeks in advance and be present to provide direction and assistance for the first joint installation and succeeding joint installations until the Contractor becomes proficient in the work and to the satisfaction of the Engineer.

The minimum ambient temperature for installing any of the qualified, preformed joint seals is 40°F and rising. When the manufacturer’s requirement for minimum installation temperature is greater than 40°F, the manufacturer’s requirement will govern.

All concrete surfaces to which sealing glands will be bonded shall be prepared in accordance with International Concrete Repair Institute (ICRI) concrete surface profile standards. The minimum acceptable surface profile is CSP2 (grinding), but CSP3 (light abrasive blast) is preferred. Any discontinuities or sharp projections into the plane of the joint shall be ground smooth prior to blasting. Whenever abrasive blast cleaning is performed, the Contractor shall take adequate measures to ensure that the abrasive blast cleaning will not cause damage to adjacent traffic or other facilities. Traffic will not be allowed to pass over the joint after blasting has occurred.

Following blasting, the joint surfaces shall be wiped down or blown clean as recommended by the manufacturer.

The joint surfaces shall be completely dry before installing any of the components of the selected joint seal. The selected joint seal shall not be installed immediately after precipitation or if precipitation is forecast. Joint preparation and installation of the selected preformed joint seal must be done during the same day.

The selected joint sealing system shall be installed continuously with no field splices in the preformed seal in the roadway section, unless field splices are allowed by the manufacturer of the selected preformed joint seal. In no case shall field splices of the preformed joint seal be allowed in a wheel path or within the roadway shoulder. When splices cannot be avoided due to traffic constraints, the splice shall be at a painted lane line.

After the joint seal has been installed, water shall not be able to penetrate the joint. Any joint seal that does not effectively seal against water shall be removed and replaced at the Contractor's expense.

Method of Measurement: This work will be measured for payment by the number of linear feet of preformed joint sealing system installed and accepted. The measurement will be made along the centerline of the joint at the top surface of header, curb, sidewalk and parapet.

Basis of Payment: This work will be paid for at the Contract unit price per linear foot for "Preformed Joint Seal," complete in place, including all materials, equipment, tools, and labor incidental thereto.

The Contract unit price shall include the cost of assistance from a technical representative of the selected joint system.

Pay Item	Pay Unit
Preformed Joint Seal	l.f.

ITEM #0971001A – MAINTENANCE AND PROTECTION OF TRAFFIC

Article 9.71.01 – Description is supplemented by the following:

The Contractor shall maintain and protect traffic as described by the following and as limited in the Special Provision "Prosecution and Progress":

Interstate 395

The Contractor shall maintain and protect the minimum number of through lanes and shoulders as dictated in the Special Provision for Section 1.08 - Prosecution and Progress "Limitations of Operations - Minimum Number of Lanes to Remain Open" Chart, on a paved travel path not less than 12 feet in width per lane.

Ramps and Turning Roadways

The Contractor shall maintain and protect existing traffic operations.

Excepted therefrom will be those periods, during the allowable periods, when the Contractor is actively working, at which time the Contractor shall be allowed to maintain and protect a minimum of one lane of traffic, on a paved travel path not less than 12 feet in width.

All Other Roadways

The Contractor shall maintain and protect a minimum of one lane of traffic in each direction, each lane on a paved travel path not less than 11 feet in width.

Commercial and Residential Driveways

The Contractor shall maintain access to and egress from all commercial and residential driveways throughout the project limits. The Contractor will be allowed to close said driveways to perform the required work during those periods when the businesses are closed, unless permission is granted from the business owner to close the driveway during business hours. If a temporary closure of a residential driveway is necessary, the Contractor shall coordinate with the owner to determine the time period of the closure.

Article 9.71.03 - Construction Method is supplemented as follows:

General

The Contractor is required to delineate any raised structures within the travel lanes, so that the structures are visible day and night, unless there are specific contract plans and provisions to temporarily lower these structures prior to the completion of work.

The Contractor shall schedule operations so that pavement removal and roadway resurfacing shall be completed full width across a roadway (bridge) section by the end of a workday (work night), or as directed by the Engineer.

When the installation of all intermediate courses of bituminous concrete pavement is completed for the entire roadway, the Contractor shall install the final course of bituminous concrete pavement.

When the Contractor is excavating adjacent to the roadway, the Contractor shall provide a 3-foot shoulder between the work area and travel lanes, with traffic drums spaced every 50 feet. At the end of the workday, if the vertical drop-off exceeds 3 inches, the Contractor shall provide a temporary traversable slope of 4:1 or flatter that is acceptable to the Engineer.

If applicable, when an existing sign is removed, it shall be either relocated or replaced by a new sign during the same working day.

The Contractor shall not store any material on-site which would present a safety hazard to motorists or pedestrians (e.g. fixed object or obstruct sight lines).

The field installation of a signing pattern shall constitute interference with existing traffic operations and shall not be allowed, except during the allowable periods.

Construction vehicles entering travel lanes at speeds less than the posted speed are interfering with traffic, and shall not be allowed without a lane closure. The lane closure shall be of sufficient length to allow vehicles to enter or exit the work area at posted speeds, in order to merge with existing traffic.

Existing Signing

The Contractor shall maintain all existing overhead and side-mounted signs throughout the project limits during the duration of the project. The Contractor shall temporarily relocate signs and sign supports as many times as deemed necessary, and install temporary sign supports if necessary and as directed by the Engineer.

Requirements for Winter

The Contractor shall schedule a meeting with representatives from the Department including the offices of Maintenance and Traffic, and the Town/City to determine what interim traffic control measures the Contractor shall accomplish for the winter to provide safety to the motorists and permit adequate snow removal procedures. This meeting shall be held prior to October 31 of each year and will include, but not be limited to, discussion of the status and schedule of the following items: lane and shoulder widths, pavement restoration, traffic signal work, pavement markings, and signing.

Signing Patterns

The Contractor shall erect and maintain all signing patterns in accordance with the traffic control plans contained herein. Proper distances between advance warning signs and proper taper lengths are mandatory.

Pavement Markings - Limited Access Highways, Turning Roadways and Ramps

During construction, the Contractor shall maintain all pavement markings throughout the limits of the Project.

Temporary pavement markings shall be installed on each intermediate course of bituminous concrete pavement and on any milled surface by the end of the work shift.

Permanent Epoxy Resin Pavement Markings shall be installed on the final course of bituminous concrete pavement within 10 calendar days of the final pavement installation if no Pavement Marking Grooves are proposed.

Temporary Pavement Markings

Temporary pavement markings shall consist of temporary painted pavement markings and shall be installed in accordance with Section 12.09. The markings shall include 4 inch wide white lane lines (solid and broken), 4 inch wide edge lines, lane-use arrows at the stop bar. Temporary 12 inch wide white stop bars shall consist of temporary pavement marking tape, as described below.

Refer to Pavement Marking Groove special provisions for pavement marking requirements.

Temporary 12 inch wide white stop bars consisting of temporary plastic pavement marking tape shall be installed on exit ramps if permanent Epoxy Resin Pavement Markings are not installed by the end of the work shift on the final course of bituminous concrete pavement. Temporary stop bars may consist of two 6 inch wide white markings or three 4 inch wide white markings placed side by side. The Contractor shall remove and dispose of these markings when the permanent Epoxy Resin Pavement Markings are installed. The cost of furnishing, installing and removing the Temporary Plastic Pavement Marking Tape is included under the applicable temporary pavement marking items.

All temporary pavement markings exposed throughout the winter shall be Epoxy Resin Pavement Markings, unless directed otherwise by the Engineer.

Temporary pavement markings, as described above, shall be maintained until the permanent pavement markings are installed.

Final Pavement Markings

Refer to Pavement Marking Groove special provisions for pavement marking requirements. Permanent epoxy resin pavement markings shall be installed in accordance with Section 12.10 and the applicable Traffic Engineering Standard Drawings.

If Temporary Plastic Pavement Marking Tape is installed, then the Contractor shall remove and dispose of these markings during the same work shift that the permanent epoxy resin pavement markings are to be installed. The cost of furnishing, installing and removing the Temporary Plastic Pavement Marking Tape shall be paid for under the appropriate pay items.

Traffic Control During Construction Operations

The following guidelines shall assist field personnel in determining when and what type of traffic control patterns to use for various situations. These guidelines shall provide for a safer and more efficient movement of traffic through work zones and enhance the safety of work forces in the work area.

Traffic Control Patterns

Traffic control patterns shall be used when a work operation requires that all or part of any vehicle or work area protrudes onto any part of a travel lane or shoulder or is within the clear zone. For each situation, the installation of traffic control devices shall be based on the following:

- Speed and volume of traffic.
- Duration of operation.
- Exposure to hazards.

Traffic control patterns shall be uniform, neat, and orderly in order to command respect from the motorist.

Lane reduction tapers should be placed so that the entire length of the taper is installed on a tangent section of roadway and the entire taper area can be seen by the motorist.

All existing conflicting signs shall be removed, covered with an opaque material, or turned so that they are not legible to oncoming traffic prior to implementing a traffic control pattern. The existing signs shall be uncovered or reinstalled once the pattern is removed.

A buffer area should be provided during installation of a traffic control pattern and maintained for the duration of the work. The buffer area shall be free of any equipment, workers, materials, and parked vehicles.

Construction Traffic Control Plans 19 through 25 should be used for moving operations such as line striping, rumble strips, pothole patching, mowing, or sweeping when it is necessary for equipment to occupy a travel lane.

Traffic control patterns are not required for vehicles on an emergency patrol type activity or for a short duration stop of up to one hour, as long as the equipment is contained within the shoulder. Flashing lights, arrow boards, truck-mounted or trailer-mounted impact attenuators, and appropriate Traffic person(s) shall be used when required.

In a situation not adequately covered by the Construction Traffic Control Plans, the Contractor shall contact the Engineer for assistance prior to setting up a traffic control pattern.

Placement of Signs

Signs shall be placed in a position that allows motorists the opportunity to reduce their speed prior to the work area. Signs shall be installed on the same side of the roadway as the work area. On multi-lane divided highways, advance warning signs shall be installed on both sides of the highway. On directional roadways (on-ramps, off-ramps, one-way roads) where the sight distance to signs is restricted, these signs should be installed on both sides of the roadway.

Allowable Adjustment of Signs and Devices Shown on the Construction Traffic Control Plans

The Construction Traffic Control Plans contained herein show the location and spacing of signs and devices under ideal conditions. Signs and devices should be installed as shown on these plans.

The proper application of the Construction Traffic Control Plans and installation of traffic control devices is dependent upon actual field conditions.

In the case of a horizontal or vertical sight restriction in advance of the work area, the traffic control pattern shall be extended to provide adequate sight distance for approaching traffic.

Adjustments to the Construction Traffic Control Plans shall only be made at the direction of the Engineer.

Table 1 indicates the minimum taper lengths required for a lane closure based on the posted speed limit and lane width of the roadway. These taper lengths shall only be used when the recommended taper lengths shown on the Construction Traffic Control Plans cannot be achieved.

Table 1 – Minimum Taper Length

POSTED SPEED LIMIT (MPH)	MINIMUM TAPER LENGTH FOR A SINGLE LANE CLOSURE (FEET)	
	FREEWAYS	SECONDARY ROADS
30 OR LESS	180	165
35	245	225
40	320	295
45	540	495
50	600	550
55	660	605
65	780	715

1. Work Zone Safety Meetings

- 1.a) Prior to the commencement of work, a Work Zone Safety Meeting shall be conducted with representatives from DOT Construction, Connecticut State Police (Local Barracks), Municipal Police, the Contractor (Project Superintendent) and the Traffic Control Subcontractor (if different than the prime Contractor) to review the traffic operations, lines of responsibility, and operating guidelines which will be used on the Project. DOT Traffic Engineering shall be invited to the Work Zone Safety Meeting. Other Work Zone Safety Meetings during the course of the Project should be scheduled as needed.
- 1.b) A Work Zone Safety Meeting Agenda shall be developed and used at the Meeting to outline the anticipated traffic control issues during the construction of this Project. Any issues that can't be resolved at these Meetings will be brought to the attention of the District Engineer and the Office of Construction. The agenda shall include:
 - i. Review Project scope of work and time;
 - ii. Review Section 1.08, Prosecution and Progress;
 - iii. Review Section 9.70, Trafficpersons;
 - iv. Review Section 9.71, Maintenance and Protection of Traffic;
 - v. Review Contractor's schedule and method of operations;
 - vi. Review special concern areas: ramps, turning roadways, medians, lane drops, etc.;
 - vii. Open discussion of work zone questions and issues;
 - viii. Discussion of review and approval process for changes in Contract requirements as they relate to work zone areas.

2. General

- 2.a) Traffic control patterns shall only be installed if the required minimum number of signs, traffic cones, traffic drums, and other equipment (i.e. one Arrow Board for each lane closed, two Truck-Mounted or Trailer-Mounted Attenuators (TMAs), Changeable Message Sign, etc.) are on Site.
- 2.b) The Contractor shall have spare maintenance and protection of traffic equipment (TMAs, Arrow Board, Changeable Message Sign(s), construction signs, traffic cones, traffic drums, etc.) available at all times in case of mechanical failures, etc. Spare maintenance and protection of traffic equipment installed as a result of a sudden equipment breakdown shall be replaced by the Contractor within 24 hours.
- 2.c) Failure of the Contractor to have the required minimum number of signs, personnel, and equipment, which results in the pattern not being installed, shall not be a reason for a time extension or claim for lost time.
- 2.d) In cases of differences of opinion between the Contractor and the Inspection staff, the Contractor shall follow the directions of the Engineer. The matter shall be brought to the District Office for resolution immediately or, in the case of work after regular business hours, on the next business day.

3. Installing and Removing Traffic Control Patterns

- 3.a) Lane closures shall be installed beginning with the advance warning signs and proceeding forward toward the work area.
- 3.b) Lane closures shall be removed in the reverse order, beginning at the end of the work area, or traffic control pattern, and proceeding back toward the advance warning signs.
- 3.c) Stopping traffic may be allowed within the allowable hours stated in Section 1.08.04:
 - i. For those activities stated within the Contract.
 - ii. During paving, milling operations, or similar activities where, in the middle of the operation, it is necessary to flip the pattern to complete the operation on the other half of the roadway so traffic does not travel across the longitudinal joint or difference in roadway elevation.
 - iii. To move slow moving equipment across live traffic lanes into the work area.
- 3.d) The Contractor shall adhere to using the proper signs, placing the signs correctly, and ensuring the proper spacing of signs.
- 3.e) Additional devices are required on entrance ramps, exit ramps, and intersecting roads to warn and/or move traffic into the proper travel path prior to merging with or exiting from the mainline traffic. This shall be completed before installing the mainline pattern past the ramp or intersecting roadway.
- 3.f) Workers are prohibited from crossing the travel lanes on limited access roadways to install and remove signs or other devices on the opposite side of the roadway. Any signs or devices on the opposite side of the roadway shall be installed and removed separately.

4. Implementation of Rolling Road Block (RRB)

- 4.a) Temporary road closures using a RRB may be allowed on limited access highways for operations associated with the installation and removal of temporary lane closures. RRB may be allowed for the installation and removal of lead signs and lane tapers only and shall meet the following requirements:
 - i. Refer to the Limitation of Operations Chart provided in Section 1.08.04 for the hours allowed for implementing a RRB operation. The Contractor shall only implement a RRB operation within the hours shown in the Chart.
 - ii. In areas with good sight lines and full shoulders, signs on the side of the road opposite the traffic pattern should be installed in a separate operation.
 - iii. TMAs equipped with Arrow Boards shall be used to slow traffic to implement the RRB. State Police Officers in marked vehicles may be used to support the implementation of the RRB. The RRB shall start by having all vehicles, including TMAs and police vehicles, leave the shoulder or on-ramp and accelerate to normal roadway speeds in each lane. The vehicles will then position themselves side by side and decelerate to the RRB speed on the highway.

- iv. A Pre-Warning Vehicle, as specified elsewhere in the Contract, shall be used to advise the motorists that sign pattern installation or removal is underway.
- v. The RRB duration shall not exceed 15 minutes from the start of the traffic block until all lanes are opened as designated in the Limitation of Operations chart. If the RRB duration exceeds 15 minutes on 2 successive shifts, no further RRB will be allowed until the Contractor obtains approval for a revised installation procedure from the District.
- vi. RRB shall not be used to expand a lane closure pattern to an additional lane during the shift. The workers and equipment required to implement the additional lane closure should be staged from within the closed lane. TMAs (and State Police if available) shall be used to protect the workers installing the taper in the additional lane.
- vii. Exceptions to these work procedures may be submitted to the District Office for consideration. A minimum of 2 business days shall be allowed for review and comment by the District.
- viii. The Engineer and the Contractor will review and discuss the RRB procedures (including any revisions) in advance of the work. The implementation of the agreed upon plan will be reviewed with the State Police during the Work Zone Safety Meeting held before each shift involving temporary lane closures. If the State Police determine that alternative procedures should be implemented for traffic control during the work shift, the Department and Contractor will attempt to resolve any discrepancies with the duty sergeant at the Troop. If the discrepancies are unable to be resolved prior to the start of the shift, then the work will proceed as recommended by the Department. Any unresolved issues shall be addressed the following day.

5. Use of Arrow Boards

- 5.a) On limited access roadways, one Arrow Board shall be used for each lane that is closed. The Arrow Board shall be installed concurrently with the installation of the traffic control pattern and its placement shall be as shown on the Construction Traffic Control Plans. Additional Arrow Boards shall be deployed if sight distances are limited.
- 5.b) On non-limited access roadways, the use of an Arrow Board for lane closures is optional. The roadway geometry, sight distance, and traffic volume shall be considered in the decision to use the Arrow Board.
- 5.c) A vehicle displaying an arrow board shall be equipped with high-intensity rotating, flashing, oscillating, or strobe lights.
- 5.d) The flashing arrow mode shall be used for lane closure (merge) tapers.
- 5.e) The flashing arrow mode shall not be used for temporary alternating one-way traffic operations or to laterally shift lanes of traffic.

- 5.f) The flashing double arrow mode shall only be used for closing a center lane on a multilane roadway where adjacent left and right lanes remain open.
- 5.g) For shoulder work or roadside work near the shoulder, the Arrow Board shall be positioned in the shoulder and the flashing alternating diamond mode should be used.
- 5.h) The flashing alternating diamond caution mode should also be used when supplemental Arrow Boards are positioned in an already closed lane.

6. Use of Truck-Mounted or Trailer-Mounted Impact Attenuators (TMAs)

- 6.a) On limited access roadways, lane closures shall use a minimum of two TMAs to install and remove traffic control patterns. If two TMAs are not available, then the pattern shall not be installed.
- 6.b) On non-limited access roadways, the use of TMAs to install and remove patterns closing a lane(s) is optional. The roadway geometry, sight line distance, and traffic volume shall be considered in the decision to utilize the TMAs.
- 6.c) On limited access roadways, one TMA shall be placed on the shoulder and the second TMA shall be approximately 1,000 feet ahead blocking the lane to establish the advance and transition signing. The Arrow Board mounted on the TMA shall be in the arrow mode when taking the lane. The sign truck and workers shall be at sufficient distance ahead of the second TMA. In no case shall the TMA be used as the sign truck or a work truck. Once the transition is in place, the TMAs shall travel in the closed lane until all Portable Changeable Message Signs, signs, Arrow Boards, and cones/drums are installed. The Arrow Board mounted on the TMA should be in the flashing alternating diamond caution mode when traveling in the closed lane.
- 6.d) A TMA shall be placed prior to the first work area in the pattern. If there are multiple work areas within the same pattern, then additional TMAs shall be positioned at each additional work area as needed. The Arrow Board mounted on the TMA should be in the flashing alternating diamond caution mode when in the closed lane.
- 6.e) TMAs shall be positioned a sufficient distance prior to the workers or equipment being protected to allow for appropriate vehicle roll-ahead in the event that the TMA is hit, but not so far that an errant vehicle could travel around the TMA and into the work area. For additional placement and use details, refer to Section 18.06. Some operations, such as paving and concrete repairs, do not allow for placement of the TMA(s) within the specified distances. In these situations, the TMA(s) shall be placed at the beginning of the work area and shall be advanced as the paving or concrete operations proceed.
- 6.f) TMAs will be paid for in accordance with how the unit is used. If it is used as a TMA and is in the proper location as specified, then it will be paid for at the specified hourly rate for Truck-Mounted or Trailer-Mounted Impact Attenuator. When the TMA is used

as an Arrow Board, it will be paid for at the daily rate for Arrow Board. If a TMA is used to install and remove a pattern and is also used as an Arrow Board in the same day, then the unit will be paid for as a Truck-Mounted or Trailer-Mounted Impact Attenuator for the hours used to install and remove the pattern, typically 2 hours (1 hour to install and 1 hour to remove). If the TMA is also used as an Arrow Board during the same day, then the unit will only be paid for at the daily rate as an Arrow Board.

7. Use of Traffic Drums and Traffic Cones

- 7.a) On limited-access highways, ramps, and turning roadways:
 - i. Traffic drums shall be used for taper channelization.
 - ii. Traffic drums shall be used to delineate raised catch basins and other hazards.
 - iii. Traffic cones with a minimum height of 42 inches may be used in place of drums in the tangent section of a closed lane or shoulder.
 - iv. Traffic cones less than 42 inches in height shall not be used.
- 7.b) On all roadways:
 - i. Traffic drums shall be used in place of traffic cones in traffic control patterns that are in effect for more than a 36-hour duration.
 - ii. Traffic cones shall not be left unattended.
 - iii. Traffic cones with a minimum height of 42 inches shall be used when the posted speed limit is 45 MPH or above.
- 7.c) Typical spacing of traffic drums and/or cones shown on the Construction Traffic Control Plans in the Contract are maximum spacing and may be reduced to meet actual field conditions as required.

8. Use of Barricade Warning Lights

- 8.a) Barricade Warning Lights may be installed on channelizing devices when used in a merge taper. The Barricade Warning Lights shall flash in a sequential pattern when used in a merge taper. The successive flashing shall occur from the upstream end (beginning) of the merge taper to the downstream end (end) of the merge taper.
- 8.b) Type C Barricade Warning Lights may be used at night to delineate the edge of the travel way.
- 8.c) Type B Barricade Warning Lights shall be used on post-mounted advanced warning signs.

9. Use of Portable Changeable Message Signs (PCMS)

- 9.a) On limited access roadways, one PCMS shall be used in advance of the traffic control pattern for all lane closures. Prior to installing the pattern, the PCMS shall be installed and in operation,

displaying the appropriate lane closure information. The PCMS shall be positioned ½ to 1 mile ahead of the start of the lane closure taper. If the distance to the nearest exit ramp is greater than the specified ½ to 1 mile distance, then an additional PCMS shall be positioned a sufficient distance ahead of the exit ramp (and before the previous on-ramp where practical) to alert motorists to the work and therefore offer them an opportunity to take the exit.

- 9.b) On non-limited access roadways, the use of PCMS for lane closures is optional. The roadway geometry, sight line distance, and traffic volume shall be considered in the decision to use the PCMS.
- 9.c) PCMS should be placed off the shoulder of the roadway and behind a traffic barrier, if practical. Where a traffic barrier is not available to shield the PCMS, it should be placed off the shoulder and outside of the clear zone. If a PCMS has to be placed on the shoulder of the roadway or within the clear zone, it should be placed on the paved shoulder with a minimum of five traffic drums placed in a taper in front of it to delineate its position. The taper shall meet minimum distance requirements for a shoulder closure. The PCMS shall be protected if it is used for a continuous duration of 36 hours or more.
- 9.d) The PCMS shall be removed from the clear zone and have the display screen cleared and turned 90 degrees away from the roadway when the PCMS is no longer required.
- 9.e) The PCMS should not be used within 1,000 feet of an existing PCMS or Variable Message Sign (VMS).
- 9.f) A PCMS message shall:
 - i. consist of no more than two phases;
 - ii. contain no more than three lines of text per phase;
 - iii. have no more than eight characters per line, including spaces.
- 9.g) The PCMS should be used for specific situations that need to command the motorist's attention which cannot be conveyed with standard construction signs. The PCMS should not be used for generic messages (ex.: Road Work Ahead, Bump Ahead, Gravel Road, etc.) or for messages that need to be displayed for long periods of time, such as during stage construction. These types of messages should be displayed with construction signs. Special signs shall be coordinated with the Office of Construction and the Division of Traffic Engineering for the proper layout/dimensions required.
- 9.h) Typical messages that are allowed on the PCMS are shown below. Approval must be received from the Office of Construction for any message(s) different than the typical messages shown in Figure 1.
- 9.i) All messages shall comply with the information provided in Tables 2 and 3.

	<u>Phase 1</u>	<u>Phase 2</u>	<u>Message No.</u>	<u>Phase 1</u>	<u>Phase 2</u>
1	LEFT LANE CLOSED	MERGE RIGHT	9	LANES CLOSED AHEAD	REDUCE SPEED
2	2 LEFT LANES CLOSED	MERGE RIGHT	10	LANES CLOSED AHEAD	USE CAUTION
3	LEFT LANE CLOSED	REDUCE SPEED	11	EXIT XX CLOSED	USE EXIT YY
4	2 LEFT LANES CLOSED	REDUCE SPEED	12	EXIT XX CLOSED USE YY	FOLLOW DETOUR
5	RIGHT LANE CLOSED	MERGE LEFT	13	2 LANES SHIFT AHEAD	USE CAUTION
6	2 RIGHT LANES CLOSED	MERGE LEFT	14	3 LANES SHIFT AHEAD	USE CAUTION
7	RIGHT LANE CLOSED	REDUCE SPEED			
8	2 RIGHT LANES CLOSED	REDUCE SPEED			

Figure 1: Typical PCMS Messages

Table 2: Acceptable Abbreviations

Word Message	Standard Abbreviation	Word Message	Standard Abbreviation
Access	ACCS	Minimum	MIN
Afternoon / Evening	PM	Minor	MNR
Ahead	AHD	Minute(s)	MIN
Alternate	ALT	Monday	MON
Avenue	AVE, AV	Morning / Late Night	AM
Bicycle	BIKE	Mount	MT
Blocked	BLKD	Mountain	MTN
Boulevard	BLVD	National	NATL
Bridge	BR	Normal	NORM
CB Radio	CB	North	N
Center	CTR	Northbound	NBND
Center	CNTR	Oversized	OVRSZ
Chemical	CHEM	Parking	PKING
Circle	CIR	Parkway	PKWY
Compressed Natural Gas	CNG	Pavement	PVMT
Condition	COND	Pedestrian	PED
Congested	CONG	Place	PL
Construction	CONST	Pounds	LBS
Court	CT	Prepare	PREP
Crossing	XING	Quality	QLTY
Crossing (other than highway-rail)	XING	Right	RT
Downtown	DWNTN	Road	RD
Drive	DR	Roadwork	RDWK
East	E	Route	RT, RTE
Eastbound	EBND	Saint	ST
Electric Vehicle	EV	Saturday	SAT
Emergency	EMER	Service	SERV
Entrance, Enter	ENT	Shoulder	SHLDR
Exit	EX	Slippery	SLIP
Express	EXP	South	S
Expressway	EXPWY	Southbound	SBND
Feet	FT	Speed	SPD
Freeway	FRWY, FWY	State, county, or other non-US or non-Interstate numbered route	[Route Abbreviation determined by highway agency]**
Friday	FRI	Street	ST
Frontage	FRNTG	Sunday	SUN
Hazardous	HAZ	Telephone	PHONE
Hazardous Material	HAZMAT	Temporary	TEMP
High Occupancy Vehicle	HOV	Terrace	TER
Highway	HWY	Thruway	THWY
Highway-Rail Grade Crossing	RR XING	Thursday	THURS

Hospital	HOSP	Tons of Weight	T
Hour(s)	HR, HRS	Traffic	TRAF
Information	INFO	Trail	TR
International	INTL	Travelers	TRVLRS
Interstate	I-	Tuesday	TUES
Junction / Intersection	JCT	Turnpike	TPK
Lane	LN	Two-Way Intersection	2-WAY
Left	LFT	Two-Wheeled Vehicles	CYCLES
Liquid Propane Gas	LP-GAS	Upper	UPR
Local	LOC	US Numbered Route	US
Lower	LWR	Vehicle(s)	VEH, VEHS
Maintenance	MAINT	Warning	WARN
Major	MAJ	Wednesday	WED
Maximum	MAX	West	W
Mile(s)	MI	Westbound	WBND
Miles Per Hour	MPH		

** A space and no dash shall be placed between the abbreviation and the number of the route.

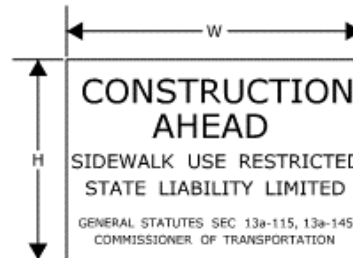
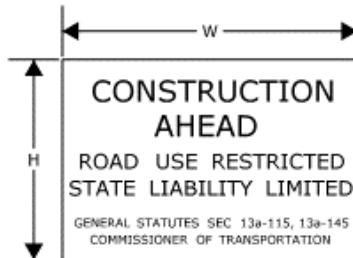
Table 3: Unacceptable Abbreviations

Unacceptable Abbreviation	Intended Word	Common Misinterpretation
ACC	Accident	Access (Road)
CLRS	Clears	Colors
DLY	Delay	Daily
FDR	Feeder	Federal
L	Left	Lane (Merge)
LT	Light (Traffic)	Left
PARK	Parking	Park
POLL	Pollution (Index)	Poll
RED	Reduce	Red
STAD	Stadium	Standard
WRNG	Warning	Wrong

10. Use of State Police Officers

- 10.a) State Police may be used only on limited access highways and secondary roadways that are under their primary jurisdiction. A minimum of one Officer may be used per critical sign pattern; however, a State Police presence is not required. Shoulder closures and right lane closures can generally be implemented without the presence of a State Police Officer. Left lane closures may also be implemented without State Police presence in areas with only moderate traffic and wide, unobstructed medians. It may be desirable to have a State Police presence, when available, under specific situations, such as nighttime lane closures; left lane closures with minimal width for setting up advance signs and staging; lane and shoulder closures on turning roadways/ramps or mainline where sight distance is minimal; and closures where extensive turning movements or traffic congestion regularly occur; however, they are not required.
- 10.b) If a State Police presence is provided, once the pattern is in place, the State Police Officer should be positioned in a non- hazardous location in advance of the pattern to provide advance warning to the motorist. If traffic backs up beyond the beginning of the pattern, then the State Police Officer shall reposition so that they are located prior to the backup. The State Police Officer should not be located immediately behind or within the roll ahead area of any TMA or within the work zone buffer area. The State Police Officer shall not be positioned in such a way that the State Police Officer obstructs any construction warning signs or PCMS from view of the motorist.
- 10.c) Other functions of the State Police Officer(s) may include:
- i. Assisting construction vehicles entering and exiting the work area.
 - ii. Enforcement of motor vehicle laws within the work area, if specifically requested by the Engineer.
- 10.d) State Police Officers assigned to a work site shall take direction from the Engineer.

SERIES 16 SIGNS



		W	H
16-E	80-1605	84" x 60"	
16-H	80-1608	60" x 42"	
16-M	80-1613	30" x 24"	

		W	H
16-S	80-1619	48" x 30"	

SIGN 16-S SHALL BE USED ON ALL PROJECTS THAT REQUIRE SIDEWALK RECONSTRUCTION OR RESTRICT PEDESTRIAN TRAVEL ON AN EXISTING SIDEWALK.

SERIES 16 SIGNS SHALL BE INSTALLED IN ADVANCE OF THE TRAFFIC CONTROL PATTERNS. SERIES 16 SIGNS SHOULD BE LOCATED TO ALLOW MOTORISTS THE OPPORTUNITY TO AVOID A WORK ZONE. SERIES 16 SIGNS SHOULD BE INSTALLED ON MAJOR INTERSECTING ROADWAYS THAT APPROACH THE WORK ZONE. ON LIMITED-ACCESS HIGHWAYS, THESE SIGNS SHOULD BE LOCATED IN ADVANCE OF THE NEAREST UPSTREAM EXIT RAMP AND ON ANY ENTRANCE RAMPS PRIOR TO OR WITHIN THE WORK ZONE LIMITS.

SIGNS 16-E AND 16-H SHALL BE POST-MOUNTED.

SIGN 16-E SHALL BE USED ON ALL FREEWAYS AND EXPRESSWAYS.

SIGN 16-H SHALL BE USED ON ALL RAMPS, OTHER STATE ROADWAYS AND MAJOR TOWN/CITY ROADWAYS.

SIGN 16-M SHALL BE USED ON OTHER TOWN ROADWAYS.

CONSTRUCTION TRAFFIC CONTROL PLAN
SERIES 16 SIGNS

SCALE: NONE

CONNECTICUT DEPARTMENT OF TRANSPORTATION
 BUREAU OF ENGINEERING & CONSTRUCTION

APPROVED

Tracy L. Fogarty
 PRINCIPAL ENGINEER

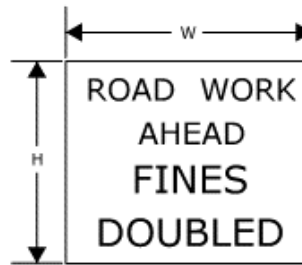
Tracy L. Fogarty, P.E.
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REGULATORY SIGN "ROAD WORK AHEAD, FINES DOUBLED"

THE REGULATORY SIGN "ROAD WORK AHEAD FINES DOUBLED" SHALL BE INSTALLED FOR ALL WORK ZONES THAT OCCUR ON ANY STATE HIGHWAY AND MUNICIPAL ROAD IN CONNECTICUT WHERE THERE ARE WORKERS PRESENT ON THE HIGHWAY.

THE "ROAD WORK AHEAD FINES DOUBLED" REGULATORY SIGN SHALL BE PLACED AFTER THE SERIES 16 SIGN AND IN ADVANCE OF THE "ROAD WORK AHEAD" SIGN.

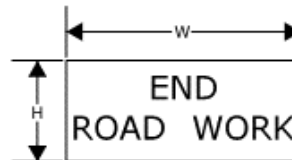
	W	H
31-1906	48"	42"
31-1907	60"	54"



"END ROAD WORK" SIGN

THE LAST SIGN IN THE PATTERN SHALL BE THE "END ROAD WORK" SIGN.

	W	H
80-9606	36"	18"
80-9612	48"	24"



CONSTRUCTION TRAFFIC CONTROL PLAN
**ROAD WORK AHEAD
 SIGNS**

SCALE: NONE

NOTES FOR TRAFFIC CONTROL PLANS

1. IF A TRAFFIC STOPPAGE OCCURS IN ADVANCE OF SIGN (A), THEN AN ADDITIONAL SIGN (A) SHALL BE INSTALLED IN ADVANCE OF THE STOPPAGE.
2. SIGNS (AA), (A), AND (D) SHOULD BE OMITTED WHEN THESE SIGNS HAVE ALREADY BEEN INSTALLED IN ADVANCE TO DESIGNATE A LARGER WORK ZONE THAN THE WORK ZONE THAT IS ENCOMPASSED ON THIS PLAN.
3. SEE TABLE 1 FOR ADJUSTMENT OF TAPERS IF NECESSARY.
4. TRAFFIC CONES AND PORTABLE CONSTRUCTION SIGNS SHALL NOT BE LEFT UNATTENDED.
5. ALL CONFLICTING SIGNS WITHIN THE LIMITS OF A ROADWAY / LANE CLOSURE AREA SHALL BE COVERED WITH AN OPAQUE MATERIAL WHILE THE CLOSURE IS IN EFFECT, AND UNCOVERED WHEN THE ROADWAY / LANE CLOSURE IS RE-OPENED TO ALL LANES OF TRAFFIC.
6. IF THIS PLAN REMAINS IN CONTINUOUS OPERATION FOR MORE THAN 48 HOURS, THEN ANY EXISTING CONFLICTING PAVEMENT MARKINGS SHALL BE ERADICATED OR COVERED, AND TEMPORARY PAVEMENT MARKINGS THAT DELINEATE THE PROPER TRAVELPATHS SHALL BE INSTALLED.
7. DISTANCES BETWEEN SIGNS IN THE ADVANCE WARNING AREA MAY BE REDUCED TO 100' ON LOW-SPEED URBAN ROADS (SPEED LIMIT \leq 40 MPH).
8. IF THIS PLAN IS TO REMAIN IN OPERATION FROM SUNSET TO SUNRISE, INSTALL BARRICADE WARNING LIGHTS - HIGH INTENSITY ON ALL POST-MOUNTED DIAMOND SIGNS IN THE ADVANCE WARNING AREA.
9. A PORTABLE CHANGEABLE MESSAGE SIGN SHALL BE INSTALLED ONE HALF MILE TO ONE MILE IN ADVANCE OF THE LANE CLOSURE TAPER.
10. SIGN (P) SHALL BE MOUNTED A MINIMUM OF 7 FEET FROM THE PAVEMENT SURFACE TO THE BOTTOM OF THE SIGN.

TABLE 1 - MINIMUM TAPER LENGTHS

POSTED SPEED LIMIT (MILES PER HOUR)	MINIMUM TAPER LENGTH FOR A SINGLE LANE CLOSURE
30 OR LESS	180'
35	245'
40	320'
45	540'
50	600'
55	660'
65	780'

CONSTRUCTION TRAFFIC CONTROL PLAN

NOTES

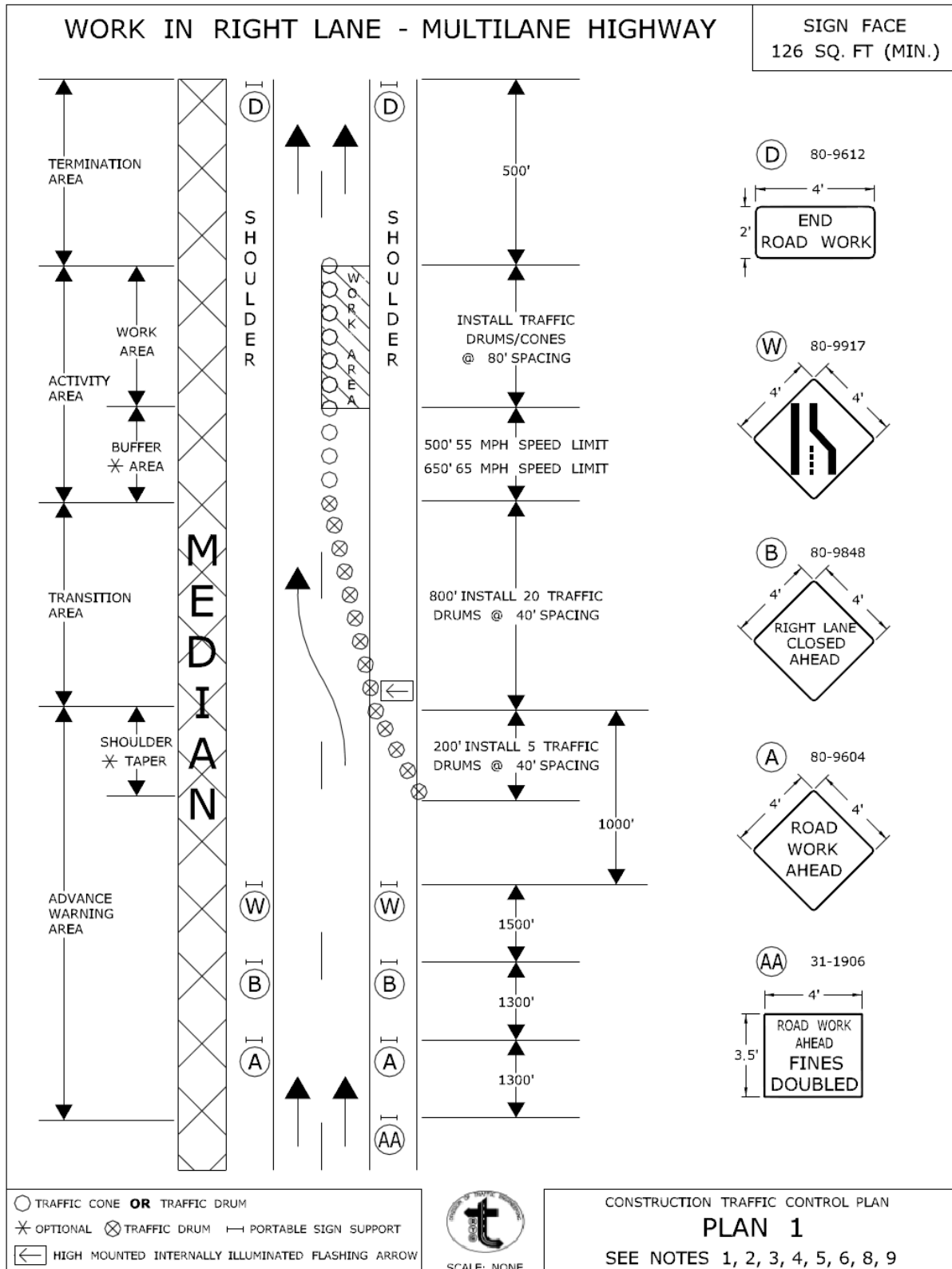
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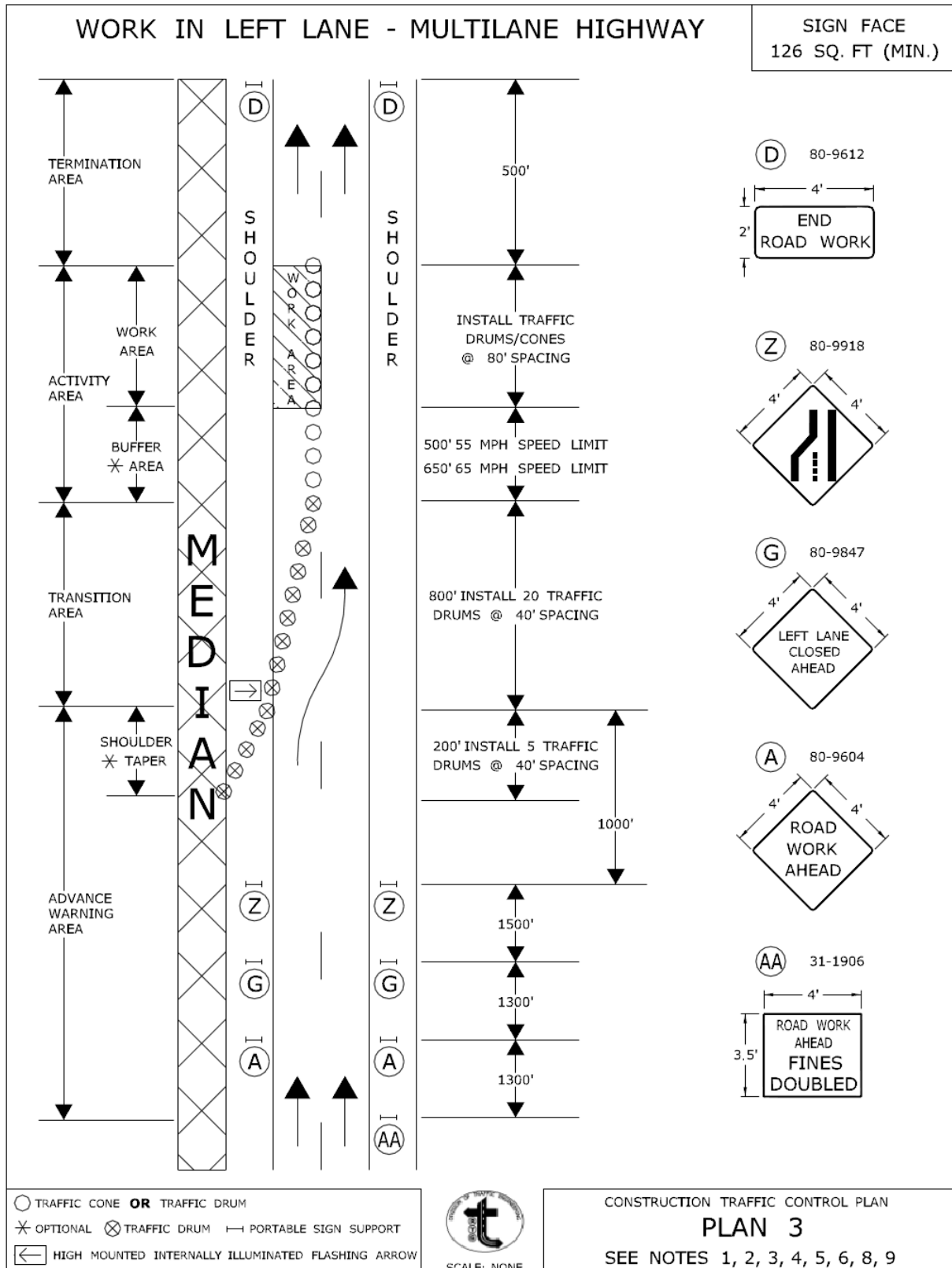
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BUREAU OF ENGINEERING & CONSTRUCTION

APPROVED

Tracy L. Fogarty
PRINCIPAL ENGINEER

Tracy L. Fogarty, P.E.
2019.05.13 06:47:47-04107



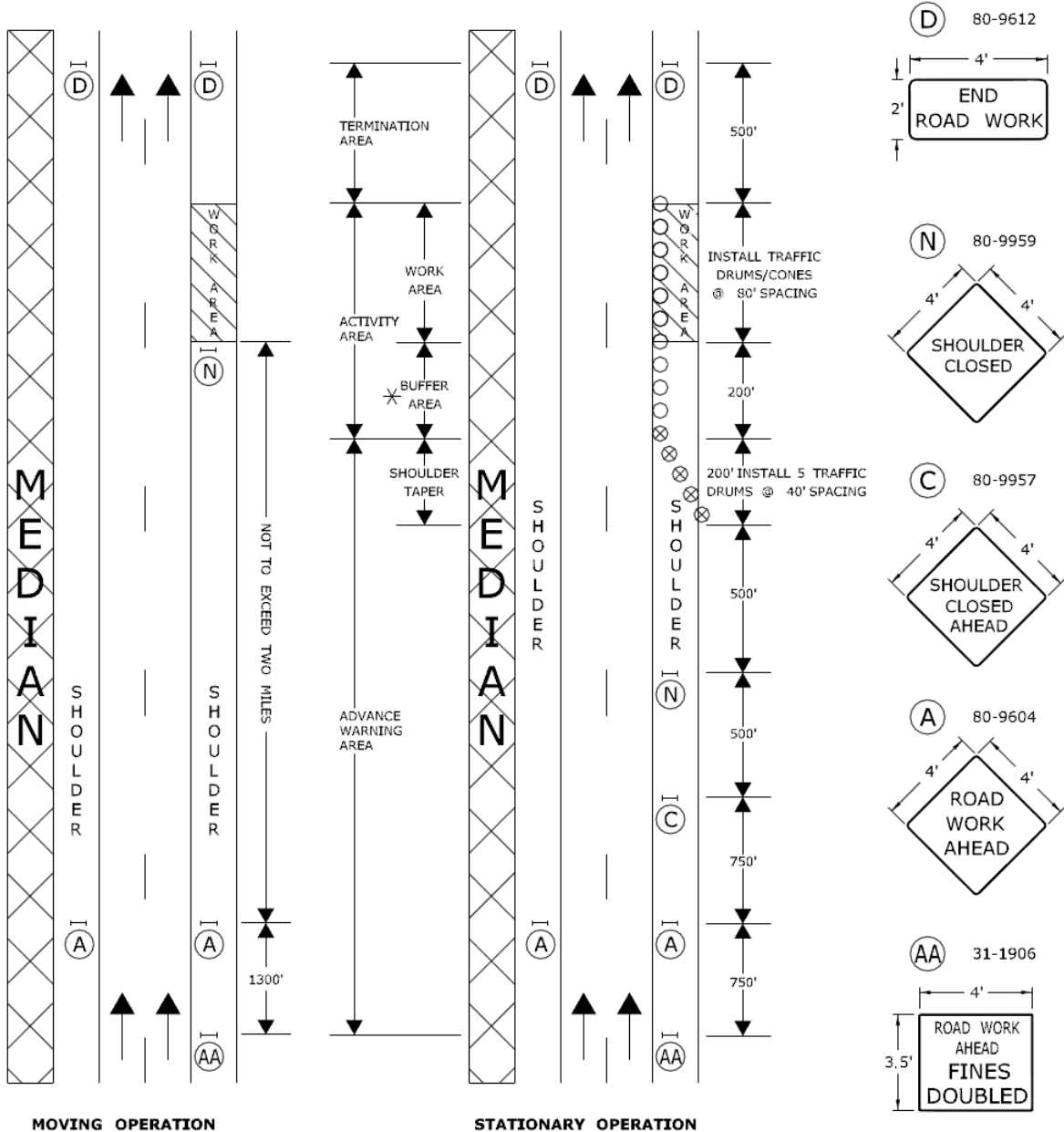


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APPROVED *Charles S. Harlow*
 Charles S. Harlow
 2012.06.05 15:51:46-0400
 PRINCIPAL ENGINEER

WORK IN SHOULDER AREA - MULTILANE HIGHWAY

SIGN FACE
94 SQ. FT (MIN.)



- TRAFFIC CONE **OR** TRAFFIC DRUM
- * OPTIONAL ⊗ TRAFFIC DRUM — PORTABLE SIGN SUPPORT
- ◀ HIGH MOUNTED INTERNALLY ILLUMINATED FLASHING ARROW



SCALE: NONE

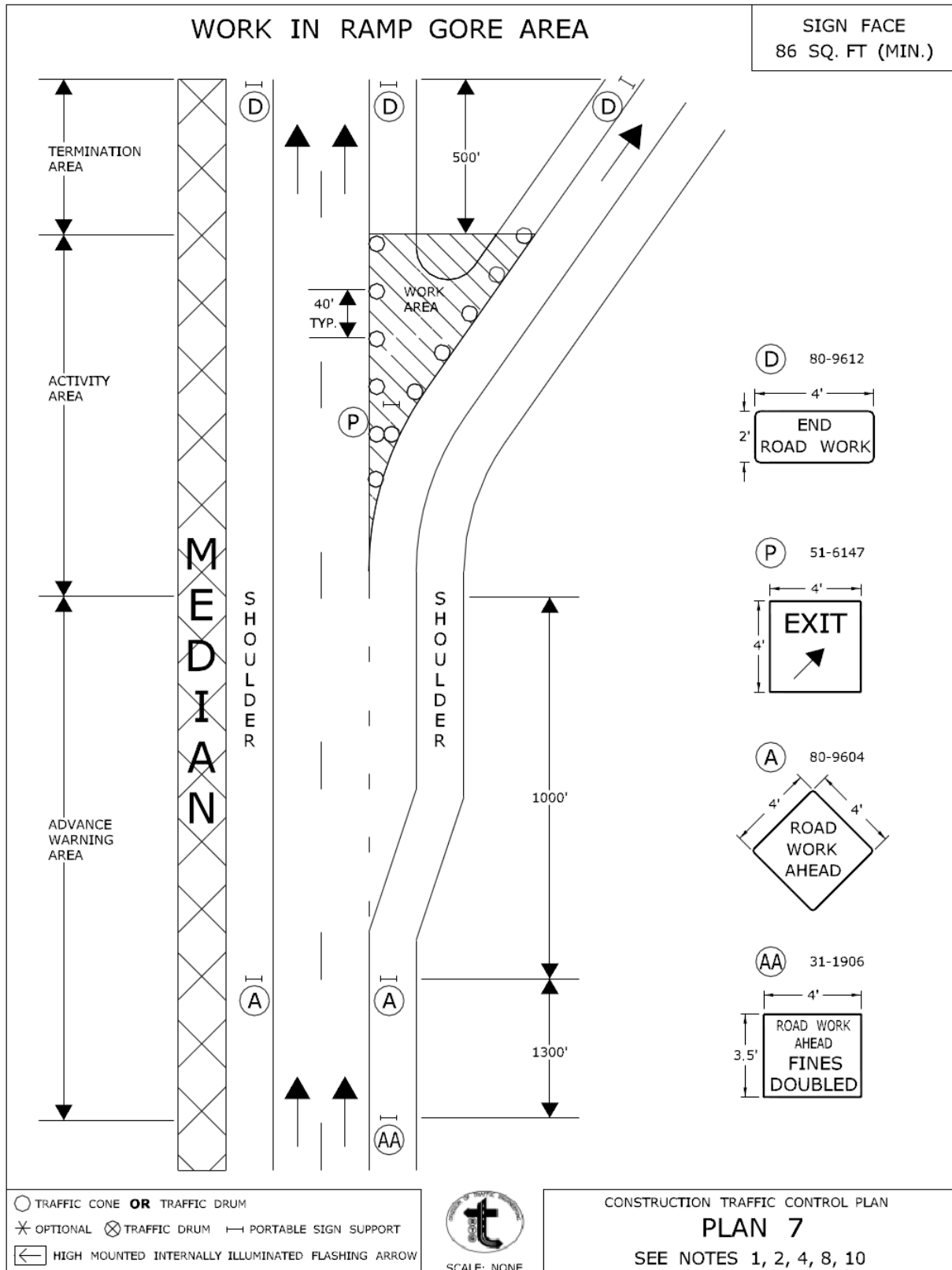
CONSTRUCTION TRAFFIC CONTROL PLAN

PLAN 6

SEE NOTES 1, 2, 4, 8

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APPROVED *Charles S. Harlow*
PRINCIPAL ENGINEER
Charles S. Harlow
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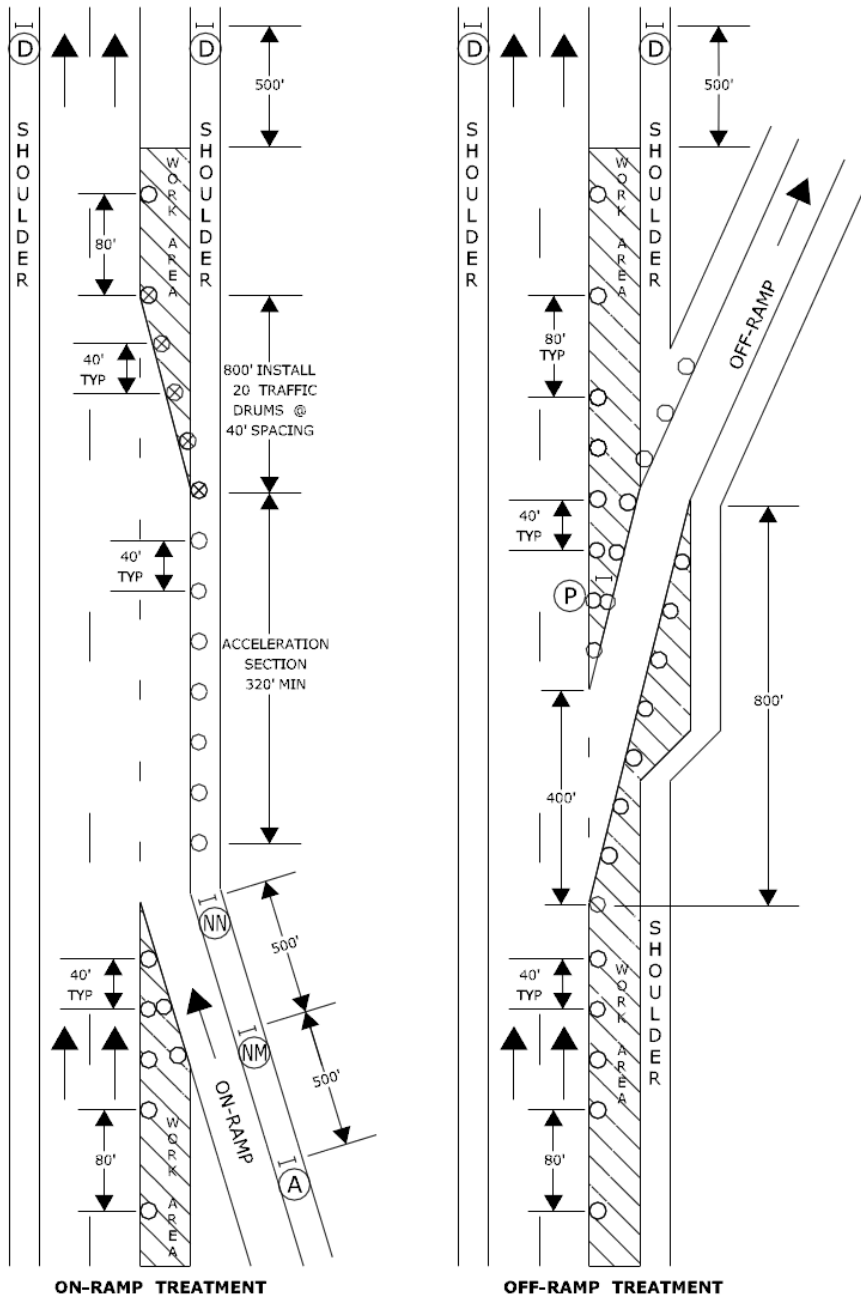


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APPROVED *Charles S. Harlow*
PRINCIPAL ENGINEER
Charles S. Harlow
2012.06.05 15:53:03-0400

TYPICAL RAMP TREATMENTS FOR MAINLINE LANE CLOSURE - MULTILANE HIGHWAY

SIGN FACE
SQ. FT VARIES



- (D) 80-9612
4' x 2' END ROAD WORK
- (P) 51-6147
4' x 4' EXIT
- (NN) 31-0528
5' YIELD
- (NM) 80-9055
4' x 4' Arrow pointing up
- (A) 80-9604
4' x 4' ROAD WORK AHEAD

USE TRAFFIC CONTROL PLAN 1 TO CLOSE THE RIGHT LANE

- TRAFFIC CONE OR TRAFFIC DRUM
- ✱ OPTIONAL ⊗ TRAFFIC DRUM — PORTABLE SIGN SUPPORT
- ◀ HIGH MOUNTED INTERNALLY ILLUMINATED FLASHING ARROW



SCALE: NONE

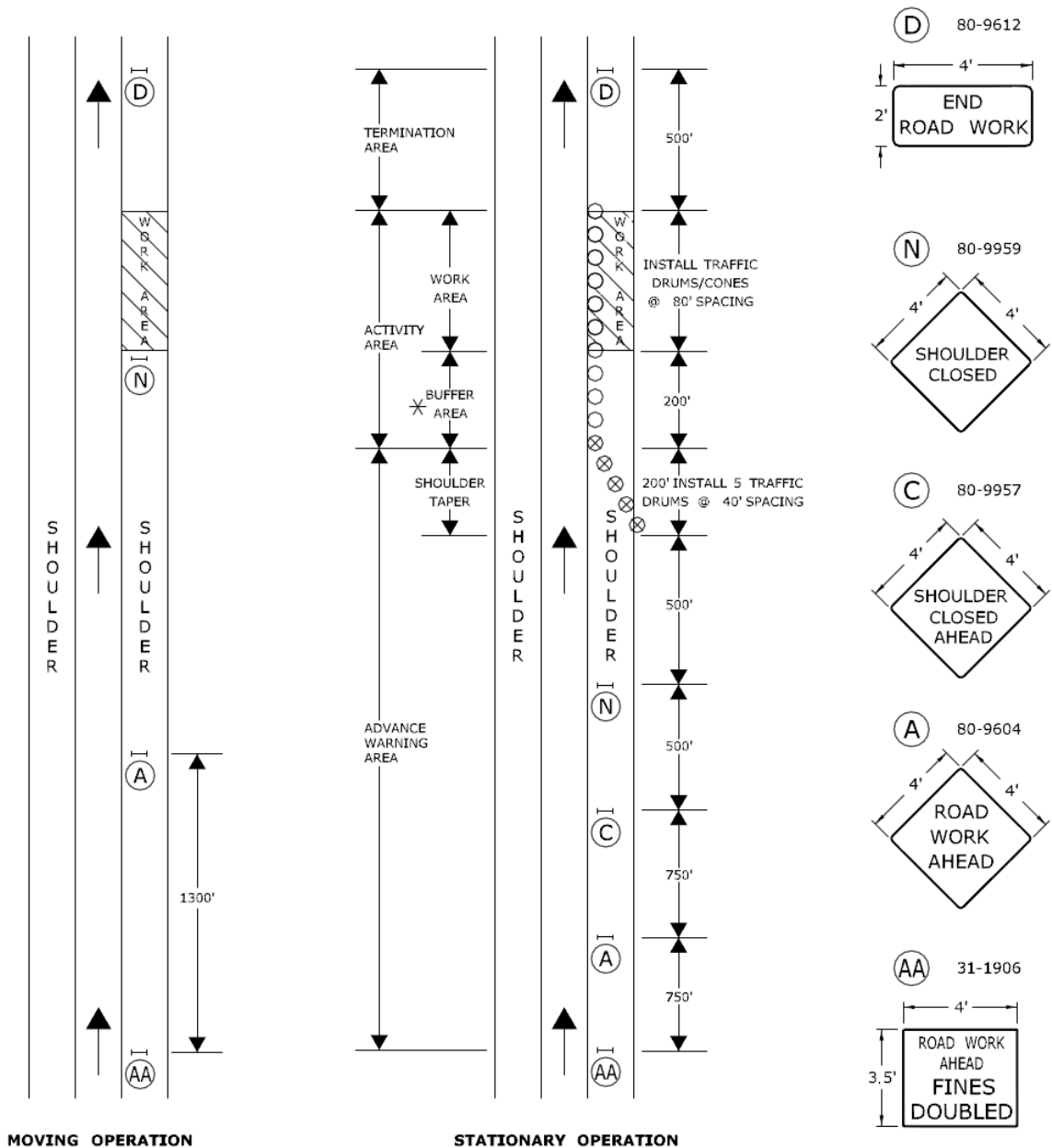
CONSTRUCTION TRAFFIC CONTROL PLAN
PLAN 8
SEE NOTES 1, 2, 3, 4, 5, 6, 8, 9, 10

CONNECTICUT DEPARTMENT OF TRANSPORTATION
BUREAU OF ENGINEERING & CONSTRUCTION

APPROVED *Charles S. Harlow*
PRINCIPAL ENGINEER
Charles S. Harlow
2012.06.05 15:53:31-0400'

WORK IN SHOULDER AREA - TURNING ROADWAYS / RAMPS

SIGN FACE
70 SQ. FT (MIN.)



