

October 4, 2017

STATE OF RHODE ISLAND AND PROVIDENCE PLANTATION
DEPARTMENT OF ADMINISTRATION

DIVISION OF PURCHASES BID NO. 7558488

RHODE ISLAND DEPARTMENT OF TRANSPORTATION

RHODE ISLAND CONTRACT NO.2017-CB-046

FEDERAL-AID PROJECT NO. FAP Nos: BRO-0548(001)

Pine Street Bridge No. 548 (31)

Marrin Street to Cedar Street

CITY/TOWN OF Pawtucket, Providence

COUNTY OF PROVIDENCE

NOTICE TO PROSPECTIVE BIDDERS

ADDENDUM NO. 2 Prospective bidders and all concerned are hereby notified of the following changes in the Plans, Specifications, Proposal and Distribution of Quantities for this contract. These changes shall be incorporated in the Plans, Specifications, Proposal and Distribution of Quantities, and shall become an integral part of the Contract Documents.

A. Specifications - Job Specific

1. JS Index

Delete Page JS-ii in its entirety and replace it with revised Page JS-ii(R-1) and new Page JS-iii attached to this Addendum No. 2. Specifications have been added.

2. JS-45

Delete Page JS-45 in its entirety and replace it with revised Page JS-45(R-1) attached to this Addendum No. 2. The description of work has been revised.

3. JS-58

Delete Page JS-58 in its entirety and replace it with revised Page JS-58(R-1) attached to this Addendum No. 2. The description of portions of the existing substructure to be removed and disposed has been revised.

4. JS-113 through JS-116

Add Pages JS-113 through JS-116 attached to this Addendum No. 2. A specification for Item Code 104.16 Value Engineering Change Proposal has been added.

5. JS-117

Add Page JS-117 attached to this Addendum No. 2. A specification for Item Code 401.9901 Pay Adjustments has been added.

6. JS-118 through JS-121

Add Pages JS-118 through JS-121 attached to this Addendum No. 2. A specification for Item Code 402.9901 Friction Course has been added.

7. JS-122

Add Page JS-122 attached to this Addendum No. 2. A specification for Item Code 402.9902 Friction Course for Shoulders has been added.

8. JS-123 through JS-126

Add Pages JS-123 through JS-126 attached to this Addendum No. 2. A specification for Item Code 413.9901 Rideability - Surface Course has been added.

9. JS-127 through JS-134

Add Pages JS-127 through JS-134 attached to this Addendum No. 2. A specification for Item Code 415.9901 Intelligent Compaction for HMA has been added.

B. Distribution of Quantities

1. Index Pages

Delete Pages Index 1(R-1) through Index 4(R-1), that were issued with Addendum No. 1, in their entirety and replace them with revised Pages Index 1(R-1) through Index 4(R-1) attached to this Addendum No. 2. Items with changes are indicated in bold type.

2. Pages 1 through 3

Delete Pages 1 through 3 in their entirety and replace them with revised Pages 1(R-1) through 3(R-1) attached to this Addendum No. 2. Quantities for Item 201.0409 and 202.0100 have been revised.

3. Page 31

Delete Page 31 in its entirety and replace with revised Page 31(R-1) attached to this Addendum No. 2. Item 401.9901 has been added.

C. Proposal Addition/Deletion

1. Proposal Pages

The lists of minimum and only acceptable bid prices have been revised, Items with changes are indicated in bold type, and a new Item 401.9901 Pay Adjustments has been added.

D. Drawings/Plans - Change/Addition

1. Sheet No. 38 - Job Specific Plan Symbols, Legend & Notes

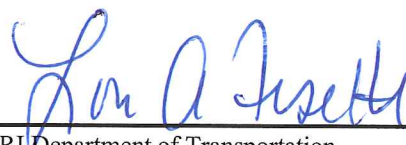
Delete Sheet No. 38 in its entirety and replace it with revised Sheet No. 38(R-1) attached to this Addendum No. 2. The Median Barrier Detail has been revised and Note 3 has been added to the General Notes.

2. Sheet No. 40 - General Plan - 1 Pine Street

Delete Sheet No. 40 in its entirety and replace with revised Sheet No. 40(R-1) attached to this Addendum No. 2. The size and layout of the electric conduit has been revised.

3. Sheet No. 41 - General Plan - 2 Route 95

Delete Sheet No. 41 in its entirety and replace it with revised Sheet No. 41(R-1) attached to this Addendum No. 2. The RI Std. 43.5.0 callout at the median barrier has been revised.