- TRAFFIC CONE **OR** TRAFFIC DRUM
- * OPTIONAL ⊗ TRAFFIC DRUM — PORTABLE SIGN SUPPORT
- ◀ HIGH MOUNTED INTERNALLY ILLUMINATED FLASHING ARROW



SCALE: NONE

CONSTRUCTION TRAFFIC CONTROL PLAN

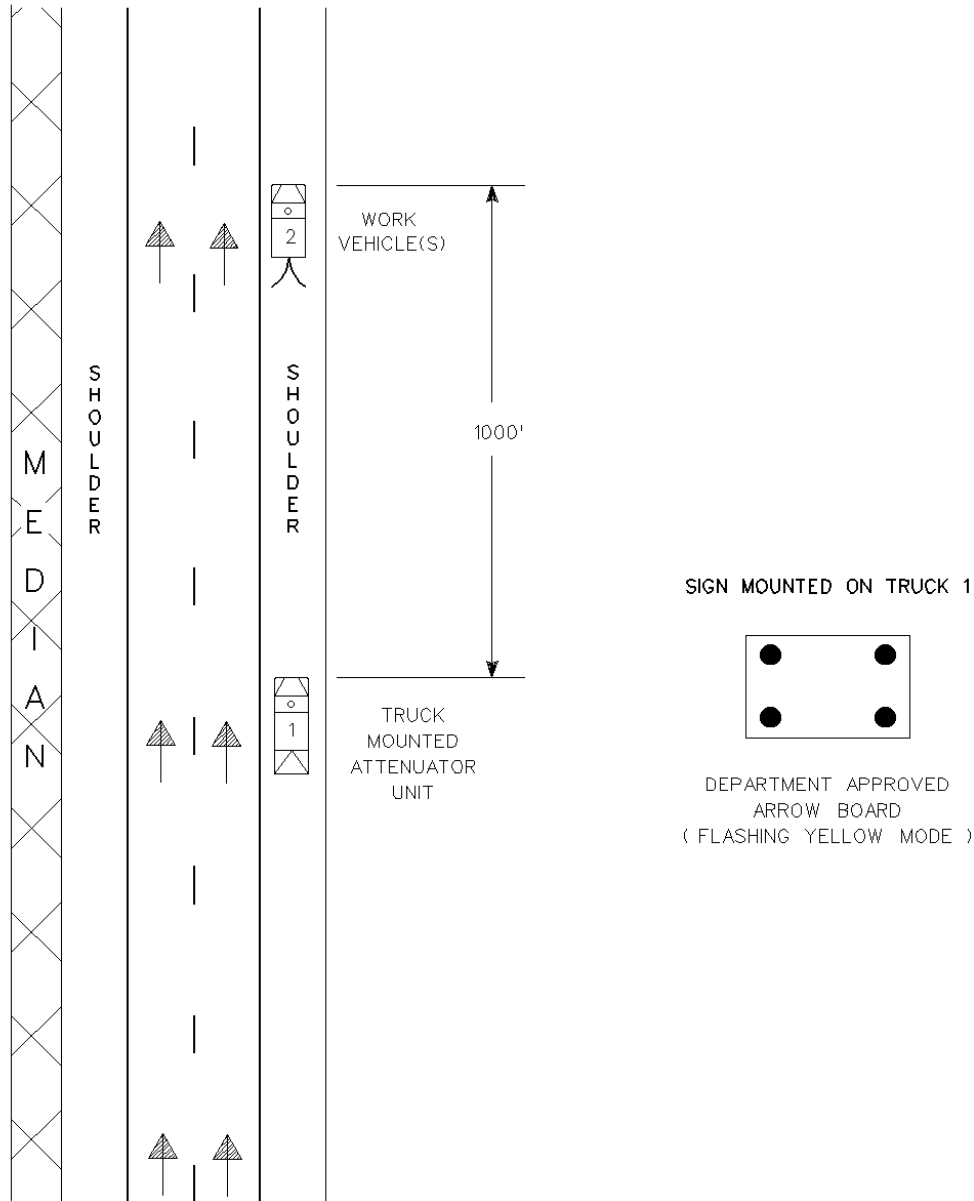
PLAN 9

SEE NOTES 1, 2, 4, 8

CONNECTICUT DEPARTMENT OF TRANSPORTATION
BUREAU OF ENGINEERING & CONSTRUCTION

APPROVED *Charles S. Harlow*
PRINCIPAL ENGINEER
2012.06.05 15:53:0400'

MOVING OPERATION ON RIGHT SHOULDER MULTILANE HIGHWAY & SECONDARY ROADWAYS



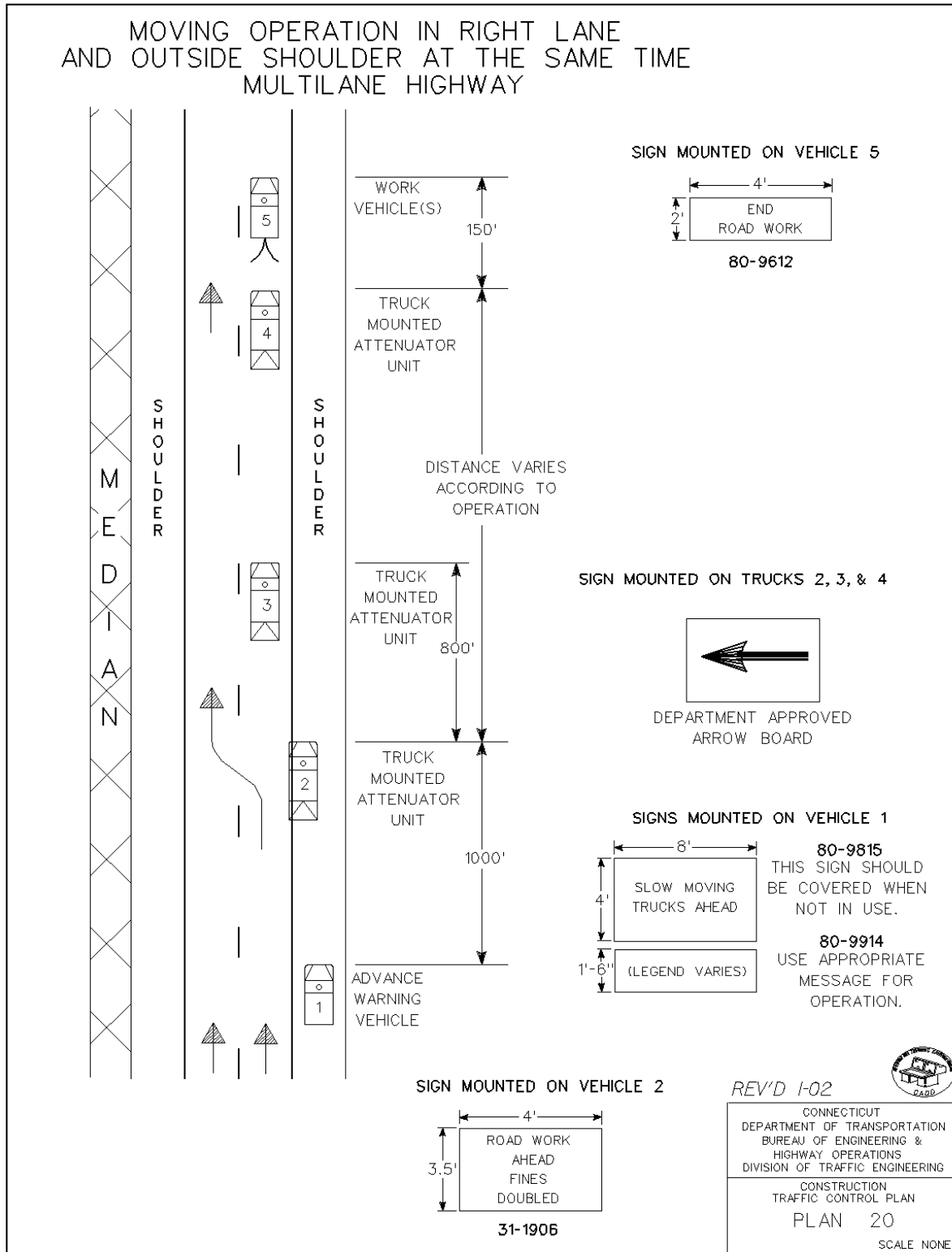
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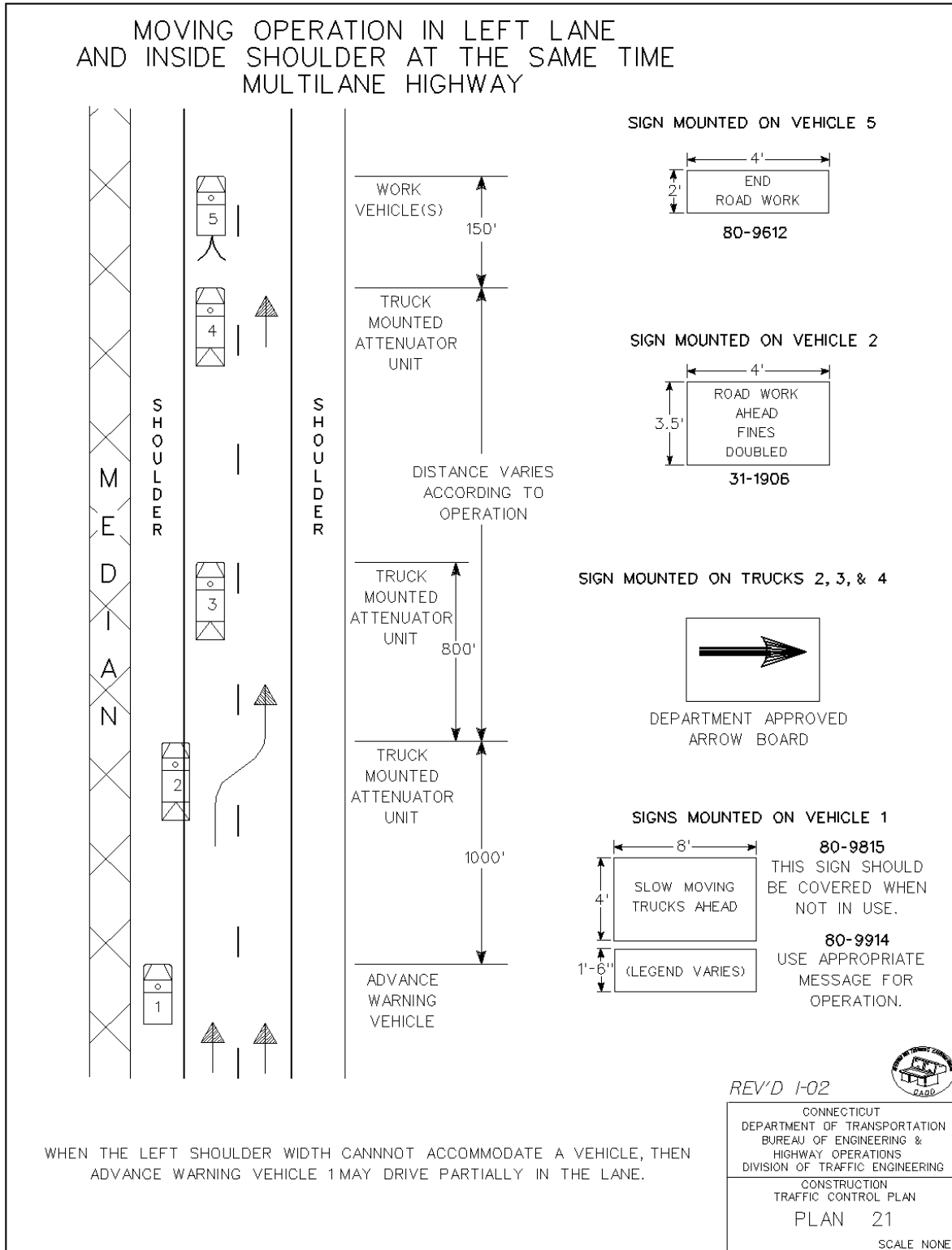
CONNECTICUT
DEPARTMENT OF TRANSPORTATION
BUREAU OF ENGINEERING &
HIGHWAY OPERATIONS
DIVISION OF TRAFFIC ENGINEERING

CONSTRUCTION
TRAFFIC CONTROL PLAN
PLAN 19
SCALE NONE

APPROVED J. McCall DATE 1-30-02
PRINCIPAL ENGINEER



APPROVED John D. McCall PRINCIPAL ENGINEER DATE I-30-02



APPROVED John D. McCall DATE 1-30-02
PRINCIPAL ENGINEER

Article 9.71.05 – Basis of Payment is supplemented by the following:

The cost of furnishing, installing, and removing the material for the 4H:1V traversable slope shall be paid for under the item “Maintenance and Protection of Traffic.”

ITEM #1001001A – TRENCHING AND BACKFILLING

Section 10.01 is amended as follows:

10.01.01 – Description: *Add after the first paragraph:*

Rock, insofar as it applies to trenching and backfilling, shall be defined as rock in definite ledge formation, boulders, or portions of boulders, cement masonry structures, concrete structures, reinforced concrete pipe, Portland cement concrete pavement or base, of 1/2 c.y. or more in volume, removed as indicated or directed from within the payment lines for trench excavation.

Revise the third paragraph to add:

“processed aggregate base, granular fill, suitable backfill material” after “crushed stone”.

10.01.02 – Materials: *Add the following:*

Processed Aggregate Base shall be as specified in M.05.01.

Granular fill shall be specified in M.02.01

10.01.03 – Construction Methods: *Replace the fourth paragraph with the following:*

Where trenching occurs in riprap or crushed stone areas, the surface material shall be replaced in kind. Where trenching in bituminous concrete sidewalk or paved areas, the trench shall be sawcut and backfilled to within the depth from the surface required to replace the removed sidewalk or pavement structure, which shall then be replaced. Suitable backfill material and granular fill shall be used for sidewalks and processed aggregate base shall be used as backfill material for pavement or bituminous concrete surfaces. The edges of all trenches in paved surfaces shall be sawcut to neat lines prior to paving. All trenches in existing paved surfaces, which parallel the curb, shall be no more than 1 1/2 feet from the curb, or when no curb is present, the apparent edge of road. The exception shall be to avoid existing appurtenances such as catch basins, water gates, manholes etc.

10.01.04—Method of Measurement: *Replace the second sentence with the following:*

If rock, conforming to the description given under 10.01.01, is encountered, the Contractor shall strip it of sufficient overlying material to allow for proper measurement, and shall notify the Engineer that the rock surface is ready for measurement.

10.01.05 -- Basis of Payment: *Replace the second paragraph with the following*

It shall also include all sand encasement, suitable backfill material, processed aggregate base, granular fill, backfilling, grading, seeding, fertilizing, mulching, clean-up and disposal of surplus

material, sawcutting sidewalks and paved areas, as well as furnishing and installing curbing, riprap, crushed stone, topsoil, sidewalk, pavement or structure, as the case may be.

Replace the third paragraph with the following and remove the fourth paragraph entirely:

When rock, conforming to the description given under 10.01.01 is encountered within the limits of trenching, its removal will be classified; and the accepted quantities of rock in trench excavation will be paid for at the Contract unit price per cubic yard for "Rock in Trench Excavation." In the absence of a "Rock in Trench Excavation" item, the work will be compensated as extra work.

ITEM #1002291A - MODIFICATION OF TRAFFIC CONTROL FOUNDATION

Description:

This item shall consist of modifying existing traffic control foundation of the type specified at the locations shown on the plans or as directed by the Engineer and in conformity with these special provisions.

Materials:

Concrete replacement shall be Class "A" concrete conforming to Section M.03 and for Rigid Metal Conduit, Article M.15.09.

Concrete bonding compound shall be of an approved type as directed by the Engineer.

Construction Methods:

All work shall be in accordance with the following procedure or as directed by the Engineer.

- a) Remove concrete foundation by cutting, chiseling or any other method approved by the Engineer as required to install new conduit sweeps.
- b) Position new conduit sweeps, and apply an approved concrete bonding compound on the exposed concrete surfaces as recommended by the manufacturer.
- c) Forms shall be positioned so that all existing exposed foundation at grade level or above will be matched. All work shall be in accordance with Section 6.01.
- d) Allow concrete to cure and backfill as indicated on the details.

When all conduits, existing and new, are used, one additional 50mm (2") rigid metal conduit sweep shall be installed as a spare. Existing conduits that will be abandoned shall be cut and capped approximately two feet from the foundation.

Surfaces, new and existing, of a foundation which is modified, shall be "Grout Clean-Down Finish" as described in Section 6.01.

Where a foundation is modified within or adjacent to a concrete sidewalk, unless otherwise directed by the Engineer, the entire section of sidewalk shall be replaced in accordance with Section 9.21.

Method of Measurement:

The work for this item shall be measured for payment by the number of foundations modified.

Basis of Payment:

This work will be paid for at the contract unit price each for "Modification Of Traffic Control Foundation", which price shall include all costs for cutting of bases, bonding compound, forms, concrete, conduit sweeps, and all fittings, material, equipment, labor and tools incidental thereto.

All concrete sidewalk replaced due to foundation modification shall be paid for at the contract unit price for "Concrete Sidewalk".

<u>Pay Item</u>	<u>Pay Unit</u>
Modification of Traffic Control Foundation	Ea.

ITEM #1008908A - CLEAN EXISTING CONDUIT

Description:

Clean existing conduit as required, as shown on the plans or as directed by the Engineer to remove dirt and debris to facilitate the installation of new cable.

Construction Methods:

Where cable is to be installed in existing conduit the conduit may have to be cleared prior to the installation. Cleaning will only be necessary if the new cable cannot be easily installed in the existing conduit. By field inspection, and with the concurrence of the Engineer, determine the sections of conduit that require cleaning.

Remove all existing cable from conduit. Install temporary cable elsewhere, as necessary, to maintain normal signalization complete with vehicle & pedestrian detection, EVPS, and coordination. Clean the conduit by one of the following methods:

- 1) Rodding.
- 2) A high pressure jet spray, or air pressure.
- 3) By pulling a mandrel or ball through the conduit.

Submit in writing the anticipated method of cleaning the conduit to the Engineer for approval prior to cleaning any conduit.

If the conduit is found damaged to any extent that the cleaning process will not clear the obstruction, it will be the judgment of the Engineer whether to replace the entire conduit run or excavate and replace only the damaged section.

If the existing conduit is found to be missing hardware such as bonding bushings and bond wire, the missing material shall be provided and installed under this item prior to installation of the cable.

Method of Measurement:

This work shall be measured from termination point to termination point. This work shall be measured for payment on actual number of linear feet (meters)..

Basis of Payment:

The work under the Item "Clean Existing Conduit" shall be paid for at the contract unit price per linear foot (meters), which price shall include all material, tools, equipment, labor, and work incidental thereto. Work pertaining to temporary operation shall be paid for under Item 1108xxxA - Temporary Signalization (Site X). Replacement of any damaged conduit shall be paid for under the applicable conduit item.

Pay Item	Pay Unit
Clean Existing Conduit	l.f.

ITEM #1108163A - MODIFY EXISTING CONTROLLER

This item shall consist of modifying the existing traffic controller assembly to provide the revised operation as shown on the plans or as directed by the Engineer. The modification shall include, but not be limited to, revisions to the timing and sequence, cabinet wiring, coordination, pre-emption, field wiring and cabinet wiring diagrams.

MATERIAL

The material for this work shall conform to the requirements of the current edition of the Connecticut Department of Transportation Functional Specifications for Traffic Control Equipment. The material shall be compatible with the existing equipment. Any material in question shall be approved prior to installation by the Engineer or the Department of Transportation Signal Lab, 280 West Street, Rocky Hill. Contact Mr. Don Assard at (860) 258-0346 or Mr. Mark Zampini at (860) 258-0349 for approval.

CONSTRUCTION METHODS

All revisions to the cabinet wiring shall be neat and orderly. All additional wiring shall be from terminal to terminal. Splices will not be allowed. All changes, additions and deletions shall be documented, dated and drawn on the reproducible original or a reproducible copy of the original cabinet wiring diagram. Four paper copies shall be furnished to the Engineer upon completion of the revision.

METHOD OF MEASUREMENT

This item will be measured for payment as an "Each" item.

BASIS OF PAYMENT

This item will be paid for at the contract price each, for "Modify Existing Controller" which price shall include all necessary load switches, relays, components, hardware, tools, equipment, engineering and labor required to modify the existing controller as shown on the plan. This price shall also include four updated cabinet wiring diagrams.

Pay Item
Modify Existing Controller

Pay Unit
Ea.

ITEM #1111201A – TEMPORARY DETECTION (SITE NO. 1)

ITEM #1111202A – TEMPORARY DETECTION (SITE NO. 2)

ITEM #1111203A – TEMPORARY DETECTION (SITE NO. 3)

ITEM #1111204A – TEMPORARY DETECTION (SITE NO. 4)

Description:

Provide a Temporary Detection (TD) system at signalized intersections throughout the duration of construction, as noted on the contract plans or directed by the Engineer. TD is intended to provide an efficient traffic-responsive operation which will reduce unused time for motorists travelling through the intersection. A TD system shall consist of all material, such as pedestrian pushbutton, accessible pedestrian signal, conduit, handholes, cable, messenger, sawcut, loop amplifier, microwave detector, Video Image Detection System (VIDS), Self-Powered Vehicle Detector (SPVD), and any additional components needed to achieve an actuated traffic signal operation.

Materials:

Material used for TD is either owned by the Contractor and in good working condition, or existing material that will be removed upon completion of the contract. Approval by the Engineer is needed prior to using existing material that will be incorporated into the permanent installation. New material that will become part of the permanent installation is not included or paid for under TD.

Construction Methods:

The work for this item includes furnishing, installation, relocating, realigning, and maintaining the necessary detection systems as to provide vehicle and pedestrian detection during each phase of construction. If not shown on the plan, program the TD modes (pulse or presence) as the existing detectors or as directed by the Engineer. If the TD method is not specified elsewhere in the Contract, (loops, SPVD, microwave, VIDS, pushbutton, or other) it may be the Contractor's choice. The method chosen for TD must be indicated on the TD Plan submission.

The traffic signal plan-of-record, if not in the controller cabinet will be provided upon request. Ensure the controller phase mode (recall, lock, non-lock) and phase timing are correct for the TD. Adjust these settings as needed or as directed by the Engineer.

At least 30 days prior to implementation of each phase of construction submit a TD proposal to the Engineer for approval. Submit the TD proposal at the same time as the Temporary Signalization plan. Indicate the following information for each intersection approach:

- Phase Mode
- Temporary Detection Method

- Area of Detection
- Detector Mode

Submit the proposed temporary phase timing settings and the TD installation schedule with the TD proposal. See the example below.

Example Proposed Temporary Detection and Timing

Site 1

Warren, Rt. 45 at Rt. 341, Location #149-201

Approach	Phase	Phase Mode	TD Method	Area of Detection	Det Mode
<i>Rt. 45 NB</i>	<i>2</i>	<i>Min Recall</i>	<i>VIDS</i>	<i>150' from Stop Bar</i>	<i>Presence</i>
<i>Rt. 45 SB</i>	<i>2</i>	<i>Min Recall</i>	<i>SPVD</i>	<i>150' from Stop Bar</i>	<i>Pulse</i>
<i>Rt. 341</i>	<i>4</i>	<i>Lock</i>	<i>Microwave</i>	<i>30' from Stop Bar</i>	<i>Pulse</i>
<i>Rt. 341</i>	<i>4</i>	<i>Lock</i>	<i>Pushbutton</i>	<i>At SE & SW corners</i>	<i>n/a</i>

Temporary Phase Timing Settings:

Phase	Min	Ped	Ped Clr	Ext	Max 1	Max2	Yel	Red
<i>2</i>	<i>20</i>	<i>0</i>	<i>0</i>	<i>6</i>	<i>45</i>	<i>60</i>	<i>4</i>	<i>1</i>
<i>4</i>	<i>14</i>	<i>7</i>	<i>9</i>	<i>3</i>	<i>27</i>	<i>35</i>	<i>3</i>	<i>1</i>

Scheduled TD: *July 4, 2017* Site 2

Scotland, Rt. 14 at Rt. 97, Location #123-201

Approach	Phase	Phase Mode	TD Method	Area of Detection	Det Mode
<i>Rt. 15 WB Left Turn</i>	<i>1</i>	<i>Non-Lock</i>	<i>VIDS</i>	<i>5' in front to 10' Behind Stop Bar</i>	<i>Presence</i>
<i>Rt. 14 EB</i>	<i>2</i>	<i>Min Recall</i>	<i>Existing Loop</i>	<i>150' from Stop Bar</i>	<i>Pulse</i>
<i>Ped Phase</i>	<i>3</i>	<i>Non-Lock</i>	<i>Pushbutton</i>	<i>At all corners</i>	<i>n/a</i>
<i>Rt. 14 WB</i>	<i>6</i>	<i>Min Recall</i>	<i>VIDS</i>	<i>150' from Stop Bar</i>	<i>Presence</i>
<i>Rt. 97</i>	<i>4</i>	<i>Lock</i>	<i>Loop, Pre-formed</i>	<i>20' from Stop Bar</i>	<i>Pulse</i>

Temporary Phase Timing Settings:

Phase	Min	Ped	Ped Clr	Ext	Max 1	Max2	Yel	Red
<i>1</i>	<i>5</i>	<i>0</i>	<i>0</i>	<i>2</i>	<i>12</i>	<i>18</i>	<i>3</i>	<i>1</i>
<i>2 & 6</i>	<i>24</i>	<i>0</i>	<i>4</i>	<i>4</i>	<i>26</i>	<i>36</i>	<i>4</i>	<i>1</i>
<i>3</i>	<i>16</i>	<i>7</i>	<i>9</i>	<i>0</i>	<i>16</i>	<i>16</i>	<i>4</i>	<i>1</i>
<i>4</i>	<i>14</i>	<i>7</i>	<i>9</i>	<i>3</i>	<i>27</i>	<i>35</i>	<i>3</i>	<i>1</i>

Scheduled TD: *July 4, 2011*

When at any time during construction the existing vehicle or pushbutton detection becomes damaged, removed, or disconnected, install TD to actuate the affected approaches. Install and make TD operational prior to removing existing detection. TD must be operational throughout all construction phases.

Provide a list of telephone numbers of personnel who will be responsible for the TD to the Engineer. If the TD malfunctions or is damaged, notify the Engineer and place the associated phase on max recall. Respond to TD malfunctions by having a qualified representative at the site within three (3) hours. Restore detection to the condition prior to the malfunction within twenty-four (24) hours.

If the Engineer determines that the nature of a malfunction requires immediate attention and the Contractor does not respond within three (3) hours following the initial contact, then an alternative maintenance service will be called to restore TD. Expenses incurred by the State for alternative service will be deducted from monies due to the Contractor with a minimum deduction of \$500.00 for each service call. The alternate maintenance service may be the traffic signal owner or another qualified Contractor.

TD shall be terminated when the detection is no longer required. This may be either when the temporary signal is taken out of service or when the permanent detectors are in place and fully operational.

Any material and equipment supplied by the Contractor specifically for TD shall remain the Contractor's property. Existing material not designated as scrap or salvage shall become the property of the Contractor. Return and deliver to the owner all existing equipment used as TD that is removed and designated as salvage.

Method of Measurement:

Temporary Signalization (TS) shall be measured for payment as follows:

Fifty percent (50%) will be paid when Temporary Detection is initially set up, approved, and becomes fully operational.

Fifty percent (50%) will be paid when Temporary Detection terminates and all temporary equipment is removed to the satisfaction of the Engineer.

Basis of Payment:

This work will be paid at the contract Lump Sum price for "Temporary Detection (Site No.)". The price includes furnishing, installing, relocating, realigning, maintaining, and removing, the necessary detection systems and all incidental material, labor, tools, and equipment. This price

ITEM #1111201A
THRU
ITEM #1111204A

also includes any detector mode setting changes, timing or program modifications to the controller that are associated with TD. All Contractor supplied material that will remain the Contractor's property will be included in the contract Lump Sum price for "Temporary Detection (Site No.)." Any items installed for TD that will become part of the permanent installation will not be paid for under this item but are paid for under the bid item for that work.

<u>Pay Item</u>	<u>Pay Unit</u>
Temporary Detection (Site No.)	L. S.

ITEM #1112284A — VEHICLE DETECTION MONITOR

Description:

Furnish and install a Vehicle Detection Monitor with stand in the Controller Cabinet.

Materials:

All hardware shall be new, corrosion-resistant. All equipment shall be current production.

Physical:

- Compact and easily accessible stand-mounted LCD/ LED Flat Panel Display.
- Diagonal screen size minimum 10 inches and maximum 15 inches.
- Withstand temperatures ranging from -4 to 140°F (-20 to 60°C).
- Operating humidity: 10-90% non-condensing.

Functional:

- Compatible with Color or Monochrome Detection systems.
- Industrial-grade video panel.
- ANSI contrast ratio of 300:1 minimum.
- Minimum brightness level: 400 candelas per square meter (400 lux).
- Native resolutions: 1024 (horizontal) x 768 (vertical).
- Support both National Television Standards Committee (NTSC) and Phase Alternating Line (PAL) video formats with auto-sensing.
- Minimum viewing angle: 140 degrees horizontally, 120 degrees vertically.
- On-Screen Display (OSD) controls brightness, contrast, color as well as horizontal and vertical positioning.
- Compatible with video detection processor output. Use appropriate converters/ adapters if necessary.
- Operable on 110 VAC or 220 VAC, 50 or 60 Hz.
- FCC, Voluntary Control Council for Interference (VCCI), Electromagnetic Compatibility (EMC), Consumer Electronics (CE) approved, UL listed and Energy Star efficient.
- MTBF Rating: 50,000 hours minimum.

Warranties and Guarantees:

Provide warranties and guarantees to the **Department of Transportation Office of Maintenance** in accordance with Article 1.06.08 of the Standard Specifications. Warranties for all equipment furnished as part of this Contract are to cover a period of 24 months following successful completion of the entire intersection acceptance test.

Method of Measurement:

The Vehicle Detection Monitor will be measured for payment as the number of units furnished, installed, operational and accepted.

Basis of Payment:

This work will be paid at the Contract unit price for each accepted "Vehicle Detection Monitor," which price shall include the Vehicle Detection Monitor, stand, documentation, warranty, labor, tools and equipment incidental thereto.

Pay Item	Pay Unit
Vehicle Detection Monitor	ea.

ITEM #1112285A – THERMAL VIDEO DETECTOR ASSEMBLY

Description:

Furnish and install a Thermal Video Detector Assembly (TVDA) as shown on the plans or as directed by the Engineer.

Materials:

All hardware shall be new, corrosion resistant. All equipment shall be current production.

Thermal Detector Assembly:

Thermal Imaging Sensor:

- Sensor Type: Focal Plane Array (FPA), Uncooled Vanadium Oxide Microbolometer
- Fixed mount pan and tilt unit bracket.
- Thermal Sensitivity: <75mk, <50 mK f/1.0 or lower.
- Active picture elements (pixels): 320(H) x 240(V), minimum. 25 micron pixel pitch.
- Thermal Output: Analog NTSC equivalent.
- Output impedance: 75 Ohms nominal.
- Operating Temperature Range: -50°C to 75°C (-58°F to 167°F)
- Lens Selection: Based on recommendation of manufacturer for each detector installed, per outcome of Site Survey.

Surge Protection

A thermal surge suppressor(s) shall be available for installation inside the traffic signal controller cabinet. The suppressor shall provide coaxial cable connection points to a Thomas Research CCTV-SP-NI or approved equal transient suppresser for each image sensor.

- Peak Surge Current (8 x 20 us) 20KA
- Technology Hybrid, Solid State
- Attenuation 0.1db @ 10Mhz
- Response Time <1 nanosecond
- Protection Line to Ground
- Shield to Ground (isolated shield modules)
- Clamp Voltage 6 volts
- Connectors BNC
- Impedance 75 Ohms
- Temperature -40 to +85 degrees C
- Humidity 0-95% non-condensing
- Dimensions 4.5" x 1.5" x 1.25"
- UL Listed UL 497B

Detector Enclosure:

- Tamper proof constructed of painted or powder coated aluminum of at least 0.06-inch (1.59-mm) thickness.
- Environmentally sealed housing. IP-66 Rating
- Adequate adjustable sunshield should be provided.
- Internal Heater, window defroster, and a thermostat to control both.
- The enclosure shall include grounding and surge protection.

Documentation: (TVDA)

Provide to the **Department of Transportation Office of Maintenance** three (3) copies of equipment manuals furnished by the manufacturer, which includes the following:

- Installation and operation procedures.
- Performance specifications (functions, electrical, mechanical and environmental) of the unit.
- Schematic diagrams.
- Pictorial of component layout on circuit board.
- List of replaceable parts including names of vendors for parts not identified by universal part numbers such as JEDEC/RETMA or EIA.
- Troubleshooting, diagnostic and maintenance procedures.

Site Survey:

Perform a site survey with the TVDA manufacturer representative at all TVDA locations prior to the installations of the TVDA equipment. The purpose of the survey is to optimize the performance from the TVDA equipment when it is installed and insure that it will meet the accuracy requirements specified previously. Submit the results of this survey to the Engineer in a report, which lists all TVDA locations with any recommended changes to camera locations, mounting adjustments, camera lens adjustments, and desired detection zone locations. This report shall be provided to the Engineer no later than the semi-final inspection.

Warranties and Guarantees: (TVDA)

Provide warranties and guarantees to the **Department of Transportation Office of Maintenance** in accordance with Article 1.06.08 of the Standard Specifications. Warranties for all equipment furnished as part of this Contract are to cover a period of 24 months following successful completion of the entire intersection acceptance test.

Construction Methods:

Install TVDA equipment in accordance with the manufacturer instructions and recommendations to achieve the detection zones as shown in the plans and accuracy as described in these specifications. Conduct the Site Survey as specified above. The location of the TVDA shown on the plan may be revised as a result of the Site Survey. Provide the Site

Survey report to the Engineer and review proposed TVDA relocations prior to installation of TVDA equipment.

Method of Measurement:

The Thermal Video Detector Assembly will be measured for payment as the number of detectors furnished, installed operational and accepted.

Basis of Payment:

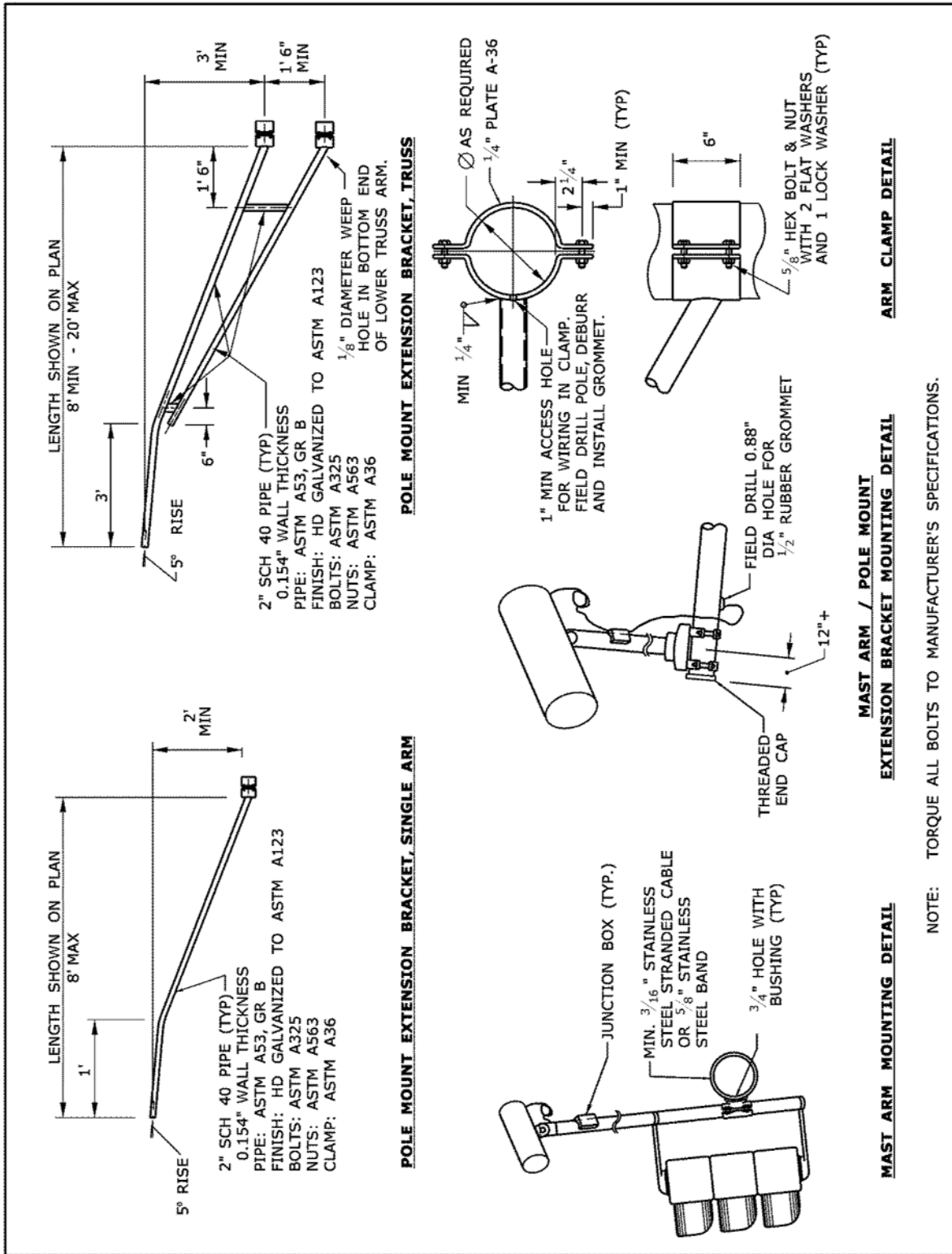
The unit bid price for Thermal Video Detector Assembly includes the detector, enclosure, surge protector, brackets used to attach the TVDA to a support structure or extension bracket, documentation, warranty, labor, tools and equipment necessary to provide the specified video signal to the VDP.

Pay Item

Thermal Video Detector Assembly

Pay Unit

Ea.



ITEM #1112286A – 360 DEGREE CAMERA ASSEMBLY

ITEM #1112287A – 360 DEGREE VIDEO DETECTION PROCESSOR

ITEM #1113725A – 23 AWG 4 TWISTED PAIR CATEGORY 6 CABLE

Description:

Furnish and install a 360 Degree Video Image Detection System (360VIDS) as shown on the plans or as directed by the Engineer. The 360VIDS consists of a 360 Degree Camera Assembly (360CA), 360 Degree Video Detection Processor (360VDP) and 23 AWG 4 Twisted Pair Category 6 Cable.

Materials:

All hardware shall be new, corrosion resistant. All equipment shall be current production.

360 Degree Camera Assembly:

Camera:

- No-aim, no-focus camera
- Downward facing lens and camera shroud
- Single Power Over Ethernet (POE) connection for power and data collection.
- Color image camera with 360 degree point of view (POV)
- Active picture elements (pixels): 2560 (H) x 1920 (V), minimum.
- Signal to noise ratio : ≥ 55 dB
- Heated camera
- IP addressable

Camera Enclosure:

- Tamper proof constructed of painted or powder coated aluminum of at least 0.25 inch thickness.
- IP66-rated camera housing.

Camera Mounting Hardware:

- Smartmount bracket.
- Junction box.
- Banded bracket.
- 90 degree vertical riser:
 - For mast arms, use vertical riser height specified on the plans
 - For span poles with horizontal extension brackets, use shortest vertical riser height physically possible
 - For span poles with no horizontal extension brackets (Shaft mounted), use vertical riser height specified on the plans

360 Degree Video Detection Processor:

Functional:

- Connectivity: Local Area Network (LAN), Wide Area Network (WAN), Camera interfaces.
- NEMA TS1/ TS2, ATC, Type 170, and 2070 compatible
- Four (4) USB 3.0 expansion ports.
- Front panel LED indicators displays calls and light states.
- Twenty-four (24) optically isolated I/O interface.
- Two (2) camera ports – Up to two (2) 360 Degree Camera Assembly; or one (1) 360 Degree Camera Assembly and four (4) IP video detection camera assembly or thermal detector assembly; or eight (8) IP video detection camera assembly or thermal detector assembly.
- Phase and detection display.
- Shall include at least a built-in 4g modem (or higher) and be Wi-Fi capable
- Power – 110/220 VAC 50/60 Hz
- Point and click zone drawing feature
- Omni-directional vehicle tracking
- Zone level visibility monitoring
- Monitor phases and loops, generates calls to controllers
- Software required to support collection of data
- Environmental : -29F to +165F (-34C to +74C), 0-95% non-condensing
- Fail-safe in the event of loss of video from 360CA or loss of power to 360VDP.
- Shall be able to configure and adjust the detection zone with the cabinet mounted Vehicle Detection Monitor (VDM) or remotely.
- Shall be activated to collect and report traffic data such as turning movements/volume counts, vehicle classification, speed, and red/green occupancy.
- Shall be configured to transmit collected traffic data and alarm events from field devices to remote desktop PC.
- Shall be configured to sync with a cloud network resource to allow for data backup including signal performance metrics data such as the Purdue coordination diagram.

Application Software:

- Shall be freely available for installation on any number of computers used to manage the 360VIDS.
- Shall be capable of point and click zone drawing
- Shall support the assignment of a detector output(s) to each zone. These assignments can be modified at any time through the software.
- Shall have the ability to digitally flatten CA image
- Shall have the ability to mask objects that occlude the camera field of view and/or disrupt the camera automatic gain and exposure control.

- Shall store detection zone data non-volatile memory so that after recovery from power interruption, all parameters are returned to latest settings.
- Shall have the ability to import and export program database to notebook PC or remote desktop PC. The program database shall also be allowed to be transferred via an external storage device.
- Shall be capable of superimposing detection zone on real time video image from selected camera with time stamping capabilities.
- Shall be capable of monitoring real time video and adjusting zones in field or remotely while 360VDP is actuating the traffic controller.
- Shall provide visual confirmation of detection by highlighting detection zone symbols.
- Shall allow for remote display of site/camera status for all connected sites.
- Shall provide visual indication of the light state for each zone within the graphical user interface.
- Shall be capable of searching the network for other 360VDP.
- Shall be compatible with Windows operating system supported by the Department.
- Shall maintain a historical log of all configurations when site is modified
- Shall feature the ability to digitally pan, tilt, and zoom within the camera assembly's field of view without movement of the camera.
- Shall support quad view video monitoring.
- Shall be capable of syncing with a cloud network resource to allow for group site sharing of site program database information and historical traffic data report generation.
- Shall maintain a database of current and historical traffic data
- Shall allow users to create reports for turning movements/volume counts, vehicle classification, speed, red/green occupancy, and site alerts remotely via the software and online reports/performance measures via the web.
- Shall display data in a graph, chart, and table format.
- Shall display data in 15, 30, and 60-minute intervals.
- Shall provide a means by which alerts can be configured to be delivered to different individuals via email
- Report output formats shall include at minimum PDF, rich text format, and Microsoft Excel formats.

Physical:

- Either shelf mounted, stand-alone design or modular card rack design.
- Aluminum card rack frame capable of accepting four (4) 360VDP modules.
- TS1 harness cable.
- Standard Ethernet and USB connectors for video input and video output.
- Female metal shell connector with latching clamp for NEMA TS 1 detector outputs and inputs.
- LED indications to monitor all detector outputs.
- Side or rear mounted connectors and controls are not allowed on stand-alone units.

- NEMA FR-4 glass epoxy or equivalent circuit boards.

Antenna:

- Shall be mounted externally on top of traffic cabinet
- Shall be “Multiple-Input and Multiple-Output” (MIMO)
- Shall cover the Cellular, WIFI, DSRC, GPS, and Bluetooth networks
- Shall connect to the 360VDP

Ethernet Repeater:

- Utilize Ethernet repeater if CAT6 cable distance is over 300’.

Ethernet Switch:

- Power Over Ethernet (POE) switch
- Ports for up-to four (4) traditional or thermal cameras.
- Powder coated aluminum.
- Dual purpose LED port lights.
- RJ-45 CAT6 connectivity.
- Environmental: -29F to +165F (-34C to +74C).
- NEMA TS2 compliant.

Video Encoder:

- Power Over Ethernet (POE)
- Video: H.264 (MPEG-4 Part 10/AVC) Baseline and Main Profile
- Compression: Motion JPEG
- Resolutions: 176x120 to 720x576, 176x120 to 1536x1152 for quad view.
- Frame rate:
 - H.264: 25/30 (50/60 Hz) fps,
 - 15fps in quad view in full resolution,
 - Motion JPEG: 25/30 (50/60 Hz) fps,
 - 15fps in quad view in full resolution.
- Video Streaming: Multi-stream H.264 and Motion JPEG: One H.264 and one JPEG stream on each channel (8 streams in total) in full frame rate individually configured streams in max. resolution at 25/30 fps; more streams if identical or limited in frame rate/ resolution. Controllable frame rate and bandwidth; VBR/CBR H.264.
- Environmental: -40F to +167F (-40C to +75C), 10-95% non-condensing.
- NEMA TS2 compliant.

Ethernet Protection Module:

- Either shelf mounted or stand-alone design.
- Protect 360CA, IP video detection camera assembly, thermal cameras and 360VDP in the event of a surge or lightning.

Environmental:

- Comply with NEMA TS 2, Section 2 requirements for Controller Assembly.
- Pass following NEMA TS 2 tests and applicable test procedures.

- Vibration: Section 3.13.3, Section 3.13.8.
- Shock: Section 3.13.4, Section 3.13.9.
- Transients, Temperature, Voltage and Humidity: Section 3.13.7.
- Power Interruption: Section 3.13.10.

Peripherals:

- Separable Keypad & Joystick or Computer Mouse including all necessary cables for connectivity to 360VDP.

23 AWG 4 Twisted Pair Category 6 Cable:

- Supply the 360CA power and return the video signal to the 360VDP.
- Outdoor Aerial CAT6 cable with UV insulation.
- Rated for 48VDC
- 250MHZ, shielded, gel-filled (flooded core) direct burial grade.
- Shall be equipped with a drain wire.
- Terminate with compatible connector.
- Polyethylene insulation.
- Shall be installed continuous between the 360CA and 360VDP.
- Cable shall be installed according to TIA/EIA-568-B.
- Other type cable may be substituted at the request of the 360VDP manufacturer with the Department's approval.

Documentation: (360VDP and 360CA)

Provide to the **Department of Transportation Office of Maintenance** three (3) copies of equipment manuals furnished by the manufacturer, which includes the following:

- Installation and operation procedures.
- Performance specifications (functions, electrical, mechanical and environmental) of the unit.
- Schematic diagrams (point to point wiring).
- Pictorial of component layout on circuit board.
- List of replaceable parts including names of vendors for parts not identified by universal part numbers such as JEDEC/RETMA or EIA.
- Troubleshooting, diagnostic and maintenance procedures.
- Testing results of grounding, voltage, and cable length measurements as indicated on the installation best practice verification at the end of this document.

Site Survey:

Perform a site survey with the 360VDP manufacturer representative at all 360VIDS locations prior to installation. The purpose of the survey is to optimize the performance from the 360VIDS equipment when it is installed. Prior to installation, submit the results of this survey to the Engineer in a report, which lists all 360VIDS locations with any recommended changes

to camera locations, mounting adjustments, camera lens adjustments, and desired detection zone locations.

Warranties and Guarantees: (360VDP and 360CA)

Provide warranties and guarantees to the **Department of Transportation Office of Maintenance** in accordance with Article 1.06.08 of the Standard Specifications. Warranties for all equipment furnished as part of this Contract are to cover a period of 36 months following successful completion of the entire intersection acceptance test.

Construction Methods:

Install 360VIDS equipment in accordance with the manufacturer instructions. Detection zones shall be replicated as shown in the plans. The Contractor shall install vehicle-counting zones for each lanes as shown in the plans. The Contractor shall ensure the vehicle counting zones be as accurate as possible. The Contractor shall contact the Engineer to confirm detection zone and vehicle counting zone locations. The Contractor shall refer to the “Installation Best Practices Guide” attached below to this specification and the Intersection Design Guide located on the Manufacturer’s website Note that all references to “Cat5e cable” in the attached “Installation Best Practices Guide” shall refer to “23 AWG 4 Twisted Pair Category 6 Cable” as specified above in this specification. In addition, any references to the SMARTMOUNT 7’ extension on the “System overview and Installation Guidance” shall follow the Camera Mounting Hardware section of this specification. The location of the 360CA shown on the plan may be revised as a result of the Site Survey. Peripherals are to be furnished and fully installed in an easily accessible position within the controller cabinet. Leave proper clearance(s) surrounding video monitor to allow for accessible connections and space to utilize surrounding equipment.

The Contractor shall forward the configuration file in electronic format to the Traffic Signal Lab’s Mr. Don Assard at Donald.Assard@ct.gov or Mr. Mark Zampini at Mark.Zampini@ct.gov, immediately upon completion of configuration of the detection zones. The Contractor shall address any comments/corrections identified by the Traffic Signal Lab.

Method of Measurement:

The 360 degree Camera Assembly will be measured for payment as the number of 360 degree cameras furnished, installed operational and accepted.

The 360 degree Video Detection Processor will be measured for payment as the number of units including all additional work and materials listed in Basis of Payment, furnished, installed, operational and accepted.

23 AWG 4 Twisted Pair Category 6 Cable will be measured for payment as linear feet, furnished, installed and accepted.

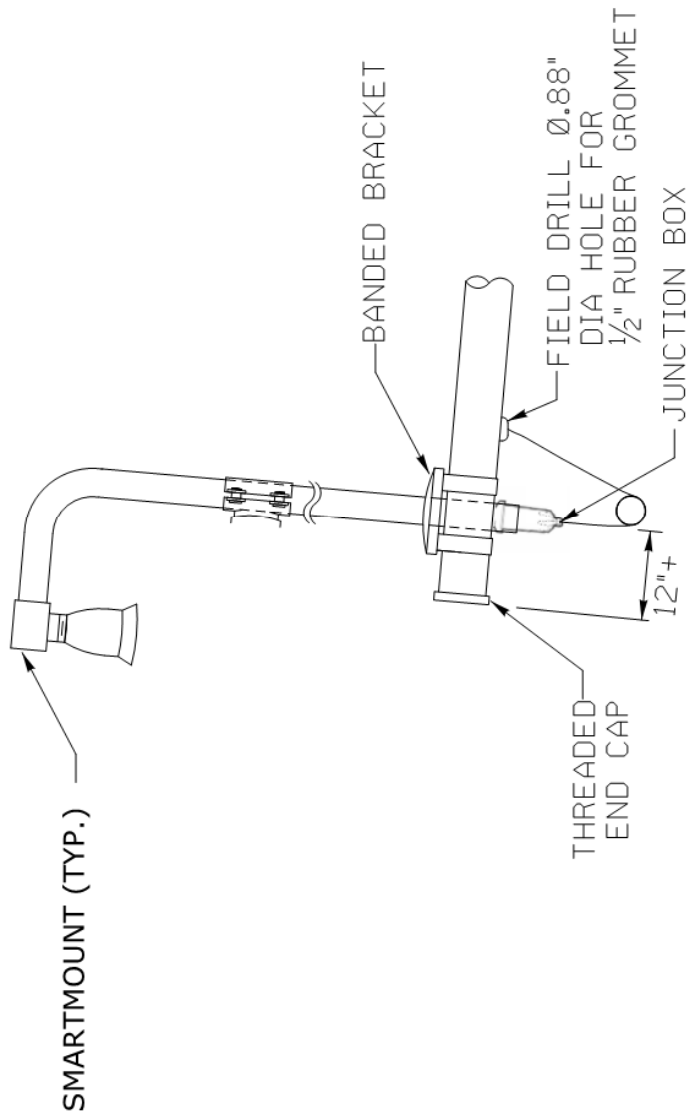
Basis of Payment:

The unit bid price for 360 degree Camera Assembly includes the 360 degree camera, enclosure, vertical riser and hardware used to attach the 360CA to a support structure, documentation, warrantee, labor, tools and equipment necessary to provide the specified video signal to the 360VDP.

The unit bid price for 360 degree Video Detection Processor includes the manufacturers' site survey, unlimited number of any necessary 360VIDS configuration software and license, card rack frame, power supply, all miscellaneous hardware such as PC interface cable with connectors, necessary peripherals such as Ethernet repeater, Ethernet switch, video encoder, Ethernet protection module, documentation, warrantee, labor, tools and equipment necessary to make the 360VIDS fully operational.

The unit bid price for 23 AWG 4 Twisted Pair Category 6 Cable includes all connectors, labor, tools and equipment necessary to install the cable between the 360CA and the 360VDP.

<u>Pay Item</u>	<u>Pay Unit</u>
360 Degree Camera Assembly	Ea.
360 Degree Video Detection Processor	Ea.
23 AWG 4 Twisted Pair Category 6 Cable	LF

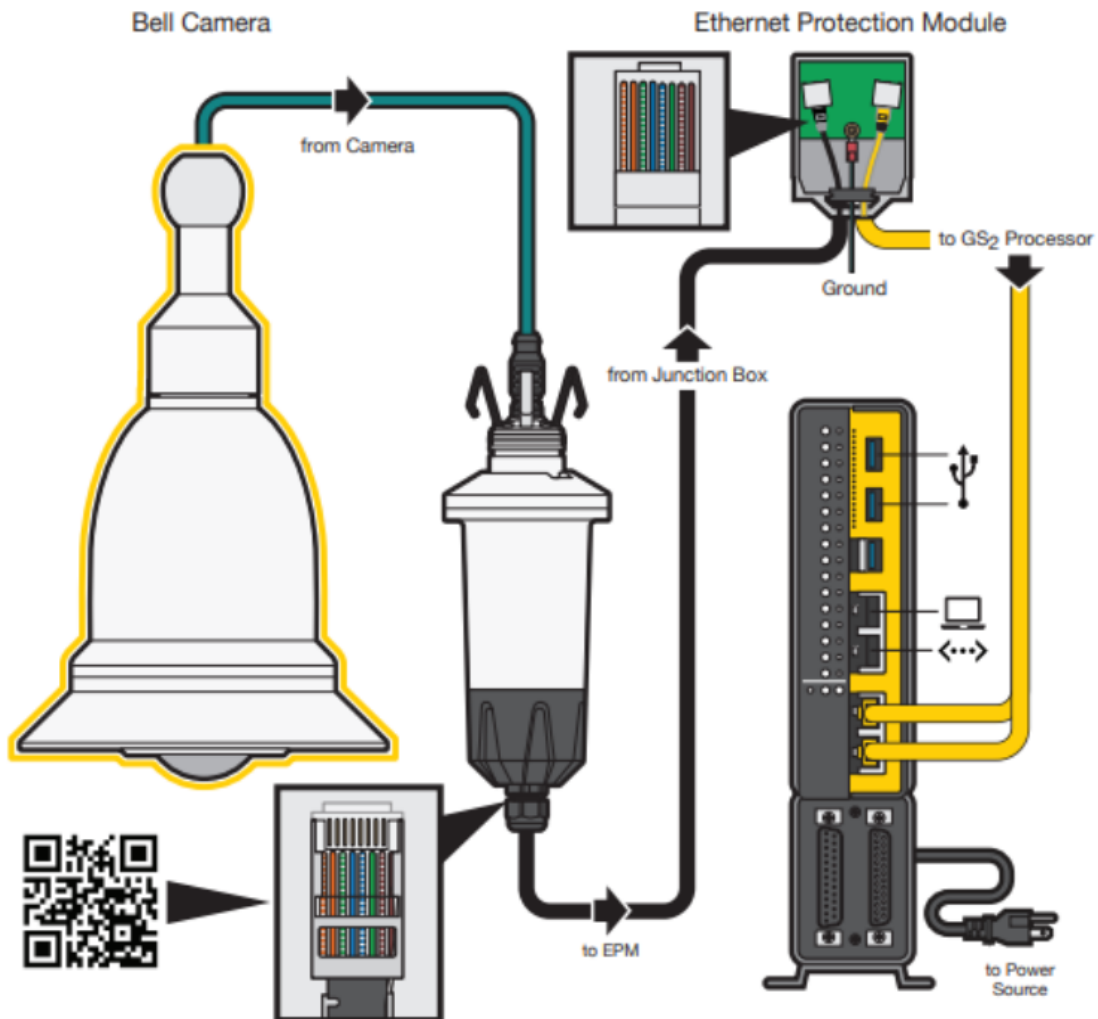


MAST ARM / POLE MOUNT
EXTENSION BRACKET MOUNTING DETAIL

NOTE: TORQUE ALL BOLTS TO MANUFACTURER'S SPECIFICATIONS.

FILENAME: \$FILEL\$ MODEL: \$MODELNAME\$

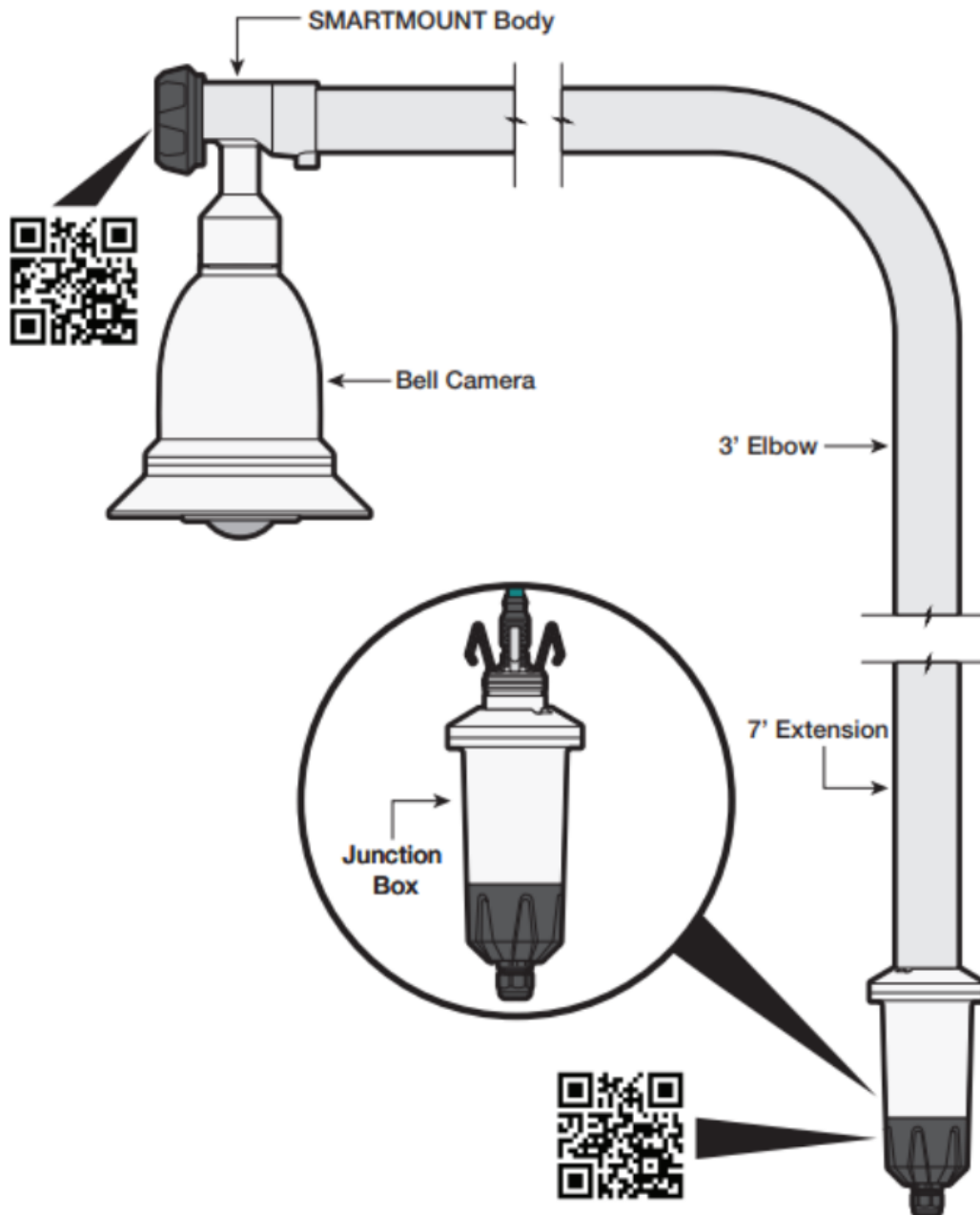
SYSTEM CONNECTIONS



Pro Tips (Before Beginning Installation):

- Test Bell Camera (while still in foam packaging).
- Make sure unit is grounded correctly.
- Make sure Bell Camera is level and in front of stop bar.
- Check TS1 Wiring Harness Insert – TS1 connection.
- Check "Tool List" in installation guide.

SYSTEM OVERVIEW



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marketing@gridsmart.com | 1.866.652.5347 | GRIDSMART.com

GRIDSMART®

INSTALLATION GUIDE

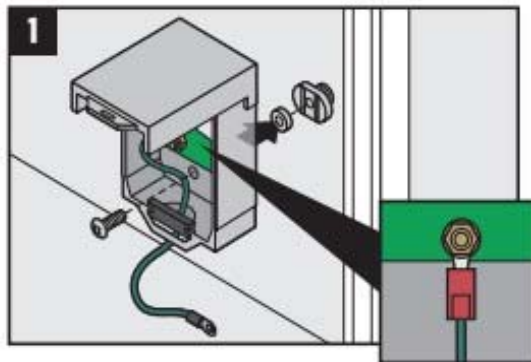
TOOLS AND ITEMS NEEDED

- 7/16" Wrench
- 1/2" Wrench
- 3/4" Wrench
- 1/4" Wrench
- 3/32" Wrench
- 17 mm Wrench
- Utility knife
- Phillips screwdriver
- Flat-head screwdriver
- 1/2" Drill bit
- 5/32" Allen wrench (included)
- Mounting bracket
- CAT5e test cable
- 24AWG Shielded CAT5e cable
- RJ-45 Crimper
- Laptop (with GRIDSMART Client installed)
- EXO Crimp frame
- Ground wire clamp (included)
- USB flash drive
- Cable tester
- Hand level
- DLG Di-120b Tester

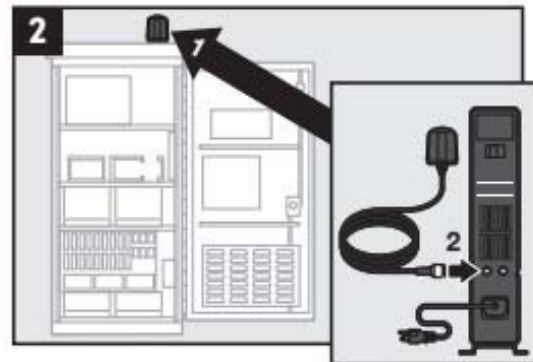


BEFORE INSTALLATION

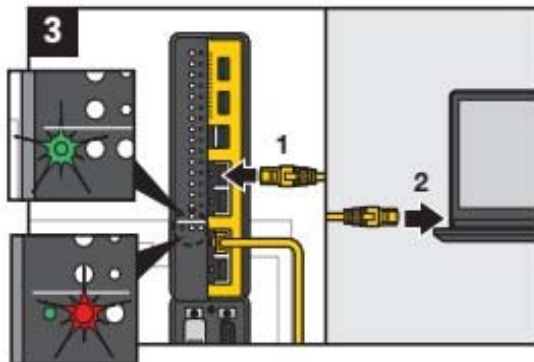
Helpful tip: On your laptop, verify that the GRIDSMART Client is updated to the latest software version. Download the latest update from GRIDSMARTCloud.com.



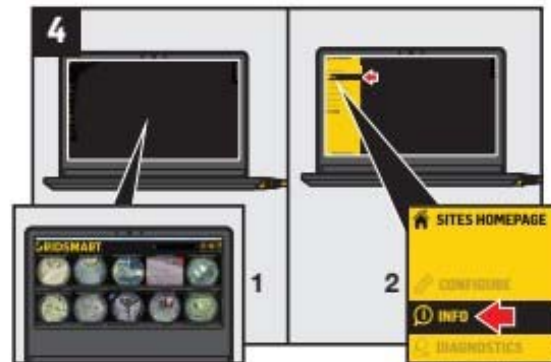
Install EPM onto cabinet DIN rail on opposite side from power distribution. Cut along rubber grommet "X". Connect 10AWG ground wire as close to ground rod as possible using ground wire clamp.



Mount Antenna to top of cabinet using 1/2" drill bit. Connect CELL Antenna lead to female connector on back of Processor.



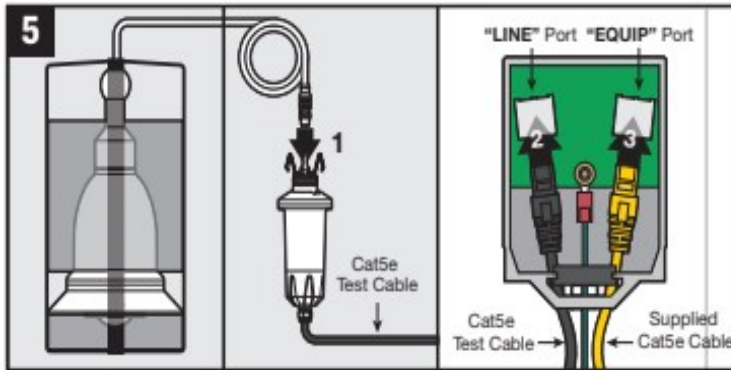
Connect Processor to power source and power on (status light turns green in 2-3 minutes). **DO NOT USE A GFCI TYPE OUTLET.** Connect laptop to "LAPTOP" port on Processor with a CAT5e cable.



Launch GRIDSMART Client on laptop. Select factory default site card. Select "Info", verify "Site Info" version.

NOTE: The Bell Camera has not yet been connected, so there will be no Camera image.

BEFORE INSTALLATION (continued)

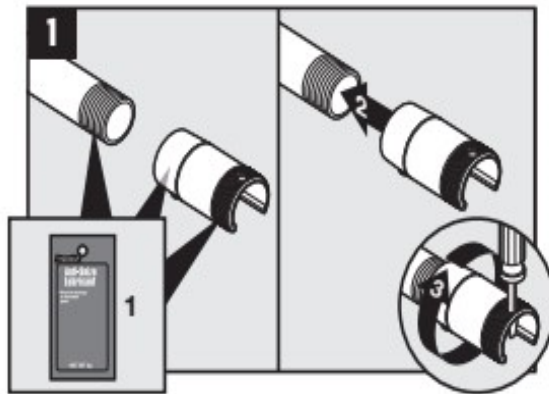


With Bell Camera in foam packaging, connect Camera cable to Junction Box upper connection. Connect one end of CAT5e test cable to Junction Box lower connection and remaining end to the EPM Module "LINE" port. Connect one end of supplied CAT5e cable to EPM Module "EQUIP" port and remaining end to Processor. Verify Bell Camera image. Camera status light turns green in 2-3 minutes.

After successful equipment test, disconnect cables to Junction Box, EPM, Processor and laptop. Leave cable connected to Bell Camera.

INSTALLATION

Helpful tip: Before proceeding, route 24 AWG gel-filled, shielded, burial grade CAT5e cable from traffic cabinet to the Bell Camera mounting location.



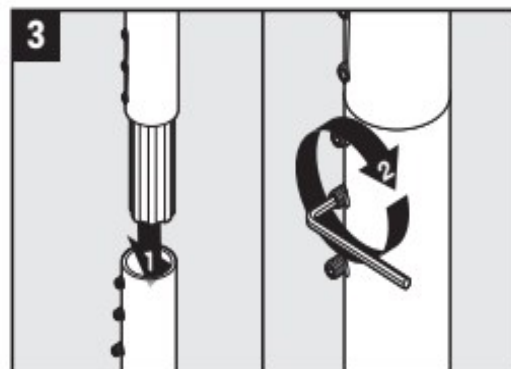
Apply anti-seize to 3' elbow and internal and external threads of SMARTMOUNT body. Install SMARTMOUNT body to upper end of 3' elbow turning clockwise to secure.

NOTE: SMARTMOUNT body opening must be facing down in final position. Tighten center set screw.

2

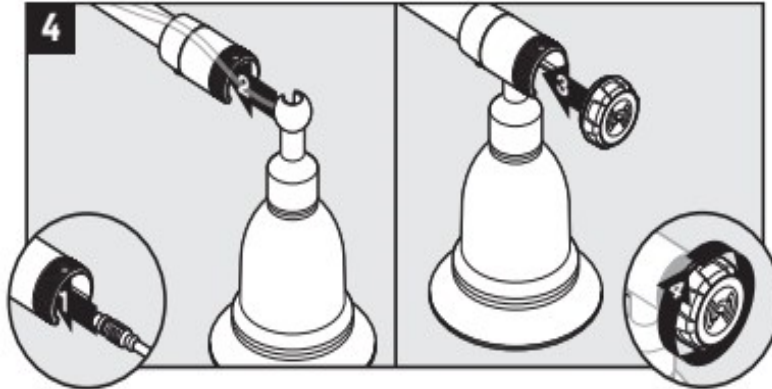
Take 7' extension pole, 3' elbow/SMARTMOUNT body/Bell Camera assembly in bucket above the road.

Install 7' extension pole to mounting bracket (follow mounting bracket instructions).



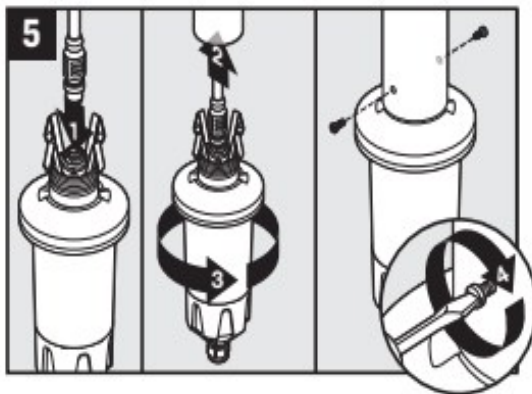
Insert 3' elbow connector into 7' extension using pole connector. Tighten screws with Allen wrench to secure.

INSTALLATION (continued)

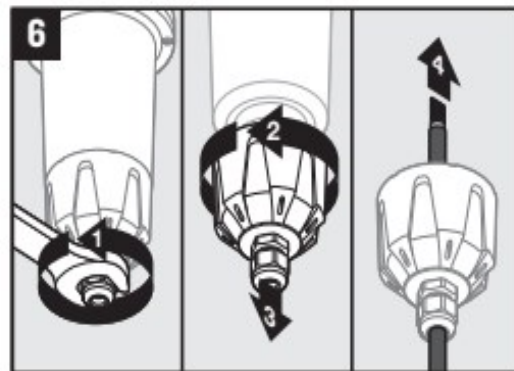


Feed Bell Camera cable through SMARTMOUNT body, 3' elbow and 7' pole extension. Slide Bell Camera ball joint into SMARTMOUNT body, being sure the ball joint opening is well aligned with body/pole opening so as not to damage cable.

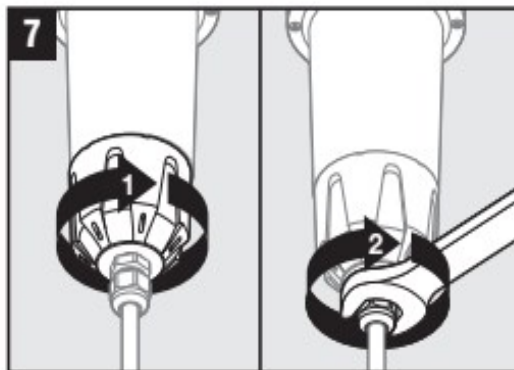
Secure Bell Camera to SMARTMOUNT body with cap. Turn cap clockwise to tighten.



Connect Bell Camera cable from 7' extension to junction box upper connection. Insert Junction Box (turning counter clockwise up to three times to prevent kinking or binding of cable) into 7' extension pole. Install Junction Box set screws to 7' extension pole to secure Junction Box. Tighten with flathead or hexhead screwdriver.

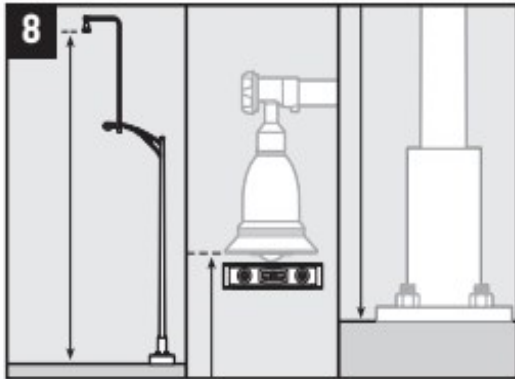


Using a 3/4" wrench, loosen cord grip from cap on bottom of Junction Box. Loosen cap and remove from Junction Box. Push unterminated field cable through cord grip and cap. **Do not tighten cord grip until step 7.** Terminate cable with RJ45, using standard 568B configuration color wiring.



Connect the RJ45 to receptacle and replace cap onto Junction Box (hand-tighten) until fully closed. Tighten cord grip using a 3/4" wrench, to 30 in-lbs max torque.

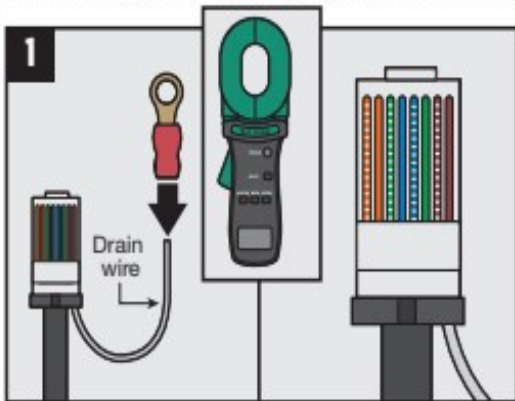
INSTALLATION (continued)



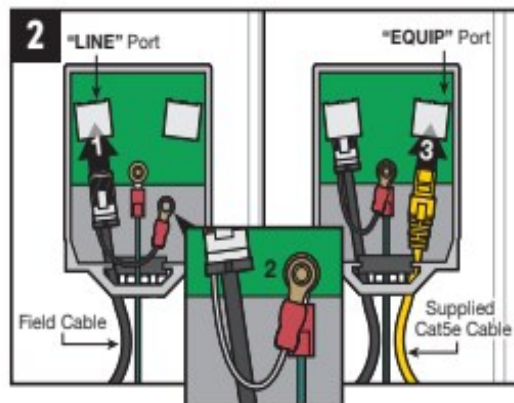
VERY IMPORTANT

Using a tape measure, measure height of Bell Camera. Record the height for use later to set up system. Orient the "G" logo away from area of consequence, level the Bell Camera and tighten the center set screw.

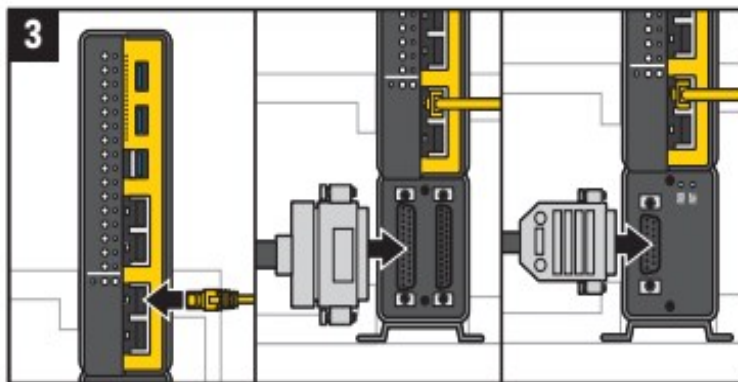
GROUNDING AND FINAL INSTALLATION



Crimp an RJ45 onto remaining end of field cable and verify with cable tester. Crimp the ring terminal to the CAT5e cable drain wire. Verify good crimp on drain wire ring terminal.



Connect field cable to EPM "LINE" port. Connect drain wire ring terminal to the EPM ground to eliminate signal noise and EMI. Connect supplied CAT5e cable EPM "EQUIP" port.



Connect supplied CAT5e to Processor "CAMERA" port. Reconnect the laptop to the "LAPTOP" port. Connect TS1, TS2 or ITS wiring harness to Processor.

1 CABINET GROUNDING

A proper cabinet ground helps mitigate interference from electrical noise at the intersection.

- The U.S. National Electrical Code (NEC) recommends a maximum of 25 ohms for touch safety and telecommunications; PLC industry standards require a maximum of 5.0 ohms for logic reference purposes.
- Use a clamp-on ground meter to verify the cabinet ground.
- GRIDSMART requires the Diligent Instruments DLG Di-120b Tester (<http://www.diligentinstruments.com/di-120.html>).
- If the ground reading is higher than the recommended NEC value, check the connection between the cabinet ground wire and the ground rod for corrosion; clean if corrosion is present. If you are in an area with poor grounds, you may need to add a ground rod to the grounding system to improve the ground.

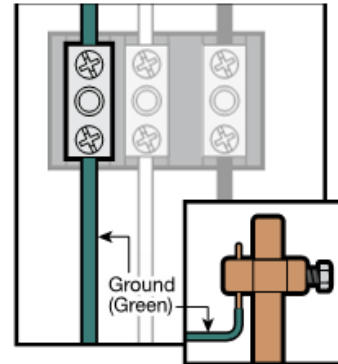
SPECIFICATION:	25 Ohms Max
MEASURED:	

2 AC POWER

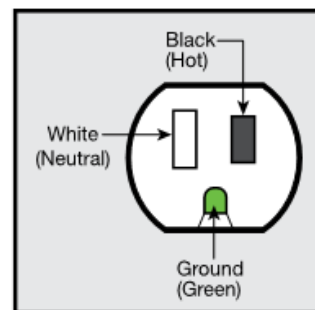
Plug the GRIDSMART Processor into an outlet on the filtered side of the cabinet power. Do not use GFCI type outlet.

- The outlet needs to be checked to verify that all three connections for the outlet are properly connected.
- Using a digital voltmeter (DVM), check the ac voltage from the line to the neutral and the line to ground. Both readings should be ~ 120/240VAC.

SPECIFICATION:	HOT/NEU: 120/240VAC HOT/GND: 120/240VAC
MEASURED:	HOT/NEU: HOT/GND:



DLG Di-120b Tester

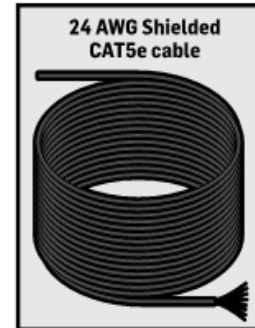


3 CABLE TYPE & LENGTH

All GRIDSMART installations require burial grade, shielded, gel filled, CAT5e cable with solid core 24 AWG conductors. The shield will protect the data signals from radiated noise which is present in most intersections. LED streetlights have been found to be very noisy electrically and as more streetlights are switched to LED lights, the level of radiated noise will increase. The cable that GRIDSMART supplies and requires for all installations is Vertical Cable part #059-487/S/CMXF.

- The maximum length that a segment of CAT5e can be is 300 feet. If the distance from the EPM to the camera is more than 300 feet, a repeater (RBA) must be used.
- When determining length of the cable, a cable tester that measures the length of the cable is required. Do not rely on sight distance or "walking off" the distance.
- Many times, there are service loops in the pull boxes and at the base of the pole, which will not be accounted for when you do not use a meter for measuring the cable length. GRIDSMART recommends the Triplet Real World Certifier (www.triplett.com/shop/real-world-certifier-rtc1000k/) for testing the cable. The tester will provide length measurements as well as cable quality measurements.

SPECIFICATION:	Cable Length: 300 Ft Max Real World Certification: 100 MB Min Cable Type: Vertical Cable part #059-487/S/CMXF
MEASURED:	Cable Length: Real World Certification: Cable Type:



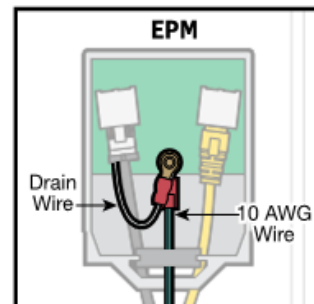
Triplet Real World Certifier



4 CONNECT DRAIN WIRE

The drain wire for the shielded CAT5e cable must be connected to the ground post in the EPM (Ethernet Protection Module). A crimp lug should be attached to the end of drain wire to attach it to the ground post. The drain should only be connected at the EPM end of the cable.

- If you are using an RBA, the drain must be spliced so the drain is continuous from the junction box to the EPM. A 10 AWG Wire is required to connect the EPM ground post to the traffic cabinet ground rod.
- Using a digital voltmeter, you should measure 0 Ohms between the EPM Ground Post and the traffic cabinet ground rod.



SPECIFICATION:	0 Ohms
MEASURED:	

Intersection:	
Camera Serial Number:	
GS₂ Processor Serial Number:	

ITEM #1113901A — CAMERA CABLE

Description: Furnish and install Camera Cable continuous between the Video Detector Assembly (VDA) and Video Detection Processor (VDP).

Materials:

Camera Cable:

- Supply the VDA power and return the video signal to the VDP.
- Composite construction or as recommended by camera manufacturer.
 - Coaxial:
 - 20 AWG, solid conductor.
 - Polyethylene foam dielectric.
 - Minimum 95% bare copper braid shield.
 - Power/ Control:
 - 5 conductors 18 AWG, 7 strand conductor, shielded.
- Polyethylene or polyvinyl chloride jacket.
- Other type cable may be substituted at the request of the VDP manufacturer.
- Connectors:
 - Use compression type connectors with compression tool to make connections.

Method of Measurement:

Camera Cable will be measured for payment by the number of linear feet of cable furnished, installed and accepted.

Basis of Payment:

The Contract price per linear foot of “Camera Cable” shall include all connectors, labor, tools and equipment necessary to install the cable between the VDA and the VDP.

Pay Item	Pay Unit
Camera Cable	l.f.

ITEM #1118012A - REMOVAL AND/OR RELOCATION OF TRAFFIC SIGNAL EQUIPMENT

Section 11.18: Replace the entire section with the following:

11.18.01 – Description:

Remove all abandoned traffic signal equipment. Restore the affected area. Where indicated on the plans remove and reinstall existing traffic signal equipment to the location(s) shown.

Lead paint is presumed present on the painted surface of all cabinets and structures located within project limits. Any activities performed by the contractor that results in a painted surface being impacted or altered, shall be performed in accordance OSHA Lead in Construction Standard 29CFR 1926.62, or the painted surface shall be tested prior to any paint being disturbed by a qualified third party hired by the contractor to confirm that no lead is present.

11.18.02 – Materials:

The related sections of the following specifications apply to all incidental and additional material required for the proper relocation of existing equipment and the restoration of any area affected by this work.

- Division III, “Materials Section” of the Standard Specifications.
- Current Supplemental Specifications to the Standard Specifications.
- Applicable Special Provisions to the Standard Specifications.
- Current Department of Transportation, Functional Specifications for Traffic Control Equipment.

Article 11.18.03 - Construction Methods:

Schedule/coordinate the removal of existing traffic signal equipment with the installation of new equipment to maintain uninterrupted traffic signal control. This includes but is not limited to vehicle signals and detectors, pedestrian signals and pushbuttons, co-ordination, and pre-emption.

Abandoned Equipment

The contract traffic signal plan usually does not show existing equipment that will be abandoned. Consult the existing traffic signal plan for the location of abandoned material especially messenger strand, conduit risers, and handholes that are a distance from the intersection. A copy of the existing plan is usually in the existing controller cabinet. If not, a plan is available from the Division of Traffic Engineering upon request.

Unless shown on the plans it is not necessary to remove abandoned conduit in-trench and conduit under-roadway

When a traffic signal support strand, rigid metal conduit, down guy, or other traffic signal equipment is attached to a utility pole, secure from the pole custodian permission to work on the pole. All applicable Public Utility Regulatory Authority (PURA) regulations and utility company requirements govern. Keep utility company apprised of the schedule and the nature of the work. Remove all abandoned hardware, conduit risers, and down guys, Remove anchor rods, to 6” (150mm) below grade.

When underground material is removed, backfill the excavation with clean fill material. Compact the fill to eliminate settling. Remove entirely the following material: pedestal foundation; controller foundation; handhole; pressure sensitive vehicle detector complete with concrete base. Unless otherwise shown on the plan, remove steel pole and mast arm foundation to a depth of 2 feet (600mm) below grade. Restore the excavated area to a grade and condition compatible with the surrounding area.

- If in an unpaved area apply topsoil and establish turf in accordance with Section 9.44 and Section 9.50 of the Standard Specifications.
- If in pavement or sidewalk, restore the excavated area in compliance with the applicable Sections of Division II, “Construction Details” of the Standard Specifications.

All material not listed as salvage becomes the property of the Contractor; which assumes all liabilities associated with material’s final disposition.

Article 11.18.04 – Method of Measurement:

This work will be measured as a Lump Sum.

Article 11.18.05 – Basis of Payment:

This work will be paid for at the contract lump sum price for “Removal of Traffic Signal Equipment.” This price shall also include removing, loading, transporting, and unloading of signal equipment/materials designated for salvage and all equipment, material, tools and labor incidental thereto. This price shall also include removing and disposing of traffic signal equipment not to be salvaged and all equipment, material, tools and labor incidental thereto.

Payment is at the contract lump sum price for “Removal of Traffic Signal Equipment” inclusive of all labor, vehicle usage, storage, and incidental material necessary for the complete removal of abandoned equipment/material. Payment will also include the necessary labor, equipment, and material for the complete restoration of all affected areas.

Pay Item	Pay Unit
Removal and/or Relocation of Traffic Signal Equipment	L.S. (L.S.)

s:\traffic1406\signal specs\specs\1118012A-REMO & RELO T S EQUIP-Projects

ITEM #1118052A – TEMPORARY SIGNALIZATION (SITE NO. 2)

Description:

Work under this item shall consist of providing Temporary Signalization (TS) at the intersections shown on the plans

1. Existing Signalized Intersection: The Contractor shall keep each traffic signal completely operational at all times during construction through the use of existing signal equipment, temporary signal equipment, new signal equipment, or any combination thereof once TS has started as noted in the section labeled “Duration.”

2. Unsignalized Intersection: The Contractor shall provide TS during construction activities and convert the temporary condition to a permanent traffic signal upon project completion. The Contractor shall furnish, install, maintain, and relocate equipment to provide a complete temporary traffic signal, including but not limited to the necessary support structures, electrical connection and disconnection (if required) and energy supply, vehicle and pedestrian indications, vehicle and pedestrian detection (paid for under Item #11112XXA – Temporary Detection {Site No. X}), pavement markings, and signing.

Materials:

- Pertinent articles of the Standard Specifications
- Supplemental Specifications and Special Provisions contained in this contract

Construction Methods: The Contractor shall perform a Preliminary Inspection and submit a Temporary Signalization (TS) Plan as described herein. No physical work will be allowed at any location until the requirements of the Preliminary Inspection and Temporary Signalization (TS) Plan have been met.

1. Preliminary Inspection

Prior to beginning any physical work, the Contractor shall meet with the Engineer and a representative from the DOT Electrical Maintenance Office (Town representative for a Town owned signal), to inspect and document (for the Engineer’s concurrence) the existing traffic signal’s physical and operational condition prior to implementing any Temporary Signalization (TS.) The inspection shall include, but not be limited to, the condition of the following:

- Controller Assembly (CA)
 - Controller Unit (CU)
 - Detection Equipment
 - Pre-emption Equipment
 - Coordination Equipment
- Vehicle and Pedestrian Signals
- Vehicle and Pedestrian Detectors
- Emergency Vehicle Pre-emption System (EVPS) *

- Interconnect Cable and Splice Enclosures
- Support Structures
- Handholes, Conduit and Cable

It may be necessary to repair or replace equipment that is missing, damaged, or malfunctioning. The Contractor shall prepare a list of items for replacement or repair. If authorized by the Engineer, this work will be considered “Extra Work” under Article 1.09.04.

* At a State owned signal the EVPS equipment is usually owned by the municipality. The Engineer will notify the municipality of the inspection schedule and information relating to its EVPS equipment as required.

The Preliminary Inspection meeting shall also include discussion of potential utility conflicts according to the *Utilities* section under *TS Plan* below.

2. Temporary Signalization (TS) Plan

At least 30 days prior to implementation of each stage, the Contractor shall submit a 1:40 (1:500 metric) scale TS plan in pdf format for each location to the Engineer for review and comment. This TS Plan shall include, but not be limited to the following:

- Survey Ties
- Dimensions of Lanes, Shoulders, and Islands
- Slope Limits
- Clearing and Grubbing Limits
- Signal Phasing and Timing
- Location of Signal Appurtenances such as Supports, Signal Heads, Pedestrian Push buttons, Pedestrian Signals
- Location of Signing and Pavement Markings (stop bars, lane lines, etc.)
- Location, method, and mode of Temporary Detection
- Location of utilities and potential conflicts

Review of the TS plan does not relieve the Contractor of ensuring the TS meets the requirements of the MUTCD. The existing traffic signal plan of record for State-owned traffic signals is available from the Division of Traffic Engineering upon request. The Contractor may request existing traffic signal plans for Town-owned traffic signals from the Town.

It is acceptable to use the existing traffic signal plan as the TS plan by marking up the existing plan to show any needed changes.

The Contractor shall not implement the TS plan until all review comments have been addressed.

The TS Plan shall also address the following elements:

Earthwork

The Contractor shall perform the necessary clearing and grubbing and the grading of slopes required for the installation, maintenance, and removal of the TS equipment. Upon

termination of the TS, the Contractor shall restore the affected area to its prior condition and to the satisfaction of the Engineer.

Maintenance and Protection of Traffic

The Contractor shall furnish, install, maintain, relocate, and remove signal-related signing (lane-use, signal ahead, NTOR, etc.), and pavement markings, as needed.

The Contractor shall install, relocate, or remove, equipment in a manner to cause no hazard to pedestrians, traffic or property. The Contractor shall maintain traffic as specified in the Special Provisions “Prosecution and Progress” and “Maintenance and Protection of Traffic” in the Contract.

Utilities

The Contractor shall verify that proposed temporary and/or relocated signal equipment will not conflict with proposed project utility relocations. The Contractor shall ensure that temporary span/temporary poles will not restrict the ability to shift utility cables off of the poles.

The Contractor shall coordinate its TS activities with all utility companies in the project area to ensure that the proposed temporary and/or relocated signal equipment will not be in conflict with existing utilities. The Contractor shall coordinate any utility work that may be needed prior to the Contractor implementing the TS plan.

Electrical Service and Telephone Service at Existing Signalized Intersections

The Contractor shall be responsible for relocating and changing any electrical service or telephone service source if required. Any arrangements with these companies and costs associated with any relocation or change shall be paid for by the Contractor. The Contractor shall ensure that the party previously responsible for the monthly payment of service shall continue to be responsible for that payment during TS.

Electrical Service for TS at Unsignalized Intersections

The Contractor shall be responsible for providing electrical service for TS at unsignalized intersections. All charges and all arrangements with the power company, including service requests, scheduling, and monthly bills in accordance with Section 10.00.12 and Section 10.00.13 of the Standard Specifications shall be the responsibility of the Contractor. The Contractor shall remove the service or leave the service if it will become permanent as shown on the plans or as directed by the Engineer.

Temporary Signalization

The Contractor shall furnish, install, maintain, relocate, and remove existing, temporary, and proposed traffic signal equipment and all necessary hardware; modifications to or furnishing of a new CA; and reprogramming of the CU phasing and timing; and any other incidentals related to this TS, as many times as necessary for each stage/phase of construction to maintain and protect traffic and pedestrian movements as shown on the plans or as directed by the Engineer.

Inspection

When requested by the Engineer, the TS will be subject to a field review by a representative of the Division of Traffic Engineering and/or the Town, The Contractor shall revise the TS as needed to address comments.

Detection

The Contractor shall provide vehicle detection on the existing, temporary, and/or new roadway alignment for all intersection approaches that have existing detection, detection in the final condition as shown on the signal plan, or as directed by the Engineer. The Contractor shall keep existing pedestrian pushbuttons accessible and operational at all times during TS. Temporary Detection is described and is paid for under Item # 11112XXA - Temporary Detection (Site No. X)

Emergency Vehicle Pre-emption System (EVPS)

The Contractor shall furnish, install, maintain, relocate, and remove the equipment necessary to keep the existing EVPS operational as shown on the plan. The Contractor shall not disconnect or alter the EVPS without the knowledge and concurrence of the Engineer and the EVPS owner. The Contractor shall schedule all EVPS relocations so that the system is out of service only when the Contractor is actively working. The Contractor shall ensure EVPS is returned to service and is completely operational at the end of the work day and shall keep the EVPS owner apprised of all changes to the EVPS.

Coordination

The Contractor shall furnish, install, maintain, relocate, and remove the equipment necessary to keep the intersection coordinated to adjacent signals as shown on the plan. The Contractor shall not disconnect the interconnect without the approval of the Engineer.

- Closed Loop System: If it is necessary to disconnect the communication cable, the Contractor will notify the Engineer and the Bridgeport Operation Center (BOC) or the Newington Operation Center (NOC) prior to disconnect and also after it is reconnected.
- Time Base System: The Contractor shall program and synchronize all Time Clock/Time Base Coordination (TC/TBC) units as necessary.

Maintenance

Once TS is in effect, the Contractor shall assume all maintenance responsibilities of the entire installation in accordance with Section 1.07.12 of the Standard Specifications. The Contractor shall notify the Engineer for the project records the date that Temporary Signalization begins. The Contractor shall coordinate with the Engineer to notify the following parties that maintenance responsibility has been transferred to the Contractor:

Signal Owner
CT DOT Electrical Maintenance Office or
Town Representative
Local Police Department

The Contractor shall provide the Engineer a list of telephone numbers of personnel who will be on-call during TS and shall respond to traffic signal malfunctions by having a

representative at the site within three hours from the initial contact. Any traffic signal malfunction shall be made operational according to plan within twenty-four (24) hours.

If the Engineer determines that the nature of a malfunction requires immediate attention and/or the Contractor does not respond within three (3) hours, then an alternate maintenance service will be called to repair the signal. Expenses incurred by the alternate maintenance service for each call will be deducted from monies due to the Contractor with a minimum deduction of \$1,000. The alternate maintenance service may be the owner of the signal or another qualified electrical contractor.

Duration

Temporary Signalization shall commence when the Contractor begins physical work at a particular intersection.

- a) For intersections with a State furnished controller, TS terminates when the inspection of the permanent signal is complete and operational and is accepted by the Engineer.
- b) For intersections with a Contractor furnished controller, Temporary Signalization terminates at the beginning of the 30 day test period for the permanent signal.

Ownership

The Contractor shall remove and deliver any existing equipment that is designated as salvage to its original owner upon completion of use. Any temporary equipment supplied by the Contractor shall be removed by the Contractor unless noted otherwise.

Method of Measurement:

Temporary Signalization (TS) shall be measured for payment as follows:

Fifty percent (50%) shall be paid when the TS for that site is operational as shown on the plan and to the satisfaction of the Engineer.

Fifty percent (50%) shall be paid upon termination of the TS as described herein.

Basis of Payment:

This work shall be paid at the contract Lump Sum price for “Temporary Signalization (Site No.)” for each site. This price includes the preliminary inspection, TS plan for each stage/phase, furnishing, installing, maintaining, relocating and revising traffic signal equipment, controller assembly modifications, controller unit program changes such as phasing and timing, removing existing, temporary, and proposed traffic signal equipment, arrangements with utility companies, towns or cities including the fees necessary for electric and telephone service, clearing and grubbing, earthwork and grading, area restoration and all necessary hardware, materials, labor, and work incidental thereto.

All material and work for signing and pavement markings is paid for under the appropriate Contract items.

All material and work necessary for vehicle and pedestrian detection for TS is paid for under item 11112XXA - Temporary Detection (Site No. X).

All Contractor supplied items that will remain the Contractor's property shall be included in the contract Lump Sum price for "Temporary Signalization."

Any items installed as part of the permanent installation will be paid for under those separate pay items in the Contract.

<u>Pay Item</u>	<u>Pay Unit</u>
Temporary Signalization (Site No.)	L.S.

ITEM #1130010A – ARROW BOARD

Replace the entire Section 11.30 with the following:

11.30.01—Description: Work under this item shall include furnishing and maintaining a trailer-mounted or truck-mounted Arrow Boards at the locations indicated on the plans or as directed by the Engineer.

11.30.02—Materials: A Materials Certificate for the Arrow Board shall be submitted to the Engineer. The Arrow Board shall meet the requirements of Type C Arrow Board in MUTCD Chapter 6F, and the following:

1. Physical Characteristics of the Arrow Board:

- a. Arrow Board Display Dimensions - width 8 feet, height 4 feet
- b. Height above Roadway - Minimum 7 feet from the roadway to the bottom of the display, except on truck-mounted Arrow Boards, which shall be as high as practical
- c. Power Source - Battery or solar power, including backup
- d. Secure Controller – Arrow Boards shall be equipped with a lockable cabinet for controller storage

2. Visual Characteristics of the Arrow Board:

- a. Matrix - Minimum of 15 illuminated elements
- b. Display Modes - flashing arrow, flashing double arrow, flashing caution, and flashing alternating diamond caution
- c. Color - Non-reflective black background with yellow or amber elements
- d. Flash Rate - 25 to 40 flashes per minute
- e. Dimming - Arrow Board shall be equipped with a photocell for automatic sign dimming, with at least 50% from full brilliance, based on lighting conditions
- f. Legibility - Arrow Board brightness must provide for legibility within 1 mile

11.30.03—Construction Methods: The Contractor shall furnish, place, operate, and relocate the Arrow Board as required on the plans or as directed by the Engineer, in accordance with Chapter 6F of the MUTCD.

The Contractor shall maintain the Arrow Board in accordance with the ATSSA "Quality Standards for Temporary Traffic Control Devices and Features." Any Arrow Board that does not meet these guidelines shall be removed and replaced.

When the Arrow Board is no longer required, it shall be removed from the Site.

11.30.04—Method of Measurement: This work will be measured for payment by the number of calendar days that the Arrow Board is in place and in operation. When an Arrow Board is in operation for less than a day, such a period of time shall be considered to be a full day regardless of actual time in operation.

11.30.05—Basis of Payment: This work will be paid for at the Contract unit price per day for "Arrow Board", which shall include furnishing, placing, operating, maintaining, relocating,

ITEM #1130010A

removing the Arrow Board and its appurtenances, and all material, labor, tools and equipment incidental thereto.

Pay Item
Arrow Board

Pay Unit
day

ITEM #1210110A – 4” (White) Type I Epoxy Resin Pavement Markings
ITEM #1210111A – 4” (Yellow) Type I Epoxy Resin Pavement Markings
ITEM #1210113A – 6” (White) Type I Epoxy Resin Pavement Markings
ITEM #1210115A – 8” (White) Type I Epoxy Resin Pavement Markings
ITEM #1210116A – 8” (Yellow) Type I Epoxy Resin Pavement Markings

Section 12.10 is supplemented and amended as follows:

Description:

Replace the entire Article with the following:

This item shall consist of furnishing and installing retroreflective Yellow and White Type I Epoxy Resin Pavement Markings of the width and color specified at the locations indicated on the plans, in conformance with the plans, this specification, and as directed by the Engineer.

Type I Epoxy Resin Pavement Markings include center lines, lane lines, and shoulder lines.

Type I Epoxy Resin Pavement Markings shall be installed in a pavement marking groove. Installation methods for pavement marking grooves are specified elsewhere in the Contract.

Materials:

Replace the entire Article with the following:

Type I Epoxy Resin Pavement Markings shall meet the requirements of M.07.22 as amended below:

Article M.07.22 – Epoxy Resin Pavement Markings:

Delete the last sentence and add the following:

- (j) Type I Epoxy Resin Pavement Markings shall consist of the following retroreflective beads:
- Potter’s VISIMAX glass bead.
 - A clear glass bead that meets the requirements of AASHTO M 247, Type 4.

Construction Methods:

1. Equipment:

Delete paragraph 1 and add the following:

Equipment furnished shall include an applicator truck of adequate size and power, together with:

ITEM #1210110A
THRU
ITEM #1210116A

- (a) remote application equipment designed to apply an epoxy resin material in a continuous pattern, and
- (b) portable retroreflective bead applicators, one for each size bead, designed to provide uniform and complete coverage of the epoxy binder by a controlled free-fall method. Pressurized retroreflective bead application shall not be used.

2. Procedures:

Delete paragraphs 3, 7, and 8 and add the following:

All surfaces that are power washed shall be allowed to dry sufficiently prior to the application of the epoxy markings. The areas to be marked shall be broom cleaned immediately prior to the application of the epoxy markings. Retroreflective beads shall be applied immediately after application of the epoxy resin marking to provide an immediate no-track system.

The epoxy for Type I Epoxy Resin Pavement Markings shall be uniformly applied to the surface to be marked to ensure a wet film thickness, without retroreflective beads, of 20 mils \pm 1 mil.

For Type I Epoxy Resin Pavement Markings, a first drop consisting of Potter's VISIMAX glass bead shall be applied at the rate of 8 lb./gal. of epoxy pavement marking material, immediately followed by a second drop consisting of glass beads meeting the requirements of AASHTO M 247, Type 4 at the rate of 8 lb./gal. of epoxy pavement marking material. Traffic cones or other acceptable methods shall be used to protect the Type I Epoxy Resin Pavement Markings until cured.

Initial Test Strip for Type I Epoxy Resin Pavement Markings: Prior to the first application of any Type I Epoxy Resin Pavement Markings, one test strip for each line color and width shall be installed at a Contractor's facility or another location designated by the Contractor and approved by the Engineer. A test strip shall also be required for each applicator unit used.

Each test strip shall consist of a minimum of 100 linear feet of Type I Epoxy Resin Pavement Markings. The Type I Epoxy Resin Pavement Markings shall be surface applied; no groove is required for the test strip(s). Additional test strips may be required by the Engineer when major equipment repairs or adjustments are made, or if the application of the Type I Epoxy Resin Pavement Markings fails to comply with these specifications.

The test strip(s) shall demonstrate the capability of the proposed Type I Epoxy Resin Pavement Marking material, equipment, and installation procedures to comply with the specifications for uniform wet thickness, dry time, retroreflective bead application and retention, marking width, and overall appearance (color uniformity and clean, well-defined edges). Materials Certificates shall be provided for each test strip as defined in Section 3: Initial Performance.

Initial Performance testing of the test strip(s) shall be performed as defined in Section 3: Initial Performance.

ITEM #1210110A
THRU
ITEM #1210116A

Type I Epoxy Resin Pavement Markings with measured minimum initial retroreflectivity readings that do not meet the specified minimum values shall be reapplied in a new test strip following any recommendations to modify binder application rate and/or retroreflective bead type(s) and drop rate from the Material Supplier. Any recommended revisions to the Type I Epoxy Resin Pavement Markings shall be approved by CTDOT Traffic Engineering prior to the reapplication of a test strip.

Certified Test Reports (CTR) and Materials Certificates as defined in Section 3: Initial Performance shall be submitted to the Engineer and the CTDOT Division of Traffic Engineering by the Contractor for each test strip. If the minimum initial retroreflectivity readings are accepted by the Engineer, then the Contractor will be permitted to proceed with the application of the permanent Type I Epoxy Resin Pavement Markings per the Contract Plans.

3. Initial Performance:

Replace the entire Article with the following:

The retroreflectivity of the markings applied shall be measured by the Contractor using the procedure and equipment detailed below for the Initial Test Period, Review Period, and Observation Period.

Test Lots: The following test lots will be randomly selected by the Engineer to represent the line markings applied:

Table 12.10.03-3.1: Line Test Lots

<u>Length of line</u>	<u>Number of Lots</u>	<u>Length of Test Lot</u>
< 1000 feet	1	Length of Line
< 1.0 mile	1	1000 feet
≥ 1.0 mile	1 per 1.0 mile	1000 feet

Measurement Equipment and Procedure: Retroreflectometer equipment shall be calibrated using the instructions from the instrument manufacturer within 24 hours prior to use.

Skip line measurement shall be obtained for every other stripe, taking no more than 2 readings per stripe with readings no closer than 20 inches from either end of the marking.

Solid line test lots shall be divided into 10 sub-lots of 100 foot length and measurements obtained at 1 randomly select location within each sub-lot.

The Contractor shall perform retroreflectivity readings on the Type I Epoxy Resin Pavement Markings between 30 and 37 days after installation per the measurement and sampling procedures contained in ASTM D7585 (Standard Practice for Evaluating Retroreflective Pavement Markings Using Portable Hand-Operated Instruments). Portable Retroreflectometer and Mobile Retroreflectometer testing is allowed using the following methods.

ITEM #1210110A
 THRU
 ITEM #1210116A

- ASTM E1710 (*Standard Test Method for Measurement of Retroreflective Pavement Marking Materials with CEN-Prescribed Geometry Using a Portable Retroreflectometer*);
- ASTM E2177 (*Standard Test Method for Measuring the Coefficient of Retroreflected Luminance (R_L) of Pavement Markings in a Standard Condition of Wetness*).

Additional Content of CTR and Materials Certificates: The CTR shall also list:

- Project, Route number, and Route direction.
- Geographical location of the test site(s), including distance from the nearest reference point.
- Manufacturer and model of retroreflectometer used.
- Most recent calibration date for equipment used.
- Time of Day the readings are taken.

Recordings shall be certified by the Contractor, reviewed by the Engineer, and provided to the CTDOT Division of Traffic Engineering.

A CTR, in accordance with 1.06.07, shall be submitted to the Engineer no later than 10 days after the measurements are taken.

The Materials Certificates shall also list:

- Liquid binder application rate.
- Retroreflective bead type(s) and drop rate.

Recordings shall be certified by the Contractor, reviewed by the Engineer, and provided to the CTDOT Division of Traffic Engineering.

Materials Certificates, in accordance with 1.06.07, shall be submitted to the Engineer no later than 10 days after the measurements are taken.

Initial Test Period: The minimum initial retroreflectivity readings shall meet or exceed the following minimum values using an observation angle of 1.05^0 and an entrance angle of 88.8^0 :

	*Type I White Markings	*Type I Yellow Markings
ASTM E1710 (Dry)	500 mcd/lux/m ²	300 mcd/lux/m ²
ASTM E2177 (Wet Recovery)	300 mcd/lux/m ²	200 mcd/lux/m ²

Review Period: A 90-day Review Period shall be implemented for Type I Epoxy Resin Pavement Markings. The Contractor shall be responsible for any defects in materials and workmanship of the Type I Epoxy Resin Pavement Markings for a period of 90 days from the date the Type I Epoxy Resin Pavement Markings are installed and experiencing live traffic conditions.

At the end of the Review Period, the Engineer shall inspect the Type I Epoxy Resin Pavement Markings for durability, color, and retroreflectivity, and inform the Contractor of all pavement markings that have failed and require replacement. The Type I Epoxy Resin Pavement Markings will be considered failed for any of the following conditions:

- Insufficient thickness or line width, uneven cross-section.

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THRU
ITEM #1210116A

- Poor adhesion or delamination.
- Insufficient groove depth.

The Contractor shall be responsible for replacing all locations consisting of failed Type I Epoxy Resin Pavement Markings at no cost to the State. All failed Type I Epoxy Resin Pavement Markings shall be replaced within 14 days of notification to the Contractor of the failed Review Period test. All Type I Epoxy Resin Pavement Markings installed as the result of a failed Review Period test shall meet all testing requirements of the initial performance testing procedures, as well as an additional Review Period.

Observation Period: Measurements testing dry and wet recovery retroreflectivity of the Type I Epoxy Resin Pavement Markings shall also be taken by the Contractor following the testing procedure required for the “Initial Test” and “Review” periods at six and twelve months after application. The test results shall be recorded for informational purposes only and the results shall not affect payment.

Method of Measurement:

Replace the entire Article with the following:

Type I Epoxy Resin Pavement Markings shall be measured for payment by the actual number of linear feet of Type I Epoxy Resin Pavement Markings installed on the pavement and accepted by the Engineer.

The cost of applying the test strip(s) for Type I Epoxy Resin Pavement Markings shall be considered incidental to the cost of the item and measured for payment by the actual number of linear feet of Type I Epoxy Resin Pavement Markings installed for the first application of each required test strip. Any additional test strips required as the result of a failed test due to improperly adjusted equipment or improper installation shall be at no cost to the State.

The cost of all measuring and testing of the retroreflectivity of the Type I Epoxy Resin Pavement Markings by the Contractor shall be considered incidental to the cost of the item.

Basis of Payment:

Replace the entire Article with the following:

This work shall be paid for at the Contract unit price per linear foot for “Type I Epoxy Resin Pavement Markings” of the width and color specified, installed on the pavement and accepted. These prices shall be for all the work required by this Section and all materials, equipment, tools and labor incidental thereto. Payment will not be made for pavement markings affected by Contractor error and ordered removed.

The Contractor shall be paid on the following schedule:

ITEM #1210110A
THRU
ITEM #1210116A

- Fifty-percent (50%) of the cost of the item shall be paid to the Contractor upon the successful passing of the initial performance tests conducted 30 to 37 days after installation for all Type I Epoxy Resin Pavement Markings.
- Thirty-percent (30%) of the cost of the item shall be paid to the Contractor upon successful passing of the Review Period testing for all Type I Epoxy Resin Pavement Markings.
- Twenty-percent (20%) of the cost of the item shall be paid to the Contractor upon successful completion of the Observation Period Tests, including the six and twelve month tests.

Pay Item

(Width) (Color) Type I Epoxy Resin Pavement Markings

Pay Unit

l.f.

ITEM #1210110A
THRU
ITEM #1210116A

ITEM #1806226A – PRE-WARNING VEHICLE

Description: Work under this item shall include furnishing, deploying and maintaining a Truck-Mounted Impact Attenuator equipped with a changeable message sign (CMS) for use as a Pre-Warning Vehicle (PWV) in a rolling road block operation on limited access highways. Impact attenuators shall only be truck-mounted. The message on the sign shall warn motorists of slow or stopped traffic conditions.

Materials: The Truck-Mounted Impact Attenuator shall meet the requirements of Article 18.06.02, except replace all instances of “flashing arrow,” “arrow sign,” and “arrow” with “CMS”. The CMS shall meet the requirements of Article 11.31.02, with the following amendments:

1. Physical Characteristics of the CMS

- a) Mounting – The CMS shall be truck mounted only
- b) Sign Display Dimensions – Width of 6 feet, height of 4 feet

2. Visual Characteristics of the CMS Display

- a) Sign Type – CMS shall have a LED display only
- b) Color – CMS shall have black background with orange, yellow, or amber legend
- c) Characters – Letter height shall be 13 inches; Single stroke
- d) Visibility– CMS brightness must provide for visibility at 1/2 mile
- e) Message – The message shall read as follows, or shall be as directed by the Engineer:

Frame 1: SLOWED TRAFFIC AHEAD

Frame 2: BE PREPARED TO STOP

Or

Frame 1: STOPPED TRAFFIC AHEAD

Frame 2: BE PREPARED TO STOP

Construction Methods: The PWV shall be initially positioned in the right shoulder ½ mile prior to the rolling road block operation.

If a traffic queue reaches the PWV’s initial location, the Contractor shall slowly reverse the PWV along the shoulder to position itself prior to the new back of queue.

The Contractor shall meet the requirements of Article 18.06.03.

Method of Measurement: This work will be measured for payment by the actual number of hours that the Pre-Warning Vehicle is used in a rolling road block operation.

Basis of Payment: This work will be paid for at the Contract unit price per hour for “Pre-Warning Vehicle,” which shall include the furnishing and use of the pre-warning vehicle and a driver, attenuator reflector, flashing lights, changeable message sign, and all equipment, materials, tools, labor, disposal of damaged Truck-Mounted Impact Attenuator components and work incidental thereto.

Pay Item
Pre-warning Vehicle

Pay Unit
hr

PERMITS, PLANS/DETAILS AND/OR REQUIRED PROVISIONS

The following Permits, Plans/Details and/or and Required Provisions follow this page are hereby made part of this Contract.

- **PERMITS AND/OR PERMIT APPLICATIONS**

No Permits are required for this contract.

- **PLANS/DETAILS**

- **Construction Contracts - Required Contract Provisions (State Funded Only Contracts)**

MATCH MARK - SEE LOC-02

NORWICH

SB OFF-RAMP TO ROUTE 82
(EXIT 11)

SB ON-RAMP FROM ROUTE 82 EB

NB ON-RAMP FROM ROUTE 82

NB OFF-RAMP TO
ROUTE 82 (EXIT 11)

SB ON-RAMP FROM ROUTE 82

PROJECT LIMITS

MONTVILLE

SB OFF-RAMP TO ROUTE 2A EB (EXIT 9)

SB ON-RAMP FROM ROUTE 2A WB

NB ON-RAMP FROM ROUTE 2A WB

BEGIN STATE PROJECT NO. 0172-0494
NB & SB MM 9.26
0.2 MILES SOUTH OF GALLIVAN LANE

NB OFF-RAMP TO
ROUTE 2A EB (EXIT 9)

SCALE IN FEET



LOC-01

STATE PROJECT NO.:
0172-0494

CITY/TOWN:
MONTVILLE/NORWICH

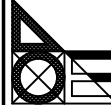


STATE OF CONNECTICUT
DEPARTMENT OF TRANSPORTATION

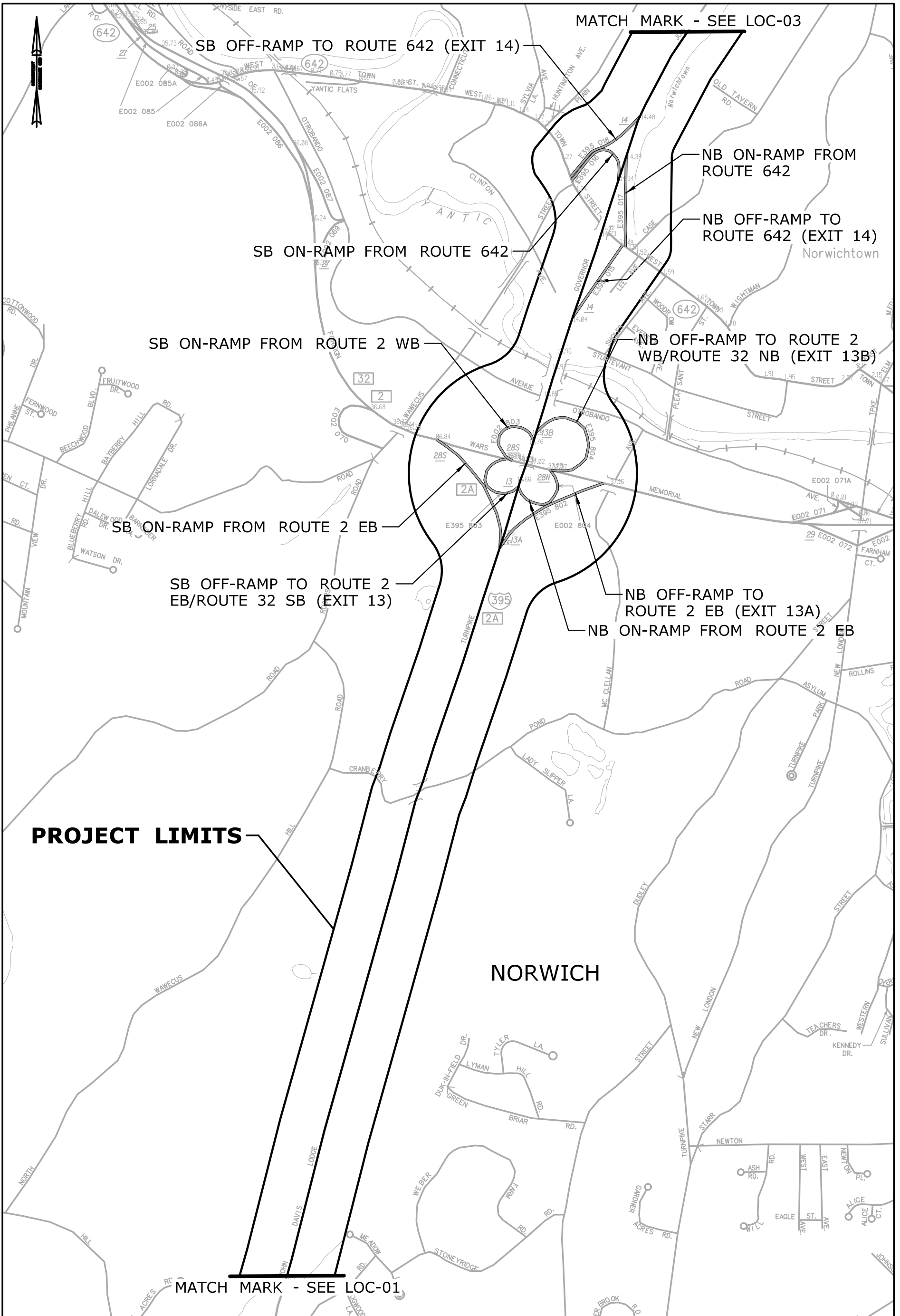


2020 PAVEMENT PRESERVATION PROGRAM
UTLRA-THIN BONDED PMA
DISTRICT 2 - I-395

OFFICE OF
ENGINEERING



DATE:
JAN 2020



PROJECT LIMITS

MATCH MARK - SEE LOC-03

SB OFF-RAMP TO ROUTE 642 (EXIT 14)

NB ON-RAMP FROM ROUTE 642

NB OFF-RAMP TO ROUTE 642 (EXIT 14)

SB ON-RAMP FROM ROUTE 642

NB OFF-RAMP TO ROUTE 2 WB/ROUTE 32 NB (EXIT 13B)

SB ON-RAMP FROM ROUTE 2 WB

SB ON-RAMP FROM ROUTE 2 EB

SB OFF-RAMP TO ROUTE 2 EB/ROUTE 32 SB (EXIT 13)

NB OFF-RAMP TO ROUTE 2 EB (EXIT 13A)

NB ON-RAMP FROM ROUTE 2 EB

NORWICH

MATCH MARK - SEE LOC-01


SCALE IN FEET



LOC-02

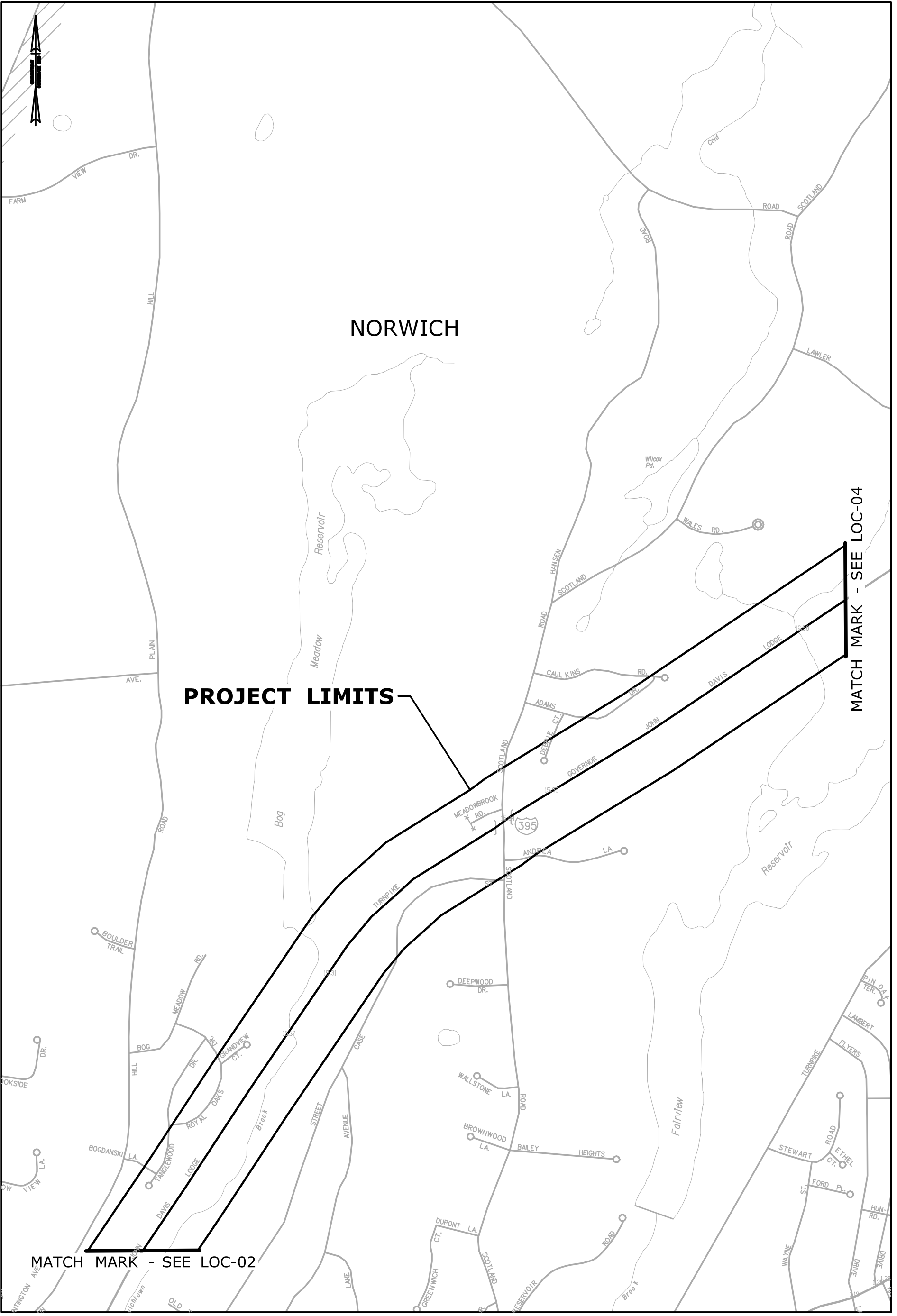
STATE PROJECT NO.:
0172-0494

CITY/TOWN:
MONTVILLE/NORWICH

STATE OF CONNECTICUT
DEPARTMENT OF TRANSPORTATION

2020 PAVEMENT PRESERVATION PROGRAM
UTLRA-THIN BONDED PMA
DISTRICT 2 - I-395

OFFICE OF
ENGINEERING


DATE:
JAN 2020






PROJECT LIMITS

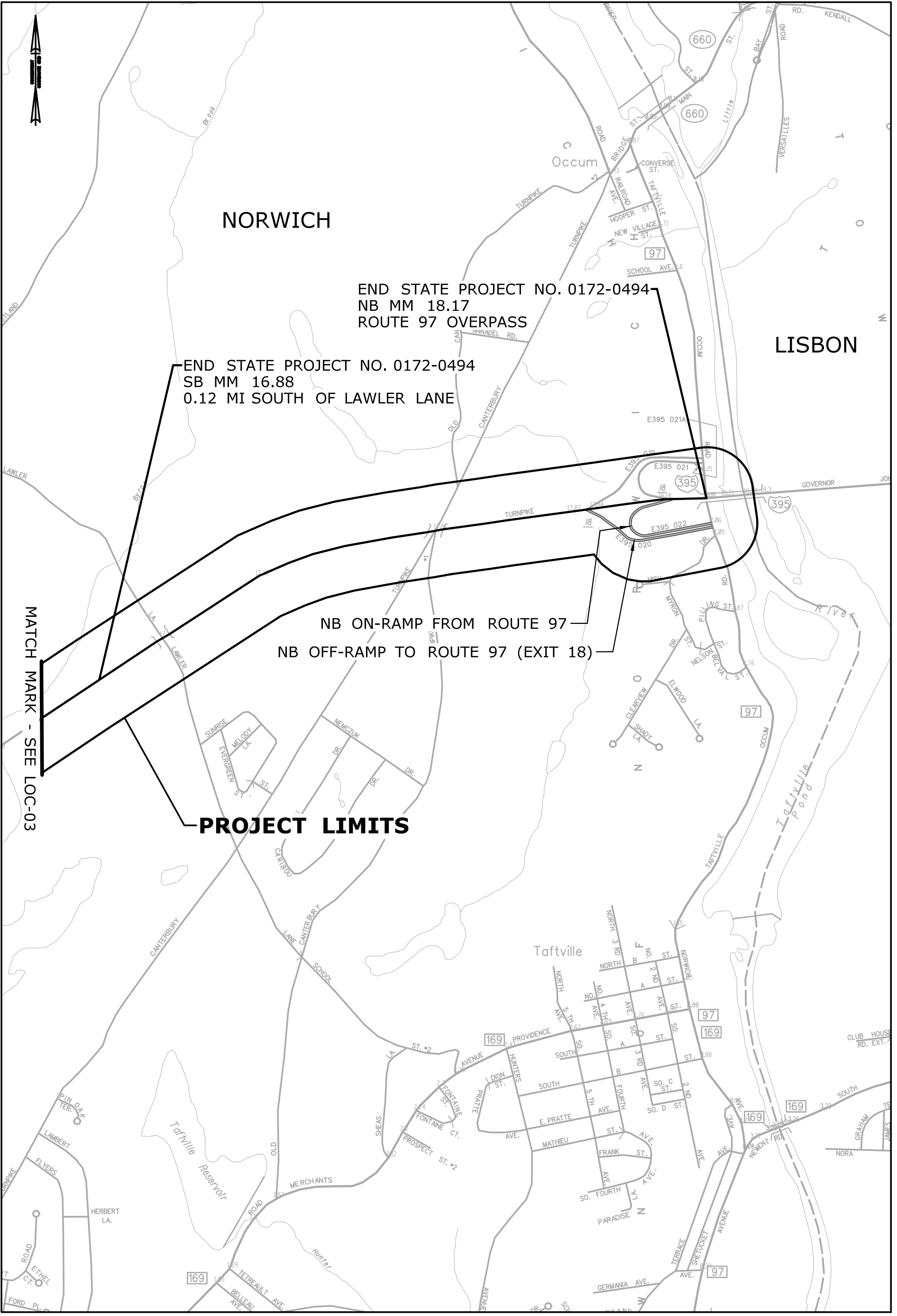
MATCH MARK - SEE LOC-02

MATCH MARK - SEE LOC-04



LOC-03

<p>STATE PROJECT NO.: 0172-0494</p> <p>CITY/TOWN: MONTVILLE/NORWICH</p>	<p>STATE OF CONNECTICUT DEPARTMENT OF TRANSPORTATION</p>   <p>2020 PAVEMENT PRESERVATION PROGRAM ULTRA-THIN BONDED PMA DISTRICT 2 - I-395</p>	<p>OFFICE OF ENGINEERING</p> 	<p>DATE: JAN 2020</p>
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MATCH MARK - SEE LOC-03

END STATE PROJECT NO. 0172-0494
 NB MM 18.17
 ROUTE 97 OVERPASS

END STATE PROJECT NO. 0172-0494
 SB MM 16.88
 0.12 MI SOUTH OF LAWLER LANE




NB ON-RAMP FROM ROUTE 97
 NB OFF-RAMP TO ROUTE 97 (EXIT 18)

PROJECT LIMITS

SCALE IN FEET



LOC-04

STATE PROJECT NO.: 0172-0494 CITY/TOWN: MONTVILLE/NORWICH	 <p>STATE OF CONNECTICUT DEPARTMENT OF TRANSPORTATION</p>  <p>2020 PAVEMENT PRESERVATION PROGRAM ULTRA-THIN BONDED PMA DISTRICT 2 - I-395</p>	OFFICE OF ENGINEERING 	DATE: JAN 2020
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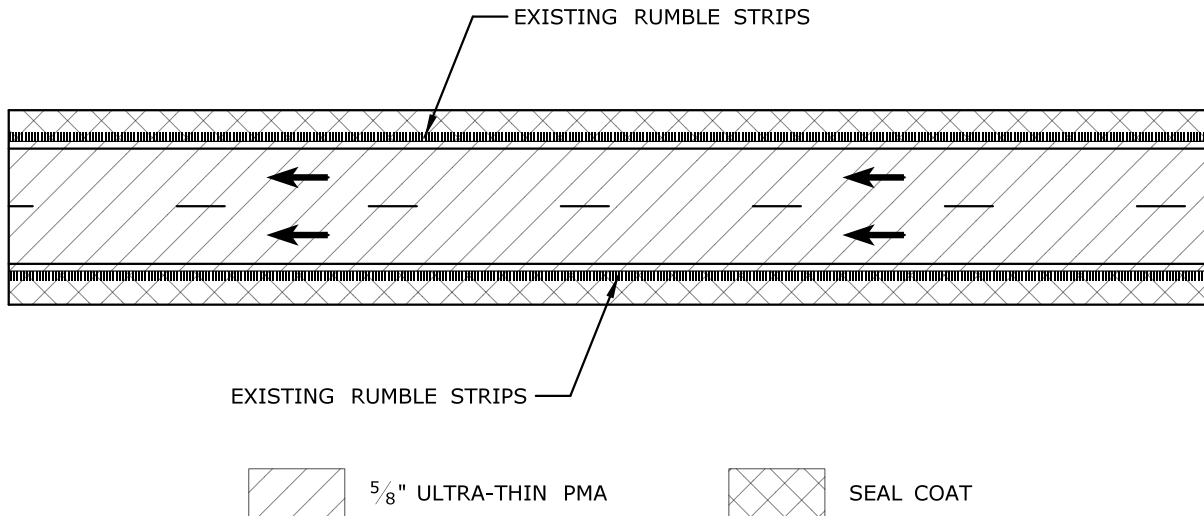
	ROADWAY ITEMS																				TRAFFIC ITEMS														
ITEM NUMBER	0202000	0202529	0305000	0406125 A	0406159	0406192 A	0406193 A	0406196 A	0406198 A	0406236	0406275 A	0406600 A	0406702 A	0520036 A	0520041 A	0586600	0586601	0586620	0586750	0586760	0586770	0815001	0975004	0980001	0406288 A	0406314 A	0406315 A	0406316 A	0971001 A	0976002	0976002	0981100	1130010 A		
ITEM	Earth Excavation	CUT BITUMINOUS CONCRETE PAVEMENT	PROCESSED AGGREGATE	BITUMINOUS CONCRETE SURFACE PATCH	PMA 50.5	POLYMER MODIFIED ASPHALT EMULSION (TYPE 1)	ULTRA-THIN BONDED PMA PAVEMENT (TYPE B)	JOINT AND CRACK FILLING OF BITUMINOUS CONCRETE PAVEMENT	JOINT AND CRACK SEALING OF BITUMINOUS CONCRETE PAVEMENT	MATERIAL FOR TACK COAT	FINE MILLING OF BITUMINOUS CONCRETE (0" TO 4")	MATERIAL TRANSFER VEHICLE	EMULSIFIED ASPHALT SEAL COAT, APPLIED	ASPHALTIC PLUG EXPANSION JOINT SYSTEM	PERFORMED JOINT SEAL	RESET CATCH BASIN	RESET TYPE 'C' CATCH BASIN	RESET TYPE 'C-L' CATCH BASIN	RESET TYPE 'C' CATCH BASIN TOP	TYPE 'C-L' CATCH BASIN TOP	TYPE 'C-M' CATCH BASIN TOP	BITUMINOUS CONCRETE LIP CURBING	MOBILIZATION AND PROJECT CLOSEOUT	CONSTRUCTION STAKING	RUMBLE STRIPS-MANUAL	80MIL PAVEMENT MARKING GROOVE - 5" WIDE	80MIL PAVEMENT MARKING GROOVE - 7" WIDE	80MIL PAVEMENT MARKING GROOVE - 9" WIDE	MAINTENANCE AND PROTECTION OF TRAFFIC	BARRICADE WARNING LIGHTS-HIGH INTENSITY	TRAFFIC DRUM	42" TRAFFIC CONE	ARROW BOARD		
UNIT	c.y.	l.f.	ton	s.y.	ton	gal	s.y.	s.y.	s.y.	gal	s.y.	ton	s.y.	c.f.	l.f.	ea.	ea.	ea.	ea.	ea.	ea.	l.f.	LS	LS	l.f.	l.f.	l.f.	l.f.	LS	day	ea.	ea.	ea.		
I-395	35	863	84	16725	1208	79153	395767	10503	451119	735	57278	13297	65856	133	360	2	54	5	54	5	2	935	LS	LS	87000	194000	22000	21500	LS	1032	150	150	172		
INTERSECTIONS																																			
103-229																																			
103-247																																			
103-249																																			
103-271																																			
SUBTOTAL	35	863	84	16725	1208	79153	395767	10503	451119	735	57278	13297	65856	133	360	2	54	5	54	5	2	935	LS	LS	87000	194000	22000	21500	LS	1032	150	150	172		
UNASSIGNED	5	47	6	840	182	3962	19788	527	22556	40	2867	668	3294	7	20	0	3	0	3	0	0	50	-	-	0	0	0	0	-	0	0	0	0		
TOTAL	40	910	90	17565	1390	83115	415555	11030	473675	775	60145	13965	69150	140	380	2	57	5	57	5	2	985	LS	LS	87000	194000	22000	21500	LS	1032	150	150	172		

	TRAFFIC ITEMS (CONT.)														TRAFFIC ELECTRICAL ITEMS																					
ITEM NUMBER	1131002	1209114	1209124	1209126	1209128	1209131	1210105	1210110 A	1210111 A	1210113 A	1210115 A	1210116 A	1211001	1220027	1806202	1806226 A																				
ITEM	REMOTE CONTROL CHANGEABLE MESSAGE SIGN	HOT-APPLIED PAINTED PAVEMENT MARKINGS 4" YELLOW	HOT-APPLIED PAINTED PAVEMENT MARKINGS 4" WHITE	HOT-APPLIED PAINTED PAVEMENT MARKINGS 6" WHITE	HOT-APPLIED PAINTED PAVEMENT MARKINGS 8" WHITE	HOT-APPLIED PAINTED LEGEND, ARROWS AND MARKINGS	EPOXY RESIN PAVEMENT MARKINGS, SYMBOLS AND LEGENDS	4" WHITE TYPE 1 EPOXY RESIN PAVEMENT MARKINGS	4" YELLOW TYPE 1 EPOXY RESIN PAVEMENT MARKINGS	6" WHITE TYPE 1 EPOXY RESIN PAVEMENT MARKINGS	8" WHITE TYPE 1 EPOXY RESIN PAVEMENT MARKINGS	8" YELLOW TYPE 1 EPOXY RESIN PAVEMENT MARKINGS	REMOVAL OF PAVEMENT MARKINGS	CONSTRUCTION SIGNS	TRUCK-MOUNTED OR TRAILER-MOUNTED IMPACT ATTENUATOR	PRE-WARNING VEHICLE																				
UNIT	day	l.f.	l.f.	l.f.	l.f.	s.f.	s.f.	l.f.	l.f.	l.f.	l.f.	l.f.	s.f.	s.f.	hr	hr																				
I-395	186	192000	196000	44000	42500	9000	4500	98000	96000	22000	21500	200	94000	750	2236	344																				
INTERSECTIONS																																				
103-229																																				
103-247																																				
103-249																																				
103-271																																				
SUBTOTAL	186	192000	196000	44000	42500	9000	4500	98000	96000	22000	21500	200	94000	750	2236	344																				
UNASSIGNED	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0																				
TOTAL	186	192000	196000	44000	42500	9000	4500	98000	96000	22000	21500	200	94000	750	2236	344																				

STATE PROJECT NO.:
0172-0494
CITY/TOWN:
MONTVILLE/NORWICH
172-494

2020 PAVEMENT PRESERVATION PROGRAM
ULTRA-THIN BONDED PMA
DISTRICT 2

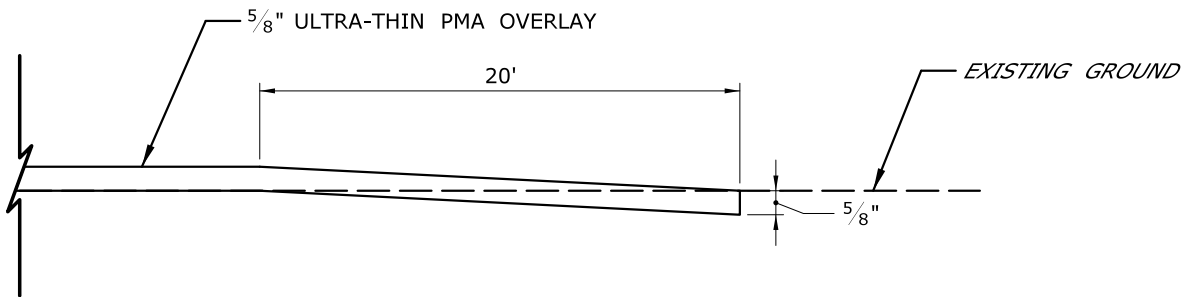
DATE:
JAN 2020
DRAWING NO.:
EST-01



NOTES:

1. LIMITS OF ULTRA-THIN PMA ON MAINLINE EXTEND FROM RIGHT SHOULDER RUMBLE STRIPS TO LEFT SHOULDER RUMBLE STRIPS.
2. WHERE NO RUMBLE STRIPS ARE PRESENT BEGIN ULTRA-THIN PMA 4 INCHES OUTSIDE OF TRAVEL WAY PAVEMENT MARKINGS.
3. FOR SHOULDERS LESS THAN 4 FEET WIDE EXTEND ULTRA-THIN PMA TO EDGE OF ROAD. PRIOR TO ULTRA-THIN APPLICATION EXISTING RUMBLE STRIPS SHALL BE MILLED AND PAVED (PAID FOR UNDER "BITUMINOUS CONCRETE SURFACE PATCH"). RUMBLE STRIPS SHALL BE REPLACED AFTER ULTRA-THIN PMA APPLICATION.
5. THICKNESS OF ULTRA-THIN PMA SHALL NOT EXCEED 5/8 INCHES AT EDGE OF TREATMENT AT ANY LOCATION.
6. LIMITS OF SEAL COATING IN SHOULDER INCLUDES RUMBLESTRIPS (TYP.).

TYPICAL MAINLINE TREATMENT



NOTES:

1. ALL MILLED TRANSITIONS SHALL BE PAID FOR IN THE COST OF THE ITEM "FINE MILLING OF BITUMINOUS CONCRETE (0" TO 4)".

PERMANENT PAVEMENT TRANSITION

NOT TO SCALE

MDS-01

STATE PROJECT NO.:
0172-0494

CITY/TOWN:
MONTVILLE/NORWICH

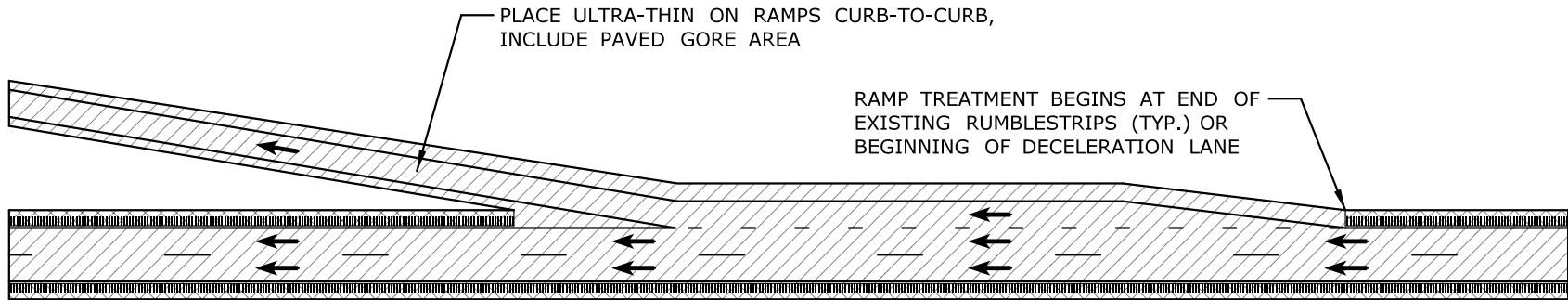




STATE OF CONNECTICUT
DEPARTMENT OF TRANSPORTATION

2020 PAVEMENT PRESERVATION PROGRAM
ULTRA-THIN BONDED PMA
DISTRICT 2 - I-395

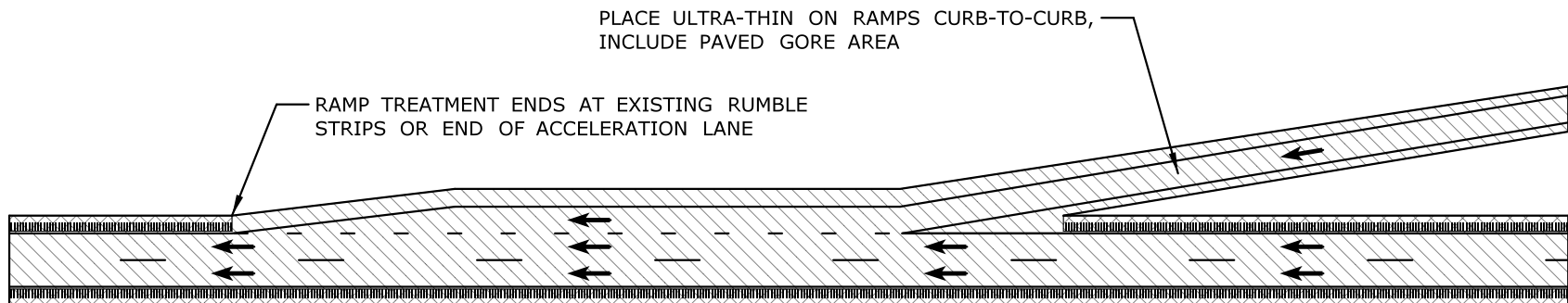




DATE:
JAN 2020



-  5/8" ULTRA-THIN PMA
-  SEAL COAT

TYPICAL OFF-RAMP AND GORE AREA



-  5/8" ULTRA-THIN PMA
-  SEAL COAT

TYPICAL ON-RAMP AND GORE AREA


GENERAL NOTES:
 1. SEE "NOTICE TO CONTRACTOR - ULTRA-THIN BONDED PMA" AND MDS-10 - MDS-13 FOR TREATMENT LOCATIONS UNDER THIS PROJECT NUMBER.


NOT TO SCALE

MDS-02

STATE PROJECT NO.:
0172-0494

CITY/TOWN:
MONTVILLE/NORWICH

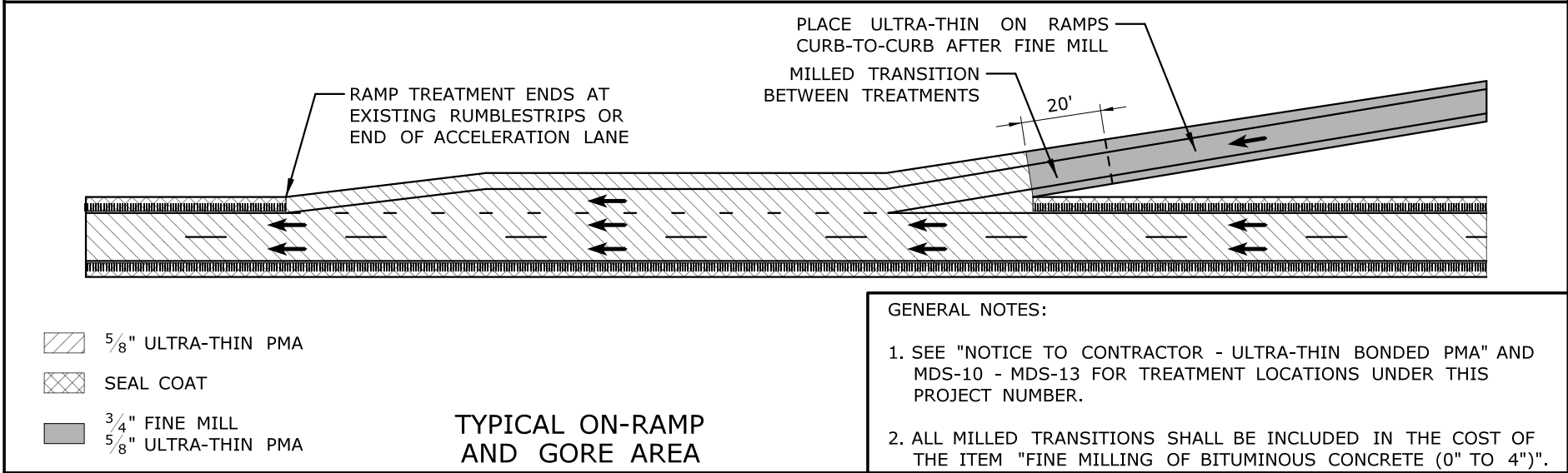
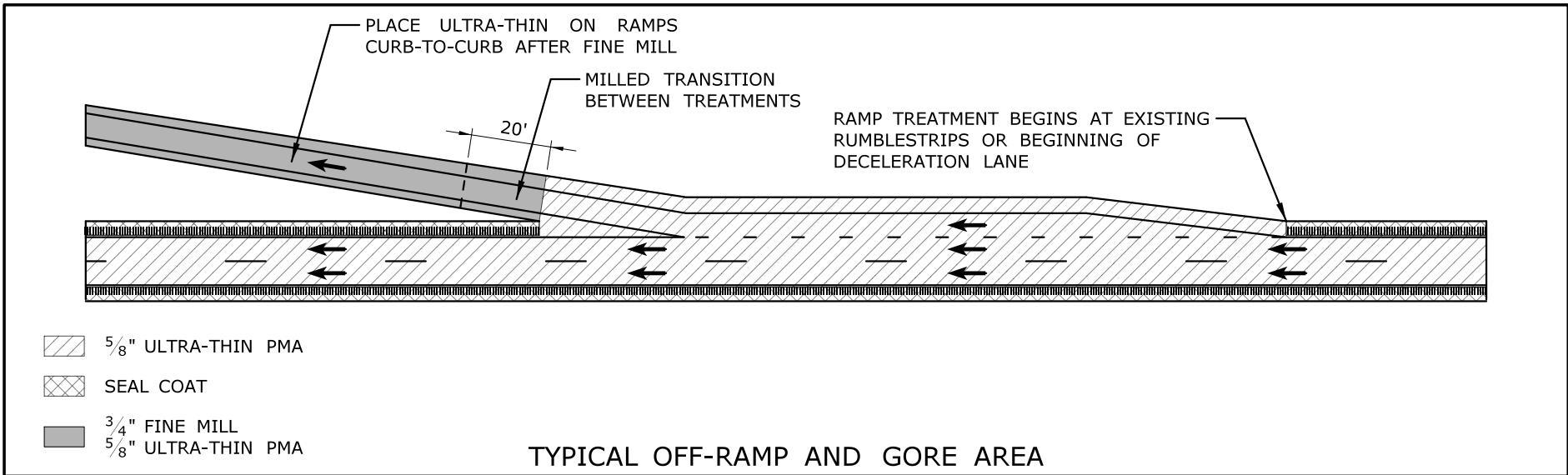

STATE OF CONNECTICUT
 DEPARTMENT OF TRANSPORTATION


 2020 PAVEMENT PRESERVATION PROGRAM
 ULTRA-THIN BONDED PMA
 DISTRICT 2 - I-395

OFFICE OF
ENGINEERING



DATE:
JAN 2020



- GENERAL NOTES:**
1. SEE "NOTICE TO CONTRACTOR - ULTRA-THIN BONDED PMA" AND MDS-10 - MDS-13 FOR TREATMENT LOCATIONS UNDER THIS PROJECT NUMBER.
 2. ALL MILLED TRANSITIONS SHALL BE INCLUDED IN THE COST OF THE ITEM "FINE MILLING OF BITUMINOUS CONCRETE (0" TO 4)".



NOT TO SCALE

MDS-03

STATE PROJECT NO.:
0172-0494

CITY/TOWN:
MONTVILLE/NORWICH

STATE OF CONNECTICUT
DEPARTMENT OF TRANSPORTATION

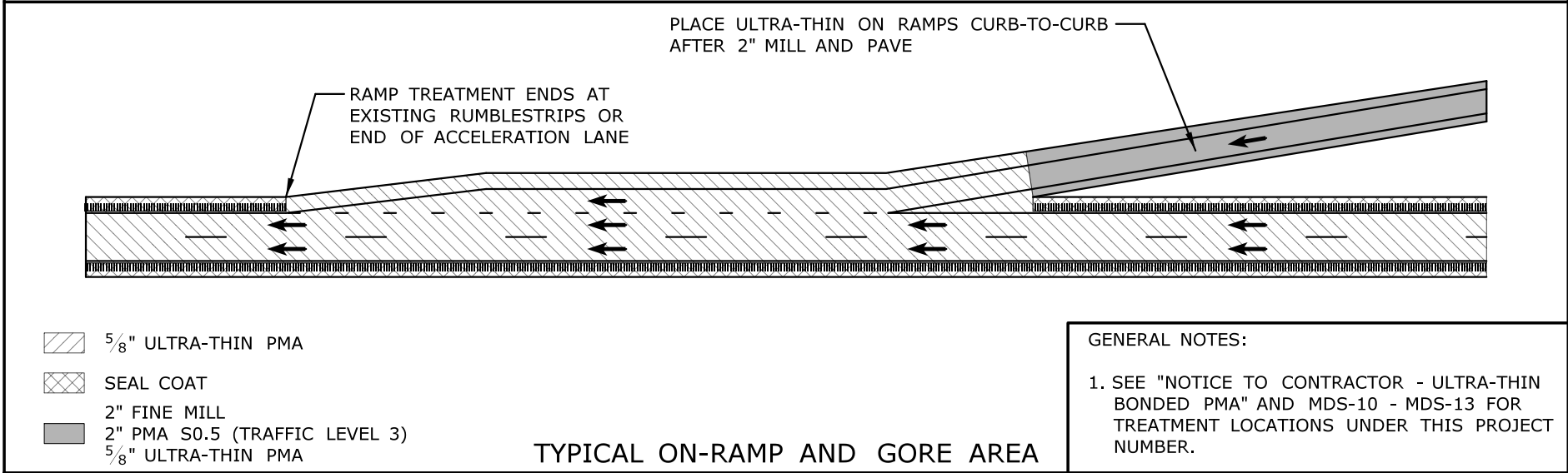
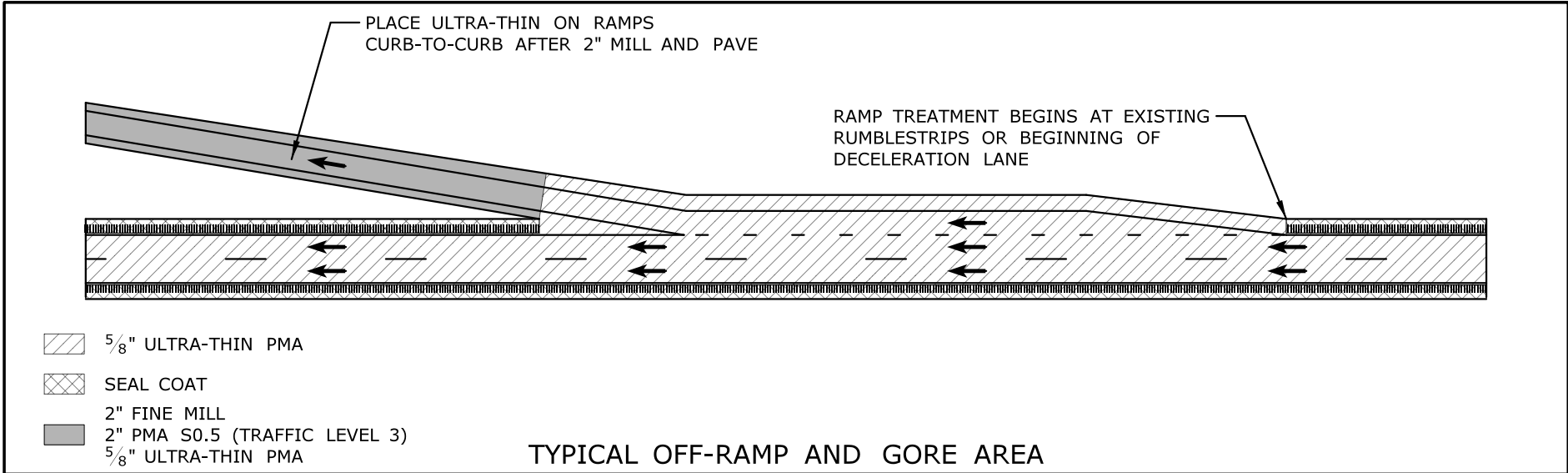



2020 PAVEMENT PRESERVATION PROGRAM
ULTRA-THIN BONDED PMA
DISTRICT 2 - I-395

OFFICE OF
ENGINEERING



DATE:
JAN 2020





NOT TO SCALE

MDS-04

STATE PROJECT NO.:
0172-0494


CITY/TOWN:
MONTVILLE/NORWICH

STATE OF CONNECTICUT
DEPARTMENT OF TRANSPORTATION

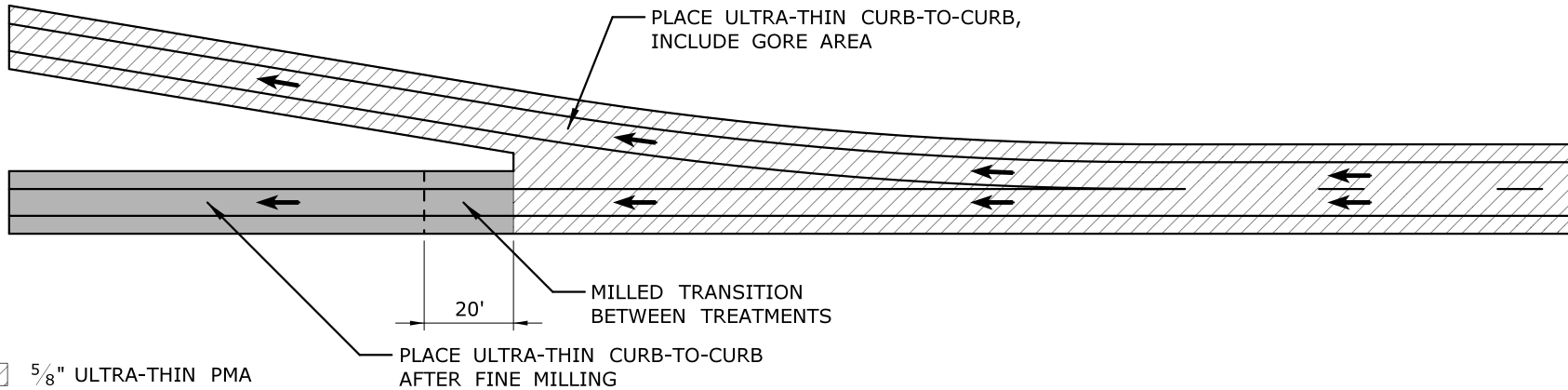





2020 PAVEMENT PRESERVATION PROGRAM
ULTRA-THIN BONDED PMA
DISTRICT 2 - I-395

OFFICE OF
ENGINEERING

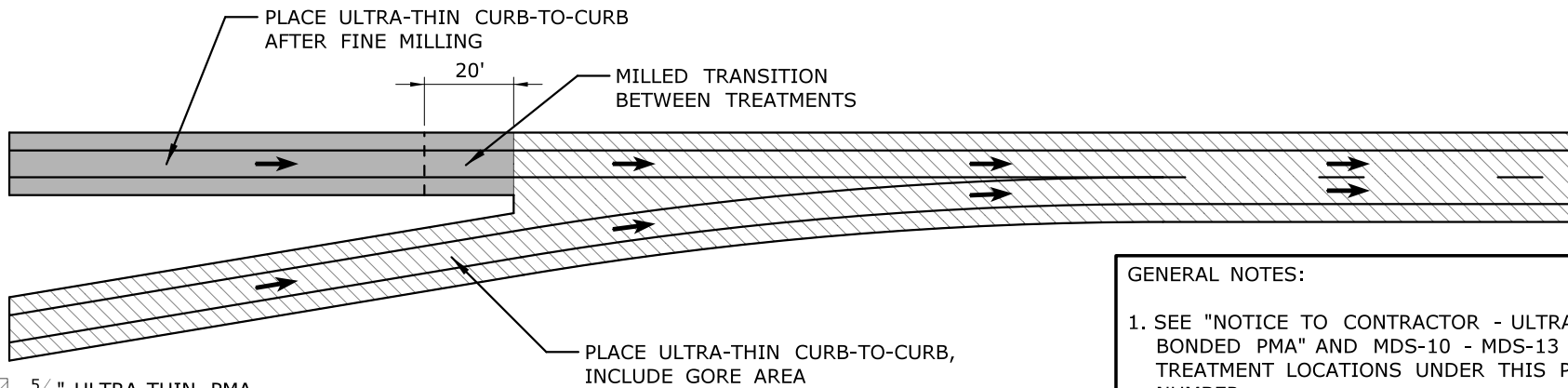




DATE:
JAN 2020



 5/8" ULTRA-THIN PMA
 3/4" FINE MILL
 5/8" ULTRA-THIN PMA

TYPICAL OFF-RAMP AND GORE AREA



 5/8" ULTRA-THIN PMA
 3/4" FINE MILL
 5/8" ULTRA-THIN PMA

TYPICAL ON-RAMP AND GORE AREA

GENERAL NOTES:

1. SEE "NOTICE TO CONTRACTOR - ULTRA-THIN BONDED PMA" AND MDS-10 - MDS-13 FOR TREATMENT LOCATIONS UNDER THIS PROJECT NUMBER.
2. ALL MILLED TRANSITIONS SHALL BE INCLUDED IN THE COST OF THE ITEM "FINE MILLING OF BITUMINOUS CONCRETE (0" TO 4)".

NOT TO SCALE

MDS-05

STATE PROJECT NO.:
0172-0494

CITY/TOWN:
MONTVILLE/NORWICH



STATE OF CONNECTICUT
DEPARTMENT OF TRANSPORTATION

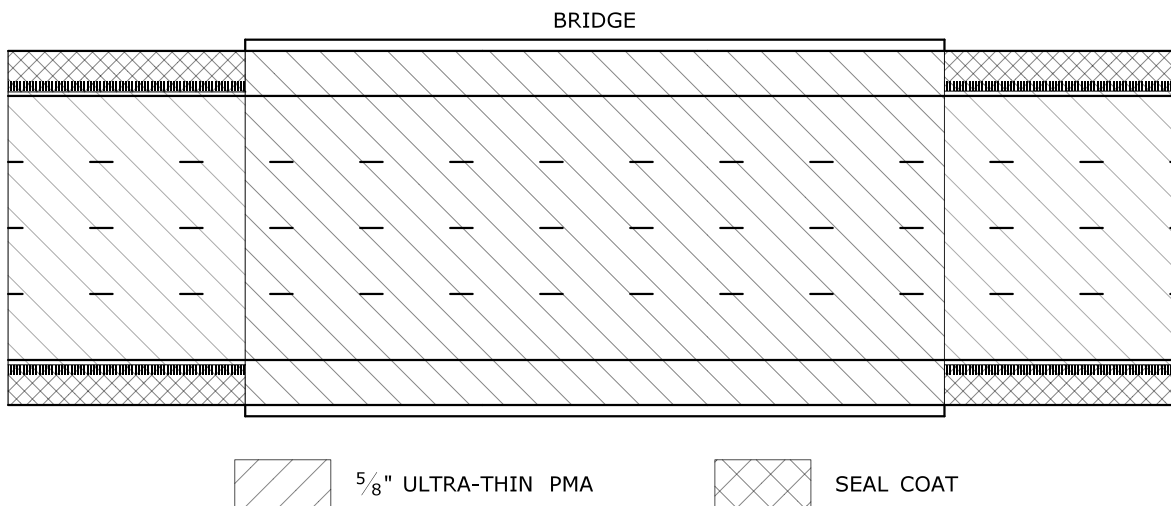


2020 PAVEMENT PRESERVATION PROGRAM
ULTRA-THIN BONDED PMA
DISTRICT 2 - I-395

OFFICE OF
ENGINEERING



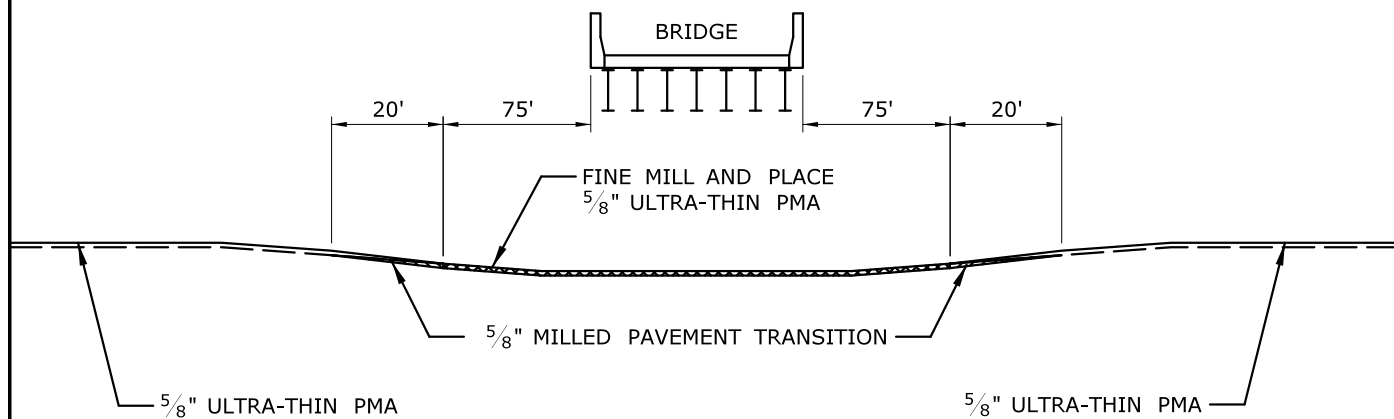
DATE:
JAN 2020



NOTES:

1. PLACE ULTRA-THIN PMA DIRECTLY ON TOP OF THE EXISTING WEARING SURFACE FROM CURB-TO-CURB, BETWEEN EXISTING RUMBLE STRIPS.
2. ULTRA-THIN PMA SHALL BE APPLIED DIRECTLY ON TOP OF EXISTING ASPHALTIC PLUG JOINTS.
3. A 20' MILLED TRANSITION WILL BE REQUIRED ON BOTH SIDES OF THE CONCRETE HEADER JOINTS TO TRANSITION FROM THE ULTRA-THIN PMA OVERLAY TO THE CONCRETE HEADERS (SEE MDS-01).
3. THE CONTRACTOR SHALL PROTECT BRIDGE HEADERS DURING ULTRA-THIN PMA APPLICATION.

TREATMENT AT BRIDGE OVERPASS



NOTES:

1. ALL MILLED TRANSITIONS AND KEYWAYS SHALL BE INCLUDED IN THE COST OF THE ITEM "FINE MILLING OF BITUMINOUS CONCRETE (0" TO 4)".

TREATMENT AT BRIDGE UNDERPASS

NOT TO SCALE

MDS-06

STATE PROJECT NO.:
0172-0494

CITY/TOWN:
MONTVILLE/NORWICH

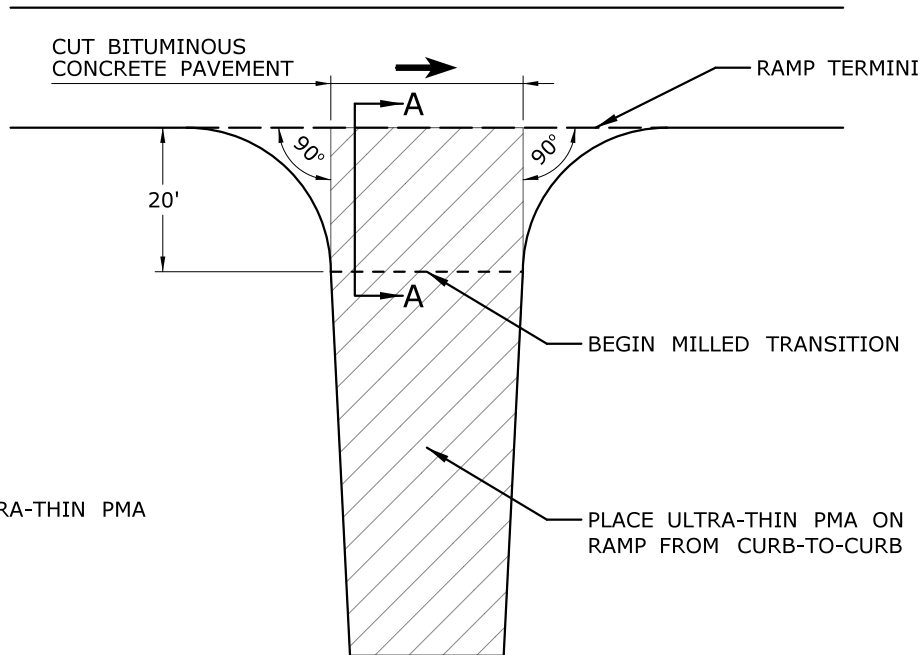



STATE OF CONNECTICUT
DEPARTMENT OF TRANSPORTATION

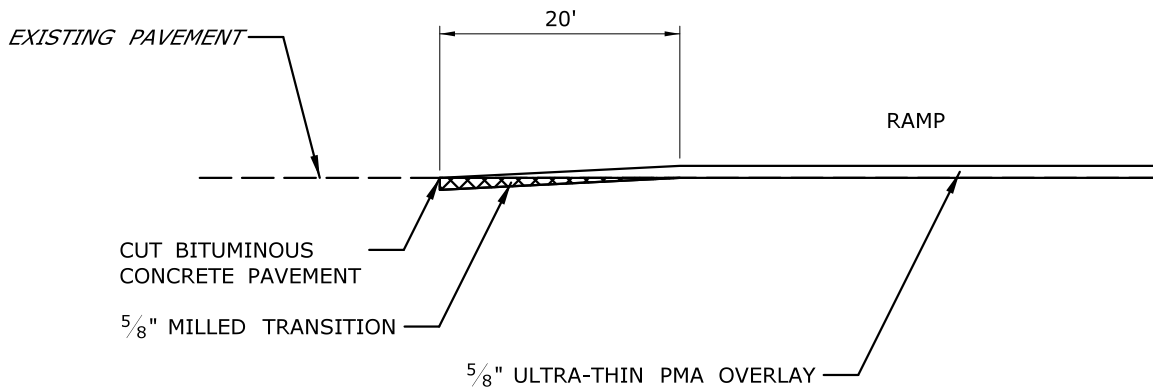
2020 PAVEMENT PRESERVATION PROGRAM
ULTRA-THIN BONDED PMA
DISTRICT 2 - I-395



DATE:
JAN 2020



 5/8" ULTRA-THIN PMA



SECTION "A-A"

GENERAL NOTES:

- 1. ALL MILLED TRANSITIONS SHALL BE INCLUDED IN THE COST OF THE ITEM "FINE MILLING OF BITUMINOUS CONCRETE (0" TO 4)".

RAMP ULTRA-THIN PLACEMENT DETAIL

NOT TO SCALE

MDS-07

STATE PROJECT NO.:
0172-0494

CITY/TOWN:
MONTVILLE/NORWICH



STATE OF CONNECTICUT
DEPARTMENT OF TRANSPORTATION

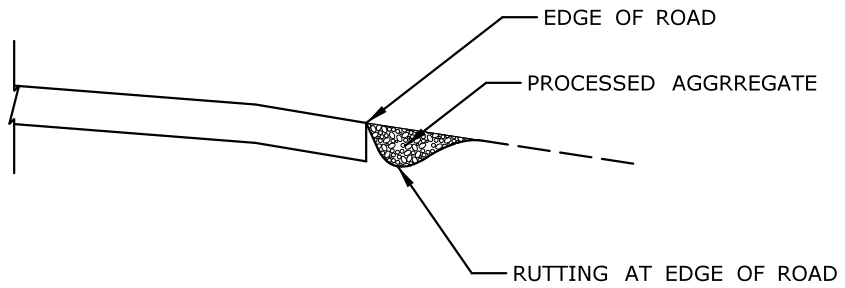
2020 PAVEMENT PRESERVATION PROGRAM
ULTRA-THIN BONDED PMA
DISTRICT 2 - I-395



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ENGINEERING



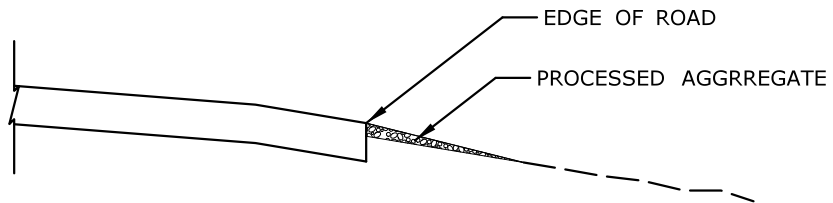
DATE:
JAN 2020



GENERAL NOTES:

1. PLACE AND COMPACT PROCESSED AGGREGATE IN ANY RUTTED OR ERODED AREAS ADJACENT TO THE EDGE OF ROAD.

EDGE OF ROAD
RUTTED/ERODED TREATMENT



GENERAL NOTES:

1. PLACE AND COMPACT PROCESSED AGGREGATE ADJACENT TO EDGE OF ROAD WHERE EXISTING VERTICAL DROP-OFF IS 2 INCHES OR GREATER.

EDGE OF ROAD
SHOULDER DROP-OFF TREATMENT

NOT TO SCALE

MDS-08

STATE PROJECT NO.:
0172-0494

CITY/TOWN:
MONTVILLE/NORWICH



STATE OF CONNECTICUT
DEPARTMENT OF TRANSPORTATION

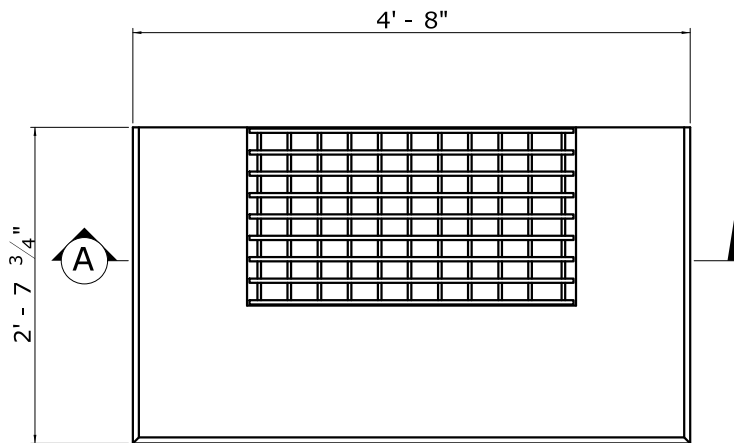
2020 PAVEMENT PRESERVATION PROGRAM
ULTRA-THIN BONDED PMA
DISTRICT 2 - I-395



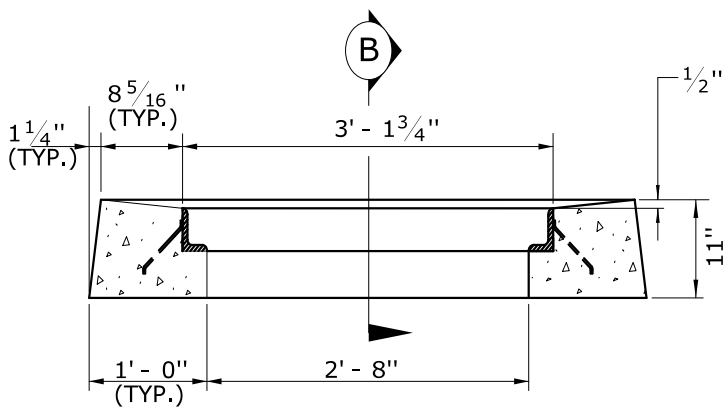
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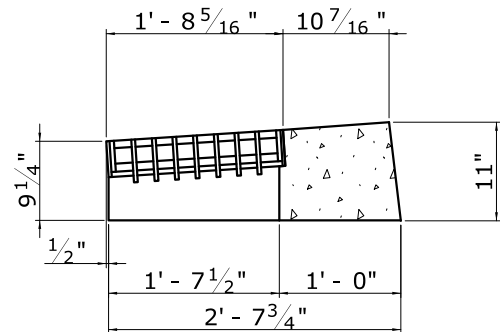
DATE:
JAN 2020



PLAN VIEW



SECTION A



SECTION B

GENERAL NOTES:

1. FOR DETAILS OF FRAME AND GRATE SEE STANDARD SHEET HW-507-08.
2. ALL STEEL, EXCEPT REINFORCING BARS, SHALL BE GALVANIZED IN CONFORMANCE WITH SECTION M06.03 OF CONNECTICUT'S STANDARD SPECIFICATIONS.
3. ALL BARS SHALL HAVE A MINIMUM 2" (51) COVER.

TYPE "C-M" BARRIER
CURB CATCH BASIN TOP

NOT TO SCALE

MDS-09

STATE PROJECT NO.:
0172-0494

CITY/TOWN:
MONTVILLE/NORWICH

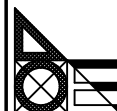


STATE OF CONNECTICUT
DEPARTMENT OF TRANSPORTATION

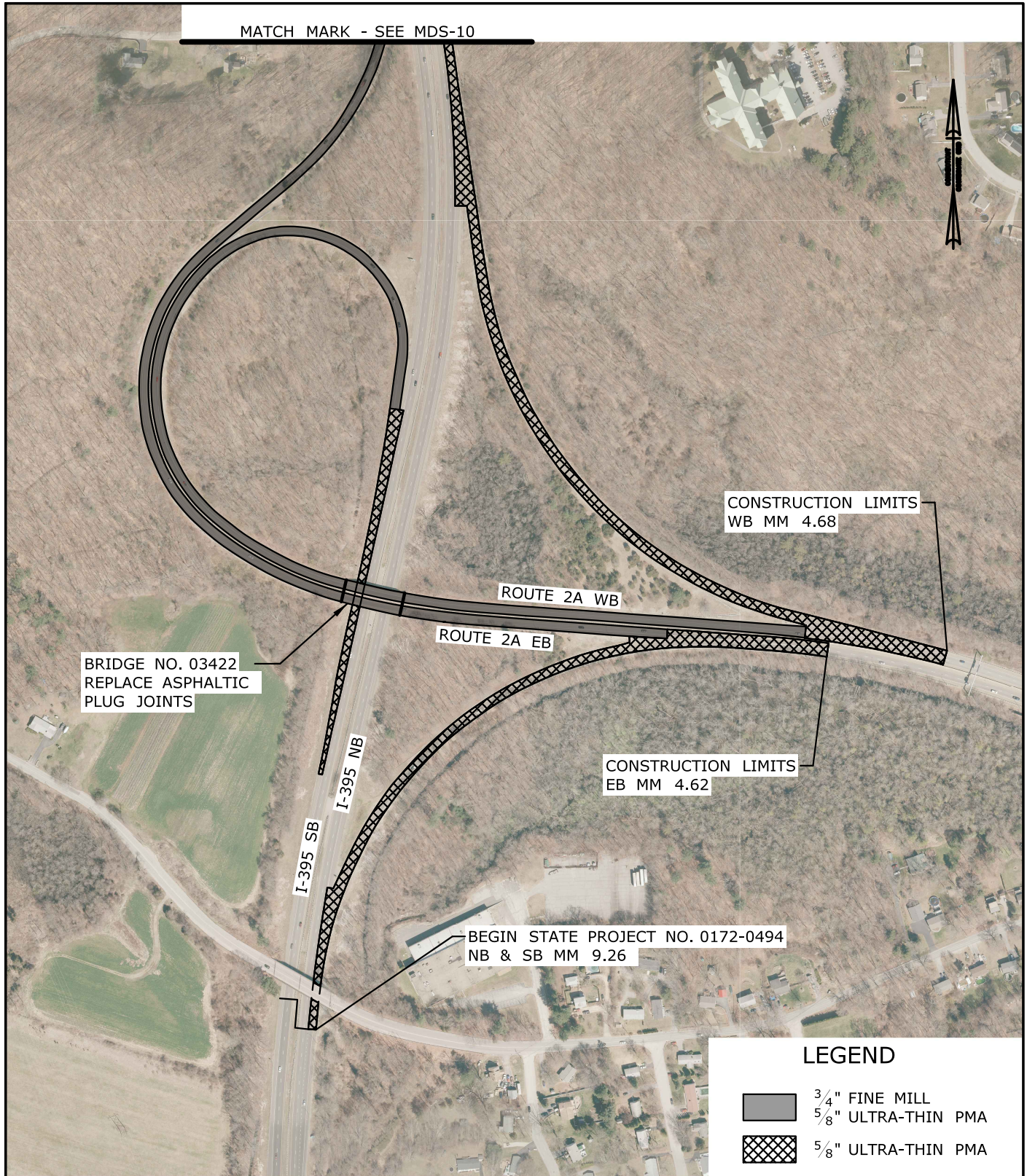
2020 PAVEMENT PRESERVATION PROGRAM
ULTRA-THIN BONDED PMA
DISTRICT 2 - I-395



OFFICE OF
ENGINEERING



DATE:
JAN 2020



RAMP TREATMENT LIMITS



MDS-10

STATE PROJECT NO.:
0172-0494

CITY/TOWN:
MONTVILLE/NORWICH

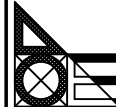


STATE OF CONNECTICUT
DEPARTMENT OF TRANSPORTATION

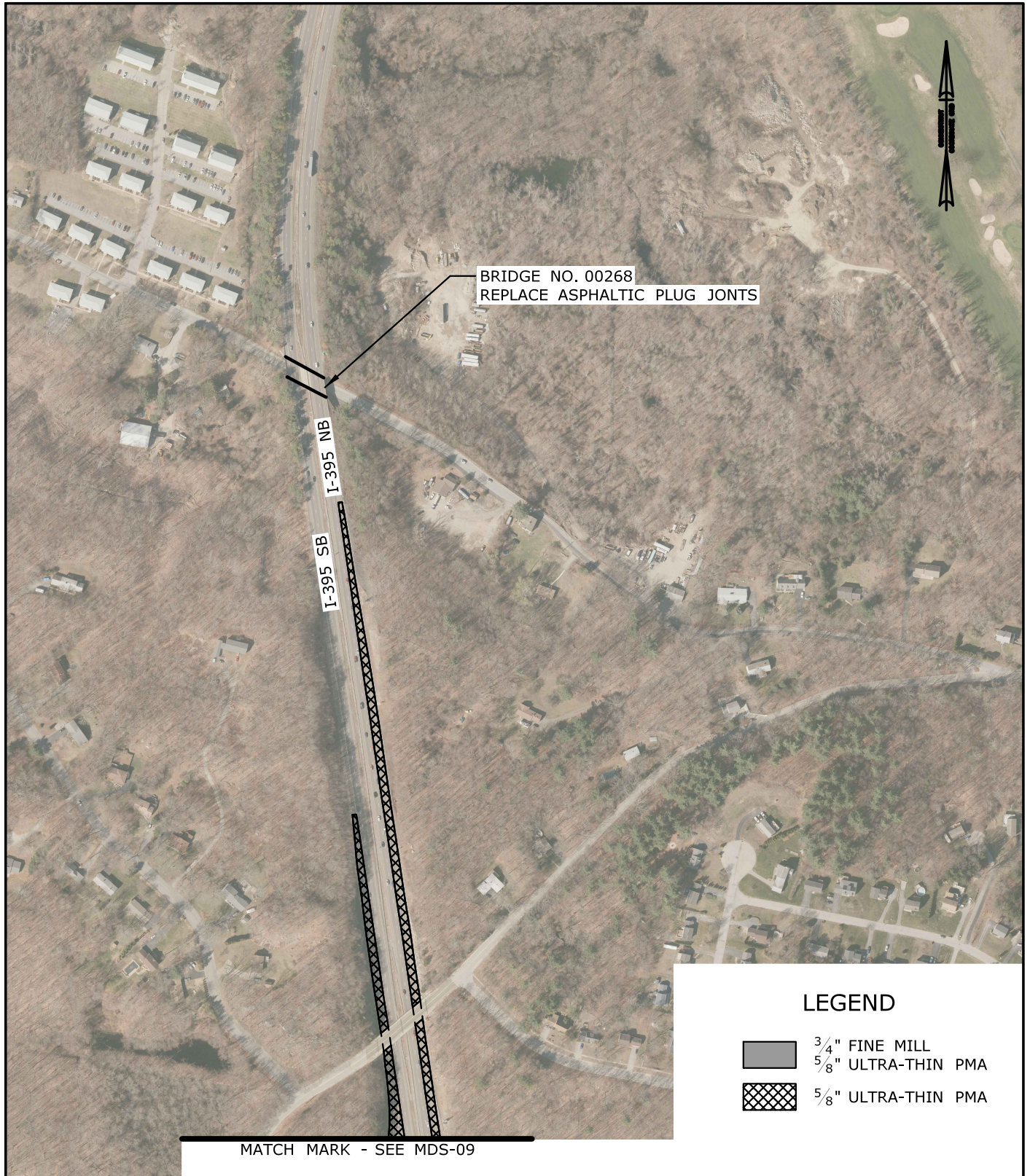
2020 PAVEMENT PRESERVATION PROGRAM
ULTRA-THIN BONDED PMA
DISTRICT 2 - I-395



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ENGINEERING






DATE:
JAN 2020



MATCH MARK - SEE MDS-09

LEGEND

-  3/4" FINE MILL
-  5/8" ULTRA-THIN PMA
-  5/8" ULTRA-THIN PMA

SCALE IN FEET



RAMP TREATMENT LIMITS

MDS-11

STATE PROJECT NO.:
0172-0494

CITY/TOWN:
MONTVILLE/NORWICH

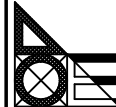


STATE OF CONNECTICUT
DEPARTMENT OF TRANSPORTATION

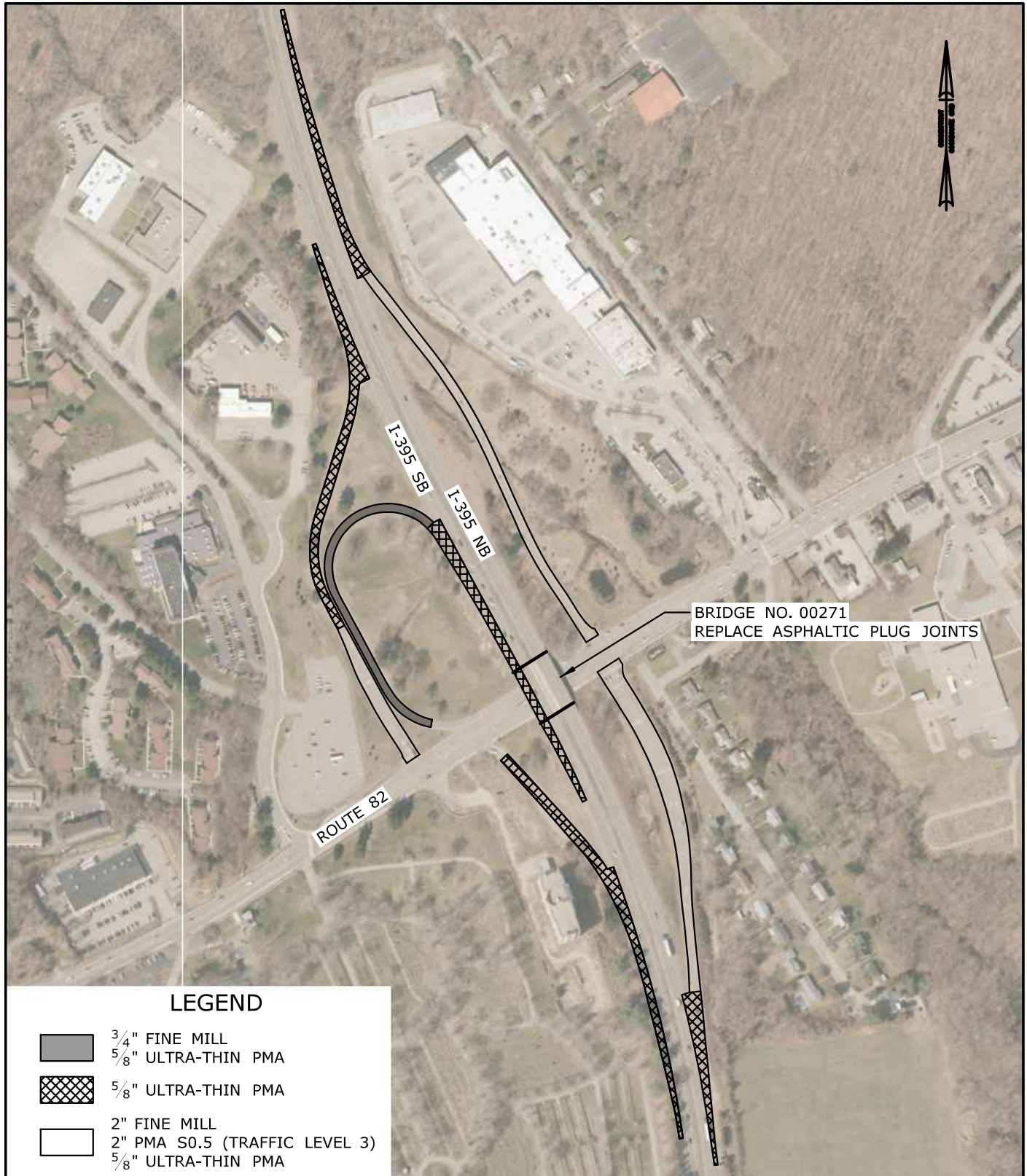
2020 PAVEMENT PRESERVATION PROGRAM
ULTRA-THIN BONDED PMA
DISTRICT 2 - I-395









OFFICE OF
ENGINEERING



DATE:
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LEGEND

-  3/4" FINE MILL
-  5/8" ULTRA-THIN PMA
-  5/8" ULTRA-THIN PMA
-  2" FINE MILL
-  2" PMA S0.5 (TRAFFIC LEVEL 3)
-  5/8" ULTRA-THIN PMA

SCALE IN FEET

RAMP TREATMENT LIMITS



MDS-12

STATE PROJECT NO.:
0172-0494

CITY/TOWN:
MONTVILLE/NORWICH

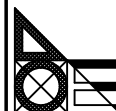


STATE OF CONNECTICUT
DEPARTMENT OF TRANSPORTATION

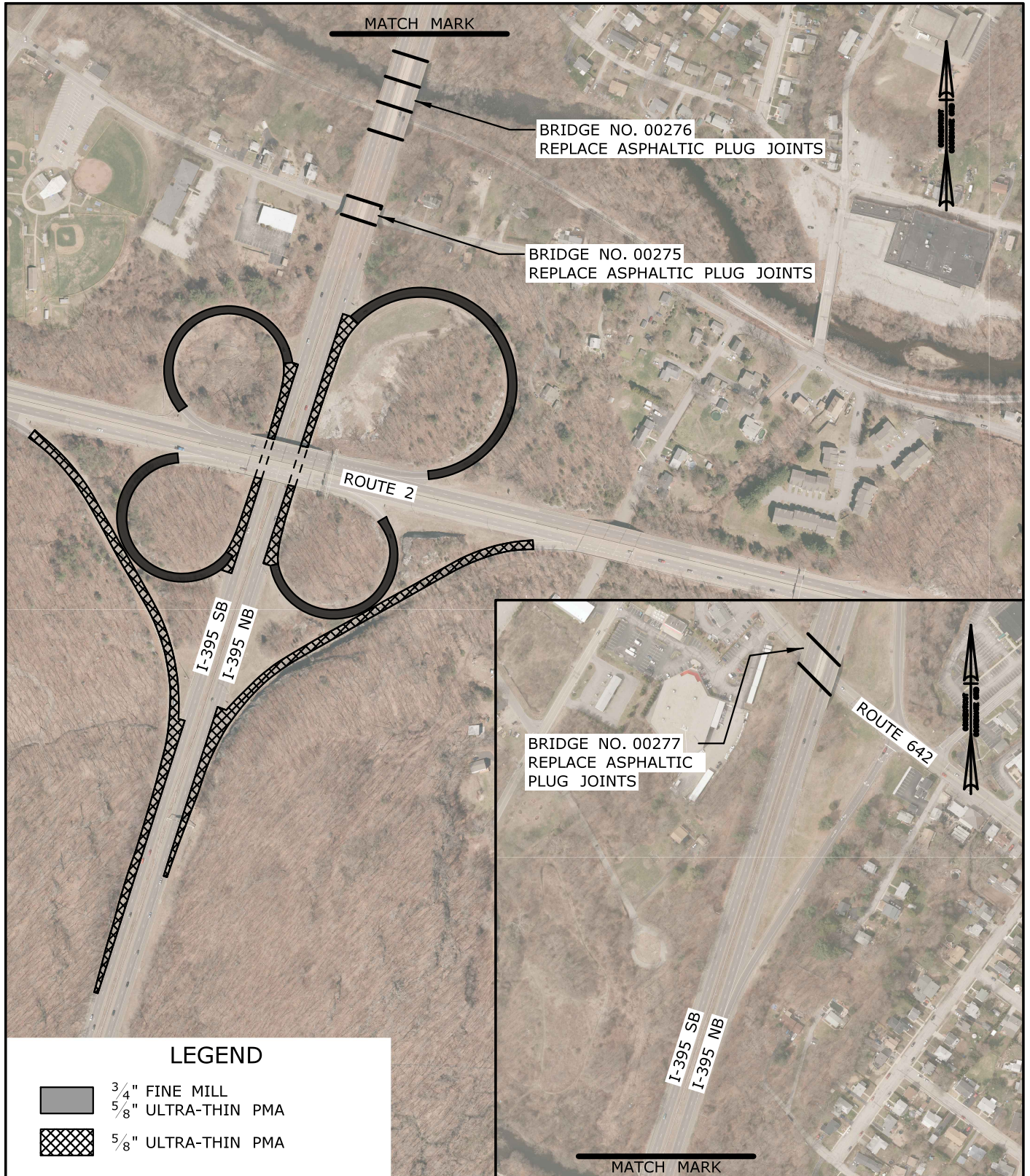
2020 PAVEMENT PRESERVATION PROGRAM
ULTRA-THIN BONDED PMA
DISTRICT 2 - I-395






OFFICE OF
ENGINEERING



DATE:
JAN 2020



LEGEND

-  3/4" FINE MILL
-  5/8" ULTRA-THIN PMA
-  5/8" ULTRA-THIN PMA

SCALE IN FEET

RAMP TREATMENT LIMITS



MDS-13

STATE PROJECT NO.:
0172-0494

CITY/TOWN:
MONTVILLE/NORWICH



STATE OF CONNECTICUT
DEPARTMENT OF TRANSPORTATION

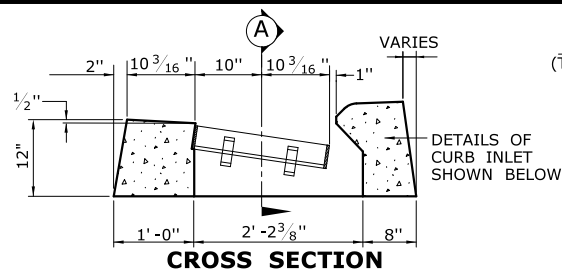
2020 PAVEMENT PRESERVATION PROGRAM
ULTRA-THIN BONDED PMA
DISTRICT 2 - I-395



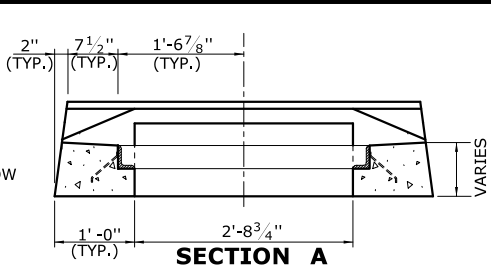
OFFICE OF
ENGINEERING



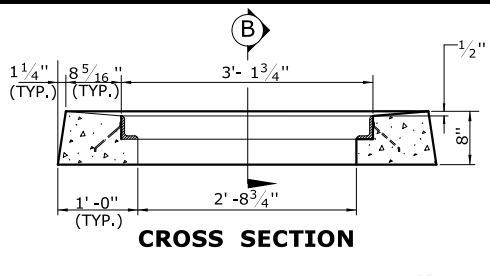
DATE:
JAN 2020



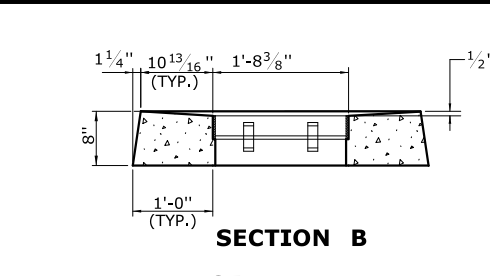
**CROSS SECTION
TYPE "C" CATCH BASIN TOP**



SECTION A

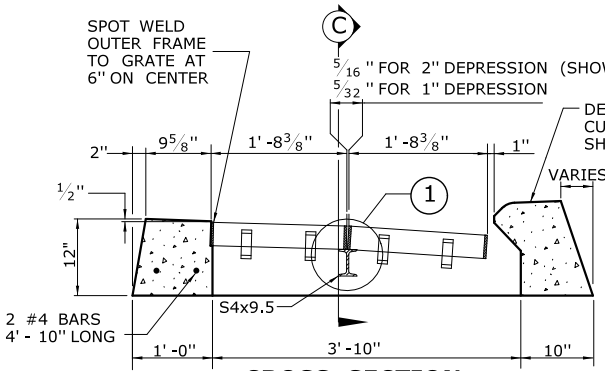


CROSS SECTION

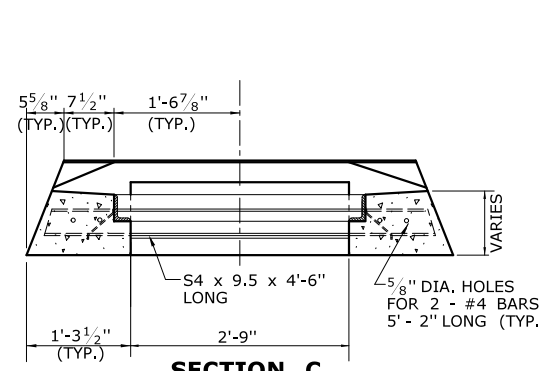


SECTION B

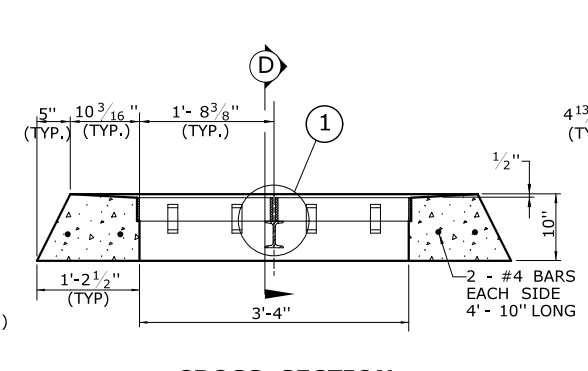
GENERAL NOTES:
1. FOR DETAILS OF FRAMES AND GRATES, SEE DRAWING NO. DGS-02.
2. ALL BARS SHALL HAVE A MINIMUM 2" COVER.



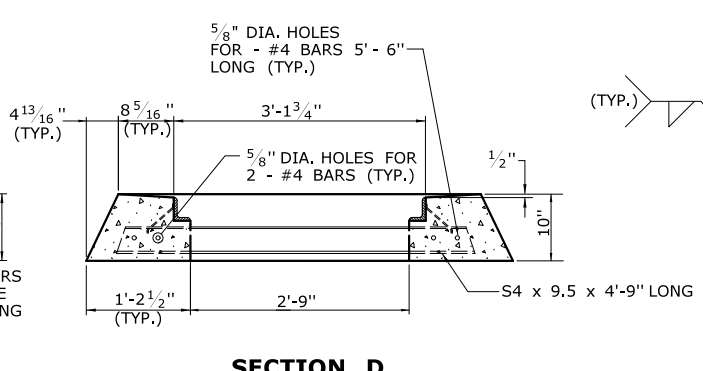
**CROSS SECTION
TYPE "C" CATCH BASIN DOUBLE GRATE - TYPE I TOP**



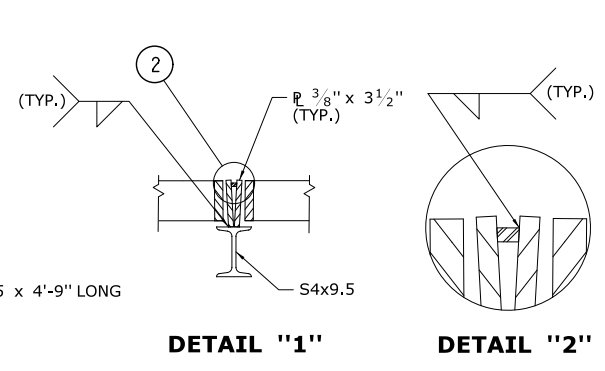
SECTION C



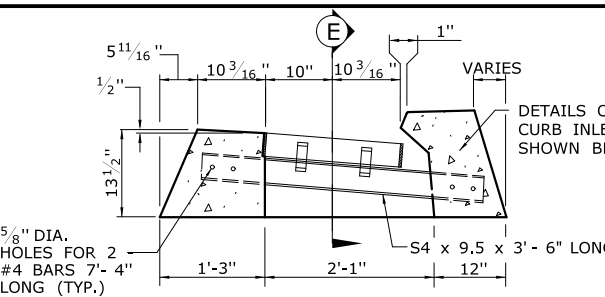
**CROSS SECTION
TYPE "C-L" CATCH BASIN DOUBLE GRATE - TYPE I TOP**



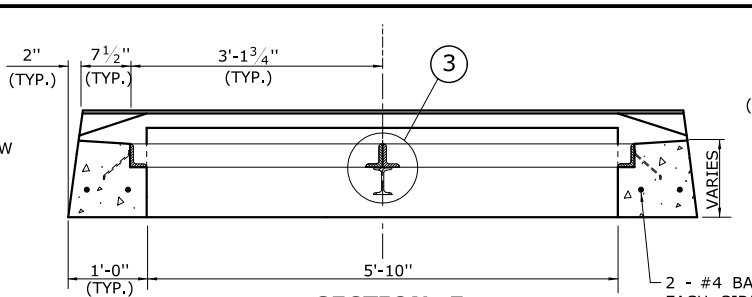
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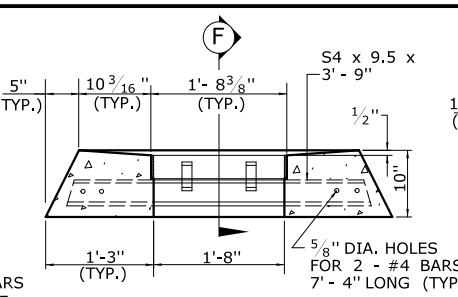
DETAIL "1" DETAIL "2"



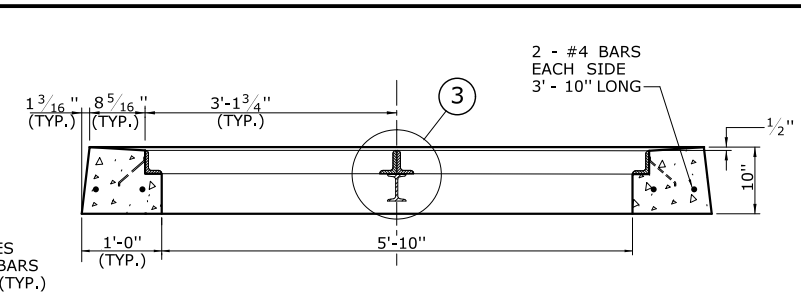
**CROSS SECTION
TYPE "C" CATCH BASIN DOUBLE GRATE - TYPE II TOP**



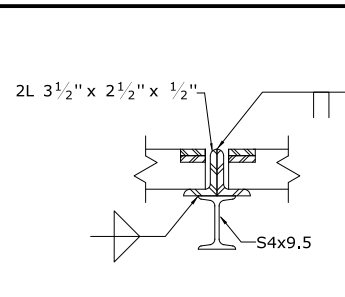
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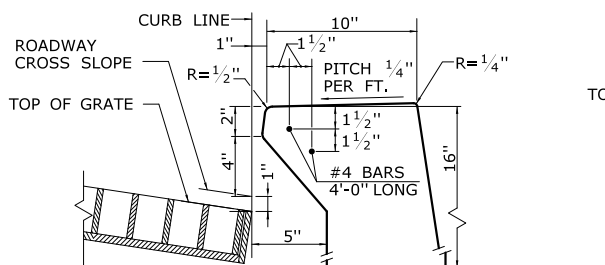
**CROSS SECTION
TYPE "C-L" CATCH BASIN DOUBLE GRATE - TYPE II TOP**



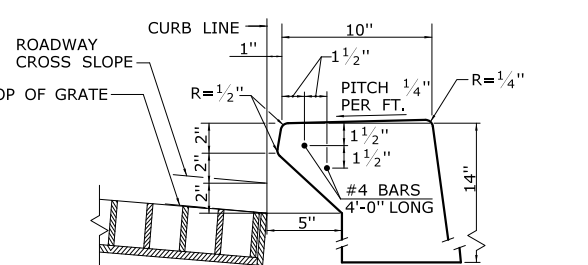
SECTION F



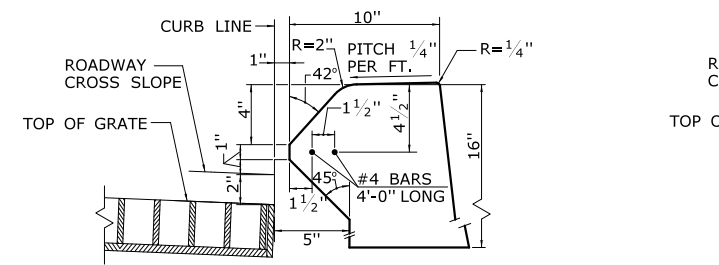
DETAIL "3"



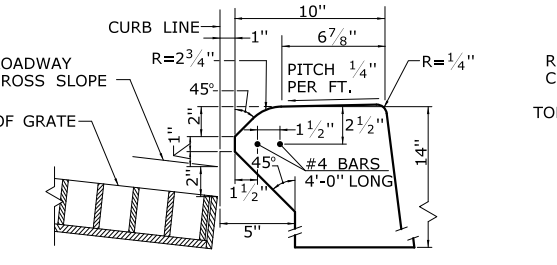
INLET WITH 6" CONCRETE OR STONE CURBING FOR TYPE "C" CB



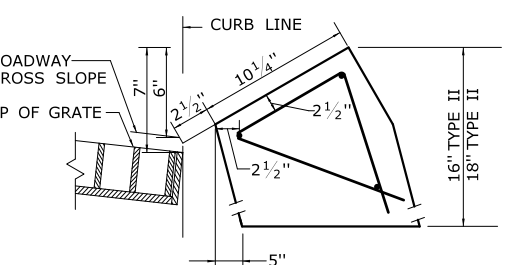
INLET WITH NO CURBING (PLAIN TYPE) FOR TYPE "C" CB



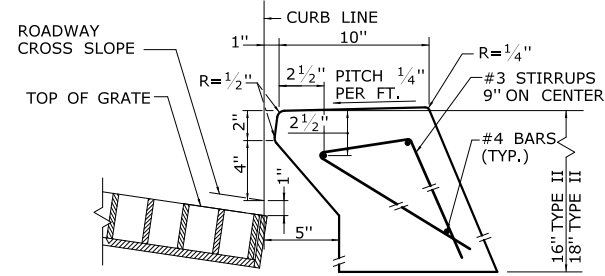
INLET WITH 6" BITUMINOUS CONCRETE LIP CURBING FOR TYPE "C" CB



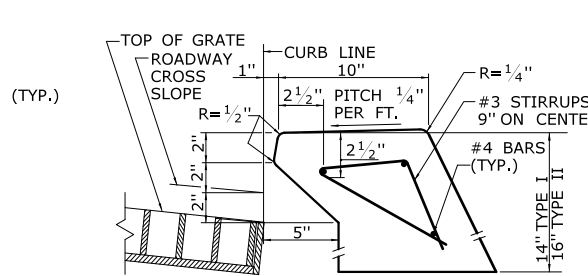
INLET WITH 4" CONCRETE PARK CURBING FOR TYPE "C" CB



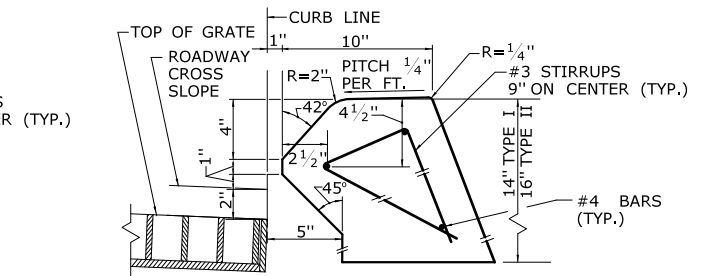
INLET WITH GRANITE SLOPE CURB FOR TYPE "C" CB



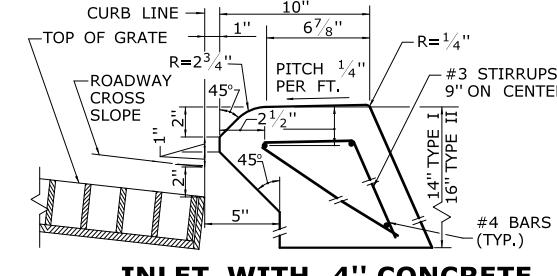
INLET WITH 6" CONCRETE OR STONE CURBING FOR TYPE "C" CB DOUBLE GRATE TYPE I & II



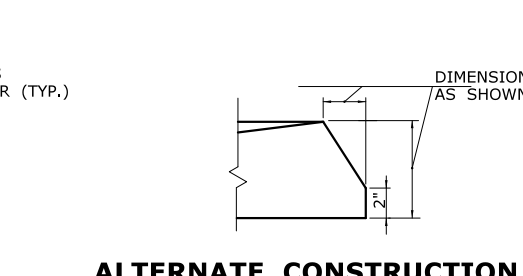
INLET WITH NO CURBING (PLAIN TYPE) FOR TYPE "C" CB DOUBLE GRATE TYPE I & II



INLET WITH 6" BITUMINOUS CONCRETE LIP CURBING FOR TYPE "C" CB DOUBLE GRATE TYPE I & II

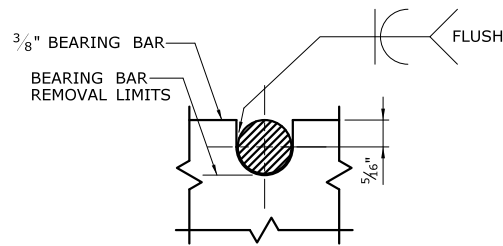


INLET WITH 4" CONCRETE PARK CURBING FOR TYPE "C" CB DOUBLE GRATE TYPE I & II



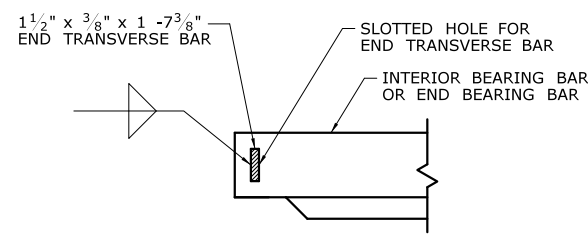
ALTERNATE CONSTRUCTION OF TYPE II TOP

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REV. DATE REVISION DESCRIPTION SHEET NO. Plotted Date: 1/16/2020	FILENAME: ...CTDOT_HIGHWAY_GD [6-11-19].dgn		APPROVED BY:		DRAWING TITLE: CATCH BASIN TOPS TYPE "C" & "C-L"		DRAWING NO. DGS-01

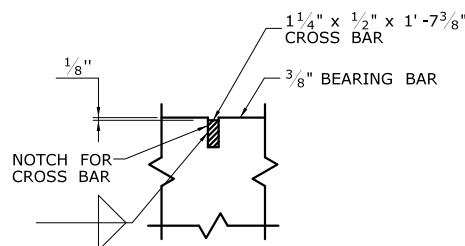


NOTE:
5/8" DIA. ROUND BAR SHALL CONTACT BEARING BAR AT BOTTOM AND BE FLUSH AT TOP.

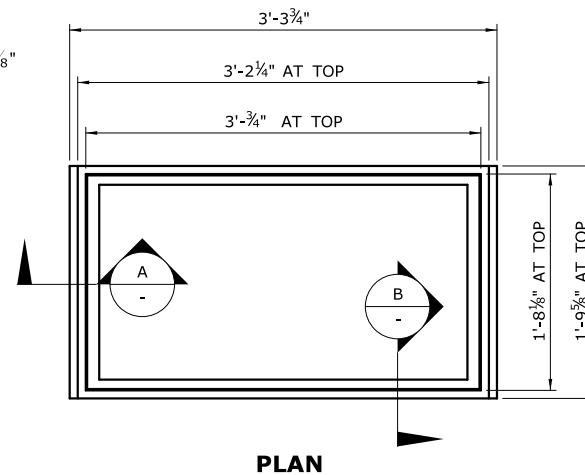
**ROUND BAR ATTACHMENT
CATCH BASIN GRATE TYPE A**



**END TRANSVERSE BAR ATTACHMENT
CATCH BASIN GRATE TYPE A AND B**



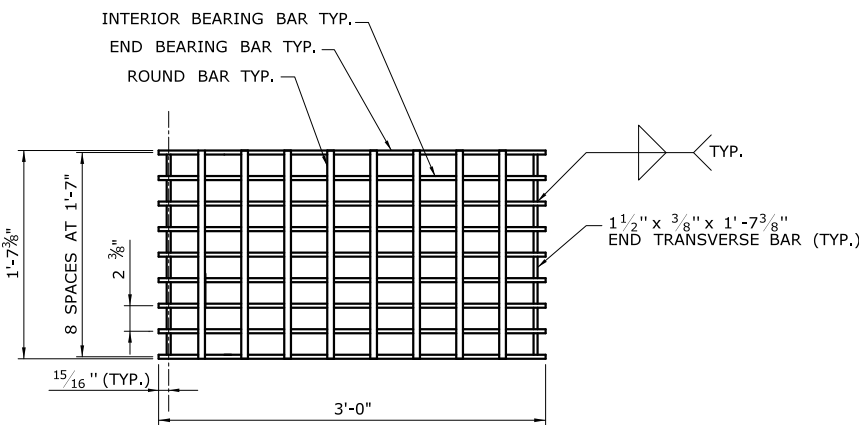
**CROSS BAR ATTACHMENT
CATCH BASIN GRATE TYPE B**



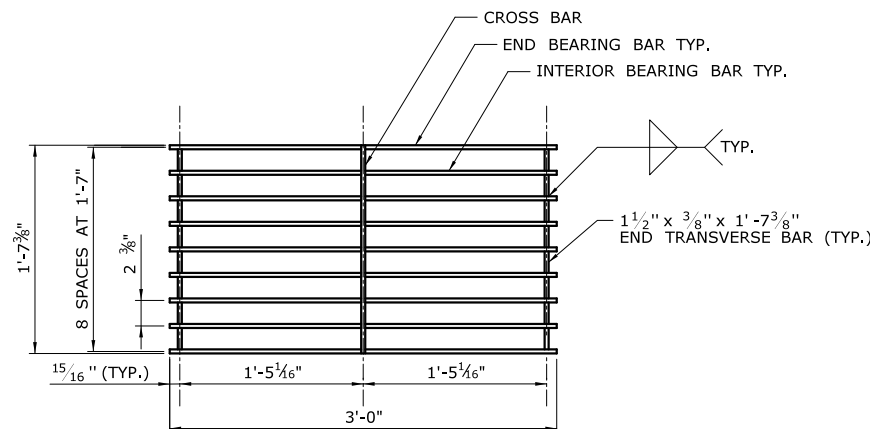
PLAN

GENERAL NOTES:

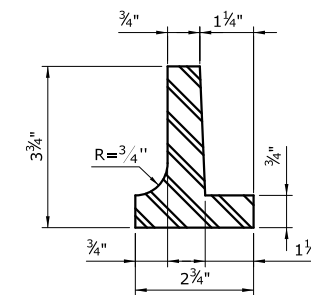
1. STEEL OR CAST IRON SHALL BE USED FOR FRAMES. STEEL SHALL BE USED FOR TYPE "A" AND "B" GRATES.
2. TYPE "A" GRATES SHALL BE USED ON ALL ROADWAYS WHERE BICYCLE TRAFFIC IS ALLOWED OR ON HEAVY DUTY LOCK DOWN TOPS AS DIRECTED BY THE ENGINEER.
3. TYPE "B" GRATES SHALL BE USED ON ALL LIMITED ACCESS HIGHWAYS, RAMPS AND WHERE BICYCLE TRAFFIC IS NOT ALLOWED OR AS DIRECTED BY THE ENGINEER.
4. DO NOT GALVANIZE CAST IRON FRAMES.
5. DIMENSIONAL TOLERANCES SHALL BE $\pm 1/16$ INCH.
6. ALL STEEL BARS SHALL BE WELDED AT ALL INTERSECTIONS.



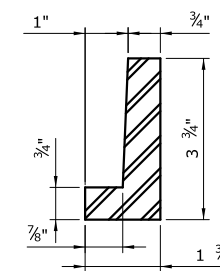
PLAN



PLAN

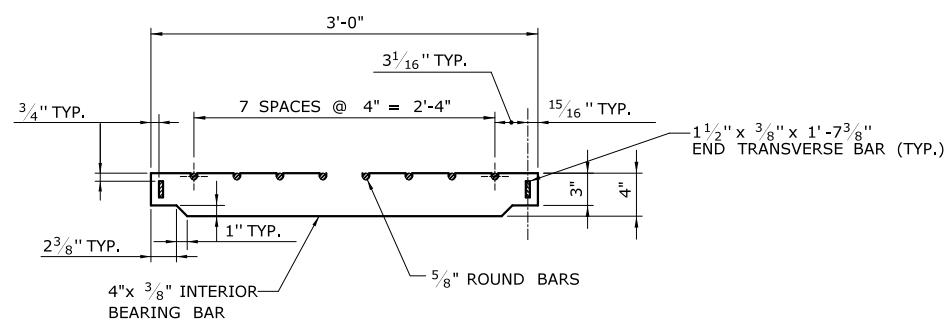


SECTION A

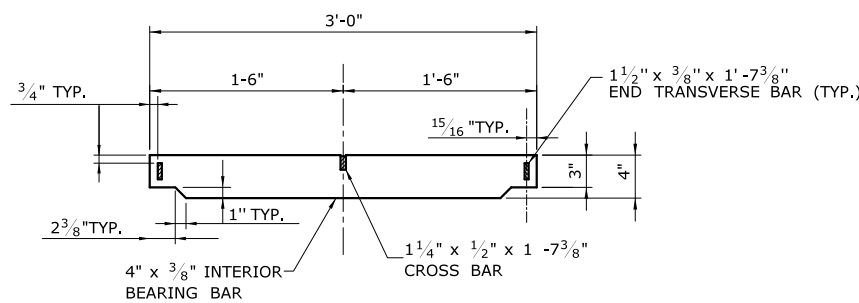


SECTION B

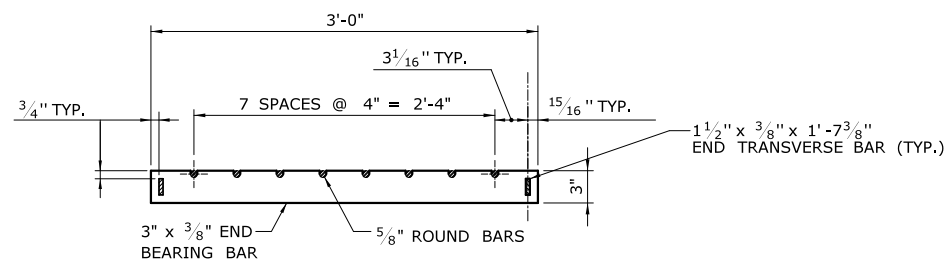
CAST IRON FRAME ALTERNATE



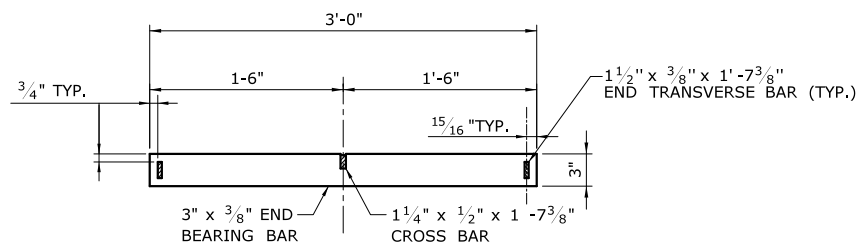
**ELEVATION- INTERIOR BEARING BAR
CATCH BASIN GRATE TYPE A**



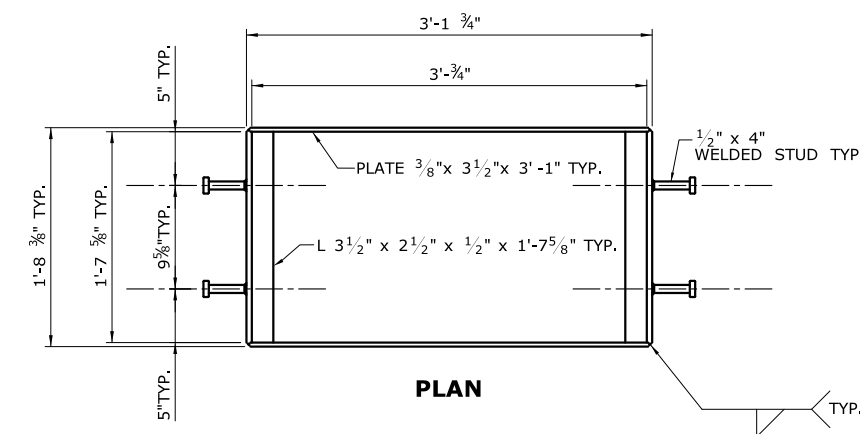
**ELEVATION- INTERIOR BEARING BAR
CATCH BASIN GRATE TYPE B**



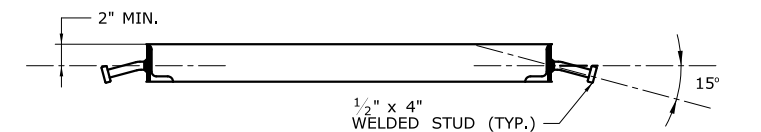
**ELEVATION- END BEARING BAR
CATCH BASIN GRATE TYPE A**



**ELEVATION- END BEARING BAR
CATCH BASIN GRATE TYPE B**




PLAN



**WELDED STUD ANCHOR DETAILS
STEEL FRAME**

REV.	DATE	REVISION DESCRIPTION	SHEET NO.	Plotted Date: 1/16/2020

DESIGNER/DRAFTER:	-
CHECKED BY:	-

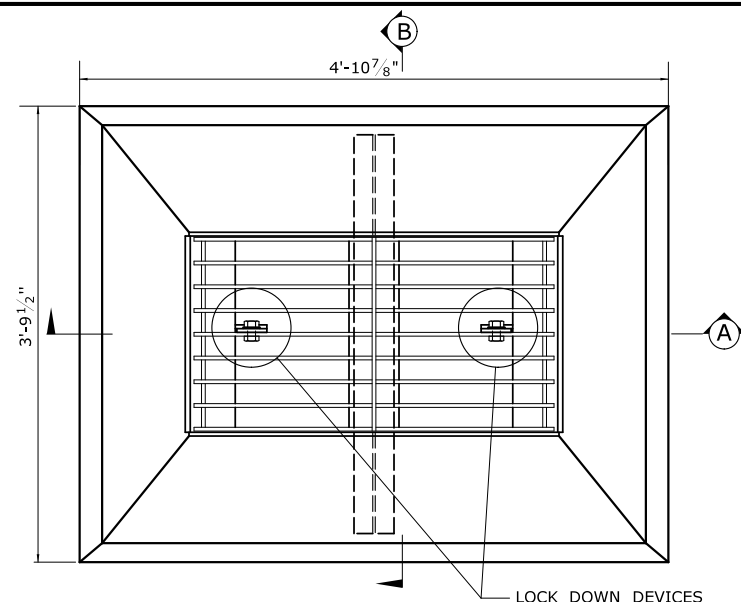

STATE OF CONNECTICUT
DEPARTMENT OF TRANSPORTATION

SIGNATURE/
 BLOCK:
OFFICE OF ENGINEERING
 APPROVED BY:

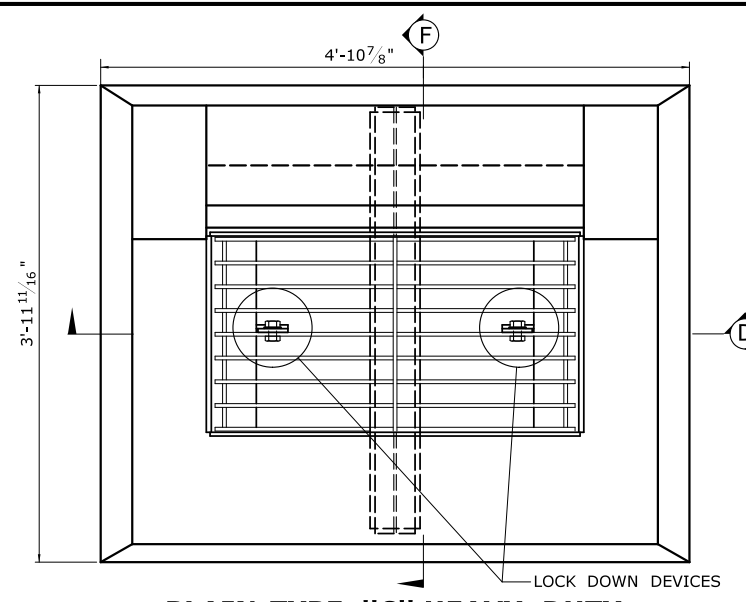
PROJECT TITLE:
**2020 PAVEMENT PRESERVATION PROGRAM
 ULTRA-THIN BONDED PMA
 DISTRICT 2 - I-395**

TOWN:
**MONTVILLE
 NORWICH**
 DRAWING TITLE:
**CATCH BASIN FRAMES
 AND GRATES**

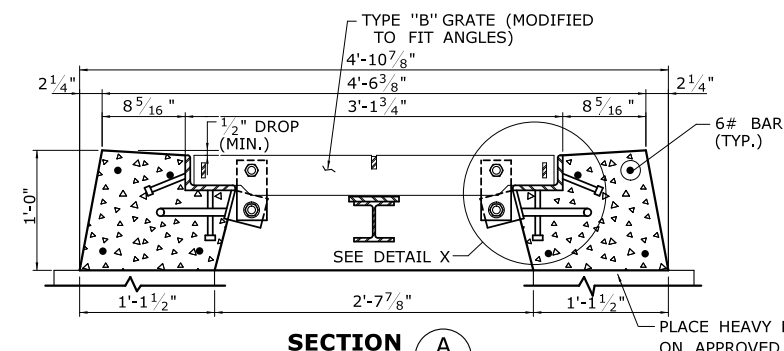
PROJECT NO.
0172-0494
 DRAWING NO.
DGS-02
 SHEET NO.



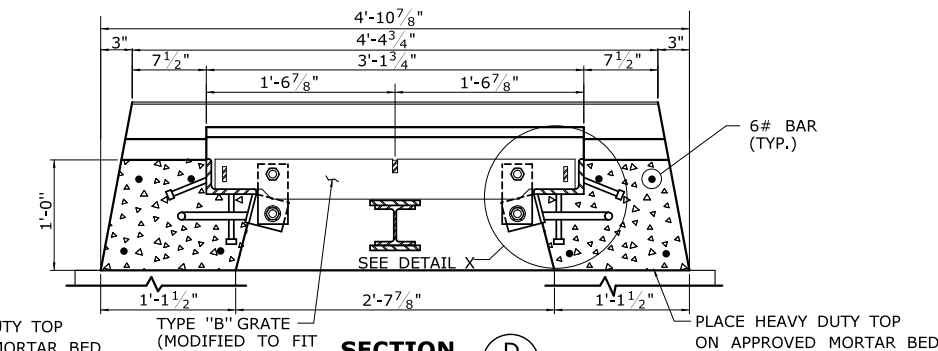
PLAIN-TYPE "C-L" HEAVY DUTY CATCH BASIN TOP



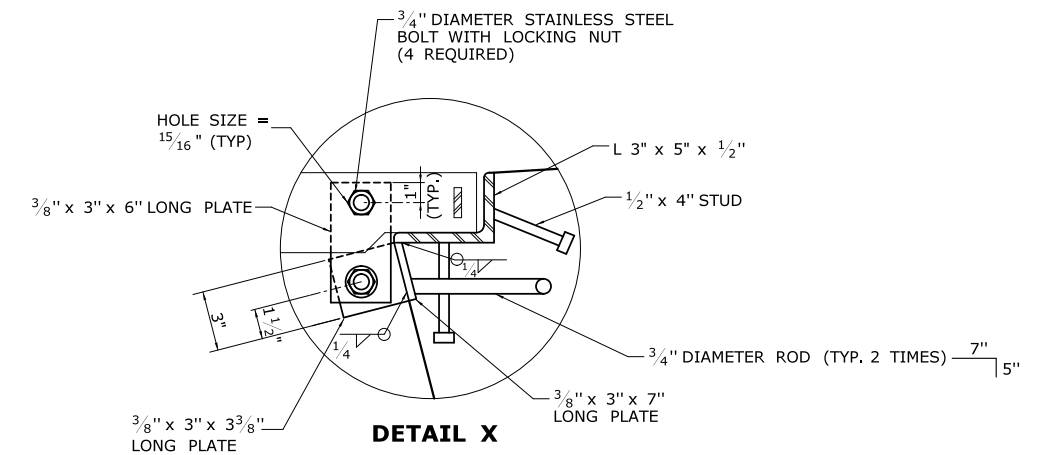
PLAIN-TYPE "C" HEAVY DUTY CATCH BASIN TOP



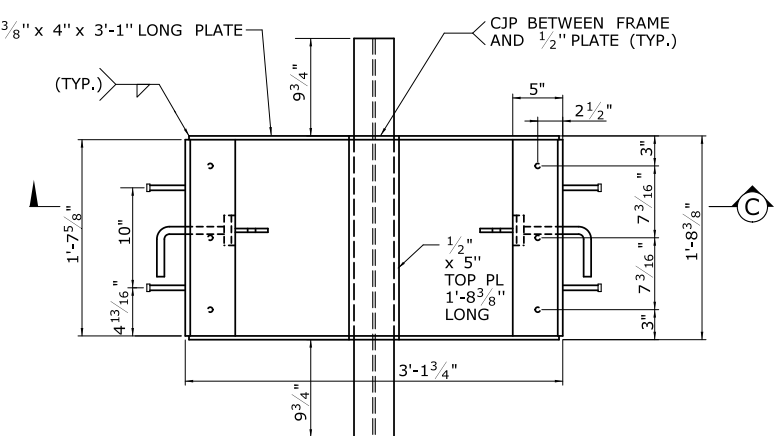
SECTION A



SECTION D

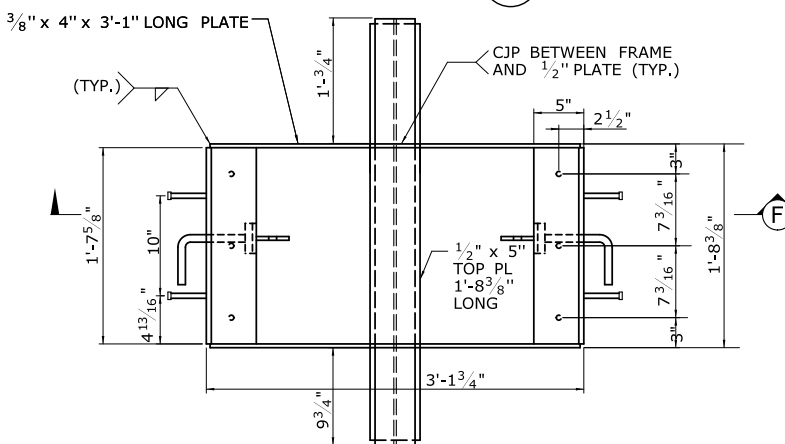


DETAIL X



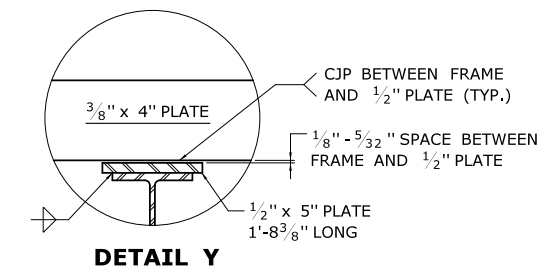
PLAIN - TYPE "C-L" FRAME

SECTION C

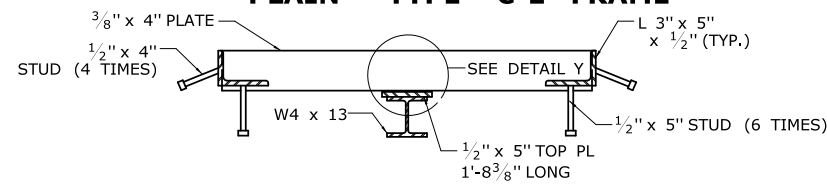


PLAIN - TYPE "C" FRAME

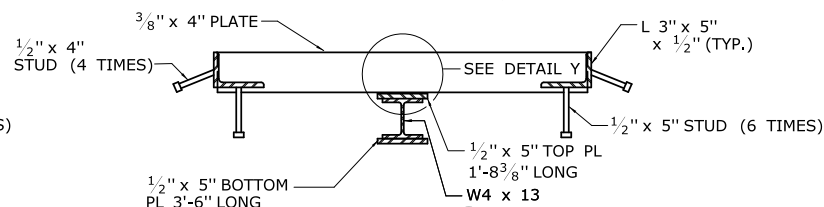
SECTION F



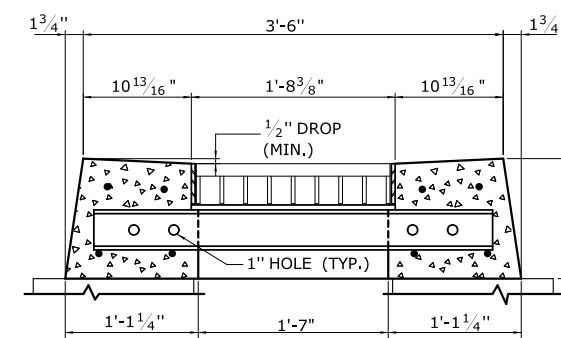
DETAIL Y



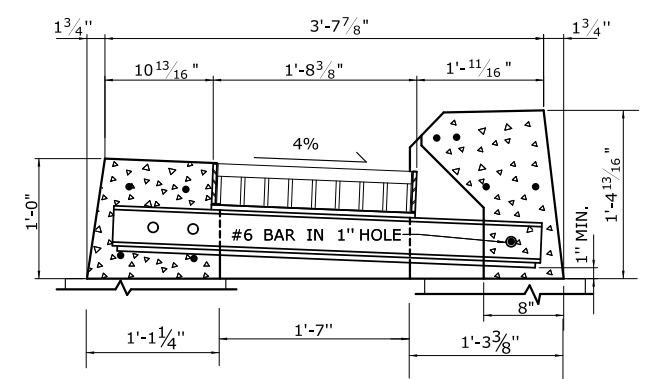
TYPE "C-L" HEAVY DUTY CATCH BASIN FRAME



TYPE "C" HEAVY DUTY CATCH BASIN FRAME



SECTION B



GENERAL NOTES:

1. LOCK DOWN DEVICES SHALL BE INSTALLED AND MAINTAINED WHEN TRAFFIC WILL BE TRAVELING OVER CATCH BASIN WITH TYPE "A" GRATES OR TYPE "B" GRATES AS DIRECTED BY THE ENGINEER.
2. FOR FRAMES AND GRATES DETAILS, SEE DRAWING NO. DGS-02.
3. 4" BITUMINOUS CONCRETE PARK CURBING SHOWN FOR THE "C" TOP.

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REV. DATE REVISION DESCRIPTION SHEET NO. Plotted Date: 1/16/2020	FILENAME: ...CTDOT_HIGHWAY_GD [6-11-19].dgn		APPROVED BY:		DRAWING TITLE: CATCH BASIN LOCK DOWN TOPS		DRAWING NO. DGS-03 SHEET NO.

**BITUMINOUS CONCRETE PLACEMENT
AT ASPHALTIC PLUG JOINTS (APJ)**

1. THE REQUIREMENTS OF SPECIAL PROVISION SECTION 4.06 SHALL BE MET EXCEPT IN LIEU OF DENSITY TESTING, THE METHODS DESCRIBED BELOW SHALL BE FOLLOWED TO ASSURE PROPER COMPACTION.
2. TOP LIFT MUST BE UNIFORM THICKNESS; INTERMEDIATE LIFTS CAN BE PLACED AT 1 1/4" TO 2 1/2" COMPACTED.
3. REQUIREMENTS FOR PROPER COMPACTION:
 - a. MINIMUM 265° F DELIVERY TEMPERATURE OF MATERIAL. PLACE AND SPREAD MATERIAL BEFORE IT COOLS TO 260° F. MATERIAL BELOW TEMPERATURE REQUIREMENT WILL BE REJECTED.
 - b. COMPACT NON-SURFACE LIFTS WITH VIBRATORY PLATE COMPACTOR MEETING THE FOLLOWING REQUIREMENTS:
 - i. DESIGNED TO COMPACT ASPHALT
 - ii. EQUIPPED WITH A WATER TANK
 - iii. CENTRIFUGAL FORCE 3200 LBS TO 6000 LBS
 - iv. WEIGHS MINIMUM 160 LBS (WITHOUT WATER)
 - v. MINIMUM 4400 VIBRATIONS PER MINUTE
 - c. COMPACT TOP LIFT WITH 3 1/2 TO 4 1/2 TON DOUBLE DRUM ROLLER, DESIGNED TO COMPACT BITUMINOUS CONCRETE.
 - d. PROVIDE NUMBER OF PASSES BASED ON LIFT THICKNESS AS FOLLOWS:

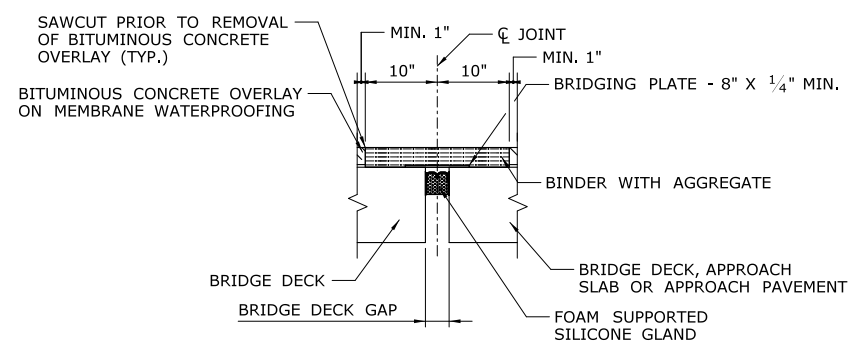
LIFT THICKNESS (INCHES)	NUMBER OF PASSES
1 1/4 TO 1 1/2	8
1 1/2 TO 2	10
2 TO 2 1/2	12
 - e. ADDITIONAL COMPACTING EQUIPMENT MAY BE REQUIRED TO COMPLETE LIFT COMPACTION BEFORE MATERIAL COOLS TO 180° F.
 - f. AT CORNERS OR OTHER AREAS INACCESSIBLE TO PLATE TAMPER, HAND TAMP 20 TIMES MINIMUM BEFORE MATERIAL COOLS TO 180° F.
4. ALTERNATE EQUIPMENT MAY BE REQUESTED AS A SUPPLEMENT TO CONTRACTOR'S QC PLAN. THE EQUIPMENT AND PROCEDURES MUST BE APPROVED BY THE ENGINEER PRIOR TO USE.
5. IF THESE METHODS ARE NOT PERFORMED TO THE SATISFACTION OF THE ENGINEER, DENSITY VERIFICATION MAY BE REQUIRED WHEREIN THE CONTRACTOR SHALL PROVIDE DENSITY TESTING WITH A QC NUCLEAR DENSITY GAUGE OR COLLECT CORE SAMPLES AS SPECIFIED IN SECTION 4.06.

ASPHALTIC PLUG EXPANSION JOINT SYSTEM NOTES

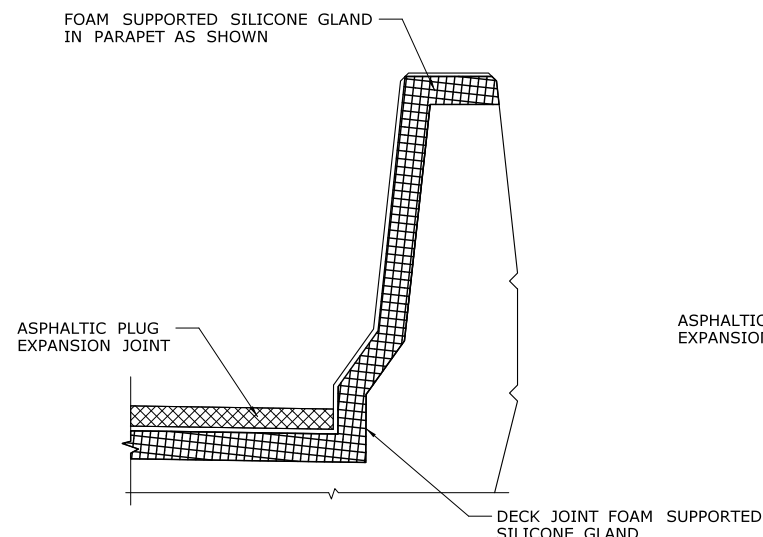
1. A BRIDGING PLATE SHALL BE USED TO SPAN THE GAP BETWEEN TWO DECK ENDS OR THE JOINT BETWEEN A DECK END AND A CONCRETE APPROACH SLAB.
2. DISCONTINUE THE INSTALLATION OF THE BRIDGING PLATE WHERE THE APPROACH SLAB IS DISCONTINUED (TYPICALLY IN THE ROADWAY SHOULDERS). SEE "ASPHALTIC PLUG EXPANSION JOINT SYSTEM" SPECIAL PROVISION.
3. NEW STEEL BRIDGING PLATES SHALL BE A MINIMUM OF 1/4" THICK BY 8" WIDE. FOR JOINT OPENINGS WHICH EXCEED 3", A 3/8" THICK BY 12" WIDE PLATE WILL BE REQUIRED.
4. NO BRIDGING PLATE SHALL BE USED AT THE FOLLOWING LOCATIONS:
 - A. JOINT BETWEEN A DECK END AND A CONCRETE APPROACH PAVEMENT
 - B. WHERE A BRIDGE DECK END MEETS A BITUMINOUS APPROACH PAVEMENT
5. THE REMOVAL OF ALL BITUMINOUS CONCRETE OVERLAY AND EXISTING JOINT SYSTEMS WITHIN THE LIMITS SHOWN TO BE INCLUDED IN THE COST OF THE "ASPHALTIC PLUG EXPANSION JOINT SYSTEM".
6. TEMPORARY CLOSED CELL BACKER ROD DIAMETER SHALL BE DETERMINED AFTER MEASURING THE JOINT OPENING, THE ROD SHALL BE 25% LARGER THAN THE JOINT OPENING.
7. SAW-CUTTING AND REMOVAL OF PAVEMENT FOR JOINT INSTALLATION TO BE INCLUDED FOR PAYMENT UNDER THE ITEM "ASPHALTIC PLUG EXPANSION JOINT SYSTEM".
8. INSTALLATION OF FOAM SUPPORTED SILICONE GLAND TO BE PAID UNDER THE ITEM "PERFORMED JOINT SEAL".
9. ASPHALTIC PLUG EXPANSION JOINT SYSTEMS MAY BE INSTALLED ONLY WITHIN THE TEMPERATURE RANGE SPECIFIED IN THE SPECIAL PROVISION "ASPHALTIC PLUG EXPANSION JOINT SYSTEM". REFERENCE THE RANGE OF THERMAL MOVEMENT FOR THE SELECTED JOINT PRODUCT IN THE TABLE FOR "INSTALLATION RESTRICTIONS" IN THE SPECIAL PROVISION.
10. CONTRACTOR SHALL NOTIFY THE DEPARTMENT IF THE EXISTING PAVEMENT IS DETERMINED TO BE LESS THAN 2" OR GREATER THAN 6" WITHIN THE BRIDGE LIMITS.

JOINT WORK FOR BRIDGES

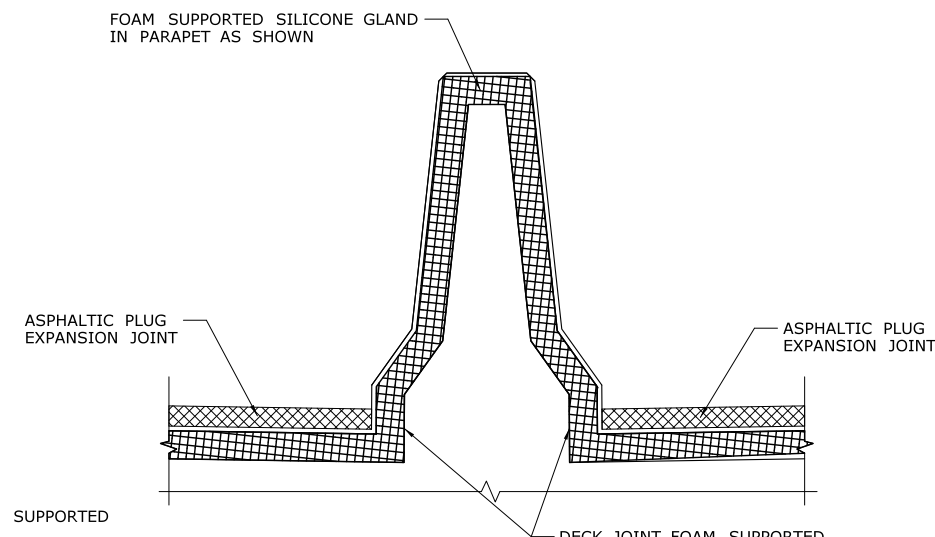
1. ALL WORK TO REMOVE BITUMINOUS CONCRETE OVERLAY AND EXISTING JOINT COMPONENTS AND SEALING ELEMENTS SHALL BE INCLUDED IN THE COST OF THE "ASPHALTIC PLUG EXPANSION JOINT SYSTEM".
2. WHERE EXISTING BRIDGE DECK JOINTS ARE CONCEALED BENEATH BITUMINOUS CONCRETE OVERLAY THE CONTRACTOR SHALL VERIFY THE BRIDGE DECK JOINT LOCATION AND SUBMIT THE LIMITS OF SAW-CUTTING FOR THE ENGINEERS APPROVAL.
3. THE FURNISHING AND PLACING OF TEMPORARY PAVEMENT IN THE JOINT CUT-OUT SHALL CONFORM TO "BITUMINOUS CONCRETE PLACEMENT AT ASPHALTIC PLUG JOINTS (APJ)" AND SHALL BE INCLUDED IN THE COST OF THE "ASPHALTIC PLUG EXPANSION JOINT SYSTEM".
4. ROUGH OR DAMAGED CONCRETE DECK SURFACES SHALL BE REPAIRED WITH A CONCRETE LEVELING MATERIAL INCLUDED FOR PAYMENT UNDER THE ITEM "ASPHALTIC PLUG EXPANSION JOINT SYSTEM".
5. THE DEPTH OF PROPOSED ASPHALTIC PLUG JOINT IS ESTIMATED TO BE 3" AVERAGE.



**TYPICAL SECTION
ASPHALTIC PLUG EXPANSION JOINT SYSTEM**
NOT TO SCALE

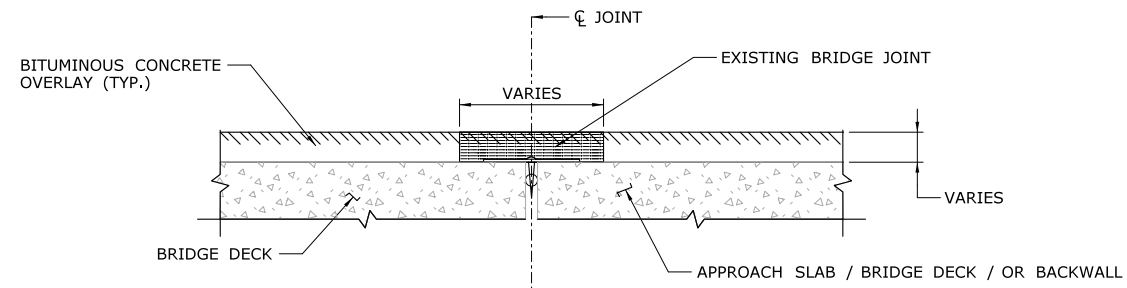


**SCHEMATIC OF ASPHALTIC PLUG JOINT
AT PARAPET**
NOT TO SCALE

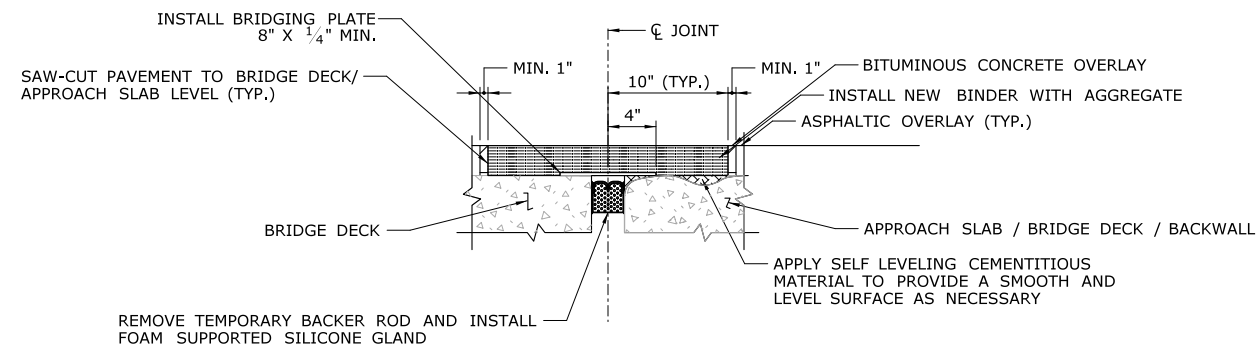


**SCHEMATIC OF ASPHALTIC PLUG JOINT
AT MEDIAN BARRIER**
NOT TO SCALE

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				SCALE AS NOTED					DRAWING TITLE: ASPHALTIC PLUG EXPANSION JOINT NOTES AND DETAILS	SHEET NO. S-01	
REV.	DATE	REVISION DESCRIPTION	SHEET NO.	Plotted Date: 1/15/2020	Filename: ...IS-01 - APJ Notes and Details.dgn						



EXISTING CONDITION
N.T.S.



INSTALL ASPHALTIC PLUG EXPANSION JOINT SYSTEM
N.T.S.

SUGGESTED SEQUENCE OF WORK

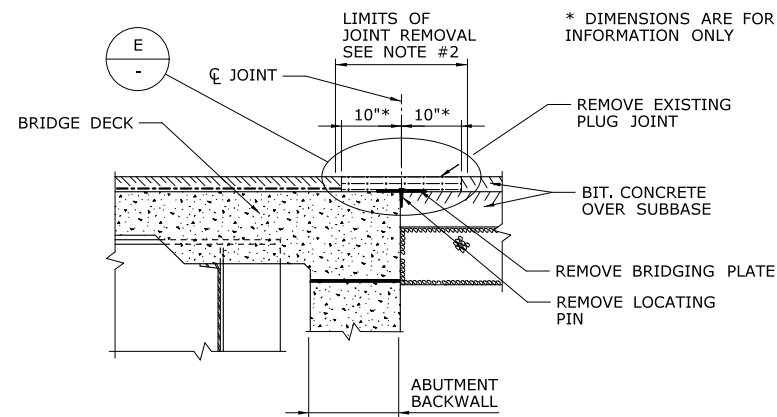
- STEP 1: CONTRACTOR SHALL IDENTIFY AND STAKE LOCATIONS OF EXISTING ASPHALTIC PLUG JOINTS TO BE REPLACED PRIOR TO PLACEMENT OF PAVEMENT OVERLAY SPECIFIED AS PART OF THIS CONTRACT. CONTRACTOR SHALL PERFORM AN EXPLORATION AT THE GUTTERLINE (AT THE FOUR CORNERS OF THE BRIDGE) AND THE CROWN (AT THE BEGINNING AND END OF THE BRIDGE), A MINIMUM OF SIX REPRESENTATIVE DEPTH MEASUREMENTS SHALL BE TAKEN PER BRIDGE AT THESE LOCATIONS TO DETERMINE THE DEPTH OF PAVEMENT AND THE LOCATION OF THE DECK ENDS (CENTERLINE OF PROPOSED JOINT). CONTRACTOR SHALL ALSO MEASURE THE DECK JOINT GAP OPENING FOR SIZING OF THE FOAM SUPPORTED SILICONE GLAND.
- STEP 2: SAW-CUT THE BITUMINOUS PAVEMENT TO THE LIMITS SHOWN IN DETAIL FOR "INSTALL ASPHALTIC PLUG JOINT EXPANSION SYSTEM" (MIN. 1" BEYOND EXISTING PLUG JOINT OR AS DIRECTED BY THE ENGINEER). SAW CUT SHALL NOT DAMAGE THE BRIDGE DECK OR APPROACH SLAB, TO BE INCLUDED IN THE COST OF THE "ASPHALTIC PLUG EXPANSION JOINT SYSTEM".
- STEP 3: REMOVE THE EXISTING PAVEMENT MATERIAL AND JOINT MATERIAL FULL DEPTH WITHIN THE LIMITS SHOWN TO BE INCLUDED IN THE COST OF THE IN THE COST OF THE "ASPHALTIC PLUG EXPANSION JOINT SYSTEM".
- STEP 4: PLACE BITUMINOUS CONCRETE OVERLAY AS REQUIRED.
- STEP 5: INSTALL PROPOSED ASPHALTIC PLUG EXPANSION JOINT SYSTEM WITH FOAM SUPPORTED SILICONE GLAND AND BRIDGING PLATE. LOCATING PINS SHALL NOT BE USED TO SECURE THE BRIDGING PLATE.

INSTALLATION OF ASPHALTIC PLUG JOINT WITH BRIDGING PLATE

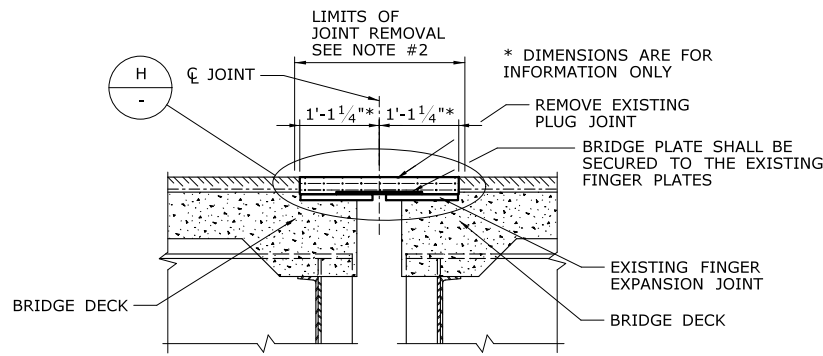
N.T.S.



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REV.	DATE	REVISION DESCRIPTION	SHEET NO.	Plotted Date: 1/15/2020	Filename: ...IS-02 - APJ Sequence Joint Replacement.dgn		

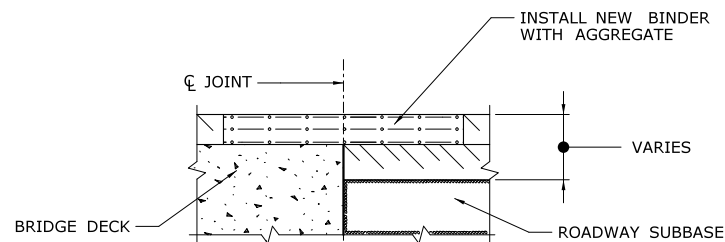


REMOVAL - EXISTING ASPHALTIC PLUG JOINT AT THE SHOULDER
SCALE: 3/4" = 1'-0"

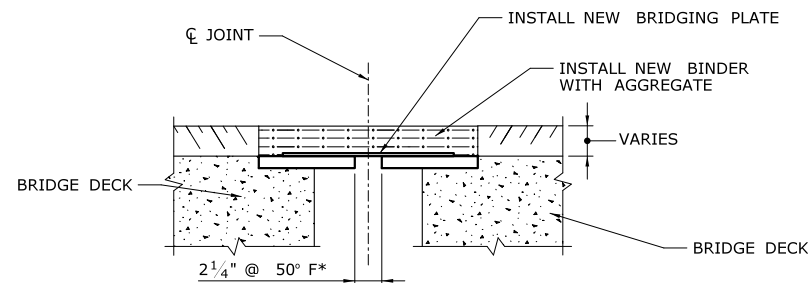


REMOVAL OF EXISTING ASPHALTIC PLUG JOINTS AT PIERS WITH FINGER JOINT PLATES
SCALE: 3/4" = 1'-0"

- NOTES:
1. THE REMOVAL OF ALL EXISTING JOINT MATERIAL AND BITUMINOUS CONCRETE WITHIN THE LIMITS OF THE PROPOSED JOINT TO BE PAID FOR UNDER THE ITEM "ASPHALTIC PLUG EXPANSION JOINT SYSTEM"
 2. WHERE EXISTING BRIDGE DECK JOINTS ARE CONCEALED BENEATH BITUMINOUS CONCRETE OVERLAY THE CONTRACTOR SHALL VERIFY THE BRIDGE DECK JOINT LOCATION AND HAVE THE LIMITS OF SAW CUTTING APPROVED BY THE ENGINEER.
 3. LIMITS OF SAW CUTTING (1" MIN. BEYOND EXISTING PLUG JOINT OR AS DIRECTED BY THE ENGINEER) SHALL BE PAID FOR UNDER THE ITEM "ASPHALTIC PLUG EXPANSION JOINT SYSTEM" (TYP.)
 4. NEW STEEL BRIDGING PLATES SHALL HAVE A MINIMUM THICKNESS OF 1/4". FOR JOINT OPENINGS THAT EXCEED 3" A 3/8" THICK BY 12" WIDE SHALL BE REQUIRED.



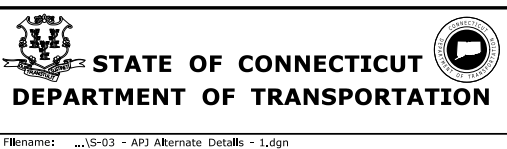
INSTALLATION OF ASPHALTIC PLUG EXPANSION JOINT SYSTEM
SCALE: 1 1/2" = 1'-0"



INSTALLATION OF ASPHALTIC PLUG JOINTS AT PIERS WITH FINGER JOINT PLATES
SCALE: 1" = 1'-0"

REV.	DATE	REVISION DESCRIPTION	SHEET NO.	Plotted Date: 1/14/2020

DESIGNER/DRAFTER: -
CHECKED BY: -
SCALE AS NOTED

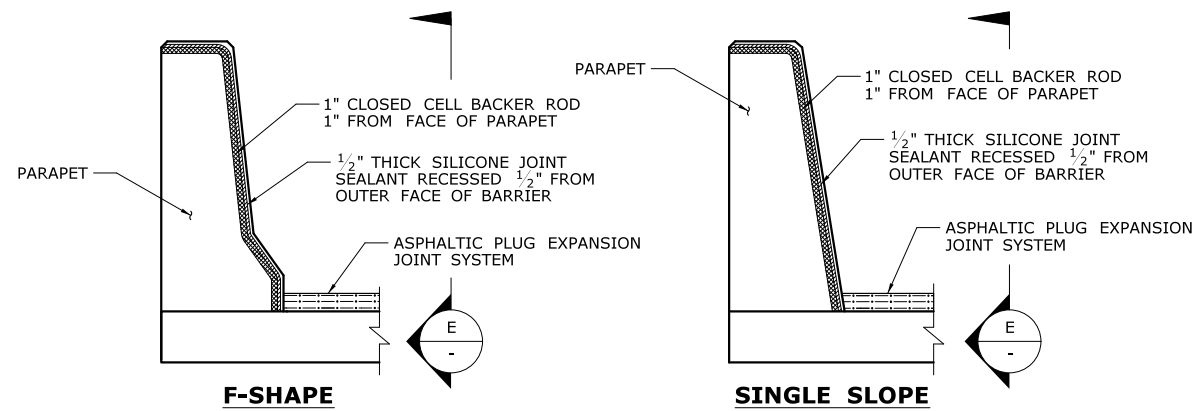


SIGNATURE/BLOCK: -
APPROVED BY: -
OFFICE OF ENGINEERING

PROJECT TITLE: 2020 PAVEMENT PRESERVATION PROGRAM
ULTRA-THIN BONDED PMA
DISTRICT 2 - I-395

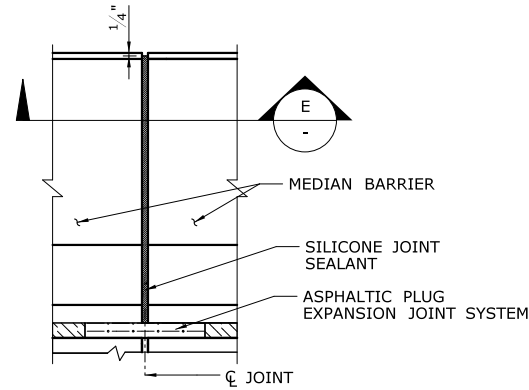
TOWN: MONTVILLE NORWICH
DRAWING TITLE: APJ ALTERNATE DETAILS - 1

PROJECT NO. 0172-0494
DRAWING NO. S-03
SHEET NO.



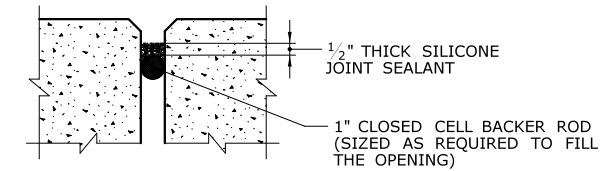
JOINT TREATMENT AT PARAPET

SCALE: 3/4" = 1'-0"



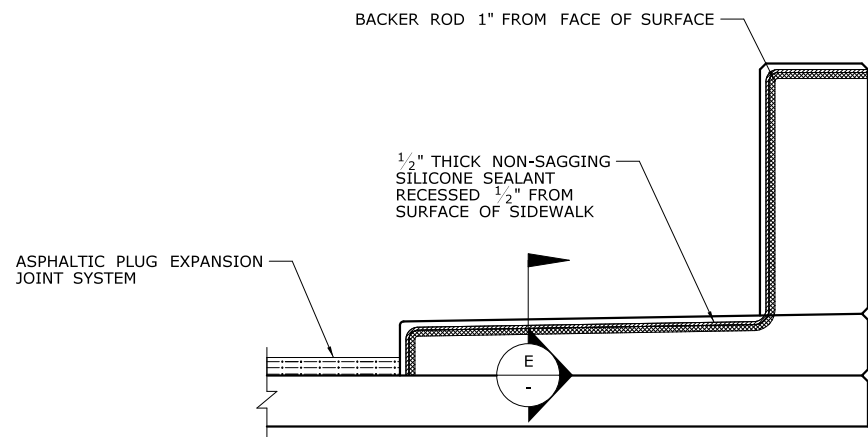
VIEW D

SCALE: 3/4" = 1'-0"



SECTION THROUGH MEDIAN/SHOULDER BARRIER JOINT

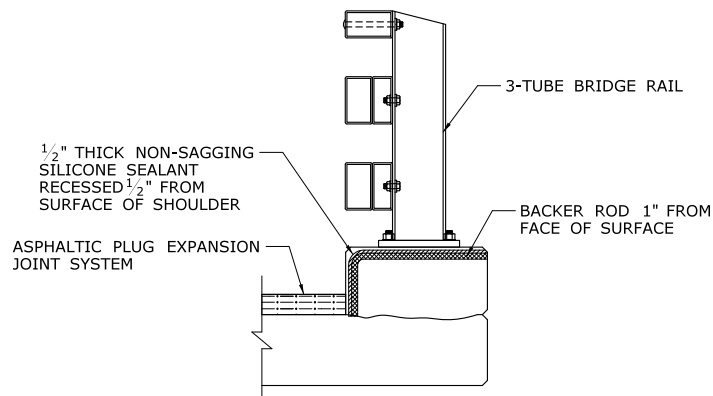
NTS



JOINT TREATMENT AT SIDEWALK

(SIMILAR DETAILS APPLY AT RAISED CONCRETE MEDIANS)

NTS



JOINT TREATMENT AT 3-TUBE BRIDGE RAIL

NTS

NOTE:

PRIOR TO INSTALLING THE NEW BACKER ROD AND SILICONE JOINT SEALANT, REMOVE EXISTING JOINT MATERIAL. CLEAN JOINT SIDES BY SANDBLASTING. DUST SHALL BE REMOVED BY THE METHOD APPROVED BY THE ENGINEER. THIS WORK WILL BE PAID FOR UNDER THE ITEM "ASPHALTIC PLUG EXPANSION JOINT SYSTEM".

REV.	DATE	REVISION DESCRIPTION	SHEET NO.	Plotted Date: 1/14/2020

DESIGNER/DRAFTER:	
CHECKED BY:	
SCALE IN FEET	
SCALE 1"=40'	



SIGNATURE/BLOCK:
OFFICE OF ENGINEERING
 APPROVED BY:

PROJECT TITLE:
**2020 PAVEMENT PRESERVATION PROGRAM
 ULTRA-THIN BONDED PMA
 DISTRICT 2 - I-395**

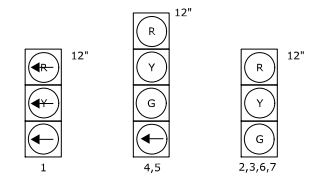
TOWN:
**MONTVILLE
 NORWICH**
 DRAWING TITLE:
**APJ ALTERNATE
 DETAILS - 2**

PROJECT NO.
0172-0494
 DRAWING NO.
S-04
 SHEET NO.

		MOVEMENT DIAGRAM																													
		PHASE 1			PHASE 2			PRE-EMPT 1			PHASE 3			PHASE 4			PHASE 5			PHASE 6			PHASE 7			PHASE 8					
NTOR		NONE			NONE			NONE			NONE			NONE			NONE			NONE			NONE			NONE					
FACES		1, 2, 3			1, 2, 3			1, 2, 3			1, 2, 3			1, 2, 3			1, 2, 3			1, 2, 3			1, 2, 3			1, 2, 3					
INTERVALS		MIN GRN 4, WALK 1, PED CLR 1, VEH EXT 1, MAX 1 15, MAX 2 15, YELLOW 3.0, RED 1.6, ADD INIT 1.2, TBR 1.0, TTR 1.0, MIN GAP 1.0, MODE NON-LOCK, INT START THIS PHASE			MIN GRN 15, WALK 1, PED CLR 1, VEH EXT 1, MAX 1 30, MAX 2 30, YELLOW 4.3, RED 1.2, ADD INIT 1.0, TBR 1.0, TTR 1.0, MIN GAP 1.0, MODE MAX RECALL, INT START THIS PHASE			MIN GRN 5, WALK 1, PED CLR 1, VEH EXT 1, MAX 1 15, MAX 2 15, YELLOW 3.0, RED 1.0, ADD INIT 2.0, TBR 1.0, TTR 1.0, MIN GAP 1.0, MODE NON-LOCK, INT START THIS PHASE			MIN GRN 5, WALK 1, PED CLR 1, VEH EXT 1, MAX 1 15, MAX 2 15, YELLOW 3.0, RED 1.0, ADD INIT 2.0, TBR 1.0, TTR 1.0, MIN GAP 1.0, MODE NON-LOCK, INT START THIS PHASE			MIN GRN 5, WALK 1, PED CLR 1, VEH EXT 1, MAX 1 15, MAX 2 15, YELLOW 3.0, RED 1.0, ADD INIT 2.0, TBR 1.0, TTR 1.0, MIN GAP 1.0, MODE NON-LOCK, INT START THIS PHASE			MIN GRN 5, WALK 1, PED CLR 1, VEH EXT 1, MAX 1 15, MAX 2 15, YELLOW 3.0, RED 1.0, ADD INIT 2.0, TBR 1.0, TTR 1.0, MIN GAP 1.0, MODE NON-LOCK, INT START THIS PHASE			MIN GRN 5, WALK 1, PED CLR 1, VEH EXT 1, MAX 1 15, MAX 2 15, YELLOW 3.0, RED 1.0, ADD INIT 2.0, TBR 1.0, TTR 1.0, MIN GAP 1.0, MODE NON-LOCK, INT START THIS PHASE			MIN GRN 5, WALK 1, PED CLR 1, VEH EXT 1, MAX 1 15, MAX 2 15, YELLOW 3.0, RED 1.0, ADD INIT 2.0, TBR 1.0, TTR 1.0, MIN GAP 1.0, MODE NON-LOCK, INT START THIS PHASE			MIN GRN 5, WALK 1, PED CLR 1, VEH EXT 1, MAX 1 15, MAX 2 15, YELLOW 3.0, RED 1.0, ADD INIT 2.0, TBR 1.0, TTR 1.0, MIN GAP 1.0, MODE NON-LOCK, INT START THIS PHASE			MIN GRN 5, WALK 1, PED CLR 1, VEH EXT 1, MAX 1 15, MAX 2 15, YELLOW 3.0, RED 1.0, ADD INIT 2.0, TBR 1.0, TTR 1.0, MIN GAP 1.0, MODE NON-LOCK, INT START THIS PHASE		

TECHNICAL NOTES		OFFICE RECORD	
STANDARD OVERLAP SKIP FEATURES APPLY		REV # 9	TIR # N/A SM # 101118
TIMINGS SHOWN REFLECT FREE OPERATION.		SIGNAL REVISED: 6/27/2017	
ACTUAL COORDINATION INFORMATION TO BE DETERMINED BY THE CLOSED LOOP LOCAL COORDINATION UNIT.		REV #	TIR # N/A SM # N/A
		SIGNAL REVISED:	
		INSTALLED VIDEO DETECTION UNDER PROJECT 0172-0494	

SIGNAL FACES



ALL INDICATIONS HAVE LED LAMPS.
FACE 1 HAS TUNNEL VISORS.
FACES 1, 2 & 3 HAVE BACK PLATES.

PRE-EMPTION SETTINGS	
	PRE-EMPT 1
PRIORITY	NO
DET. LOCK	YES
DELAY	0
ALT. MIN. GRN	5
ALT. YELLOW	PARENT
ALT. RED	PARENT
ALT. PED. CLR.	NO
HOLD GREEN	15
HOLD YELLOW	4.3
HOLD RED	1.2
HOLD PHASE	2
EXIT PHASE	4
EXIT CALL	NONE

CONSTRUCTION NOTES

ALL TRAFFIC SIGNAL EQUIPMENT IS EXISTING EXCEPT AS NOTED.

ANY PROPOSED REVISIONS TO THE LOCATION OF THE APPURTANCES SHOWN ON THE PLAN MUST BE SUBMITTED FOR REVIEW AND APPROVAL BY THE DIVISION OF TRAFFIC ENGINEERING PRIOR TO INSTALLATION.

- CLEAN EXISTING CONDUIT
- VIDEO DETECTION BY USE OF VIDEO 360 CAMERA MOUNTED ON SPAN POLE I.D. #103-229-B

VIDEO DETECTION LOCATIONS ARE FOR ILLUSTRATION ONLY. EXACT LOCATIONS SHALL BE DETERMINED BY THE MANUFACTURER OR A DESIGNATED REPRESENTATIVE. DETECTOR CABLES ARE TO BE INSTALLED CONTINUOUS BETWEEN EACH CAMERA ASSEMBLY AND THE CONTROLLER CABINET.

COORDINATE WITH UTILITY COMPANY REPRESENTATIVES LISTED IN THE SPECIAL PROVISION, 1.07 - LEGAL RELATIONS AND RESPONSIBILITIES.

REMOVE ALL ABANDONED TRAFFIC SIGNAL EQUIPMENT PER SPECIAL PROVISION.

REMOVE EXISTING 14/2 CABLE FOR LOOP DETECTOR LOCATIONS THAT HAVE BEEN CONVERTED TO VIDEO DETECTION AND ABANDON CONDUIT.

MODIFY EXISTING CONTROLLER TO ACCOMMODATE CHANGES.
SUPPLY 5 COPIES OF REVISED WIRING DIAGRAMS

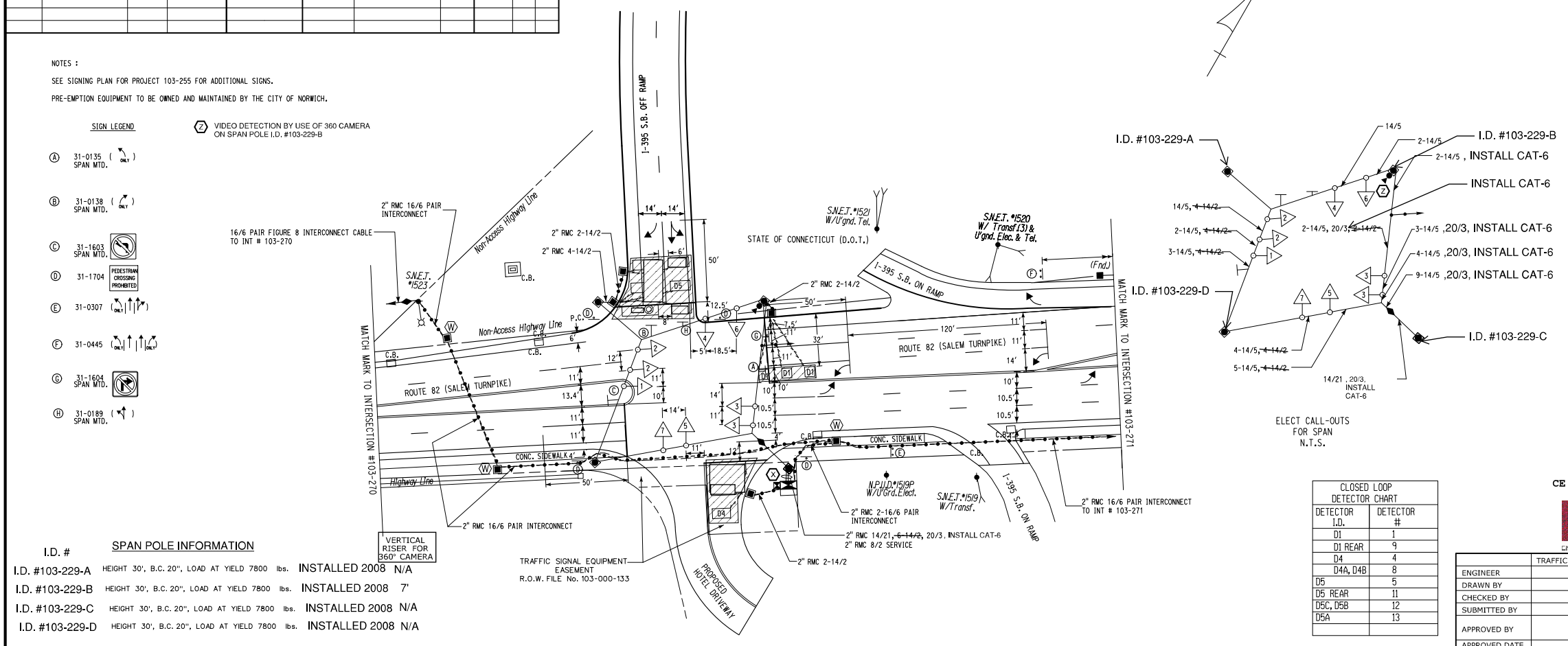
COORDINATE THIS REVISION WITH CONNECTICUT DOT SIGNAL LAB. CONTACT MR. DONALD ASSARD (860) 258-0346 OR MR. MARK ZAMPINI (860) 258-0349 AT LEAST 14 DAYS PRIOR TO THE REVISION

DETECTORS		SYSTEM LOC		COORDINATION TYPE: CLOSED LOOP	
IDNT	SIZE (WXL)	VIDEO	MODE	MASTER	PROGRAM
D1	6' x 34'	VIDEO 360	PRESENCE	103-263	103-270
D4	See Plan	VIDEO 360	PRESENCE	103-229	103-271
D5	See Plan	VIDEO 360	PRESENCE	103-232	103-256
				103-211	103-235
				103-212	103-262
				103-260	103-213
				103-250	103-214

NOTES :
SEE SIGNING PLAN FOR PROJECT 103-255 FOR ADDITIONAL SIGNS.
PRE-EMPTION EQUIPMENT TO BE OWNED AND MAINTAINED BY THE CITY OF NORWICH.

SIGN LEGEND
VIDEO DETECTION BY USE OF 360 CAMERA ON SPAN POLE I.D. #103-229-B

- A 31-0135 () SPAN MTD.
- B 31-0138 () SPAN MTD.
- C 31-1603 () SPAN MTD.
- D 31-1704 () PEDESTRIAN CROSSING PROHIBITED
- E 31-0307 ()
- F 31-0445 ()
- G 31-1604 () SPAN MTD.
- H 31-0189 () SPAN MTD.



CLOSED LOOP DETECTOR CHART	
DETECTOR I.D.	DETECTOR #
D1	1
D1 REAR	9
D4	4
D4A, D4B	8
D5	5
D5 REAR	11
D5C, D5B	12
D5A	13



CE for revision #9

CLEARANCE INTERVALS DESIGNED BY: BETA GROUP, INC.
ENGINEER'S SEAL & SIGNATURE APPLY TO CLEARANCE INTERVALS ONLY.

SPAN POLE INFORMATION	
I.D. #103-229-A	HEIGHT 30', B.C. 20", LOAD AT YIELD 7800 lbs. INSTALLED 2008 N/A
I.D. #103-229-B	HEIGHT 30', B.C. 20", LOAD AT YIELD 7800 lbs. INSTALLED 2008 7'
I.D. #103-229-C	HEIGHT 30', B.C. 20", LOAD AT YIELD 7800 lbs. INSTALLED 2008 N/A
I.D. #103-229-D	HEIGHT 30', B.C. 20", LOAD AT YIELD 7800 lbs. INSTALLED 2008 N/A

ENGINEER	TRAFFIC	DATE	ELECTRICAL	DATE
DRAWN BY				
CHECKED BY				
SUBMITTED BY				
APPROVED BY				
APPROVED DATE				

REV # INTERSECTION # 103-229	
ENERGY BY - STATE	ADDRESS #686
MAINT LEVEL 1	SERVICE POLE - SNET # 1519
UNMETERED SERVICE	

NO.	DATE	REVISION DESCRIPTION

LEGEND:	
R RED	PROPOSED WOOD SPAN POLE
Y YELLOW	EXISTING WOOD SPAN POLE
G GREEN	PROPOSED STEEL SPAN POLE
← RED ARROW	EXISTING STEEL SPAN POLE
← GREEN ARROW	PROPOSED UTILITY POLE
← WALKY PED. CLR	EXISTING UTILITY POLE
D.W. DON'T WALK	PEDESTAL MOUNTING
FL. FLASHING	PEDESTRIAN PUSH BUTTON & SIGN
	DIRECTIONAL ARW. FOR PUSH BUTTON

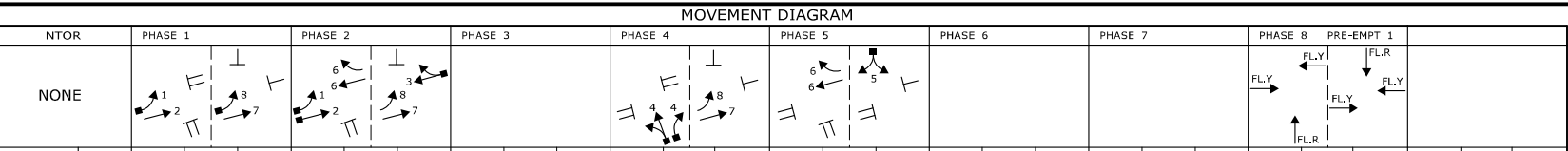
TRAFFIC SIGNAL FACE	
TRAFFIC SIGNAL FACE	PEDESTRIAN SIGNAL FACE
DET. LEADS IN SAW CUT	
PROPOSED RMC (RIGID METAL CONDUIT)	EXISTING RMC (RIGID METAL CONDUIT)
AUXILIARY TERMINATION CABINET	AUXILIARY EQUIPMENT CABINET
VIDEO DETECTION ZONE	

PROPOSED CONTROLLER	
EXISTING CONTROLLER	LOOP DETECTOR
SD SYSTEM DETECTOR	MAGNETIC DETECTOR
OPTICAL DETECTOR	VIDEO DETECTOR
AUDIO DETECTOR	

STATE OF CONNECTICUT
DEPARTMENT OF TRANSPORTATION

ROUTE 82 (SALEM TURNPIKE)
AT I-395 S.B. OFF RAMP AND HOTEL DRIVE

CITY:	PROJECT NO.
NORWICH	0172-0494
DRAWING TITLE:	DRAWING NO.
TRAFFIC CONTROL SIGNAL PLAN	
SHEET NO.	TR-01



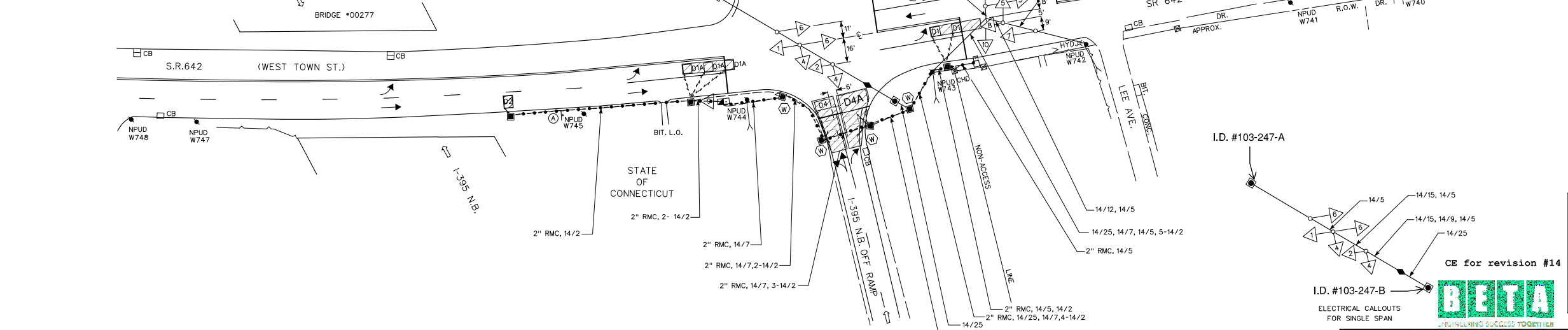
F A C E #	FLASH	PHASE 1			PHASE 2			PHASE 3			PHASE 4			PHASE 5			PHASE 6			PHASE 7			PHASE 8			PRE-EMPT 1		
		GRN	CL	CL	GRN	CL	CL	GRN	CL	CL	GRN	CL	CL	GRN	CL	CL	GRN	CL	CL	GRN	CL	CL	GRN	CL	CL	GRN	CL	CL
1	Y	←G	←G	G	G	Y	R																					
2	Y	G	G	G	G	Y	R																					
3	Y	R	R	R	R	R	R																					
4	R	R	R	R	R	R	R																					
5	R	R	R	R	R	R	R																					
6	Y	R	R	R	R	Y	R																					
7	Y	G	G	G	G	Y	R																					
8	Y	←G	←G	G	G	Y	R																					
9	Y	G	G	G	G	Y	R																					
10	R	R	R	R	R	R	R																					

INTERVALS	MIN GRN	WALK	PED CLR	VEH EXT	MAX 1	MAX 2	YELLOW	RED	ADD INIT	MAX INIT	TBR	TTR	MIN GAP	MODE	
														NON-LOCK	MIN RECALL THIS PHASE
	3			1.0	8	8	3.0		1.0					NON-LOCK	MIN RECALL THIS PHASE
	15			2.5	22	22	3.7		1.5					OFF	OFF
	5			1	18	18	3.3		2.6					NON-LOCK	NON-LOCK
	5			1	15	15	3.7		1.0					NON-LOCK	NON-LOCK
	14			1	18	18								OFF	OFF
	1													OFF	OFF
	1													OFF	OFF
	1													ON/OMIT	OFF

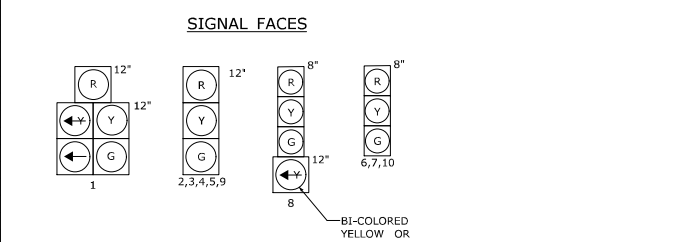
DETECTORS	IDENT	SIZE (WXL)	VIDEO	MODE	SYSTEM LOC	COORDINATION TYPE: TC/TBC			
						FUNCTION	PROGRAM TIME	DAYS	CYCLE
	D1	6' x 34'	VIDEO 360	PRESENCE	103-247	MAX 1	2200 - 0600	DAILY	
	D1A	6' x 34'	VIDEO 360	PRESENCE	103-247	MAX 2	ALL OTHER TIMES		
	D2	8' x 6'	VIDEO THERM	PRESENCE		PATTERN 1	0600-0830	M - F	80"
	D2A	11' x 6'	VIDEO THERM	PRESENCE		PATTERN 1	0330-0600		0 0
	D4	See Plan	VIDEO 360	PRESENCE		PATTERN 2	FUTURE		
	D4A	See Plan	VIDEO 360	DELAY 8"		PATTERN 3	FUTURE		
	D5	6' x 34'	VIDEO 360	DELAY 6"		FREE	FUTURE		

SIGN LEGEND
 (A) EXIST 31-0222 (↑↑)
 (B) EXIST 31-0223 (↑↑)

NOTES:
 STATE TO MAINTAIN PAVEMENT MARKINGS AND SIGNING ON SR 642 (WEST TOWN ST.) AND I-395 NB ON/OFF RAMP AND ALL STOP BARS.
 CITY TO MAINTAIN CENTERLINE ON CASE STREET.
 CITY OF NORWICH TO OWN AND MAINTAIN EMERGENCY PRE-EMPTION EQUIPMENT.
 VIDEO DETECTION BY USE OF VIDEO 360 CAMERA ON A 3' VERTICAL RISER CO-MOUNTED WITH 2-VIDEO THERM CAMERAS ON AN ALUMINUM LIGHT STANDARD (15' BRACKET; 30' MOUNTING HEIGHT)



TECHNICAL NOTES
 STANDARD OVERLAP SKIP FEATURES APPLY
 1 TO BE "G" IF PHASE 1 OR PHASE 2 IS NEXT.
 2 TO BE "←G" IF PHASE 2 IS NEXT.
 3 TO BE "G" IF PHASE 2 IS NEXT.
 4 TO BE "←G" IF PHASE 1 IS NEXT.
 PHASE 2 ON TO OMIT PHASE 1.
 5 TO BE "Y" IF PHASE 5 IS NEXT.
 6 TO BE "R" IF PHASE 5 IS NEXT.
 EMERGENCY PRE-EMPTION TO BE INOPERATIVE DURING FLASHING OPERATION.
 FIRE SIREN IN THE VICINITY OF THE INTERSECTION SHALL SOUND DURING PRE-EMPTION SEQUENCE.
 SIGNAL TO FLASH FOR 5 MINUTES UPON ACTIVATION OF PRE-EMPTION.



INDICATIONS 1,2,3,4,5,9 AND 10 HAVE LED LAMPS.
 INDICATIONS 6,7 AND 8 HAVE INCANDESCENT LAMPS.

PRE-EMPTION SETTINGS	
	PRE-EMPT 1
PRIORITY	NO
DET. LOCK	YES
DELAY	0
ALT. MIN. GRN	5
ALT. YELLOW	PARENT
ALT. RED	1
ALT. PED. CLR.	NO
HOLD GREEN	300
HOLD YELLOW	0
HOLD RED	0
HOLD PHASE	8
EXIT PHASE	2
EXIT CALL	NONE

OFFICE RECORD			
REV # 14	TIR # N/A	SM # 101118	SIGNAL REVISED: 10/9/2018
REVISED TIMINGS UNDER PROJECT #172-440			
REV #	TIR # N/A	SM # N/A	SIGNAL REVISED:
INSTALLED VIDEO DETECTION UNDER PROJECT 0172-0484			

CONSTRUCTION NOTES

ALL TRAFFIC SIGNAL EQUIPMENT IS EXISTING EXCEPT AS NOTED.

STATE FORCES TO STAKE ALL R.O.W. PRIOR TO EXCAVATION UNLESS OTHERWISE DIRECTED BY THE ENGINEER

ANY PROPOSED REVISIONS TO THE LOCATION OF THE APPURTANCES SHOWN ON THE PLAN MUST BE SUBMITTED FOR REVIEW AND APPROVAL BY THE DIVISION OF TRAFFIC ENGINEERING PRIOR TO INSTALLATION.

MODIFY CONTROLLER FOUNDATION TO ACCEPT NEW CONDUIT

VIDEO DETECTION BY USE OF VIDEO 360 CAMERA ON A 3' VERTICAL RISER MOUNTED WITH 2-VIDEO THERM CAMERAS ON AN ALUMINUM LIGHT STANDARD (15' BRACKET, 30' MOUNTING HEIGHT)

VIDEO DETECTION LOCATIONS ARE FOR ILLUSTRATION ONLY. EXACT LOCATIONS SHALL BE DETERMINED BY THE MANUFACTURER OR A DESIGNATED REPRESENTATIVE. DETECTOR CABLES ARE TO BE INSTALLED CONTINUOUS BETWEEN EACH CAMERA ASSEMBLY AND THE CONTROLLER CABINET.

COORDINATE WITH UTILITY COMPANY REPRESENTATIVES LISTED IN THE SPECIAL PROVISION, 1.07 - LEGAL RELATIONS AND RESPONSIBILITIES.

REMOVE ALL ABANDONED TRAFFIC SIGNAL EQUIPMENT PER SPECIAL PROVISION.

REMOVE EXISTING 14/2 CABLE FOR LOOP DETECTOR LOCATIONS THAT HAVE BEEN CONVERTED TO VIDEO DETECTION AND ABANDON CONDUIT.

MODIFY EXISTING CONTROLLER TO ACCOMMODATE CHANGES.
 SUPPLY 5 COPIES OF REVISED WIRING DIAGRAMS

CLEARANCE INTERVALS DESIGNED BY: BETA GROUP, INC.

ENGINEER'S SEAL & SIGNATURE APPLY TO CLEARANCE INTERVALS ONLY.

ENGINEER	TRAFFIC	DATE	ELECTRICAL	DATE	REV #	INTERSECTION # 103-247	
						ENERGY BY CITY	ADDRESS #
						MAINT LEVEL 5	SERVICE POLE - SNET W799
						UNMETERED SERVICE	

SPAN POLE INFORMATION
 LENGTH 30', B.C. 20" LOAD AT YIELD 7800LBS. INSTALLED 2006

NO.	DATE	REVISION

LEGEND:	PROPOSED	EXISTING	TRAFFIC SIGNAL	PROPOSED	EXISTING	SIDEWALK RAMP
R RED	○ PROPOSED WOOD SPAN POLE	● EXISTING WOOD SPAN POLE	□ TRAFFIC SIGNAL FACE	□ PROPOSED CONTROLLER	□ EXISTING CONTROLLER	▭ CABLE CLOSURE
Y YELLOW	○ PROPOSED STEEL SPAN POLE	● EXISTING STEEL SPAN POLE	□ PEDESTRIAN SIGNAL FACE	□ LOOP DETECTOR	□ DET. LEADS IN SAW CUT	▭ WIRELESS SENSOR
G GREEN	○ PROPOSED UTILITY POLE	● EXISTING UTILITY POLE	□ PROPOSED RMC (RIGID METAL CONDUIT)	□ SD SYSTEM DETECTOR	□ EXISTING RMC (RIGID METAL CONDUIT)	▭ WIRELESS RECEIVER
← RED ARROW	○ PROPOSED WALK/ PED. CLR	● EXISTING WALK/ PED. CLR	□ PROPOSED RMC (RIGID METAL CONDUIT)	□ MAGNETIC DETECTOR	□ EXISTING RMC (RIGID METAL CONDUIT)	▭ WIRELESS TRANSMITTER
← GREEN ARROW	○ PROPOSED PEDESTAL MOUNTING	● EXISTING PEDESTAL MOUNTING	□ PROPOSED RMC (RIGID METAL CONDUIT)	□ OPTICAL DETECTOR	□ EXISTING RMC (RIGID METAL CONDUIT)	▭ GUY WIRE
← YIELD PT.	○ PROPOSED PEDESTRIAN PUSH BUTTON & SIGN	● EXISTING PEDESTRIAN PUSH BUTTON & SIGN	□ PROPOSED RMC (RIGID METAL CONDUIT)	□ VIDEO DETECTOR	□ EXISTING RMC (RIGID METAL CONDUIT)	▭ PROPOSED HANDHOLE
W0 DON'T WALK	○ PROPOSED VIDEO DETECTION ZONE	● EXISTING VIDEO DETECTION ZONE	□ PROPOSED RMC (RIGID METAL CONDUIT)	□ AUDIO DETECTOR	□ EXISTING RMC (RIGID METAL CONDUIT)	▭ EXISTING HANDHOLE
FL FLASHING			□ PROPOSED RMC (RIGID METAL CONDUIT)			

STATE OF CONNECTICUT
DEPARTMENT OF TRANSPORTATION

S.R. 642 (WEST TOWN ST.) AT
 I-395 NB RAMP AND
 CASE STREET

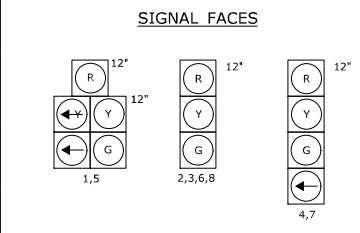
CITY:	PROJECT NO.
NORWICH	0172-0494
DRAWING TITLE:	DRAWING NO.
TRAFFIC CONTROL SIGNAL PLAN	TR-02

SCALE 1" = 40'

DATE PLOTTED : 3/18/2019 \\DOT-SDCENG07\CTDOT_Projects\0172-0484\Traffic\Signals\TR_TCS_103_247_014.dwg

		MOVEMENT DIAGRAM																																				
		PHASE 1				PHASE 2				PHASE 3				PHASE 4				PHASE 5				PHASE 6				PHASE 7				PHASE 8				PRE-EMPT 1				
NTOR		NONE				NONE				NONE				NONE				NONE				NONE				NONE				NONE				NONE				
F A C E #	FLASH	GRN	CL	CL	GRN	CL	CL	GRN	CL	CL	GRN	CL	CL	GRN	CL	CL	GRN	CL	CL	GRN	CL	CL	GRN	CL	CL	GRN	CL	CL	GRN	CL	CL	GRN	CL	CL	GRN	CL	CL	
	1	Y	←	R	←	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	
	2	Y	R	←	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R		
	3	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R		
	4	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R		
	5	Y	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R		
	6	Y	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R		
	7	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R		
8	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R			
INTERVALS		MIN GRN	3				15				6				3				15				6				SEE PRE-EMPT HOLD SETTING											
		WALK																																				
		PED CLR																																				
		VEH EXT	1,0				2,5				1,5				1,0				2,5																			
		MAX 1	9				20				15				9				15																			
		MAX 2	9				30				15				9				15																			
		YELLOW	3,0				3,3				3,0				3,0				3,0																			
		RED	1,0				3,0				3,4				1,0				3,0																			
		ADD INIT																																				
		MAX INIT																																				
		TBR																																				
		TTR																																				
		MIN GAP																																				
		MODE	NON-LOCK				MIN RECALL				OFF				NON-LOCK				NON-LOCK				MIN RECALL				NON-LOCK				ON/OMIT				OFF			
		INT START	THIS PHASE				THIS PHASE				THIS PHASE				THIS PHASE				THIS PHASE				THIS PHASE				THIS PHASE				THIS PHASE							

TECHNICAL NOTES		OFFICE RECORD	
STANDARD OVERLAP SKIP FEATURES APPLY		REV # 9	TIR # N/A SM # 101118 SIGNAL REVISED: 10/9/2018
EMERGENCY PRE-EMPTION TO BE INOPERATIVE DURING FLASHING OPERATION.		REV #	TIR # N/A SM # N/A SIGNAL REVISED:
FIRE SIREN IN THE VICINITY OF THE INTERSECTION SHALL SOUND DURING PRE-EMPTION SEQUENCE.		REV #	TIR # N/A SM # N/A SIGNAL REVISED:
PHASES 1 AND 5 TO DRIVE 1 AND 5 "←" AND "→".		REV #	TIR # N/A SM # N/A SIGNAL REVISED:
PHASES 2 AND 6 TO DRIVE 1 AND 5 R, Y & G.		REV #	TIR # N/A SM # N/A SIGNAL REVISED:
ARTERY PHASE DETECTION TO BE NON-ACTUATING DURING COORDINATION.		REV #	TIR # N/A SM # N/A SIGNAL REVISED:
PHASE 2 ON TO OMIT PHASE 5.		REV #	TIR # N/A SM # N/A SIGNAL REVISED:
PHASE 6 ON TO OMIT PHASE 1.		REV #	TIR # N/A SM # N/A SIGNAL REVISED:



ALL INDICATIONS HAVE LED LAMPS.
FACES 1 AND 6 HAVE TUNNEL VISORS AND LOUVERS ON R, Y, G.

PRE-EMPTION SETTINGS	
	PRE-EMPT 1
PRIORITY	NO
DET. LOCK	YES
DELAY	0
ALT. MIN. GRN	5
ALT. YELLOW	PARENT
ALT. RED	PARENT
ALT. PED. CLR.	NO
HOLD GREEN	300
HOLD YELLOW	0
HOLD RED	0
HOLD PHASE	8
EXIT PHASE	2&6
EXIT CALL	NONE

CONSTRUCTION NOTES

ALL TRAFFIC SIGNAL EQUIPMENT IS EXISTING EXCEPT AS NOTED.

ANY PROPOSED REVISIONS TO THE LOCATION OF THE APPURTANCES SHOWN ON THE PLAN MUST BE SUBMITTED FOR REVIEW AND APPROVAL BY THE DIVISION OF TRAFFIC ENGINEERING PRIOR TO INSTALLATION.

ⓧ CLEAN EXISTING CONDUIT

ⓧ VIDEO DETECTION BY USE OF VIDEO 360 CAMERA MOUNTED ON SPAN POLE I.D. #103-249-A

VIDEO DETECTION LOCATIONS ARE FOR ILLUSTRATION ONLY. EXACT LOCATIONS SHALL BE DETERMINED BY THE MANUFACTURER OR A DESIGNATED REPRESENTATIVE. DETECTOR CABLES ARE TO BE INSTALLED CONTINUOUS BETWEEN EACH CAMERA ASSEMBLY AND THE CONTROLLER CABINET.

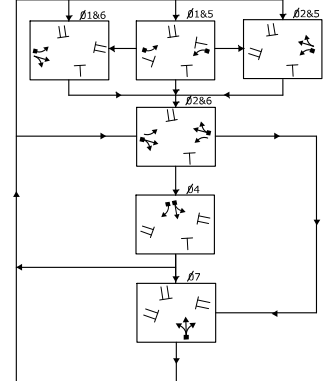
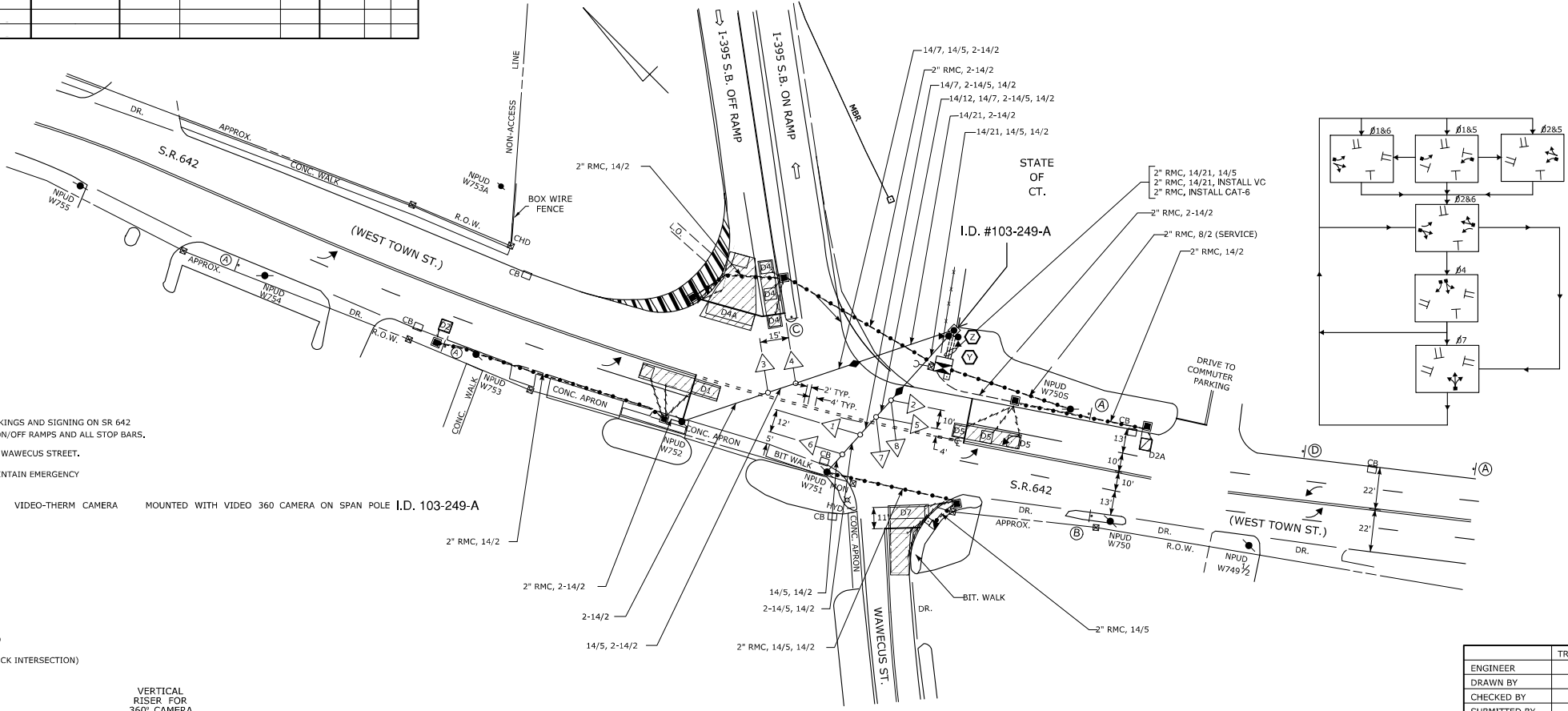
COORDINATE WITH UTILITY COMPANY REPRESENTATIVES LISTED IN THE SPECIAL PROVISION, 1.07 - LEGAL RELATIONS AND RESPONSIBILITIES.

REMOVE ALL ABANDONED TRAFFIC SIGNAL EQUIPMENT PER SPECIAL PROVISION.

REMOVE EXISTING 14/2 CABLE FOR LOOP DETECTOR LOCATIONS THAT HAVE BEEN CONVERTED TO VIDEO DETECTION AND ABANDON LOCATIONS.

MODIFY EXISTING CONTROLLER TO ACCOMMODATE CHANGES.
SUPPLY 5 COPIES OF REVISED WIRING DIAGRAMS

DETECTORS		SYSTEM LOC		COORDINATION TYPE: TC/TBC	
IDENT	SIZE (WxL)	VIDEO	MODE	MASTER 103-249	PROGRAM
D1	See Plan	VIDEO 360	PRESENCE	103-247	FLASH
D2	6' x 6'	VIDEO THERM	PRESENCE		MAX 1
D2A	6' x 6'	VIDEO 360	PRESENCE		MAX 2
D4	6' x 34'	VIDEO 360	PRESENCE		MAX 2
D4A	See Plan	VIDEO 360	DELAY 8"		PATTERN 1
D5	6' x 34'	VIDEO 360	PRESENCE		PATTERN 2
D7	See Plan	VIDEO 360	DELAY 8"		PATTERN 3
					FREE



NOTES:

STATE TO MAINTAIN PAVEMENT MARKINGS AND SIGNING ON SR 642 (WEST TOWN ST.) AND I-395 SB ON/OFF RAMP AND ALL STOP BARS.

CITY TO MAINTAIN CENTERLINE ON WAWECUS STREET.

CITY OF NORWICH TO OWN AND MAINTAIN EMERGENCY PRE-EMPTION EQUIPMENT.

ⓧ VIDEO DETECTION BY USE OF VIDEO-THERM CAMERA MOUNTED WITH VIDEO 360 CAMERA ON SPAN POLE I.D. 103-249-A

- SIGN LEGEND:**
- ⓐ EXIST. 31-0282 (←→)
 - ⓑ EXIST. 31-0222 (←→)
 - ⓒ EXIST. 31-1526 (KEEP RIGHT)
 - ⓓ EXIST. 31-0806 (DO NOT BLOCK INTERSECTION)

SPAN POLE INFORMATION

VERTICAL RISER FOR 360° CAMERA

LENGTH 30', B.C. 20" LOAD AT YIELD 7800LBS. INSTALLED 2006 7"

CLEARANCE INTERVALS DESIGNED BY: BETA GROUP, INC.

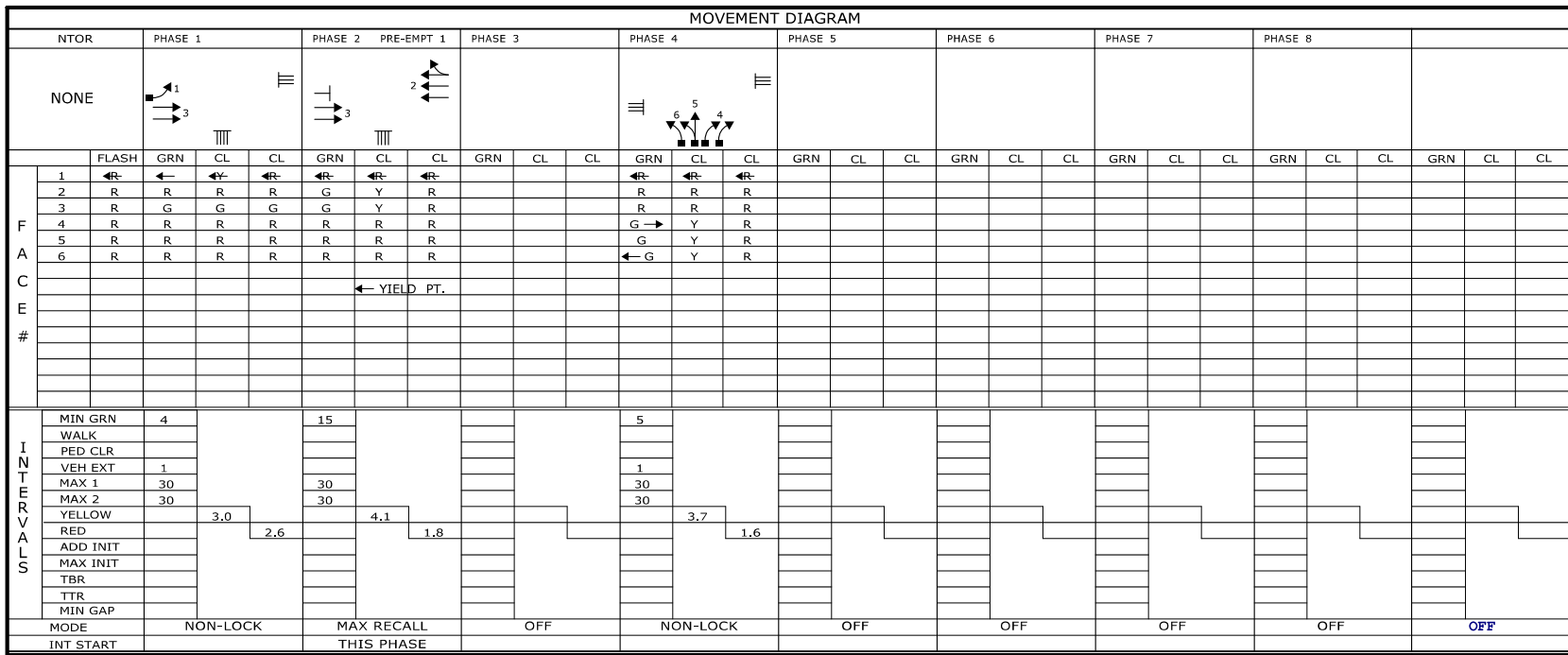
ENGINEER'S SEAL & SIGNATURE APPLY TO CLEARANCE INTERVALS ONLY.

BETA

ENGINEERING SUCCESS TOGETHER

ENGINEER	TRAFFIC	DATE	ELECTRICAL	DATE	REV #	INTERSECTION # 103-249
DRAWN BY						
CHECKED BY						
SUBMITTED BY						
APPROVED BY						
APPROVED DATE						

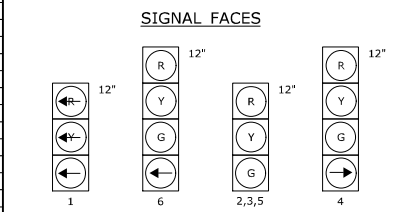
<p>STATE OF CONNECTICUT DEPARTMENT OF TRANSPORTATION</p>		<p>SR 642 (WEST TOWN ST.) AT I-395 SB RAMP AND WAWECUS STREET</p>		<p>CITY: NORWICH</p> <p>PROJECT NO. 0172-0494</p> <p>DRAWING NO. TRAFFIC CONTROL SIGNAL PLAN</p> <p>SHEET NO. TR-03</p>	
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TECHNICAL NOTES

STANDARD OVERLAP SKIP FEATURES APPLY
TIMINGS SHOWN REFLECT FREE OPERATION.
ACTUAL COORDINATION INFORMATION TO BE DETERMINED BY THE CLOSED LOOP LOCAL COORDINATION UNIT.

REV #	TIR #	SM #	SIGNAL REVISED:
1	N/A	10118	6/28/2017
2	N/A	N/A	0172-0494



FACE 1 HAS TUNNEL VISORS
ALL INDICATIONS HAVE LED LAMPS
FACES 1,2 & 3 HAVE BACK PLATES.

PRE-EMPTION SETTINGS

	PRE-EMPT 1
PRIORITY	NO
DET. LOCK	YES
DELAY	0
ALT. MIN. GRN	5
ALT. YELLOW	PARENT
ALT. RED	PARENT
ALT. PED. CLR.	NO
HOLD GREEN	15
HOLD YELLOW	4.1
HOLD RED	1.8
HOLD PHASE	2
EXIT PHASE	4
EXIT CALL	NONE

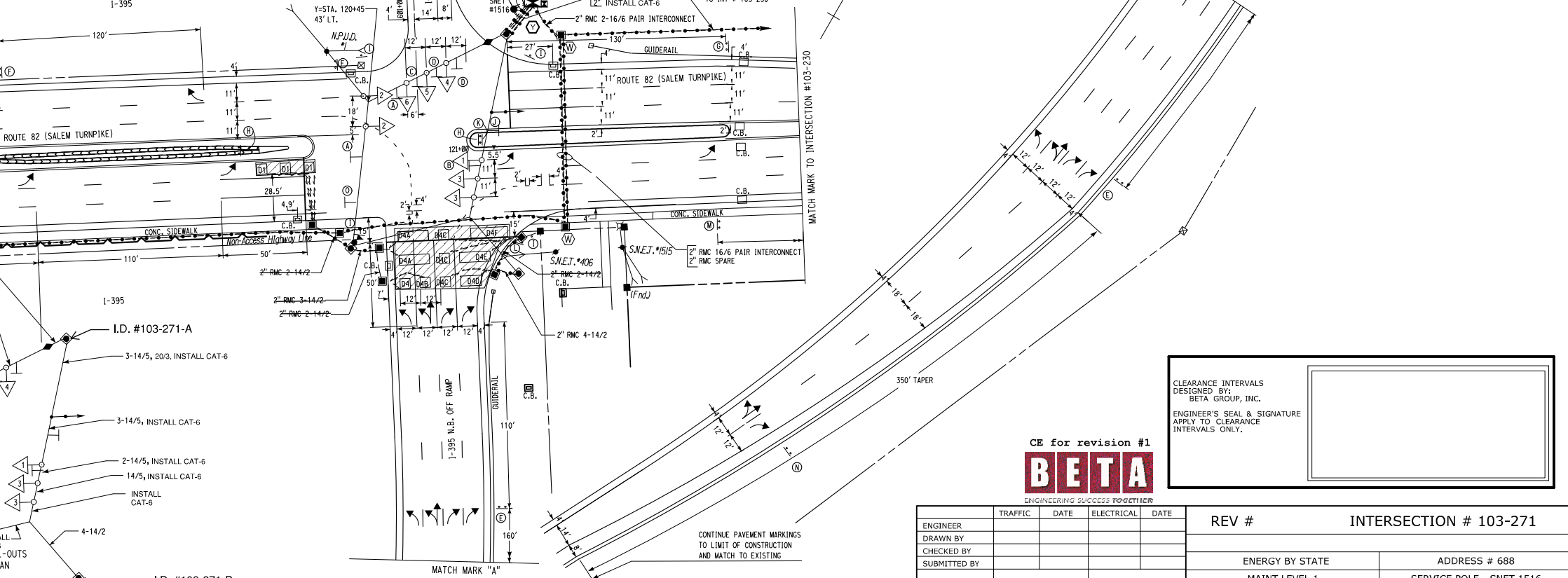
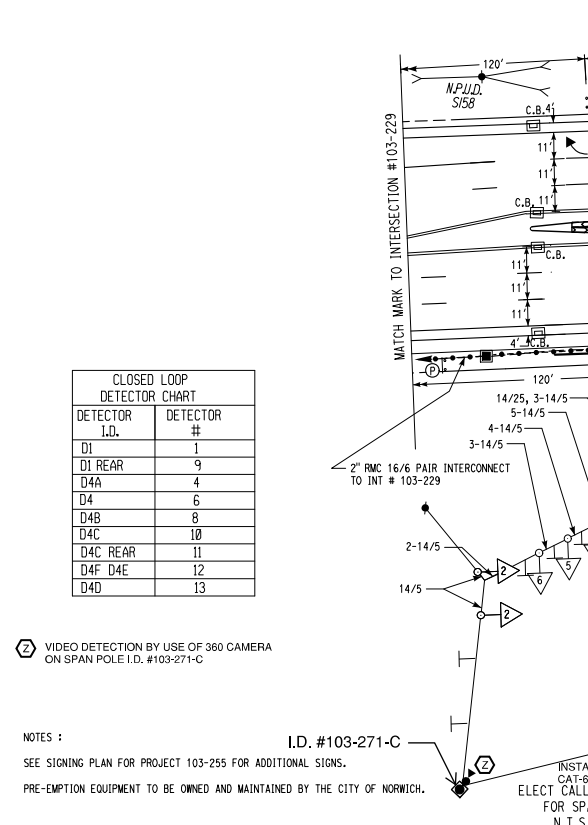
DETECTORS

IDENT	SIZE (WXL)	VIDEO	MODE	SYSTEM LOC	COORDINATION TYPE: CLOSED LOOP	FUNCTION	PROGRAM	TIME	DAYS	CYCLE	OFFSET
D1	6' x 34'	VIDEO 360	PRESENCE	103-263 103-235	MASTER 103-230	FLASH	NONE				
D4	See Plan	VIDEO 360	PRESENCE	103-270 103-212			SEE TECH NOTES				

SPAN POLE INFORMATION

I.D. #	HEIGHT	B.C.	LOAD AT YIELD	INSTALL
#103-271-A	30'	20"	7800 lbs.	N/A INSTALLED 2008
#103-271-B	30'	20"	7800 lbs.	N/A INSTALLED 2008
#103-271-C	30'	20"	7800 lbs.	7' INSTALLED 2008

- ### SIGN LEGEND
- (A) 31-0135 () SPAN MTD.
 - (B) 31-0841 () SPAN MTD.
 - (C) 31-0189 () SPAN MTD.
 - (D) 31-0138 () SPAN MTD.
 - (E) 31-0410 () SPAN MTD.
 - (F) 31-0371 () SPAN MTD.
 - (G) 31-0384 () SPAN MTD.
 - (H) 31-1526 () SPAN MTD.
 - (I) 31-1704 () PEDESTRIAN CROSSING PROHIBITED
 - (J) 31-1603 () SPAN MTD.
 - (K) 31-1619 () NO LEFT TURN
 - (L) 31-1620 () NO LEFT TURN
 - (M) 31-0849 () RIGHT TURN ON RED FROM RIGHT LINE ONLY
 - (N) 31-0307 () RIGHT TURN ONLY
 - (O) 31-0283 () RIGHT TURN ONLY
 - (P) 31-1604 () SPAN MTD.
 - (Q) 31-0370 () SPAN MTD.



LEGEND

R RED	PROPOSED WOOD SPAN POLE	TRAFFIC SIGNAL FACE	PROPOSED CONTROLLER	SIDEWALK RAMP
Y YELLOW	EXISTING WOOD SPAN POLE	PEDESTRIAN SIGNAL FACE	EXISTING CONTROLLER	CABLE CLOSURE
G GREEN	PROPOSED STEEL SPAN POLE	DET. LEADS IN SAW CUT	LOOP DETECTOR	WIRELESS SENSOR
← RED ARROW	EXISTING STEEL SPAN POLE	PROPOSED RMC (RIGID METAL CONDUIT)	SD SYSTEM DETECTOR	WIRELESS RECEIVER
→ GREEN ARROW	PROPOSED UTILITY POLE	EXISTING RMC (RIGID METAL CONDUIT)	MAGNETIC DETECTOR	WIRELESS TRANSMITTER
↔ WALKY PED. CLR	EXISTING UTILITY POLE	AUXILIARY TERMINATION CABINET	OPTICAL DETECTOR	GUY WIRE
D.W. DON'T WALK	PEDESTAL MOUNTING	AUXILIARY EQUIPMENT CABINET	VIDEO DETECTOR	PROPOSED HANDHOLE
FL. FLASHING	PEDESTRIAN PUSH BUTTON & SIGN	VIDEO DETECTION ZONE	AUDIO DETECTOR	EXISTING HANDHOLE
	DIRECTIONAL ARW. FOR PUSH BUTTON			

STATE OF CONNECTICUT DEPARTMENT OF TRANSPORTATION

DATE PLOTTED: 3/15/2019 \\DOT-SDCENG07V\CTDOT_Projects\0172-0440\Traffic3-Final Design\103 Norwich FD\Microstation Plans\TR_TCS_103_271_001.dgn

ENGINEER	TRAFFIC	DATE	ELECTRICAL	DATE	REV #	INTERSECTION # 103-271
DRAWN BY					ENERGY BY STATE	ADDRESS # 688
CHECKED BY					MAINT LEVEL 1	SERVICE POLE - SNET 1516
SUBMITTED BY					UNMETERED SERVICE	
APPROVED BY						
APPROVED DATE						

CITY: **NORWICH**

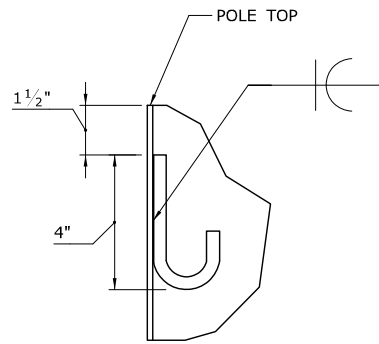
PROJECT NO. 0172-0494

DRAWING TITLE: **TRAFFIC CONTROL SIGNAL PLAN**

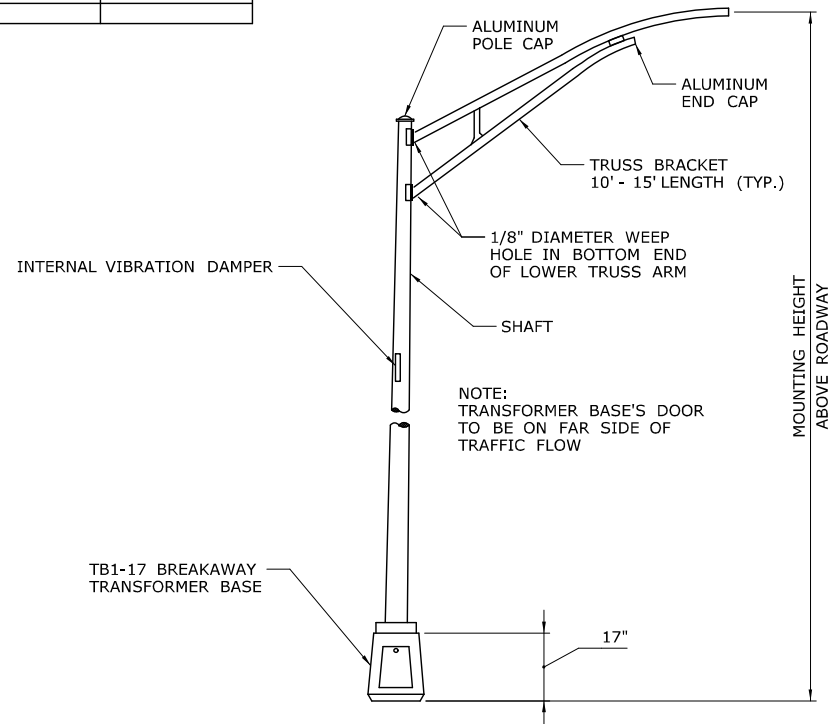
SHEET NO. TR-04

SCALE 1" = 40'

ALUMINUM LIGHT STANDARD - DIMENSION TABLE								
ITEM NO.	MOUNTING HEIGHT	BRACKET LENGTH	SHAFT DIAMETER		SHAFT WALL THICKNESS	BASE TYPE	ANCHOR BOLT SIZE	BOLT CIRCLE DIAMETER
			BOTTOM	TOP				
1003206	30'	15'	8"	6"	0.188"	TRANSFORMER	1"X40"	15"

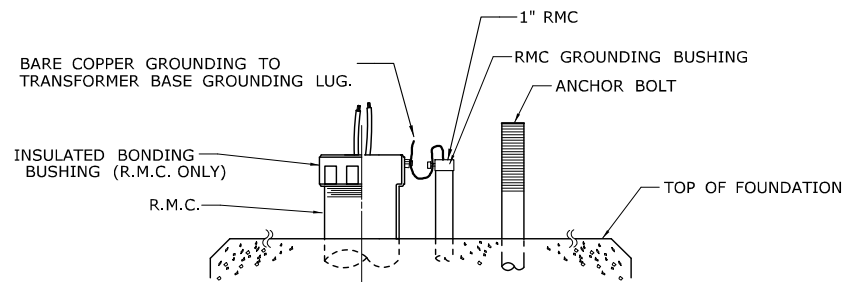


**J-HOOK MOUNTING
DETAIL**

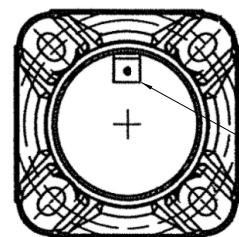


ALUMINUM LIGHT STANDARD FOR VEHICLE DETECTOR

NOTE:
TRANSFORMER BASE DOOR TO BE ON FAR SIDE OF TRAFFIC FLOW.
TOP 2'-6" OF SHAFT IS NOT TAPERED.
REFER TO SIGNAL PLANS FOR BRACKET LENGTHS.

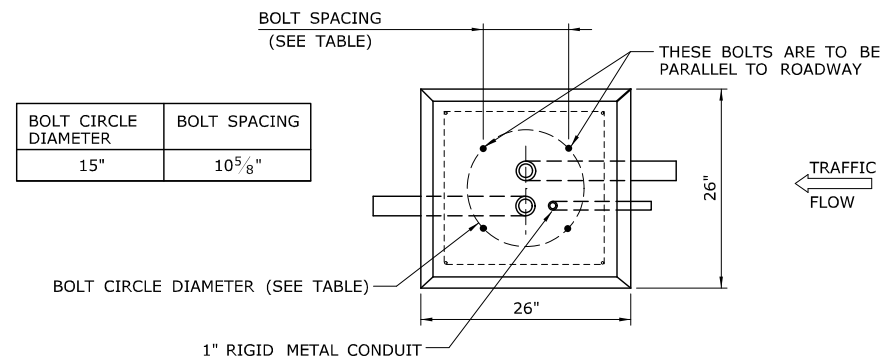


**CONDUIT TERMINATION AT
VEHICLE DETECTOR LIGHT STANDARD BASE**

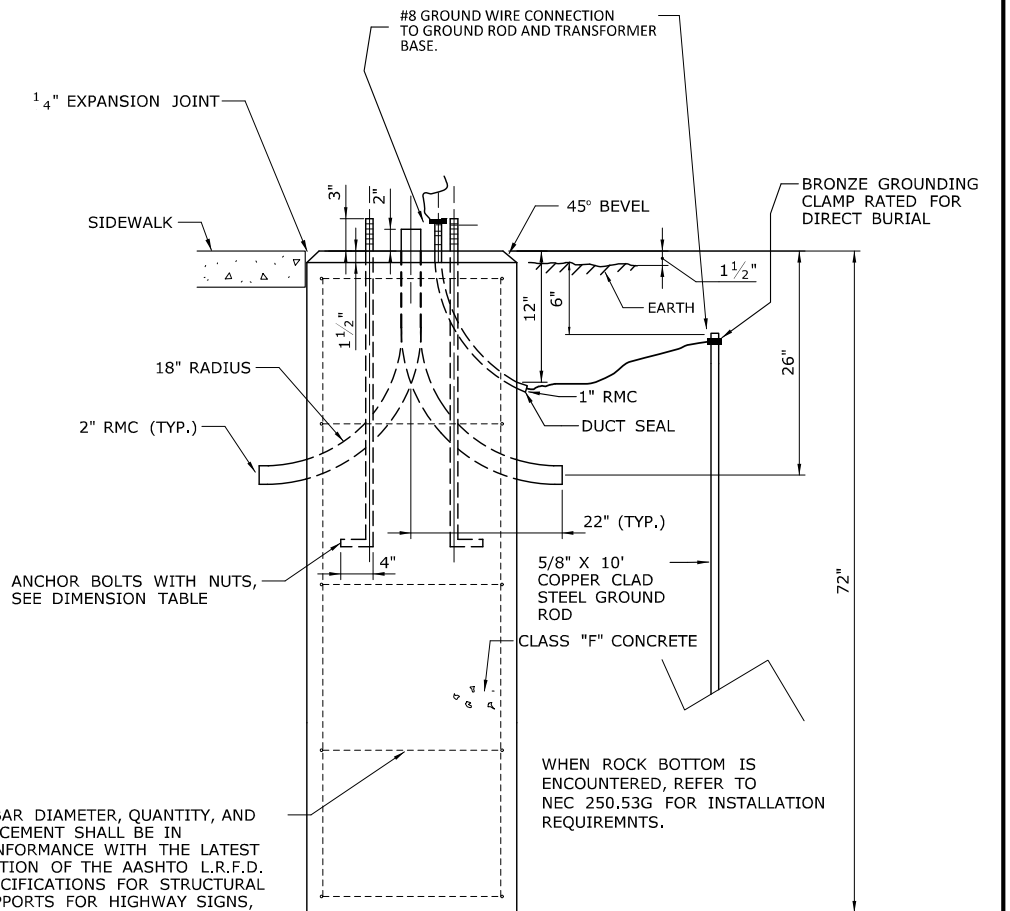


1/4" THICK ALUMINUM T-STOCK
GROUND LUG WITH A 3/8"-16
HOLE FOR A GROUND
CONNECTOR WELDED 1 1/2" UP
FROM BUTT

ALUMINUM LIGHT STANDARD BASE



BOLT CIRCLE DIAMETER	BOLT SPACING
15"	10 5/8"



REBAR DIAMETER, QUANTITY, AND
PLACEMENT SHALL BE IN
CONFORMANCE WITH THE LATEST
EDITION OF THE AASHTO L.R.F.D.
SPECIFICATIONS FOR STRUCTURAL
SUPPORTS FOR HIGHWAY SIGNS,
LUMINAIRES AND TRAFFIC SIGNALS,
INCLUDING THE LATEST INTERIM
SPECIFICATIONS

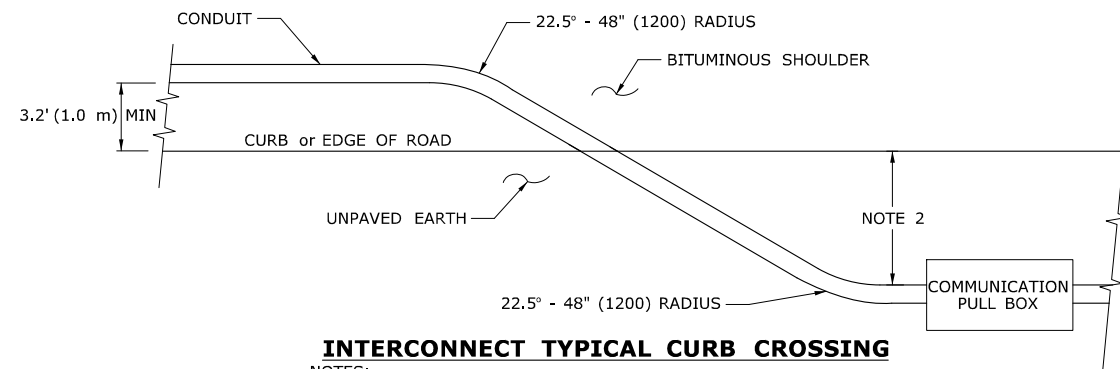
WHEN ROCK BOTTOM IS
ENCOUNTERED, REFER TO
NEC 250.53G FOR INSTALLATION
REQUIREMENTS.

LIGHT STANDARD FOUNDATION - TYPE I

LIGHT STANDARD NOTES:

- ALUMINUM ALLOY SHALL BE 6063, T6 TEMPER.
- BOLT CIRCLE SHOWN IS FOR TRANSFORMER BASE BOTTOM.
- TO BE DESIGNED TO AASHTO "STANDARD SPECIFICATION FOR STRUCTURAL SUPPORTS FOR HIGHWAY SIGNS, LUMINAIRES AND TRAFFIC SIGNALS" FOR 90 M.P.H. WINDS.
- WELDING DESIGN AND FABRICATION SHALL CONFORM TO THE LATEST EDITION OF THE ANSI/AWS D1.2, STRUCTURAL WELDING CODE - ALUMINUM.
- FOR BASE CONNECTION WELDS, FABRICATION INSPECTION AND TESTING SHALL BE PERFORMED AS NECESSARY PRIOR TO ASSEMBLY, DURING ASSEMBLY, DURING WELDING, AND AFTER WELDING, TO ENSURE THAT MATERIALS AND WORKMANSHIP MEET THE REQUIREMENTS OF THE CONTRACT DOCUMENTS. FABRICATION INSPECTION AND TESTING IS THE RESPONSIBILITY OF THE CONTRACTOR. VERIFICATION INSPECTION AND TESTING IS THE PREROGATIVE OF THE ENGINEER (CONNDOT).
- NON-DESTRUCTIVE TESTING FOR ALUMINUM SHALL BE AS FOLLOWS: A RANDOM 25% OF ALL BASE CONNECTION WELDS SHALL BE INSPECTED IN ACCORDANCE WITH ASTM E-165 STANDARD PRACTICE FOR LIQUID PENETRANT INSPECTION METHOD.

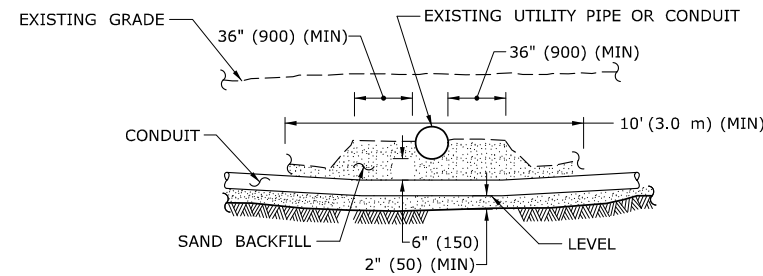
THE INFORMATION, INCLUDING ESTIMATED QUANTITIES OF WORK, SHOWN ON THESE SHEETS IS BASED ON LIMITED INVESTIGATIONS BY THE STATE AND IS IN NO WAY WARRANTED TO INDICATE THE CONDITIONS OF ACTUAL QUANTITIES OF WORK WHICH WILL BE REQUIRED.		DESIGNER/DRAFTER: CHECKED BY: NO SCALE	<p>STATE OF CONNECTICUT DEPARTMENT OF TRANSPORTATION</p>	SIGNATURE/ BLOCK: APPROVED BY: DATE:	PROJECT TITLE: LIGHT STANDARD & FOUNDATION FOR VEHICLE DETECTION	TOWN: PROJECT NO. 0172-0494 DRAWING NO. SHEET NO. TR-05
REV. DATE REVISION DESCRIPTION SHEET NO.	Plotted Date: 11/14/2019	Filename: ...CTDOT_TRAFFIC-GS-LS_AND_FOUND(10-11-2019).dgn	172-494	270		



INTERCONNECT TYPICAL CURB CROSSING

NOTES:

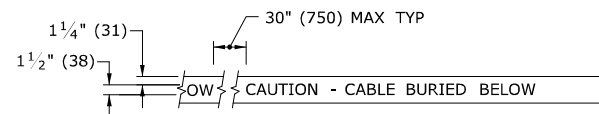
1. RESTORE AREAS DISTURBED BY TRENCH TO ORIGINAL CONDITION.
2. INSTALL PULL BOX A MINIMUM OF 10' (3.0 m) FROM CURB UNLESS OTHERWISE SHOWN ON PLANS OR DIRECTED BY ENGINEER.



CROSSING UNDER EXISTING UTILITY

NOTES:

1. WHEN ENCOUNTERED AT APPROXIMATELY THE SAME DEPTH, CROSS BENEATH.
2. PROTECT & SUPPORT EXPOSED EXISTING UTILITY.



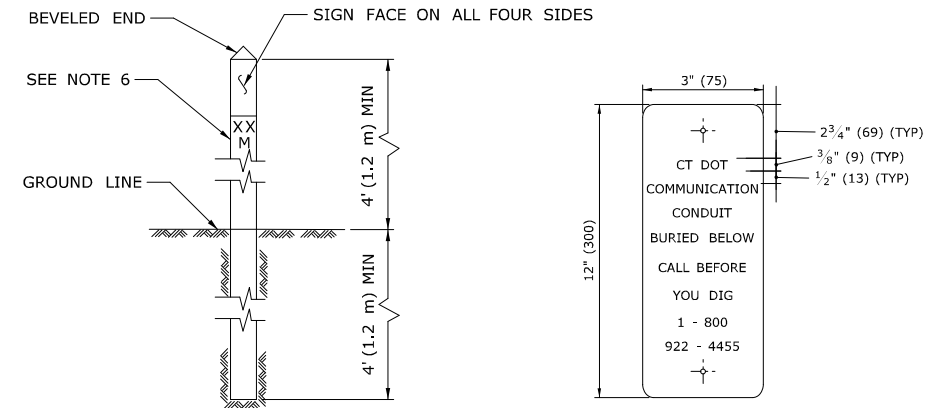
DETECTABLE WARNING TAPE

NOTE:

STANDARD SPECIFICATIONS, ARTICLE: 1.05.15

1. TAPE COLORS:

- COMMUNICATION - ORANGE BACKGROUND / BLACK LEGEND
- POWER - RED BACKGROUND / BLACK LEGEND

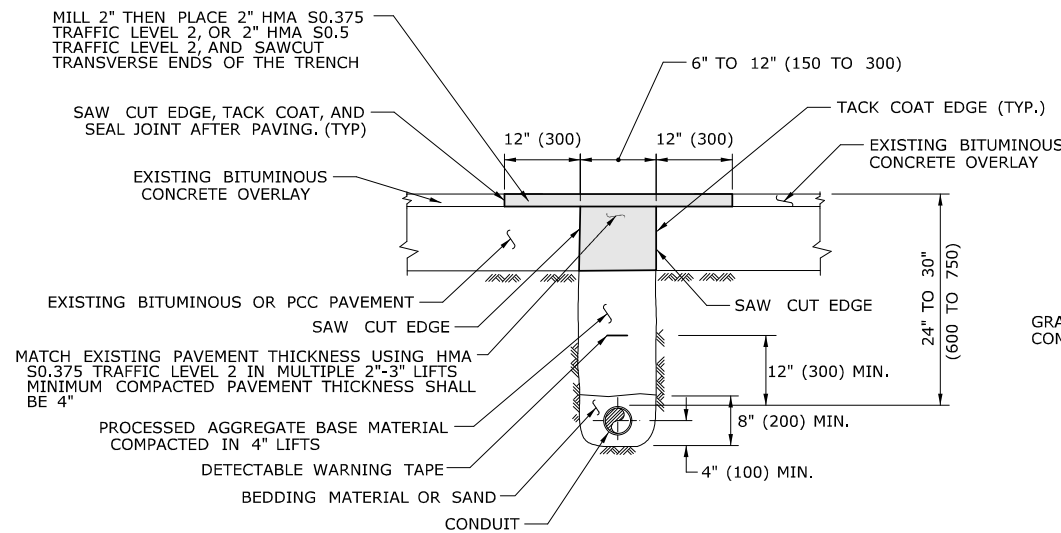


INTERCONNECT CONDUIT IDENTIFICATION POST

SIGN FACE DETAIL
SIGN # 41-4669

NOTES:

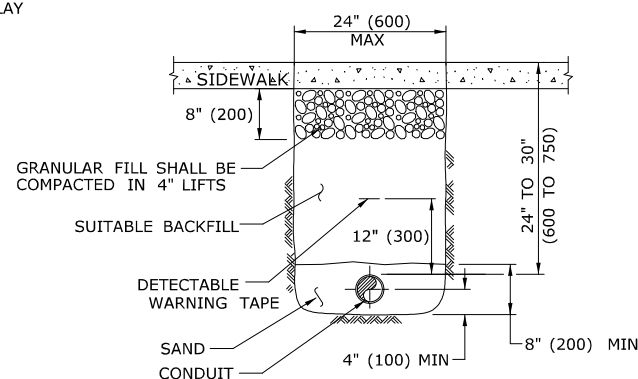
1. 4" x 4" (100 x 100) NOMINAL, PRESSURE TREATED WOOD POST.
2. ATTACH SIGN TO POST WITH 1/4" x 1 1/4" (6 x 31) STAINLESS STEEL LAG SCREW WITH NYLON WASHER ON FACE OF SIGN.
3. SIGN COLORS: BACKGROUND - ORANGE (RETROREFLECTIVE) LEGEND - BLACK (OPAQUE).
4. INSTALL POST APPROX 24" (600) FROM RMC IN VICINITY OF EACH PULL BOX.
5. INSTALL POSTS BETWEEN PULL BOXES, APPROX 10' (3.0 m) OFF CURB. SPACE POSTS 1500'+ (460 m+) APART.
6. PERMANENTLY ATTACH STAINLESS STEEL NUMBERS INDICATING DISTANCE TO TRENCH IN FEET (METERS) CONTAINING COMMUNICATION CABLE. ATTACH NUMBERS TO SIDE OF POST FACING CONDUIT. INCLUDE "M" SUFFIX IF METERS.



PAVEMENT - BITUMINOUS CONCRETE OR OVERLAYED PORTLAND CEMENT CONCRETE

NOTES:

- STANDARD SPECIFICATION, ARTICLE 3.04 AND SPECIAL PROVISION, SECTION 4.06.03
1. TOTAL HOT MIX ASPHALT (HMA) THICKNESS TO MATCH EXISTING BITUMINOUS CONCRETE AND PORTLAND CEMENT CONCRETE (PCC) THICKNESS.
 2. WHEN ALLOWED BY ENGINEER, USE CONTROLLED LOW STRENGTH MATERIAL (CLSM) AS BEDDING MATERIAL. TOP OF CLSM AT LEAST 20" (500) BELOW SURFACE.

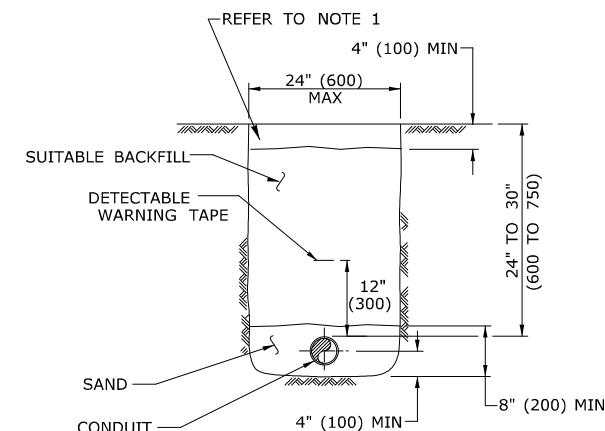


SIDEWALK

NOTES:

STANDARD SPECIFICATIONS, ARTICLE: 9.21 & 9.22

1. WHERE CONCRETE SIDEWALK DAMAGED OR CUT, REPLACE THE ENTIRE SECTION BETWEEN JOINTS. REPLACEMENT SIDEWALK IS PAID FOR AT THE CONTRACT UNIT PRICE FOR "CONCRETE SIDEWALK".



EARTH

NOTES:

STANDARD SPECIFICATIONS, ARTICLE: 9.50

1. IN MOWED AREAS: PLACE TOPSOIL, FERTILIZER, SEED, & MULCH.

GENERAL NOTES:

1. TOP OF CONDUIT NO LESS THAN 24" (600) DEEP.
2. COMPACT BACKFILL IN ≤6" (150) LIFTS. HAND COMPACTION NOT PERMITTED.

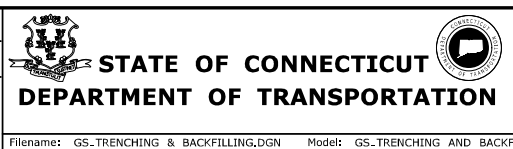
LEGEND AS SHOWN ON TRAFFIC CONTROL SIGNAL PLAN:
--- RMC (RIGID METAL CONDUIT)

REV.	DATE	REVISION DESCRIPTION
2	4-2019	REVISED FILL & OVERLAY REQUIREMENTS, & MINOR REVISIONS.
1	4-2012	REVISED BITUMINOUS CONCRETE TO HMA, & MINOR REVISIONS.

THE INFORMATION, INCLUDING ESTIMATED QUANTITIES OF WORK, SHOWN ON THESE SHEETS IS BASED ON LIMITED INVESTIGATIONS BY THE STATE AND IS IN NO WAY WARRANTED TO INDICATE THE CONDITIONS OF ACTUAL QUANTITIES OF WORK WHICH WILL BE REQUIRED.

Plotted Date: 7/1/2019

DESIGNER/DRAFTER:
CHECKED BY:
NO SCALE



SIGNATURE/BLOCK:
OFFICE OF ENGINEERING
APPROVED BY: DATE:

PROJECT TITLE:
TRENCHING & BACKFILLING, ELECTRICAL CONDUIT

TOWN:
PROJECT NO. 0172-0494
DRAWING NO.
SHEET NO. TR-06

**Construction Contracts - Required Contract Provisions
(State Funded Only Contracts)**

Index

1. Contractor Work Force Utilization / Specific Equal Employment Opportunity
2. Contract Wage Rates
3. Americans with Disabilities Act of 1990, as Amended
4. Connecticut Statutory Labor Requirements
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EXHIBIT D - State Wage Rates (Attached at the end)

1. Contractor Work Force Utilization / Equal Employment Opportunity

- (a) The Contractor shall comply with the Contractor Work Force Utilization / Equal Employment Opportunity requirements attached at Exhibit B and hereby made part of this Contract, whenever a contractor or subcontractor at any tier performs construction work in excess of \$10,000. These goals shall be included in each contract and subcontract. Goal achievement is calculated for each trade using the hours worked under each trade.
- (b) Companies with contracts, agreements or purchase orders valued at \$10,000 or more will develop and implement an Affirmative Action Plan utilizing the ConnDOT Affirmative Action Plan Guideline. This Plan shall be designed to further the provision of equal employment opportunity to all persons without regard to their race, color, religion, sex or national origin, and to promote the full realization of equal employment opportunity through a positive continuation program. Plans shall be updated as required by ConnDOT.

2. Contract Wage Rates

The Contractor shall comply with:

The State wage rate requirements indicated in Exhibit E hereof are hereby made part of this Contract.

Prevailing Wages for Work on State Highways; Annual Adjustments. With respect to contracts for work on state highways and bridges on state highways, the Contractor shall comply with the provisions of Section 31-54 and 31-55a of the Connecticut General Statutes, as revised.

As required by section 1.05.12 (Payrolls) of the State of Connecticut, Department of Transportation's Standard Specification for Roads, Bridges and Incidental Construction (FORM 816), as may be revised, every Contractor or subcontractor performing project work on a federal aid project is required to post the relevant prevailing wage rates as determined by the United States Secretary of Labor. The wage rate determinations shall be posted in prominent and easily accessible places at the work site.

3. Americans with Disabilities Act of 1990, as Amended

This provision applies to those Contractors who are or will be responsible for compliance with the terms of the Americans with Disabilities Act of 1990, as amended (42 U.S.C. 12101 et seq.), (Act), during the term of the Contract. The Contractor represents that it is familiar with the terms of this Act and that it is in compliance with the Act. Failure of the Contractor to satisfy this standard as the same applies to performance under this Contract, either now or during the term of the Contract as it may be amended, will render the Contract voidable at the option of the State upon notice to the contractor. The Contractor warrants that it will hold the State harmless and indemnify the State from any liability which may be imposed upon the State as a result of any failure of the Contractor to be in compliance with this Act, as the same applies to performance under this Contract.

4. Connecticut Statutory Labor Requirements

- (a) **Construction, Alteration or Repair of Public Works Projects; Wage Rates.** The Contractor shall comply with Section 31-53 of the Connecticut General Statutes, as revised. The wages paid on an hourly basis to any person performing the work of any mechanic, laborer or worker on the work herein contracted to be done and the amount of payment or contribution paid or payable on behalf of each such person to any employee welfare fund, as defined in subsection (i)

of section 31-53 of the Connecticut General Statutes, shall be at a rate equal to the rate customary or prevailing for the same work in the same trade or occupation in the town in which such public works project is being constructed. Any contractor who is not obligated by agreement to make payment or contribution on behalf of such persons to any such employee welfare fund shall pay to each mechanic, laborer or worker as part of such person's wages the amount of payment or contribution for such person's classification on each pay day.

(b) Debarment List. Limitation on Awarding Contracts. The Contractor shall comply with Section 31-53a of the Connecticut General Statutes, as revised.

(c) Construction Safety and Health Course. The Contractor shall comply with section 31-53b of the Connecticut General Statutes, as revised. The contractor shall furnish proof to the Labor Commissioner with the weekly certified payroll form for the first week each employee begins work on such project that any person performing the work of a mechanic, laborer or worker pursuant to the classifications of labor under section 31-53 of the Connecticut General Statutes, as revised, on such public works project, pursuant to such contract, has completed a course of at least ten hours in duration in construction safety and health approved by the federal Occupational Safety and Health Administration or, has completed a new miner training program approved by the Federal Mine Safety and Health Administration in accordance with 30 CFR 48 or, in the case of telecommunications employees, has completed at least ten hours of training in accordance with 29 CFR 1910.268.

Any employee required to complete a construction safety and health course as required that has not completed the course, shall have a maximum of fourteen (14) days to complete the course. If the employee has not been brought into compliance, they shall be removed from the project until such time as they have completed the required training.

Any costs associated with this notice shall be included in the general cost of the contract. In addition, there shall be no time granted to the contractor for compliance with this notice. The contractor's compliance with this notice and any associated regulations shall not be grounds for claims as outlined in Section 1.11 – "Claims".

(d) Awarding of Contracts to Occupational Safety and Health Law Violators Prohibited. The Contract is subject to Section 31-57b of the Connecticut General Statutes, as revised.

(e) Residents Preference in Work on Other Public Facilities. NOT APPLICABLE TO FEDERAL AID CONTRACTS. Pursuant to Section 31-52a of the Connecticut General Statutes, as revised, in the employment of mechanics, laborers or workmen to perform the work specified herein, preference shall be given to residents of the state who are, and continuously for at least six months prior to the date hereof have been, residents of this state, and if no such person is available, then to residents of other states

5. Tax Liability - Contractor's Exempt Purchase Certificate (CERT – 141)

The Contractor shall comply with Chapter 219 of the Connecticut General Statutes pertaining to tangible personal property or services rendered that is/are subject to sales tax. The Contractor is responsible for determining its tax liability. If the Contractor purchases materials or supplies pursuant to the Connecticut Department of Revenue Services' "Contractor's Exempt Purchase Certificate (CERT-141)," as may be revised, the Contractor acknowledges and agrees that title to such materials

and supplies installed or placed in the project will vest in the State simultaneously with passage of title from the retailers or vendors thereof, and the Contractor will have no property rights in the materials and supplies purchased.

Forms and instructions are available anytime by:

Internet: Visit the DRS website at www.ct.gov/DRS to download and print Connecticut tax forms; or Telephone: Call 1-800-382-9463 (Connecticut calls outside the Greater Hartford calling area only) and select Option 2 or call 860-297-4753 (from anywhere).

6. Executive Orders

This contract is subject to the provisions of Executive Order No. Three of Governor Thomas J. Meskill, promulgated June 16, 1971, concerning labor employment practices, Executive Order No. Seventeen of Governor Thomas J. Meskill, promulgated February 15, 1973, concerning the listing of employment openings and Executive Order No. Sixteen of Governor John G. Rowland promulgated August 4, 1999, concerning violence in the workplace, all of which are incorporated into and are made a part of the contract as if they had been fully set forth in it. The contract may also be subject to Executive Order No. 14 of Governor M. Jodi Rell, promulgated April 17, 2006, concerning procurement of cleaning products and services and to Executive Order No. 49 of Governor Dannel P. Malloy, promulgated May 22, 2015, mandating disclosure of certain gifts to public employees and contributions to certain candidates for office. If Executive Order No. 14 and/or Executive Order No. 49 are applicable, they are deemed to be incorporated into and are made a part of the contract as if they had been fully set forth in it. At the Contractor's request, the Department shall provide a copy of these orders to the Contractor.

7. Non Discrimination Requirement (pursuant to section 4a-60 and 4a-60a of the Connecticut General Statutes, as revised): References to "minority business enterprises" in this Section are not applicable to Federal-aid projects/contracts. Federal-aid projects/contracts are instead subject to the Federal Disadvantaged Business Enterprise Program.

(a) For purposes of this Section, the following terms are defined as follows:

- (1) "Commission" means the Commission on Human Rights and Opportunities;
- (2) "Contract" and "contract" include any extension or modification of the Contract or contract;
- (3) "Contractor" and "contractor" include any successors or assigns of the Contractor or contractor;
- (4) "Gender identity or expression" means a person's gender-related identity, appearance or behavior, whether or not that gender-related identity, appearance or behavior is different from that traditionally associated with the person's physiology or assigned sex at birth, which gender-related identity can be shown by providing evidence including, but not limited to, medical history, care or treatment of the gender-related identity, consistent and uniform assertion of the gender-related identity or any other evidence that the gender-related identity is sincerely held, part of a person's core identity or not being asserted for an improper purpose.
- (5) "good faith" means that degree of diligence which a reasonable person would exercise in the performance of legal duties and obligations;
- (6) "good faith efforts" shall include, but not be limited to, those reasonable initial efforts necessary to comply with statutory or regulatory requirements and additional or substituted efforts when it is determined that such initial efforts will not be sufficient to comply with such requirements;
- (7) "marital status" means being single, married as recognized by the state of Connecticut, widowed, separated or divorced;

- (8) "mental disability" means one or more mental disorders, as defined in the most recent edition of the American Psychiatric Association's "Diagnostic and Statistical Manual of Mental Disorders", or a record of or regarding a person as having one or more such disorders;
- (9) "minority business enterprise" means any small contractor or supplier of materials fifty-one percent or more of the capital stock, if any, or assets of which is owned by a person or persons: (1) who are active in the daily affairs of the enterprise, (2) who have the power to direct the management and policies of the enterprise, and (3) who are members of a minority, as such term is defined in subsection (a) of Connecticut General Statutes § 32-9n; and
- (10) "public works contract" means any agreement between any individual, firm or corporation and the State or any political subdivision of the State other than a municipality for construction, rehabilitation, conversion, extension, demolition or repair of a public building, highway or other changes or improvements in real property, or which is financed in whole or in part by the State, including, but not limited to, matching expenditures, grants, loans, insurance or guarantees.

For purposes of this Section, the terms "Contract" and "contract" do not include a contract where each contractor is (1) a political subdivision of the State of Connecticut, including, but not limited to municipalities, unless the contract is a municipal public works contract or quasi-public agency project contract, (2) any other state of the United States, including but not limited to, the District of Columbia, Puerto Rico, U.S. territories and possessions, and federally recognized Indian tribal governments, as defined in Connecticut General Statutes § 1-267, (3) the federal government, (4) a foreign government, or (5) an agency of a subdivision, state or government described in subdivision (1), (2), (3), or (4) of this subsection.

- (b) (1) The Contractor agrees and warrants that in the performance of the Contract such Contractor will not discriminate or permit discrimination against any person or group of persons on the grounds of race, color, religious creed, age, marital status, national origin, ancestry, sex, gender identity or expression, status as a veteran, intellectual disability, mental disability or physical disability, including, but not limited to, blindness, unless it is shown by such Contractor that such disability prevents performance of the work involved, in any manner prohibited by the laws of the United States or of the State of Connecticut; and the Contractor further agrees to take affirmative action to insure that applicants with job-related qualifications are employed and that employees are treated when employed without regard to their race, color, religious creed, age, marital status, national origin, ancestry, sex, gender identity or expression, status as a veteran, intellectual disability, mental disability or physical disability, including, but not limited to, blindness, unless it is shown by the Contractor that such disability prevents performance of the work involved; (2) the Contractor agrees, in all solicitations or advertisements for employees placed by or on behalf of the Contractor, to state that it is an "affirmative action-equal opportunity employer" in accordance with regulations adopted by the Commission; (3) the Contractor agrees to provide each labor union or representative of workers with which the Contractor has a collective bargaining agreement or other contract or understanding and each vendor with which the Contractor has a contract or understanding, a notice to be provided by the Commission, advising the labor union or workers' representative of the Contractor's commitments under this section and to post copies of the notice in conspicuous places available to employees and applicants for employment; (4) the Contractor agrees to comply with each provision of this Section and Connecticut General Statutes §§ 46a-68e and 46a-68f and with each regulation or relevant order issued by said Commission pursuant to Connecticut General Statutes §§ 46a-56, 46a-68e and 46a-68f; and (5) the Contractor agrees to provide the Commission on Human Rights and Opportunities with such information requested by the Commission, and permit access to pertinent books, records and accounts, concerning the employment practices and procedures of the Contractor as relate to the provisions of this Section

and Connecticut General Statutes § 46a-56. If the contract is a public works contract, the Contractor agrees and warrants that he will make good faith efforts to employ minority business enterprises as subcontractors and suppliers of materials on such public works projects.

- (c) Determination of the Contractor's good faith efforts shall include, but shall not be limited to, the following factors: The Contractor's employment and subcontracting policies, patterns and practices; affirmative advertising, recruitment and training; technical assistance activities and such other reasonable activities or efforts as the Commission may prescribe that are designed to ensure the participation of minority business enterprises in public works projects.
- (d) The Contractor shall develop and maintain adequate documentation, in a manner prescribed by the Commission, of its good faith efforts.
- (e) The Contractor shall include the provisions of subsection (b) of this Section in every subcontract or purchase order entered into in order to fulfill any obligation of a contract with the State and such provisions shall be binding on a subcontractor, vendor or manufacturer unless exempted by regulations or orders of the Commission. The Contractor shall take such action with respect to any such subcontract or purchase order as the Commission may direct as a means of enforcing such provisions including sanctions for noncompliance in accordance with Connecticut General Statutes §46a-56; provided if such Contractor becomes involved in, or is threatened with, litigation with a subcontractor or vendor as a result of such direction by the Commission, the Contractor may request the State of Connecticut to enter into any such litigation or negotiation prior thereto to protect the interests of the State and the State may so enter.
- (f) The Contractor agrees to comply with the regulations referred to in this Section as they exist on the date of this Contract and as they may be adopted or amended from time to time during the term of this Contract and any amendments thereto.
- (g) (1) The Contractor agrees and warrants that in the performance of the Contract such Contractor will not discriminate or permit discrimination against any person or group of persons on the grounds of sexual orientation, in any manner prohibited by the laws of the United States or the State of Connecticut, and that employees are treated when employed without regard to their sexual orientation; (2) the Contractor agrees to provide each labor union or representative of workers with which such Contractor has a collective bargaining agreement or other contract or understanding and each vendor with which such Contractor has a contract or understanding, a notice to be provided by the Commission on Human Rights and Opportunities advising the labor union or workers' representative of the Contractor's commitments under this section, and to post copies of the notice in conspicuous places available to employees and applicants for employment; (3) the Contractor agrees to comply with each provision of this section and with each regulation or relevant order issued by said Commission pursuant to Connecticut General Statutes § 46a-56; and (4) the Contractor agrees to provide the Commission on Human Rights and Opportunities with such information requested by the Commission, and permit access to pertinent books, records and accounts, concerning the employment practices and procedures of the Contractor which relate to the provisions of this Section and Connecticut General Statutes § 46a-56.
- (h) The Contractor shall include the provisions of the foregoing paragraph in every subcontract or purchase order entered into in order to fulfill any obligation of a contract with the State and such provisions shall be binding on a subcontractor, vendor or manufacturer unless exempted by regulations or orders of the Commission. The Contractor shall take such action with respect to any such subcontract or purchase order as the Commission may direct as a means of enforcing such provisions including sanctions for noncompliance in accordance with Connecticut General Statutes § 46a-56; provided, if such Contractor becomes involved in, or is threatened with, litigation with a subcontractor or vendor as a result of such direction by the Commission, the Contractor may request the State of Connecticut to enter into any such litigation or negotiation prior thereto to protect the interests of the State and the State may so enter.

Please be aware the Nondiscrimination Certifications can be found at the Office of Policy and Management website:

<https://portal.ct.gov/OPM/Fin-PSA/Forms/Nondiscrimination-Certification>

8. Whistleblower Provision

The following clause is applicable if the Contract has a value of Five Million Dollars (\$5,000,000) or more.

Whistleblowing. This Contract may be subject to the provisions of Section 4-61dd of the Connecticut General Statutes. In accordance with this statute, if an officer, employee or appointing authority of the Contractor takes or threatens to take any personnel action against any employee of the Contractor in retaliation for such employee's disclosure of information to any employee of the contracting state or quasi-public agency or the Auditors of Public Accounts or the Attorney General under the provisions of subsection (a) of such statute, the Contractor shall be liable for a civil penalty of not more than five thousand dollars for each offense, up to a maximum of twenty per cent of the value of this Contract. Each violation shall be a separate and distinct offense and in the case of a continuing violation, each calendar day's continuance of the violation shall be deemed to be a separate and distinct offense. The State may request that the Attorney General bring a civil action in the Superior Court for the Judicial District of Hartford to seek imposition and recovery of such civil penalty. In accordance with subsection (f) of such statute, each large state contractor, as defined in the statute, shall post a notice of the provisions of the statute relating to large state contractors in a conspicuous place which is readily available for viewing by the employees of the Contractor.

9. Connecticut Freedom of Information Act

- (a) **Disclosure of Records.** This Contract may be subject to the provisions of section 1-218 of the Connecticut General Statutes. In accordance with this statute, each contract in excess of two million five hundred thousand dollars between a public agency and a person for the performance of a governmental function shall (a) provide that the public agency is entitled to receive a copy of records and files related to the performance of the governmental function, and (b) indicate that such records and files are subject to FOIA and may be disclosed by the public agency pursuant to FOIA. No request to inspect or copy such records or files shall be valid unless the request is made to the public agency in accordance with FOIA. Any complaint by a person who is denied the right to inspect or copy such records or files shall be brought to the Freedom of Information Commission in accordance with the provisions of sections 1-205 and 1-206 of the Connecticut General Statutes.
- (b) **Confidential Information.** The State will afford due regard to the Contractor's request for the protection of proprietary or confidential information which the State receives from the Contractor. However, all materials associated with the Contract are subject to the terms of the FOIA and all corresponding rules, regulations and interpretations. In making such a request, the Contractor may not merely state generally that the materials are proprietary or confidential in nature and not, therefore, subject to release to third parties. Those particular sentences, paragraphs, pages or sections that the Contractor believes are exempt from disclosure under the FOIA must be specifically identified as such. Convincing explanation and rationale sufficient to justify each exemption consistent with the FOIA must accompany the request. The rationale and explanation must be stated in terms of the prospective harm to the competitive position of the Contractor that would result if the identified material were to be released and the reasons why the materials are legally exempt from release pursuant to the FOIA. To the extent that any other provision or part of the Contract conflicts or is in any way inconsistent with this section, this section controls and

shall apply and the conflicting provision or part shall not be given effect. If the Contractor indicates that certain documentation is submitted in confidence, by specifically and clearly marking the documentation as "CONFIDENTIAL," DOT will first review the Contractor's claim for consistency with the FOIA (that is, review that the documentation is actually a trade secret or commercial or financial information and not required by statute), and if determined to be consistent, will endeavor to keep such information confidential to the extent permitted by law. See, *e.g.*, Conn. Gen. Stat. §1-210(b)(5)(A-B). The State, however, has no obligation to initiate, prosecute or defend any legal proceeding or to seek a protective order or other similar relief to prevent disclosure of any information that is sought pursuant to a FOIA request. Should the State withhold such documentation from a Freedom of Information requester and a complaint be brought to the Freedom of Information Commission, the Contractor shall have the burden of cooperating with DOT in defense of that action and in terms of establishing the availability of any FOIA exemption in any proceeding where it is an issue. In no event shall the State have any liability for the disclosure of any documents or information in its possession which the State believes are required to be disclosed pursuant to the FOIA or other law.

10. Service of Process

The Contractor, if not a resident of the State of Connecticut, or, in the case of a partnership, the partners, if not residents, hereby appoints the Secretary of State of the State of Connecticut, and his successors in office, as agent for service of process for any action arising out of or as a result of this Contract; such appointment to be in effect throughout the life of this Contract and six (6) years thereafter.

11. Substitution of Securities for Retainages on State Contracts and Subcontracts

This Contract is subject to the provisions of Section 3-112a of the General Statutes of the State of Connecticut, as revised.

12. Health Insurance Portability and Accountability Act of 1996 (HIPAA)

The Contractor shall comply, if applicable, with the Health Insurance Portability and Accountability Act of 1996 and, pursuant thereto, the provisions attached at Exhibit C, and hereby made part of this Contract.

13. Forum and Choice of Law

Forum and Choice of Law. The parties deem the Contract to have been made in the City of Hartford, State of Connecticut. Both parties agree that it is fair and reasonable for the validity and construction of the Contract to be, and it shall be, governed by the laws and court decisions of the State of Connecticut, without giving effect to its principles of conflicts of laws. To the extent that any immunities provided by Federal law or the laws of the State of Connecticut do not bar an action against the State, and to the extent that these courts are courts of competent jurisdiction, for the purpose of venue, the complaint shall be made returnable to the Judicial District of Hartford only or shall be brought in the United States District Court for the District of Connecticut only, and shall not be transferred to any other court, provided, however, that nothing here constitutes a waiver or compromise of the sovereign immunity of the State of Connecticut. The Contractor waives any objection which it may now have or will have to the laying of venue of any Claims in any forum and further irrevocably submits to such jurisdiction in any suit, action or proceeding.

14. Summary of State Ethics Laws

Pursuant to the requirements of section 1-101qq of the Connecticut General Statutes, the summary of State ethics laws developed by the State Ethics Commission pursuant to section 1-81b of the Connecticut General Statutes is incorporated by reference into and made a part of the Contract as if the summary had been fully set forth in the Contract.

15. Audit and Inspection of Plants, Places of Business and Records

- (a) The State and its agents, including, but not limited to, the Connecticut Auditors of Public Accounts, Attorney General and State's Attorney and their respective agents, may, at reasonable hours, inspect and examine all of the parts of the Contractor's and Contractor Parties' plants and places of business which, in any way, are related to, or involved in, the performance of this Contract. For the purposes of this Section, "Contractor Parties" means the Contractor's members, directors, officers, shareholders, partners, managers, principal officers, representatives, agents, servants, consultants, employees or any one of them or any other person or entity with whom the Contractor is in privity of oral or written contract and the Contractor intends for such other person or entity to Perform under the Contract in any capacity.
- (b) The Contractor shall maintain, and shall require each of the Contractor Parties to maintain, accurate and complete Records. The Contractor shall make all of its and the Contractor Parties' Records available at all reasonable hours for audit and inspection by the State and its agents.
- (c) The State shall make all requests for any audit or inspection in writing and shall provide the Contractor with at least twenty-four (24) hours' notice prior to the requested audit and inspection date. If the State suspects fraud or other abuse, or in the event of an emergency, the State is not obligated to provide any prior notice.
- (d) The Contractor shall keep and preserve or cause to be kept and preserved all of its and Contractor Parties' Records until three (3) years after the latter of (i) final payment under this Agreement, or (ii) the expiration or earlier termination of this Agreement, as the same may be modified for any reason. The State may request an audit or inspection at any time during this period. If any Claim or audit is started before the expiration of this period, the Contractor shall retain or cause to be retained all Records until all Claims or audit findings have been resolved.
- (e) The Contractor shall cooperate fully with the State and its agents in connection with an audit or inspection. Following any audit or inspection, the State may conduct and the Contractor shall cooperate with an exit conference.
- (f) The Contractor shall incorporate this entire Section verbatim into any contract or other agreement that it enters into with any Contractor Party.

16. Campaign Contribution Restriction

For all State contracts, defined in Conn. Gen. Stat. §9-612(f)(1) as having a value in a calendar year of \$50,000 or more, or a combination or series of such agreements or contracts having a value of \$100,000 or more, the authorized signatory to this contract expressly acknowledges receipt of the State Elections Enforcement Commission's notice advising state contractors of state campaign contribution and solicitation prohibitions, and will inform its principals of the contents of the notice, as set forth in "Notice to Executive Branch State Contractors and Prospective State Contractors of Campaign Contribution and Solicitation Limitations," a copy of which is attached hereto and hereby made a part of this contract, attached as Exhibit D.

17. Tangible Personal Property

- (a) The Contractor on its behalf and on behalf of its Affiliates, as defined below, shall comply with the provisions of Conn. Gen. Stat. §12-411b, as follows:

- (1) For the term of the Contract, the Contractor and its Affiliates shall collect and remit to the State of Connecticut, Department of Revenue Services, any Connecticut use tax due under the provisions of Chapter 219 of the Connecticut General Statutes for items of tangible personal property sold by the Contractor or by any of its Affiliates in the same manner as if the Contractor and such Affiliates were engaged in the business of selling tangible personal property for use in Connecticut and had sufficient nexus under the provisions of Chapter 219 to be required to collect Connecticut use tax;
 - (2) A customer's payment of a use tax to the Contractor or its Affiliates relieves the customer of liability for the use tax;
 - (3) The Contractor and its Affiliates shall remit all use taxes they collect from customers on or before the due date specified in the Contract, which may not be later than the last day of the month next succeeding the end of a calendar quarter or other tax collection period during which the tax was collected;
 - (4) The Contractor and its Affiliates are not liable for use tax billed by them but not paid to them by a customer; and
 - (5) Any Contractor or Affiliate who fails to remit use taxes collected on behalf of its customers by the due date specified in the Contract shall be subject to the interest and penalties provided for persons required to collect sales tax under chapter 219 of the general statutes.
- (b) For purposes of this section of the Contract, the word "Affiliate" means any person, as defined in section 12-1 of the general statutes, that controls, is controlled by, or is under common control with another person. A person controls another person if the person owns, directly or indirectly, more than ten per cent of the voting securities of the other person. The word "voting security" means a security that confers upon the holder the right to vote for the election of members of the board of directors or similar governing body of the business, or that is convertible into, or entitles the holder to receive, upon its exercise, a security that confers such a right to vote. "Voting security" includes a general partnership interest.
- (c) The Contractor represents and warrants that each of its Affiliates has vested in the Contractor plenary authority to so bind the Affiliates in any agreement with the State of Connecticut. The Contractor on its own behalf and on behalf of its Affiliates shall also provide, no later than 30 days after receiving a request by the State's contracting authority, such information as the State may require to ensure, in the State's sole determination, compliance with the provisions of Chapter 219 of the Connecticut General Statutes, including, but not limited to, §12-411b.

18. Bid Rigging and/or Fraud – Notice to Contractor

The Connecticut Department of Transportation is cooperating with the U.S. Department of Transportation and the Justice Department in their investigation into highway construction contract bid rigging and/or fraud.

A toll-free "HOT LINE" telephone number 800-424-9071 has been established to receive information from contractors, subcontractors, manufacturers, suppliers or anyone with knowledge of bid rigging and/or fraud, either past or current. The "HOT LINE" telephone number will be available during normal working hours (8:00 am – 5:00 pm EST). Information will be treated confidentially and anonymity respected.

19. Consulting Agreement Affidavit

The Contractor shall comply with Connecticut General Statutes Section 4a-81(a) and 4a-81(b), as revised. Pursuant to Public Act 11-229, after the initial submission of the form, if there is a change in the information contained in the form, a contractor shall submit the updated form, as applicable, either (i) not later than thirty (30) days after the effective date of such change or (ii) prior to execution of any new contract, whichever is earlier.

The Affidavit/Form may be submitted in written format or electronic format through the Department of Administrative Services (DAS) website.

EXHIBIT A

CONTRACTOR WORKFORCE UTILIZATION / EQUAL EMPLOYMENT OPPORTUNITY

1. Project Workforce Utilization Goals:

These goals are applicable to all the Contractor’s construction work (whether or not it is Federal or Federally assisted or funded) 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 the geographical area where the work is actually performed.

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 the provisions of these specifications which contain the applicable goals for minority and female participation.

The goals for minority and female utilization are expressed in percentage terms for the contractor’s aggregate work-force in each trade on all construction work in the covered area, are referenced in the Appendix A below.

STATE FUNDED PROJECTS (only)
APPENDIX A
(Labor Market Goals)

LABOR MARKET AREA GOAL
Female

Minority

Bridgeport				22.7%
1.4%				
Ansonia	Beacon Falls	Bridgeport	Derby	
Easton	Fairfield	Milford	Monroe	
Oxford	Seymour	Shelton	Stratford	
Trumbull				
Danbury				10.7%
3.8%				
Bethel	Bridgewater	Brookfield	Danbury	
Kent	New Fairfield	New Milford	Newtown	
Redding	Ridgefield	Roxbury	Sherman	
Washington				
Danielson				4.3%
1.8%				
Brooklyn	Eastford	Hampton	Killingly	
Pomfret	Putnam	Scotland	Sterling	
Thompson	Voluntown	Union	Woodstock	
Hartford				13.7%
2.1%				
Andover	Ashford	Avon	Barkhamsted	

Belin	Bloomfield	Bolton	Bristol
Burlington	Canton	Chaplin	Colchester
Columbia	Coventry	Cromwell	Durham
East Granby	East Haddam	East Hampton	East Hartford
East Windsor	Ellington	Enfield	Farmington
Glastonbury	Granby	Haddam	Hartford
Harwinton	Hebron	Lebanon	Manchester
Mansfield	Marlborough	Middlefield	Middletown
Newington	Plainville	Plymouth	Portland
Rocky Hill	Simsbury	Somers	South Windsor
Southington	Stafford	Suffield	Tolland
Vernon	West Hartford	Wethersfield	Willington
Winchester	Windham	Windsor	Windsor Locks

Lower River				4.3%
1.8%				

Chester	Deep River	Essex	Old Lyme
Westbrook			

LABOR MARKET AREA GOAL

Minority

Female

New Haven				17.9%
3.1%				

Bethany	Branford	Cheshire	Clinton
East Haven	Guilford	Hamden	Killingworth
Madison	Meriden	New Haven	North Branford
North Haven	Orange	Wallingford	West Haven
Woodbridge			

New London				7.4%
3.1%				

Bozrah	Canterbury	East Lyme	Franklin
Griswold	Groton	Ledyard	Lisbon
Montville	New London	North Stonington	Norwich
Old Lyme	Old Saybrook	Plainfield	Preston
Salem	Sprague	Stonington	Waterford
Hopkinton	RI – Westerly Rhode Island		

Stamford				33.2%
2.1%				

Darien	Greenwich	New Canaan	Norwalk
Stamford	Weston	Westport	Wilton

Torrington				4.3%
1.8%				

Canaan	Colebrook	Cornwall	Goshen
Hartland	Kent	Litchfield	Morris
Norfolk	North Canaan	Salisbury	Sharon

Torrington

Warren

Waterbury				12.4%
1.6%				

Bethlehem
Southbury
Wolcott

Middlebury
Thomaston
Woodbury

Naugatuck
Waterbury

Prospect
Watertown

Rev. 4/24/2019

EXHIBIT B**Health Insurance Portability and Accountability Act of 1996 (“HIPAA”).**

- (a) If the Contactor is a Business Associate under the requirements of the Health Insurance Portability and Accountability Act of 1996 (“HIPAA”), the Contractor must comply with all terms and conditions of this Section of the Contract. If the Contractor is not a Business Associate under HIPAA, this Section of the Contract does not apply to the Contractor for this Contract.
- (b) The Contractor is required to safeguard the use, publication and disclosure of information on all applicants for, and all clients who receive, services under the Contract in accordance with all applicable federal and state law regarding confidentiality, which includes but is not limited to HIPAA, more specifically with the Privacy and Security Rules at 45 C.F.R. Part 160 and Part 164, subparts A, C, and E; and
- (c) The State of Connecticut Agency named on page 1 of this Contract (hereinafter the “Department”) is a “covered entity” as that term is defined in 45 C.F.R. § 160.103; and
- (d) The Contractor, on behalf of the Department, performs functions that involve the use or disclosure of “individually identifiable health information,” as that term is defined in 45 C.F.R. § 160.103; and
- (e) The Contractor is a “business associate” of the Department, as that term is defined in 45 C.F.R. § 160.103; and
- (f) The Contractor and the Department agree to the following in order to secure compliance with the HIPAA, the requirements of Subtitle D of the Health Information Technology for Economic and Clinical Health Act (hereinafter the HITECH Act), (Pub. L. 111-5, sections 13400 to 13423), and more specifically with the Privacy and Security Rules at 45 C.F.R. Part 160 and Part 164, subparts A, C, and E.
- (g) Definitions
 - (1) “Breach shall have the same meaning as the term is defined in section 13400 of the HITECH Act (42 U.S.C. §17921(1))
 - (2) “Business Associate” shall mean the Contractor.
 - (3) “Covered Entity” shall mean the Department of the State of Connecticut named on page 1 of this Contract.
 - (4) “Designated Record Set” shall have the same meaning as the term “designated record set” in 45 C.F.R. § 164.501.
 - (5) “Electronic Health Record” shall have the same meaning as the term is defined in section 13400 of the HITECH Act (42 U.S.C. §17921(5))

- (6) "Individual" shall have the same meaning as the term "individual" in 45 C.F.R. § 160.103 and shall include a person who qualifies as a personal representative as defined in 45 C.F.R. § 164.502(g).
 - (7) "Privacy Rule" shall mean the Standards for Privacy of Individually Identifiable Health Information at 45 C.F.R. part 160 and parts 164, subparts A and E.
 - (8) "Protected Health Information" or "PHI" shall have the same meaning as the term "protected health information" in 45 C.F.R. § 160.103, limited to information created or received by the Business Associate from or on behalf of the Covered Entity.
 - (9) "Required by Law" shall have the same meaning as the term "required by law" in 45 C.F.R. § 164.103.
 - (10) "Secretary" shall mean the Secretary of the Department of Health and Human Services or his designee.
 - (11) "More stringent" shall have the same meaning as the term "more stringent" in 45 C.F.R. § 160.202.
 - (12) "This Section of the Contract" refers to the HIPAA Provisions stated herein, in their entirety.
 - (13) "Security Incident" shall have the same meaning as the term "security incident" in 45 C.F.R. § 164.304.
 - (14) "Security Rule" shall mean the Security Standards for the Protection of Electronic Protected Health Information at 45 C.F.R. part 160 and parts 164, subpart A and C.
 - (15) "Unsecured protected health information" shall have the same meaning as the term as defined in section 13402(h)(1)(A) of HITECH. Act. (42 U.S.C. §17932(h)(1)(A)).
- (h) Obligations and Activities of Business Associates.
- (1) Business Associate agrees not to use or disclose PHI other than as permitted or required by this Section of the Contract or as Required by Law.
 - (2) Business Associate agrees to use appropriate safeguards to prevent use or disclosure of PHI other than as provided for in this Section of the Contract.
 - (3) Business Associate agrees to use administrative, physical and technical safeguards that reasonably and appropriately protect the confidentiality, integrity, and availability of electronic protected health information that it creates, receives, maintains, or transmits on behalf of the Covered Entity.
 - (4) Business Associate agrees to mitigate, to the extent practicable, any harmful effect that is known to the Business Associate of a use or disclosure of PHI by Business Associate in violation of this Section of the Contract.

- (5) Business Associate agrees to report to Covered Entity any use or disclosure of PHI not provided for by this Section of the Contract or any security incident of which it becomes aware.
- (6) Business Associate agrees to insure that any agent, including a subcontractor, to whom it provides PHI received from, or created or received by Business Associate, on behalf of the Covered Entity, agrees to the same restrictions and conditions that apply through this Section of the Contract to Business Associate with respect to such information.
- (7) Business Associate agrees to provide access, at the request of the Covered Entity, and in the time and manner agreed to by the parties, to PHI in a Designated Record Set, to Covered Entity or, as directed by Covered Entity, to an Individual in order to meet the requirements under 45 C.F.R. § 164.524.
- (8) Business Associate agrees to make any amendments to PHI in a Designated Record Set that the Covered Entity directs or agrees to pursuant to 45 C.F.R. § 164.526 at the request of the Covered Entity, and in the time and manner agreed to by the parties.
- (9) Business Associate agrees to make internal practices, books, and records, including policies and procedures and PHI, relating to the use and disclosure of PHI received from, or created or received by, Business Associate on behalf of Covered Entity, available to Covered Entity or to the Secretary in a time and manner agreed to by the parties or designated by the Secretary, for purposes of the Secretary determining Covered Entity's compliance with the Privacy Rule.
- (10) Business Associate agrees to document such disclosures of PHI and information related to such disclosures as would be required for Covered Entity to respond to a request by an Individual for an accounting of disclosures of PHI in accordance with 45 C.F.R. § 164.528 and section 13405 of the HITECH Act (42 U.S.C. § 17935) and any regulations promulgated thereunder.
- (11) Business Associate agrees to provide to Covered Entity, in a time and manner agreed to by the parties, information collected in accordance with clause h. (10) of this Section of the Contract, to permit Covered Entity to respond to a request by an Individual for an accounting of disclosures of PHI in accordance with 45 C.F.R. § 164.528 and section 13405 of the HITECH Act (42 U.S.C. § 17935) and any regulations promulgated thereunder. Business Associate agrees at the Covered Entity's direction to provide an accounting of disclosures of PHI directly to an individual in accordance with 45 C.F.R. § 164.528 and section 13405 of the HITECH Act (42 U.S.C. § 17935) and any regulations promulgated thereunder.
- (12) Business Associate agrees to comply with any state or federal law that is more stringent than the Privacy Rule.
- (13) Business Associate agrees to comply with the requirements of the HITECH Act relating to privacy and security that are applicable to the Covered Entity and with the requirements of 45 C.F.R. sections 164.504(e), 164.308, 164.310, 164.312, and 164.316.

- (14) In the event that an individual requests that the Business Associate (a) restrict disclosures of PHI; (b) provide an accounting of disclosures of the individual's PHI; or (c) provide a copy of the individual's PHI in an electronic health record, the Business Associate agrees to notify the covered entity, in writing, within two business days of the request.
- (15) Business Associate agrees that it shall not, directly or indirectly, receive any remuneration in exchange for PHI of an individual without (1) the written approval of the covered entity, unless receipt of remuneration in exchange for PHI is expressly authorized by this Contract and (2) the valid authorization of the individual, except for the purposes provided under section 13405(d)(2) of the HITECH Act,(42 U.S.C. § 17935(d)(2)) and in any accompanying regulations

(16) Obligations in the Event of a Breach

- A. The Business Associate agrees that, following the discovery of a breach of unsecured protected health information, it shall notify the Covered Entity of such breach in accordance with the requirements of section 13402 of HITECH (42 U.S.C. 17932(b) and the provisions of this Section of the Contract.
- B. Such notification shall be provided by the Business Associate to the Covered Entity without unreasonable delay, and in no case later than 30 days after the breach is discovered by the Business Associate, except as otherwise instructed in writing by a law enforcement official pursuant to section 13402 (g) of HITECH (42 U.S.C. 17932(g)) . A breach is considered discovered as of the first day on which it is, or reasonably should have been, known to the Business Associate. The notification shall include the identification and last known address, phone number and email address of each individual (or the next of kin of the individual if the individual is deceased) whose unsecured protected health information has been, or is reasonably believed by the Business Associate to have been, accessed, acquired, or disclosed during such breach.
- C. The Business Associate agrees to include in the notification to the Covered Entity at least the following information:
1. A brief description of what happened, including the date of the breach and the date of the discovery of the breach, if known.
 2. A description of the types of unsecured protected health information that were involved in the breach (such as full name, Social Security number, date of birth, home address, account number, or disability code).
 3. The steps the Business Associate recommends that individuals take to protect themselves from potential harm resulting from the breach.
 4. A detailed description of what the Business Associate is doing to investigate the breach, to mitigate losses, and to protect against any further breaches.
 5. Whether a law enforcement official has advised either verbally or in writing the Business Associate that he or she has determined that notification or notice to

individuals or the posting required under section 13402 of the HITECH Act would impede a criminal investigation or cause damage to national security and; if so, include contact information for said official.

- D. Business Associate agrees to provide appropriate staffing and have established procedures to ensure that individuals informed by the Covered Entity of a breach by the Business Associate have the opportunity to ask questions and contact the Business Associate for additional information regarding the breach. Such procedures shall include a toll-free telephone number, an e-mail address, a posting on its Web site and a postal address. Business Associate agrees to include in the notification of a breach by the Business Associate to the Covered Entity, a written description of the procedures that have been established to meet these requirements. Costs of such contact procedures will be borne by the Contractor.
 - E. Business Associate agrees that, in the event of a breach, it has the burden to demonstrate that it has complied with all notifications requirements set forth above, including evidence demonstrating the necessity of a delay in notification to the Covered Entity.
- (i) Permitted Uses and Disclosure by Business Associate.
- (1) General Use and Disclosure Provisions Except as otherwise limited in this Section of the Contract, Business Associate may use or disclose PHI to perform functions, activities, or services for, or on behalf of, Covered Entity as specified in this Contract, provided that such use or disclosure would not violate the Privacy Rule if done by Covered Entity or the minimum necessary policies and procedures of the Covered Entity.
 - (2) Specific Use and Disclosure Provisions
 - (A) Except as otherwise limited in this Section of the Contract, Business Associate may use PHI for the proper management and administration of Business Associate or to carry out the legal responsibilities of Business Associate.
 - (B) Except as otherwise limited in this Section of the Contract, Business Associate may disclose PHI for the proper management and administration of Business Associate, provided that disclosures are Required by Law, or Business Associate obtains reasonable assurances from the person to whom the information is disclosed that it will remain confidential and used or further disclosed only as Required by Law or for the purpose for which it was disclosed to the person, and the person notifies Business Associate of any instances of which it is aware in which the confidentiality of the information has been breached.
 - (C) Except as otherwise limited in this Section of the Contract, Business Associate may use PHI to provide Data Aggregation services to Covered Entity as permitted by 45 C.F.R. § 164.504(e)(2)(i)(B).
- (j) Obligations of Covered Entity.

- (1) Covered Entity shall notify Business Associate of any limitations in its notice of privacy practices of Covered Entity, in accordance with 45 C.F.R. § 164.520, or to the extent that such limitation may affect Business Associate's use or disclosure of PHI.
 - (2) Covered Entity shall notify Business Associate of any changes in, or revocation of, permission by Individual to use or disclose PHI, to the extent that such changes may affect Business Associate's use or disclosure of PHI.
 - (3) Covered Entity shall notify Business Associate of any restriction to the use or disclosure of PHI that Covered Entity has agreed to in accordance with 45 C.F.R. § 164.522, to the extent that such restriction may affect Business Associate's use or disclosure of PHI.
- (k) Permissible Requests by Covered Entity. Covered Entity shall not request Business Associate to use or disclose PHI in any manner that would not be permissible under the Privacy Rule if done by the Covered Entity, except that Business Associate may use and disclose PHI for data aggregation, and management and administrative activities of Business Associate, as permitted under this Section of the Contract.
- (l) Term and Termination.
- (1) Term. The Term of this Section of the Contract shall be effective as of the date the Contract is effective and shall terminate when the information collected in accordance with clause h. (10) of this Section of the Contract is provided to the Covered Entity and all of the PHI provided by Covered Entity to Business Associate, or created or received by Business Associate on behalf of Covered Entity, is destroyed or returned to Covered Entity, or, if it is infeasible to return or destroy PHI, protections are extended to such information, in accordance with the termination provisions in this Section.
 - (2) Termination for Cause Upon Covered Entity's knowledge of a material breach by Business Associate, Covered Entity shall either:
 - (A) Provide an opportunity for Business Associate to cure the breach or end the violation and terminate the Contract if Business Associate does not cure the breach or end the violation within the time specified by the Covered Entity; or
 - (B) Immediately terminate the Contract if Business Associate has breached a material term of this Section of the Contract and cure is not possible; or
 - (C) If neither termination nor cure is feasible, Covered Entity shall report the violation to the Secretary.
 - (3) Effect of Termination
 - (A) Except as provided in (l)(2) of this Section of the Contract, upon termination of this Contract, for any reason, Business Associate shall return or destroy all PHI received from Covered Entity, or created or received by Business Associate on behalf of Covered Entity. Business Associate shall also provide the information collected in accordance with clause h. (10) of this Section of the Contract to the Covered Entity

within ten business days of the notice of termination. This provision shall apply to PHI that is in the possession of subcontractors or agents of Business Associate. Business Associate shall retain no copies of the PHI.

(B) In the event that Business Associate determines that returning or destroying the PHI is infeasible, Business Associate shall provide to Covered Entity notification of the conditions that make return or destruction infeasible. Upon documentation by Business Associate that return or destruction of PHI is infeasible, Business Associate shall extend the protections of this Section of the Contract to such PHI and limit further uses and disclosures of PHI to those purposes that make return or destruction infeasible, for as long as Business Associate maintains such PHI. Infeasibility of the return or destruction of PHI includes, but is not limited to, requirements under state or federal law that the Business Associate maintains or preserves the PHI or copies thereof.

(m) Miscellaneous Provisions.

- (1) Regulatory References. A reference in this Section of the Contract to a section in the Privacy Rule means the section as in effect or as amended.
- (2) Amendment. The Parties agree to take such action as is necessary to amend this Section of the Contract from time to time as is necessary for Covered Entity to comply with requirements of the Privacy Rule and the Health Insurance Portability and Accountability Act of 1996, Pub. L. No. 104-191.
- (3) Survival. The respective rights and obligations of Business Associate shall survive the termination of this Contract.
- (4) Effect on Contract. Except as specifically required to implement the purposes of this Section of the Contract, all other terms of the Contract shall remain in force and effect.
- (5) Construction. This Section of the Contract shall be construed as broadly as necessary to implement and comply with the Privacy Standard. Any ambiguity in this Section of the Contract shall be resolved in favor of a meaning that complies, and is consistent with, the Privacy Standard.
- (6) Disclaimer. Covered Entity makes no warranty or representation that compliance with this Section of the Contract will be adequate or satisfactory for Business Associate's own purposes. Covered Entity shall not be liable to Business Associate for any claim, civil or criminal penalty, loss or damage related to or arising from the unauthorized use or disclosure of PHI by Business Associate or any of its officers, directors, employees, contractors or agents, or any third party to whom Business Associate has disclosed PHI contrary to the provisions of this Contract or applicable law. Business Associate is solely responsible for all decisions made, and actions taken, by Business Associate regarding the safeguarding, use and disclosure of PHI within its possession, custody or control.

(7) Indemnification. The Business Associate shall indemnify and hold the Covered Entity harmless from and against any and all claims, liabilities, judgments, fines, assessments, penalties, awards and any statutory damages that may be imposed or assessed pursuant to HIPAA, as amended or the

HITECH Act, including, without limitation, attorney's fees, expert witness fees, costs of investigation, litigation or dispute resolution, and costs awarded thereunder, relating to or arising out of any violation by the Business Associate and its agents, including subcontractors, of any obligation of Business Associate and its agents, including subcontractors, under this section of the contract, under HIPAA, the HITECH Act, the Privacy Rule and the Security Rule.

**Notice to Executive Branch State Contractors and Prospective State
Contractors of Campaign Contribution and Solicitation Limitations**

This notice is provided under the authority of Connecticut General Statutes §9-612 (f) (2) and is for the purpose of informing state contractors and prospective state contractors of the following law (italicized words are defined on the reverse side of this page).

CAMPAIGN CONTRIBUTION AND SOLICITATION LIMITATIONS

No *state contractor, prospective state contractor, principal of a state contractor or principal of a prospective state contractor*, with regard to a *state contract or state contract solicitation* with or from a state agency in the executive branch or a quasi-public agency or a holder, or principal of a holder, of a valid prequalification certificate, shall make a contribution to (i) an exploratory committee or candidate committee established by a candidate for nomination or election to the office of Governor, Lieutenant Governor, Attorney General, State Comptroller, Secretary of the State or State Treasurer, (ii) a political committee authorized to make contributions or expenditures to or for the benefit of such candidates, or (iii) a party committee (which includes town committees).

In addition, no holder or principal of a holder of a valid prequalification certificate, shall make a contribution to (i) an exploratory committee or candidate committee established by a candidate for nomination or election to the office of State senator or State representative, (ii) a political committee authorized to make contributions or expenditures to or for the benefit of such candidates, or (iii) a party committee.

On and after January 1, 2011, no state contractor, prospective state contractor, principal of a state contractor or principal of a prospective state contractor, with regard to a state contract or state contract solicitation with or from a state agency in the executive branch or a quasi-public agency or a holder, or principal of a holder of a valid prequalification certificate, shall **knowingly solicit** contributions from the state contractor's or prospective state contractor's employees or from a *subcontractor or principals of the subcontractor* on behalf of (i) an exploratory committee or candidate committee established by a candidate for nomination or election to the office of Governor, Lieutenant Governor, Attorney General, State Comptroller, Secretary of the State or State Treasurer, (ii) a political committee authorized to make contributions or expenditures to or for the benefit of such candidates, or (iii) a party committee.

DUTY TO INFORM

State contractors and prospective state contractors are required to inform their principals of the above prohibitions, as applicable, and the possible penalties and other consequences of any violation thereof.

PENALTIES FOR VIOLATIONS

Contributions or solicitations of contributions made in violation of the above prohibitions may result in the following civil and criminal penalties:

Civil penalties—Up to \$2,000 or twice the amount of the prohibited contribution, whichever is greater, against a principal or a contractor. Any state contractor or prospective state contractor which fails to make reasonable efforts to comply with the provisions requiring notice to its principals of these prohibitions and the possible consequences of their violations may also be subject to civil penalties of up to \$2,000 or twice the amount of the prohibited contributions made by their principals.

Criminal penalties—Any knowing and willful violation of the prohibition is a Class D felony, which may subject the violator to imprisonment of not more than 5 years, or not more than \$5,000 in fines, or both.

CONTRACT CONSEQUENCES

In the case of a state contractor, contributions made or solicited in violation of the above prohibitions may result in the contract being voided.

In the case of a prospective state contractor, contributions made or solicited in violation of the above prohibitions shall result in the contract described in the state contract solicitation not being awarded to the prospective state contractor, unless the State Elections Enforcement Commission determines that mitigating circumstances exist concerning such violation.

The State shall not award any other state contract to anyone found in violation of the above prohibitions for a period of one year after the election for which such contribution is made or solicited, unless the State Elections Enforcement Commission determines that mitigating circumstances exist concerning such violation.

Additional information may be found on the website of the State Elections Enforcement Commission, www.ct.gov/seec. Click on the link to "Lobbyist/Contractor Limitations."

DEFINITIONS

“State contractor” means a person, business entity or nonprofit organization that enters into a state contract. Such person, business entity or nonprofit organization shall be deemed to be a state contractor until December thirty-first of the year in which such contract terminates. “State contractor” does not include a municipality or any other political subdivision of the state, including any entities or associations duly created by the municipality or political subdivision exclusively amongst themselves to further any purpose authorized by statute or charter, or an employee in the executive or legislative branch of state government or a quasi-public agency, whether in the classified or unclassified service and full or part-time, and only in such person's capacity as a state or quasi-public agency employee.

“Prospective state contractor” means a person, business entity or nonprofit organization that (i) submits a response to a state contract solicitation by the state, a state agency or a quasi-public agency, or a proposal in response to a request for proposals by the state, a state agency or a quasi-public agency, until the contract has been entered into, or (ii) holds a valid prequalification certificate issued by the Commissioner of Administrative Services under section 4a-100. “Prospective state contractor” does not include a municipality or any other political subdivision of the state, including any entities or associations duly created by the municipality or political subdivision exclusively amongst themselves to further any purpose authorized by statute or charter, or an employee in the executive or legislative branch of state government or a quasi-public agency, whether in the classified or unclassified service and full or part-time, and only in such person's capacity as a state or quasi-public agency employee.

“Principal of a state contractor or prospective state contractor” means (i) any individual who is a member of the board of directors of, or has an ownership interest of five per cent or more in, a state contractor or prospective state contractor, which is a business entity, except for an individual who is a member of the board of directors of a nonprofit organization, (ii) an individual who is employed by a state contractor or prospective state contractor, which is a business entity, as president, treasurer or executive vice president, (iii) an individual who is the chief executive officer of a state contractor or prospective state contractor, which is not a business entity, or if a state contractor or prospective state contractor has no such officer, then the officer who duly possesses comparable powers and duties, (iv) an officer or an employee of any state contractor or prospective state contractor who has *managerial or discretionary responsibilities with respect to a state contract*, (v) the spouse or a *dependent child* who is eighteen years of age or older of an individual described in this subparagraph, or (vi) a political committee established or controlled by an individual described in this subparagraph or the business entity or nonprofit organization that is the state contractor or prospective state contractor.

“State contract” means an agreement or contract with the state or any state agency or any quasi-public agency, let through a procurement process or otherwise, having a value of fifty thousand dollars or more, or a combination or series of such agreements or contracts having a value of one hundred thousand dollars or more in a calendar year, for (i) the rendition of services, (ii) the furnishing of any goods, material, supplies, equipment or any items of any kind, (iii) the construction, alteration or repair of any public building or public work, (iv) the acquisition, sale or lease of any land or building, (v) a licensing arrangement, or (vi) a grant, loan or loan guarantee. “State contract” does not include any agreement or contract with the state, any state agency or any quasi-public agency that is exclusively federally funded, an education loan, a loan to an individual for other than commercial purposes or any agreement or contract between the state or any state agency and the United States Department of the Navy or the United States Department of Defense.

“State contract solicitation” means a request by a state agency or quasi-public agency, in whatever form issued, including, but not limited to, an invitation to bid, request for proposals, request for information or request for quotes, inviting bids, quotes or other types of submittals, through a competitive procurement process or another process authorized by law waiving competitive procurement.

“Managerial or discretionary responsibilities with respect to a state contract” means having direct, extensive and substantive responsibilities with respect to the negotiation of the state contract and not peripheral, clerical or ministerial responsibilities.

“Dependent child” means a child residing in an individual's household who may legally be claimed as a dependent on the federal income tax of such individual.

“Solicit” means (A) requesting that a contribution be made, (B) participating in any fundraising activities for a candidate committee, exploratory committee, political committee or party committee, including, but not limited to, forwarding tickets to potential contributors, receiving contributions for transmission to any such committee, serving on the committee that is hosting a fundraising event, introducing the candidate or making other public remarks at a fundraising event, being honored or otherwise recognized at a fundraising event, or bundling contributions, (C) serving as chairperson, treasurer or deputy treasurer of any such committee, or (D) establishing a political committee for the sole purpose of soliciting or receiving contributions for any committee. Solicit does not include: (i) making a contribution that is otherwise permitted by Chapter 155 of the Connecticut General Statutes; (ii) informing any person of a position taken by a candidate for public office or a public official, (iii) notifying the person of any activities of, or contact information for, any candidate for public office; or (iv) serving as a member in any party committee or as an officer of such committee that is not otherwise prohibited in this section.

“Subcontractor” means any person, business entity or nonprofit organization that contracts to perform part or all of the obligations of a state contractor's state contract. Such person, business entity or nonprofit organization shall be deemed to be a subcontractor until December thirty first of the year in which the subcontract terminates. “Subcontractor” does not include (i) a municipality or any other political subdivision of the state, including any entities or associations duly created by the municipality or political subdivision exclusively amongst themselves to further any purpose authorized by statute or charter, or (ii) an employee in the executive or legislative branch of state government or a quasi-public agency, whether in the classified or unclassified service and full or part-time, and only in such person's capacity as a state or quasi-public agency employee.

“Principal of a subcontractor” means (i) any individual who is a member of the board of directors of, or has an ownership interest of five per cent or more in, a subcontractor, which is a business entity, except for an individual who is a member of the board of directors of a nonprofit organization, (ii) an individual who is employed by a subcontractor, which is a business entity, as president, treasurer or executive vice president, (iii) an individual who is the chief executive officer of a subcontractor, which is not a business entity, or if a subcontractor has no such officer, then the officer who duly possesses comparable powers and duties, (iv) an officer or an employee of any subcontractor who has managerial or discretionary responsibilities with respect to a subcontract with a state contractor, (v) the spouse or a dependent child who is eighteen years of age or older of an individual described in this subparagraph, or (vi) a political committee established or controlled by an individual described in this subparagraph or the business entity or nonprofit organization that is the subcontractor.

EXHIBIT D

(state wages will be inserted here)

Minimum Rates and Classifications for

ID# 20-9291

**Connecticut Department of Labor
Wage and Workplace Standards**

By virtue of the authority vested in the Labor Commissioner under provisions of Section 31-53 of the General Statutes of Connecticut, as amended, the following are declared to be the prevailing rates and welfare payments and will apply only where the contract is advertised for bid within 20 days of the date on which the rates are established. Any contractor or subcontractor not obligated by agreement to pay

Project #172-494

Project Town:Norwich

State#: unk

FAP#: unk

Project: #172-494

CLASSIFICATION	Hourly	Benefits
1) Boilermaker	33.79	34% + 8.96
1a) Bricklayer, Cement Masons, Cement Finishers, Plasterers, Stone Masons	35.72	33.16
2) Carpenters, Piledrivermen	33.53	25.66
2a) Diver Tenders	33.53	25.66
3) Divers	41.99	25.66
03a) Millwrights	34.94	26.19
4) Painters: (Bridge Construction) Brush, Roller, Blasting (Sand, Water, etc.), Spray	51.0	21.80
4a) Painters: Brush and Roller	34.62	21.80
4b) Painters: Spray Only	36.62	21.80
4c) Painters: Steel Only	35.62	21.80
4d) Painters: Blast and Spray	37.62	21.80
4e) Painters: Tanks, Tower and Swing	36.62	21.80

Project: #172-494

5) Electrician (Trade License required: E-1,2 L-5,6 C-5,6 T-1,2 L-1,2 V-1,2,7,8,9)	40.0	27.67+3% of gross wage
6) Ironworkers: Ornamental, Reinforcing, Structural, and Precast Concrete Erection	36.67	35.77 + a
7) Plumbers (Trade License required: (P-1,2,6,7,8,9 J-1,2,3,4 SP-1,2) and Pipefitters (Including HVAC Work) (Trade License required: S-1,2,3,4,5,6,7,8 B-1,2,3,4 D-1,2,3,4 G-1, G-2, G-8, G-9)	43.62	32.06
-----LABORERS-----		
8) Group 1: Laborer (Unskilled), Common or General, acetylene burner, concrete specialist	30.75	20.84
9) Group 2: Chain saw operators, fence and guard rail erectors, pneumatic tool operators, powdermen	31.0	20.84
10) Group 3: Pipelayers	31.25	20.84
11) Group 4: Jackhammer/Pavement breaker (handheld); mason tenders (cement/concrete), catch basin builders, asphalt rakers, air track operators, block paver, curb setter and forklift operators	31.25	20.84
12) Group 5: Toxic waste removal (non-mechanical systems)	32.75	20.84
13) Group 6: Blasters	32.5	20.84
Group 7: Asbestos/lead removal, non-mechanical systems (does not include leaded joint pipe)	31.75	20.84
Group 8: Traffic control signalmen	18.0	20.84
Group 9: Hydraulic Drills	29.3	18.90
-----LABORERS (TUNNEL CONSTRUCTION, FREE AIR). Shield Drive and Liner Plate Tunnels in Free Air.-----		
13a) Miners, Motormen, Mucking Machine Operators, Nozzle Men, Grout Men, Shaft & Tunnel Steel & Rodmen, Shield & Erector, Arm Operator, Cable Tenders	32.98	20.84 + a
13b) Brakemen, Trackmen	32.01	20.84 + a
-----CLEANING, CONCRETE AND CAULKING TUNNEL-----		

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14) Concrete Workers, Form Movers, and Strippers	32.01	20.84 + a
15) Form Erectors	32.34	20.84 + a
----ROCK SHAFT LINING, CONCRETE, LINING OF SAME AND TUNNEL IN FREE AIR:----		
16) Brakemen, Trackmen, Tunnel Laborers, Shaft Laborers	32.01	20.84 + a
17) Laborers Topside, Cage Tenders, Bellman	31.9	20.84 + a
18) Miners	32.98	20.84 + a
----TUNNELS, CAISSON AND CYLINDER WORK IN COMPRESSED AIR: ----		
18a) Blaster	39.47	20.84 + a
19) Brakemen, Trackmen, Groutman, Laborers, Outside Lock Tender, Gauge Tenders	39.27	20.84 + a
20) Change House Attendants, Powder Watchmen, Top on Iron Bolts	37.29	20.84 + a
21) Mucking Machine Operator	40.06	20.84 + a
----TRUCK DRIVERS----(*see note below)		
Two axle trucks	29.51	24.52 + a
Three axle trucks; two axle ready mix	29.62	24.52 + a
Three axle ready mix	29.67	24.52 + a
Four axle trucks, heavy duty trailer (up to 40 tons)	29.72	24.52 + a
Four axle ready-mix	29.77	24.52 + a
Heavy duty trailer (40 tons and over)	29.98	24.52 + a

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Specialized earth moving equipment other than conventional type on-the road trucks and semi-trailer (including Euclids)	29.77	24.52 + a
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----POWER EQUIPMENT OPERATORS----

Group 1: Crane handling or erecting structural steel or stone, hoisting engineer (2 drums or over), front end loader (7 cubic yards or over), Work Boat 26 ft. & Over, Tunnel Boring Machines. (Trade License Required)	40.97	24.80 + a
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Group 2: Cranes (100 ton rate capacity and over); Excavator over 2 cubic yards; Piledriver (\$3.00 premium when operator controls hammer); Bauer Drill/Caisson. (Trade License Required)	40.64	24.80 + a
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Group 3: Excavator/Backhoe under 2 cubic yards; Cranes (under 100 ton rated capacity), Gradall; Master Mechanic; Hoisting Engineer (all types of equipment where a drum and cable are used to hoist or drag material regardless of motive power of operation), Rubber Tire Excavator (Drott-1085 or similar); Grader Operator; Bulldozer Fine Grade (slopes, shaping, laser or GPS, etc.). (Trade License Required)	39.88	24.80 + a
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Group 4: Trenching Machines; Lighter Derrick; Concrete Finishing Machine; CMI Machine or Similar; Koehring Loader (Skooper)	39.48	24.80 + a
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Group 5: Specialty Railroad Equipment; Asphalt Paver; Asphalt Spreader; Asphalt Reclaiming Machine; Line Grinder; Concrete Pumps; Drills with Self Contained Power Units; Boring Machine; Post Hole Digger; Auger; Pounder; Well Digger; Milling Machine (over 24	38.87	24.80 + a
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Group 5 continued: Side Boom; Combination Hoe and Loader; Directional Driller.	38.87	24.80 + a
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Group 6: Front End Loader (3 up to 7 cubic yards); Bulldozer (rough grade dozer).	38.55	24.80 + a
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Group 7: Asphalt Roller; Concrete Saws and Cutters (ride on types); Vermeer Concrete Cutter; Stump Grinder; Scraper; Snooper; Skidder; Milling Machine (24	38.2	24.80 + a
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Group 8: Mechanic, Grease Truck Operator, Hydroblaster, Barrier Mover, Power Stone Spreader; Welder; Work Boat under 26 ft.; Transfer Machine.	37.79	24.80 + a
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Group 9: Front End Loader (under 3 cubic yards), Skid Steer Loader regardless of attachments (Bobcat or Similar); Fork Lift, Power Chipper; Landscape Equipment (including hydroseeder).	37.34	24.80 + a
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Group 10: Vibratory Hammer, Ice Machine, Diesel and Air Hammer, etc.	35.24	24.80 + a
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Group 11: Conveyor, Earth Roller; Power Pavement Breaker (whiphammer), Robot Demolition Equipment.	35.24	24.80 + a
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Group 12: Wellpoint Operator.	35.18	24.80 + a
Group 13: Compressor Battery Operator.	34.58	24.80 + a
Group 14: Elevator Operator; Tow Motor Operator (Solid Tire No Rough Terrain).	33.41	24.80 + a
Group 15: Generator Operator; Compressor Operator; Pump Operator; Welding Machine Operator; Heater Operator.	32.99	24.80 + a
Group 16: Maintenance Engineer/Oiler	32.32	24.80 + a
Group 17: Portable asphalt plant operator; portable crusher plant operator; portable concrete plant operator.	36.76	24.80 + a
Group 18: Power Safety Boat; Vacuum Truck; Zim Mixer; Sweeper; (minimum for any job requiring CDL license).	34.26	24.80 + a

**NOTE: SEE BELOW

----LINE CONSTRUCTION----(Railroad Construction and Maintenance)---

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20) Lineman, Cable Splicer, Technician	48.19	6.5% + 22.00
21) Heavy Equipment Operator	42.26	6.5% + 19.88
22) Equipment Operator, Tractor Trailer Driver, Material Men	40.96	6.5% + 19.21
23) Driver Groundmen	26.5	6.5% + 9.00
23a) Truck Driver	40.96	6.5% + 17.76

----LINE CONSTRUCTION----

24) Driver Groundmen	30.92	6.5% + 9.70
25) Groundmen	22.67	6.5% + 6.20
26) Heavy Equipment Operators	37.1	6.5% + 10.70

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27) Linemen, Cable Splicers, Dynamite Men	41.22	6.5% + 12.20
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28) Material Men, Tractor Trailer Drivers, Equipment Operators	35.04	6.5% + 10.45
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Welders: Rate for craft to which welding is incidental.

*Note: Hazardous waste removal work receives additional \$1.25 per hour for truck drivers.

ALL Cranes: When crane operator is operating equipment that requires a fully licensed crane operator to operate he receives an extra \$4.00 premium in addition to the hourly wage rate and benefit contributions:

- 1) Crane handling or erecting structural steel or stone; hoisting engineer (2 drums or over)**
- 2) Cranes (100 ton rate capacity and over) Bauer Drill/Caisson**

Crane with 150 ft. boom (including jib) - \$1.50 extra

Crane with 200 ft. boom (including jib) - \$2.50 extra

Crane with 250 ft. boom (including jib) - \$5.00 extra

Crane with 300 ft. boom (including jib) - \$7.00 extra

Crane with 400 ft. boom (including jib) - \$10.00 extra

All classifications that indicate a percentage of the fringe benefits must be calculated at the percentage rate times the "base hourly rate".

Apprentices duly registered under the Commissioner of Labor's regulations on "Work Training Standards for Apprenticeship and Training Programs" Section 31-51-d-1 to 12, are allowed to be paid the appropriate percentage of the prevailing journeymen hourly base and the full fringe benefit rate, providing the work

--Connecticut General Statute Section 31-55a: Annual Adjustments to wage rates by contractors doing

The Prevailing wage rates applicable to this project are subject to annual adjustments each July 1st for the duration of the project.

Each contractor shall pay the annual adjusted prevailing wage rate that is in effect each July 1st, as posted by the Department of Labor.

It is the contractor's responsibility to obtain the annual adjusted prevailing wage rate increases directly from the Department of Labor's website.

The annual adjustments will be posted on the Department of Labor's Web page: www.ct.gov/dol. For those without internet access, please contact the division listed below.

The Department of Labor will continue to issue the initial prevailing wage rate schedule to the Contracting Agency for the project.

All subsequent annual adjustments will be posted on our Web Site for contractor access.

Contracting Agencies are under no obligation pursuant to State labor law to pay any increase due to the annual adjustment provision.

Effective October 1, 2005 - Public Act 05-50: any person performing the work of any mechanic, laborer, or worker shall be paid prevailing wage

All Person who perform work ON SITE must be paid prevailing wage for the appropriate mechanic, laborer, or worker classification.

All certified payrolls must list the hours worked and wages paid to All Persons who perform work ON SITE regardless of their ownership i.e.: (Owners, Corporate Officers, LLC Members, Independent Contractors, et. al)

Reporting and payment of wages is required regardless of any contractual relationship alleged to exist between the contractor and such person.

As of: January 30, 2020

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~~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 clause (29 CFR 5.5 (a) (1) (ii)).

Please direct any questions which you may have pertaining to classification of work and payment of prevailing wages to the Wage and Workplace Standards Division, telephone (860)263-6790.

As of: January 30, 2020

Connecticut Department of Labor
Wage and Workplace Standards Division
FOOTNOTES

Please Note: If the “Benefits” listed on the schedule for the following occupations includes a letter(s) (+ a or + a+b for instance), refer to the information below.

Benefits to be paid at the appropriate prevailing wage rate for the listed occupation.

If the “Benefits” section for the occupation lists only a dollar amount, disregard the information below.

Bricklayers, Cement Masons, Cement Finishers, Concrete Finishers, Stone Masons
(Building Construction) and
(Residential- Hartford, Middlesex, New Haven, New London and Tolland Counties)

- a. Paid Holiday: Employees shall receive 4 hours for Christmas Eve holiday provided the employee works the regularly scheduled day before and after the holiday. Employers may schedule work on Christmas Eve and employees shall receive pay for actual hours worked in addition to holiday pay.

Elevator Constructors: Mechanics

- a. Paid Holidays: New Year’s Day, Memorial Day, Independence Day, Labor Day, Veterans’ Day, Thanksgiving Day, Christmas Day, plus the Friday after Thanksgiving.
- b. Vacation: Employer contributes 8% of basic hourly rate for 5 years or more of service or 6% of basic hourly rate for 6 months to 5 years of service as vacation pay credit.

Glaziers

- a. Paid Holidays: Labor Day and Christmas Day.

Power Equipment Operators
(Heavy and Highway Construction & Building Construction)

- a. Paid Holidays: New Year’s Day, Good Friday, Memorial day, Independence Day, Labor Day, Thanksgiving Day and Christmas Day, provided the employee works 3 days during the week in which the holiday falls, if scheduled, and if scheduled, the working day before and the working day after the holiday. Holidays falling on Saturday may be observed on Saturday, or if the employer so elects, on the preceding Friday.

Ironworkers

- a. Paid Holiday: Labor Day provided employee has been on the payroll for the 5 consecutive work days prior to Labor Day.

Laborers (Tunnel Construction)

- a. Paid Holidays: New Year's Day, Memorial Day, Independence Day, Labor Day, Thanksgiving Day and Christmas Day. No employee shall be eligible for holiday pay when he fails, without cause, to work the regular work day preceding the holiday or the regular work day following the holiday.

Roofers

- a. Paid Holidays: July 4th, Labor Day, and Christmas Day provided the employee is employed 15 days prior to the holiday.

Sprinkler Fitters

- a. Paid Holidays: Memorial Day, July 4th, Labor Day, Thanksgiving Day and Christmas Day, provided the employee has been in the employment of a contractor 20 working days prior to any such paid holiday.

Truck Drivers

(Heavy and Highway Construction & Building Construction)

- a. Paid Holidays: New Year's Day, Memorial Day, Independence Day, Labor Day, Thanksgiving Day, Christmas day, and Good Friday, provided the employee has at least 31 calendar days of service and works the last scheduled day before and the first scheduled day after the holiday, unless excused.

Information Bulletin ***Occupational Classifications***

The Connecticut Department of Labor has the responsibility to properly determine "job classification" on prevailing wage projects covered under C.G.S. Section 31-53(d).

Note: This information is intended to provide a sample of some occupational classifications for guidance purposes only. It is not an all-inclusive list of each occupation's duties. This list is being provided only to highlight some areas where a contractor may be unclear regarding the proper classification. If unsure, the employer should seek guidelines for CTDOL.

Below are additional clarifications of specific job duties performed for certain classifications:

- **ASBESTOS WORKERS**

Applies all insulating materials, protective coverings, coatings and finishes to all types of mechanical systems.

- **ASBESTOS INSULATOR**

Handle, install apply, fabricate, distribute, prepare, alter, repair, dismantle, heat and frost insulation, including penetration and fire stopping work on all penetration fire stop systems.

- **BOILERMAKERS**

Erects hydro plants, incomplete vessels, steel stacks, storage tanks for water, fuel, etc. Builds incomplete boilers, repairs heat exchanges and steam generators.

- **BRICKLAYERS, CEMENT MASONS, CEMENT FINISHERS, MARBLE MASONS, PLASTERERS, STONE MASONS, PLASTERERS. STONE MASONS, TERRAZZO WORKERS, TILE SETTERS**

Lays building materials such as brick, structural tile and concrete cinder, glass, gypsum, terra cotta block. Cuts, tools and sets marble, sets stone, finishes concrete, applies decorative steel, aluminum and plastic tile, applies cements, sand, pigment and marble chips to floors, stairways, etc.

- **CARPENTERS, MILLWRIGHTS. PILEDRIVERMEN. LATHERS. RESILEINT FLOOR LAYERS, DOCK BUILDERS, DIKERS, DIVER TENDERS**

Constructs, erects, installs and repairs structures and fixtures of wood, plywood and wallboard. Installs, assembles, dismantles, moves industrial machinery. Drives piling into ground to provide foundations for structures such as buildings and bridges, retaining walls for earth embankments, such as cofferdams. Fastens wooden, metal or rockboard lath to walls, ceilings and partitions of buildings, acoustical tile layer, concrete form builder. Applies firestopping materials on fire resistive joint systems only. Installation of curtain/window walls only where attached to wood or metal studs. Installation of insulated material of all types whether blown, nailed or attached in other ways to walls, ceilings and floors of buildings. Assembly and installation of modular furniture/furniture systems. Free-standing furniture is not covered. This includes free standing: student chairs, study top desks, book box desks, computer furniture, dictionary stand, atlas stand, wood shelving, two-position information access station, file cabinets, storage cabinets, tables, etc.

- **LABORER, CLEANING**

- The clean up of any construction debris and the general (heavy/light) cleaning, including sweeping, wash down, mopping, wiping of the construction facility and its furniture, washing, polishing, and dusting.

- **DELIVERY PERSONNEL**

- If delivery of supplies/building materials is to one common point and stockpiled there, prevailing wages are not required. If the delivery personnel are involved in the distribution of the material to multiple locations within the construction site then they would have to be paid prevailing wages for the type of work performed: laborer, equipment operator, electrician, ironworker, plumber, etc.

- An example of this would be where delivery of drywall is made to a building and the delivery personnel distribute the drywall from one "stockpile" location to further sub-locations on each floor. Distribution of material around a construction site is the job of a laborer or tradesman, and not a delivery personnel.

- **ELECTRICIANS**

Install, erect, maintenance, alteration or repair of any wire, cable, conduit, etc., which generates, transforms, transmits or uses electrical energy for light, heat, power or other purposes, including the Installation or maintenance of telecommunication, LAN wiring or computer equipment, and low voltage wiring. ****License required per Connecticut General Statutes: E-1,2 L-5,6 C-5,6 T-1,2 L-1,2 V-1,2,7,8,9.***

- **ELEVATOR CONSTRUCTORS**

Install, erect, maintenance and repair of all types of elevators, escalators, dumb waiters and moving walks. **License required by Connecticut General Statutes: R-1,2,5,6.*

- **FORK LIFT OPERATOR**

Laborers Group 4) Mason Tenders - operates forklift solely to assist a mason to a maximum height of nine (9) feet only.

Power Equipment Operator Group 9 - operates forklift to assist any trade, and to assist a mason to a height over nine (9) feet.

- **GLAZIERS**

Glazing wood and metal sash, doors, partitions, and 2 story aluminum storefronts. Installs glass windows, skylights, store fronts and display cases or surfaces such as building fronts, interior walls, ceilings and table tops and metal store fronts. Installation of aluminum window walls and curtain walls is the "joint" work of glaziers and ironworkers, which require equal composite workforce.

- **IRONWORKERS**

Erection, installation and placement of structural steel, precast concrete, miscellaneous iron, ornamental iron, metal curtain wall, rigging and reinforcing steel. Handling, sorting, and installation of reinforcing steel (rebar). Metal bridge rail (traffic), metal bridge handrail, and decorative security fence installation. Installation of aluminum window walls and curtain walls is the "joint" work of glaziers and ironworkers which require equal composite workforce.

- **INSULATOR**

- Installing fire stopping systems/materials for "Penetration Firestop Systems": transit to cables, electrical conduits, insulated pipes, sprinkler pipe penetrations, ductwork behind radiation, electrical cable trays, fire rated pipe penetrations, natural polypropylene, HVAC ducts, plumbing bare metal, telephone and communication wires, and boiler room ceilings.

- **LABORERS**

Acetylene burners, asphalt rakers, chain saw operators, concrete and power buggy operator, concrete saw operator, fence and guard rail erector (except metal bridge rail (traffic), decorative security fence (non-metal)).

installation.), hand operated concrete vibrator operator, mason tenders, pipelayers (installation of storm drainage or sewage lines on the street only), pneumatic drill operator, pneumatic gas and electric drill operator, powermen and wagon drill operator, air track operator, block paver, curb setters, blasters, concrete spreaders.

- **PAINTERS**

Maintenance, preparation, cleaning, blasting (water and sand, etc.), painting or application of any protective coatings of every description on all bridges and appurtenances of highways, roadways, and railroads. Painting, decorating, hardwood finishing, paper hanging, sign writing, scenic art work and drywall hhg for any and all types of building and residential work.

- **LEAD PAINT REMOVAL**

- Painter's Rate

1. Removal of lead paint from bridges.
2. Removal of lead paint as preparation of any surface to be repainted.
3. Where removal is on a Demolition project prior to reconstruction.

- Laborer's Rate

1. Removal of lead paint from any surface NOT to be repainted.
2. Where removal is on a *TOTAL* Demolition project only.

- **PLUMBERS AND PIPEFITTERS**

Installation, repair, replacement, alteration or maintenance of all plumbing, heating, cooling and piping. ****License required per Connecticut General Statutes: P-1,2,6,7,8,9 J-1,2,3,4 SP-1,2 S-1,2,3,4,5,6,7,8 B-1,2,3,4 D-1,2,3,4.***

- **POWER EQUIPMENT OPERATORS**

Operates several types of power construction equipment such as compressors, pumps, hoists, derricks, cranes, shovels, tractors, scrapers or motor graders, etc. Repairs and maintains equipment. ****License required, crane operators only, per Connecticut General Statutes.***

- **ROOFERS**

Covers roofs with composition shingles or sheets, wood shingles, slate or asphalt and gravel to waterproof roofs, including preparation of surface. (demolition or removal of any type of roofing and or clean-up of any and all areas where a roof is to be relaid.)

- **SHEETMETAL WORKERS**

Fabricate, assembles, installs and repairs sheetmetal products and equipment in such areas as ventilation, air-conditioning, warm air heating, restaurant equipment, architectural sheet metal work, sheetmetal roofing, and aluminum gutters. Fabrication, handling, assembling, erecting, altering, repairing, etc. of coated metal material panels and composite metal material panels when used on building exteriors and interiors as soffits, fascia, louvers, partitions, canopies, cornice, column covers, awnings, beam covers, cladding, sun shades, lighting troughs, spires, ornamental roofing, metal ceilings, mansards, copings, ornamental and ventilation hoods, vertical and horizontal siding panels, trim, etc. The sheet metal classification also applies to the vast variety of coated metal material panels and composite metal material panels that have evolved over the years as an alternative to conventional ferrous and non-ferrous metals like steel, iron, tin, copper, brass, bronze, aluminum, etc. Fabrication, handling, assembling, erecting, altering, repairing, etc. of architectural metal roof, standing seam roof, composite metal roof, metal and composite bathroom/toilet partitions, aluminum gutters, metal and composite lockers and shelving, kitchen equipment, and walk-in coolers. To include testing and air –balancing ancillary to installation and construction.

- **SPRINKLER FITTERS**

Installation, alteration, maintenance and repair of fire protection sprinkler systems.

****License required per Connecticut General Statutes: F-1,2,3,4.***

- **TILE MARBLE AND TERRAZZO FINISHERS**

Assists and tends the tile setter, marble mason and terrazzo worker in the performance of their duties.

- **TRUCK DRIVERS**

~How to pay truck drivers delivering asphalt is under REVISION~

Truck Drivers are requires to be paid prevailing wage for time spent "working" directly on the site. These drivers remain covered by the prevailing wage for any time spent transporting between the actual construction location and facilities (such as fabrication, plants, mobile factories, batch plant, borrow pits, job headquarters, tool yards, etc.) dedicated exclusively, or nearly so, to performance of the contract or project, which are so located in proximity to the actual construction location that it is reasonable to include them. ****License required, drivers only, per Connecticut General Statutes.***

For example:

- Material men and deliverymen are not covered under prevailing wage as long as they are not directly involved in the construction process. If, they unload the material, they would then be covered by prevailing wage for the classification they are performing work in: laborer, equipment operator, etc.
- Hauling material off site is not covered provided they are not dumping it at a location outlined above.
- Driving a truck on site and moving equipment or materials on site would be considered covered work, as this is part of the construction process.

➤ *Any questions regarding the proper classification should be directed to:*
Public Contract Compliance Unit
Wage and Workplace Standards Division
Connecticut Department of Labor
200 Folly Brook Blvd, Wethersfield, CT 06109
(860) 263-6543.

Statute 31-55a

Last Updated: June 02, 2008

You are here: [DOL Web Site](#) ▶ [Wage and Workplace Issues](#) ▶ Statute 31-55a

- Special Notice -

To All State and Political Subdivisions, Their Agents, and Contractors

Connecticut General Statute 31-55a - Annual adjustments to wage rates by contractors doing state work.

Each contractor that is awarded a contract on or after October 1, 2002, for (1) the construction of a state highway or bridge that falls under the provisions of section 31-54 of the general statutes, or (2) the construction, remodeling, refinishing, refurbishing, rehabilitation, alteration or repair of any public works project that falls under the provisions of section 31-53 of the general statutes shall contact the Labor Commissioner on or before July first of each year, for the duration of such contract, to ascertain the prevailing rate of wages on an hourly basis and the amount of payment or contributions paid or payable on behalf of each mechanic, laborer or worker employed upon the work contracted to be done, and shall make any necessary adjustments to such prevailing rate of wages and such payment or contributions paid or payable on behalf of each such employee, effective each July first.

- The prevailing wage rates applicable to any contract or subcontract awarded on or after October 1, 2002 are subject to annual adjustments each July 1st for the duration of any project which was originally advertised for bids on or after October 1, 2002.
- Each contractor affected by the above requirement shall pay the annual adjusted prevailing wage rate that is in effect each July 1st, as posted by the Department of Labor.
- It is the *contractor's* responsibility to obtain the annual adjusted prevailing wage rate increases directly from the Department of Labor's Web Site. The annual adjustments will be posted on the Department of Labor Web page: www.ctdol.state.ct.us. For those without internet access, please contact the division listed below.
- The Department of Labor will continue to issue the initial prevailing wage rate schedule to the Contracting Agency for the project. All subsequent annual adjustments will be posted on our Web Site for contractor access.

Any questions should be directed to the Contract Compliance Unit, Wage and Workplace

Standards Division, Connecticut Department of Labor, 200 Folly Brook Blvd.,
Wethersfield, CT 06109 at (860)263-6790.

[Workplace Laws](#)

Published by the Connecticut Department of Labor, Project Management Office

November 29, 2006

Notice
To All Mason Contractors and Interested Parties
Regarding Construction Pursuant to Section 31-53 of the
Connecticut General Statutes (Prevailing Wage)

The Connecticut Labor Department Wage and Workplace Standards Division is empowered to enforce the prevailing wage rates on projects covered by the above referenced statute.

Over the past few years the Division has withheld enforcement of the rate in effect for workers who operate a forklift on a prevailing wage rate project due to a potential jurisdictional dispute.

The rate listed in the schedules and in our Occupational Bulletin (see enclosed) has been as follows:

Forklift Operator:

- **Laborers (Group 4) Mason Tenders** - operates forklift solely to assist a mason to a maximum height of nine feet only.
- **Power Equipment Operator (Group 9)** - operates forklift to assist any trade and to assist a mason to a height over nine feet.

The U.S. Labor Department conducted a survey of rates in Connecticut but it has not been published and the rate in effect remains as outlined in the above Occupational Bulletin.

Since this is a classification matter and not one of jurisdiction, effective January 1, 2007 the Connecticut Labor Department will enforce the rate on each schedule in accordance with our statutory authority.

Your cooperation in filing appropriate and accurate certified payrolls is appreciated.

Informational Bulletin

THE 10-HOUR OSHA CONSTRUCTION SAFETY AND HEALTH COURSE

(applicable to public building contracts entered into *on or after July 1, 2007*, where the total cost of all work to be performed is at least \$100,000)

- (1) This requirement was created by Public Act No. 06-175, which is codified in Section 31-53b of the Connecticut General Statutes (pertaining to the prevailing wage statutes);
- (2) The course is required for public building construction contracts (projects funded in whole or in part by the state or any political subdivision of the state) entered into on or after July 1, 2007;
- (3) It is required of private employees (not state or municipal employees) and apprentices who perform manual labor for a general contractor or subcontractor on a public building project where the total cost of all work to be performed is at least \$100,000;
- (4) The ten-hour construction course pertains to the ten-hour Outreach Course conducted in accordance with federal OSHA Training Institute standards, and, for telecommunications workers, a ten-hour training course conducted in accordance with federal OSHA standard, 29 CFR 1910.268;
- (5) The internet website for the federal OSHA Training Institute is http://www.osha.gov/fso/ote/training/edcenters/fact_sheet.html;
- (6) The statutory language leaves it to the contractor and its employees to determine who pays for the cost of the ten-hour Outreach Course;
- (7) Within 30 days of receiving a contract award, a general contractor must furnish proof to the Labor Commissioner that all employees and apprentices performing manual labor on the project will have completed such a course;
- (8) Proof of completion may be demonstrated through either: (a) the presentation of a *bona fide* student course completion card issued by the federal OSHA Training Institute; *or* (2) the presentation of documentation provided to an employee by a trainer certified by the Institute pending the actual issuance of the completion card;
- (9) Any card with an issuance date more than 5 years prior to the commencement date of the construction project shall not constitute proof of compliance;

- (10) Each employer shall affix a copy of the construction safety course completion card to the certified payroll submitted to the contracting agency in accordance with Conn. Gen. Stat. § 31-53(f) on which such employee's name first appears;
- (11) Any employee found to be in non-compliance shall be subject to removal from the worksite if such employee does not provide satisfactory proof of course completion to the Labor Commissioner by the fifteenth day after the date the employee is determined to be in noncompliance;
- (12) Any such employee who is determined to be in noncompliance may continue to work on a public building construction project for a maximum of fourteen consecutive calendar days while bringing his or her status into compliance;
- (13) The Labor Commissioner may make complaint to the prosecuting authorities regarding any employer or agent of the employer, or officer or agent of the corporation who files a false certified payroll with respect to the status of an employee who is performing manual labor on a public building construction project;
- (14) The statute provides the minimum standards required for the completion of a safety course by manual laborers on public construction contracts; any contractor can exceed these minimum requirements; and
- (15) Regulations clarifying the statute are currently in the regulatory process, and shall be posted on the CTDOL website as soon as they are adopted in final form.
- (16) Any questions regarding this statute may be directed to the Wage and Workplace Standards Division of the Connecticut Labor Department via the internet website of <http://www.ctdol.state.ct.us/wgwkstnd/wgemenu.htm>; or by telephone at (860)263-6790.

THE ABOVE INFORMATION IS PROVIDED EXCLUSIVELY AS AN EDUCATIONAL RESOURCE, AND IS NOT INTENDED AS A SUBSTITUTE FOR LEGAL INTERPRETATIONS WHICH MAY ULTIMATELY ARISE CONCERNING THE CONSTRUCTION OF THE STATUTE OR THE REGULATIONS.

Sec. 31-53b. Construction safety and health course. Proof of completion required for employees on public building projects. Enforcement. Regulations. (a) Each contract entered into on or after July 1, 2007, for the construction, remodeling, refinishing, refurbishing, rehabilitation, alteration or repair of any public building project by the state or any of its agents, or by an political subdivision of the state or any of its agents, where the total cost of all work to be performed by all contractors and subcontractors in connection with the contract is at least one hundred thousand dollars, shall contain a provision requiring that, not later than thirty days after the date such contract is awarded, each contractor furnish proof to the Labor Commissioner that all employees performing manual labor on or in such public building, pursuant to such contract, have completed a course of at least ten hours in duration in construction safety and health approved by the federal Occupational Safety and Health Administration or, in the case of telecommunications employees, have completed at least ten hours of training in accordance with 29 CFR 1910.268.

(b) Any employee required to complete a construction safety and health course required under subsection (a) of this section who has not completed the course shall be subject to removal from the worksite if the employee does not provide documentation of having completed such course by the fifteenth day after the date the employee is found to be in noncompliance. The Labor Commissioner or said commissioner's designee shall enforce this section.

(c) Not later than January 1, 2007, the Labor Commissioner shall adopt regulations, in accordance with the provisions of chapter 54, to implement the provisions of subsections (a) and (b) of this section. Such regulations shall require that the ten-hour construction safety and health courses required under subsection (a) of this section be conducted in accordance with federal Occupational Safety and Health Administration Training Institute standards, or in accordance with 29 CFR 1910.268, as appropriate. The Labor Commissioner shall accept as sufficient proof of compliance with the provisions of subsection (a) or (b) of this section a student course completion card issued by the federal Occupational Safety and Health Administration Training Institute, or such other proof of compliance said commissioner deems appropriate, dated no earlier than five years before the commencement date of such public works project.

(d) For the purposes of this section, "public building" means a structure, paid for in whole or in part with state funds, within a roof and within exterior walls or fire walls, designed for the housing, shelter, enclosure and support or employment of people, animals or property of any kind, including, but not limited to, sewage treatment plants and water treatment plants, "Public building" does not include site work, roads or bridges, rail lines, parking lots or underground water, sewer or drainage systems including pump houses or other utility systems.

CONNECTICUT DEPARTMENT OF LABOR
WAGE AND WORKPLACE STANDARDS DIVISION

CONTRACTORS WAGE CERTIFICATION FORM

I, _____ of _____
Officer, Owner, Authorized Rep. Company Name

do hereby certify that the _____
Company Name

Street

City

and all of its subcontractors will pay all workers on the

Project Name and Number

Street and City

the wages as listed in the schedule of prevailing rates required for such project (a copy of which is attached hereto).

Signed

Subscribed and sworn to before me this _____ day of _____, 2004.

Notary Public

 Return to:

Connecticut Department of Labor
Wage & Workplace Standards Division
200 Folly Brook Blvd.
Wethersfield, CT 06109