For

RI Department of Transportation
Administrator, Division of Project Management

INDEX
SPECIFICATIONS – JOB SPECIFIC

(R-1)

<u>CODE</u>	<u>TITLE</u>	<u>PAGE</u>
800.9901	Pine Street Bridge No. 548	JS-57
803.9901	Remove and Dispose Existing Bridge Superstructure	JS-58
803.9902	Remove and Dispose Existing Bridge Substructure	JS-58
808.	Ultra-High Performance Concrete (UHPC)	JS-60
809.	Precast Concrete Elements for Substructures	JS-68
810.	Reinforcing Steel	JS-77
916.9901	Narrow Condition Impact Attenuator	JS-81
928.	Truck Mounted Attenuator with Truck Mounted Flashing Arrow Board	JS-82
937.1000	Maintenance and Movement of Traffic Protective Devices	JS-85
938.1000	Price Adjustments	JS-86
943.0200	On-the-Job Training	JS-87
L02.1000	Seeding	JS-92
T04.9901	23 AWG Category 6 STP – Network Video Cable	JS-93
T07.9901	Furnish and Install 195 Watt LED Luminaire	JS-96
T07.9902	Wireless Lighting Controller	JS-97
T12.9901	Modify Traffic Signal Systems	JS-100
T12.9902	Maintenance of Traffic Signal Systems	JS-102
T12.9910	Remove and Replace Camera Lowering Device	JS-104
T12.9911	Furnish and Install Hardened Ethernet Switch with SFP Fiber Optic Transceivers	JS-108
T15.9901	Remove, Stockpile, and Reset Sign on Existing Foundations	JS-112
104.16	Value Engineering Change Proposal	JS-113
401.9901	Pay Adjustments	JS-117

INDEX
SPECIFICATIONS – JOB SPECIFIC

<u>CODE</u>	<u>TITLE</u>	<u>PAGE</u>
402.9901	Friction Course	JS-118
402.9902	Friction Course for Shoulders	JS-122
413.9901	Rideability – Surface Course	JS-123
415.9901	Intelligent Compaction for HMA	JS-127

**CODE 701.9901
VERIZON TELEPHONE FACILITIES**

DESCRIPTION: The work under this item shall consist of furnishing all labor, materials, tools, equipment and incidentals necessary to install a new manhole on the south approach to Pine Street Bridge, and to install new telephone ducts in bridge sidewalks and under approach sidewalks from the new telephone manhole on the south approach to existing pole P-18-1 on the north approach. All of the above work shall be complete in place in accordance with the Contract Plans and the Verizon Work Plan and Standards in Appendix F of the Contract Specific General Provisions.

MATERIALS: All materials shall comply with Verizon standards and specifications.

CONSTRUCTION METHODS: All work shall be performed in strict conformance with Verizon Communications procedures and specifications, and shall be performed by a Verizon Approved Contractor. All work performed shall be subject to the inspection and approval of Verizon Communications or its agent. It will be the Contractor's responsibility to contact Verizon Communications to ensure an inspector will be on site when performing this work.

METHOD OF MEASUREMENT: This item does not require a measurement for payment.

BASIS OF PAYMENT: Item Code 701.9901 "Verizon Telephone Facilities" will be paid for at the contract Lump Sum price as listed in the Proposal. The price so stated shall constitute full and complete compensation for all labor, materials, tools and equipment, and all other incidentals required to complete the work as described in the plans and these Special Provisions, complete in place and accepted by the Engineer and Verizon.

Removal and disposal of existing telephone conduit in approaches is included as incidental to this item.

Partial payments for this Lump Sum item will be made in accordance with Special Provision Code 109.07.

**CODE 803.9901
REMOVE AND DISPOSE EXISTING BRIDGE SUPERSTRUCTURE**

**CODE 803.9902
REMOVE AND DISPOSE PORTIONS OF EXISTING BRIDGE SUBSTRUCTURE**

DESCRIPTION. This work consists of the removal and disposal of the entire superstructure and portions of the substructure of the existing Pine Street Bridge No. 548 in accordance with the Contract Drawings, these Specifications, Section 803 of the RI Standard Specifications, and as directed by the Engineer.

For the purposes of these Special Provisions, the portions of the existing superstructure and substructure to be removed and disposed (to the limits indicated on the Contract Drawings) are in general described as follows:

- Superstructure; the entire superstructure from existing North Abutment to the existing South Abutment (all components above the beam seats, including bearings, roadway joints, protective screens, utilities and all attached and embedded components).
- Substructure; the entire abutments and wingwalls/return walls, the entire center pier in the median of I-95 (including median barrier and slab adjacent thereto), and portions of the piers adjacent to the right hand shoulders of I-95 to the limits indicated on the Contract Drawings (including all attached and embedded components, timber cribbing, cleaning bridge seats, approach slabs, and slope paving).

Excavation required to remove these items, and restoration of disturbed areas in accordance with the RI Standard Specifications, is included in the cost of these items.

The Contractor shall also install temporary deck underside and side protective shielding in accordance with Section 803.0500 of the RI Standard Specifications except that no separate payment will be made for this item. The costs for this item shall be included in the items for removing and disposing the existing bridge.

CONSTRUCTION METHODS. All work performed under these items shall be done in a cautious and professional manner. Care shall be taken to prevent damage to vehicles, utilities and adjacent structures or properties. If any damage does ensue due to the Contractor's or his Subcontractor's operations, it shall be repaired to the satisfaction of the Engineer and property owner(s) at the expense of the Contractor. **No blasting or explosive demolition will be allowed.**

All respective utility companies are to be given a minimum of forty eight (48) hours advanced notice of demolition activities to be performed adjacent to their utilities.

The Contractor shall ensure that no debris or any other foreign material falls onto roadways below the bridges. Should any debris inadvertently fall onto roadways, the debris shall be removed immediately and all work shall stop until such time as a revised procedure of operation has been submitted and approved by the Engineer. Any delay caused as a result of cessation of work shall not relieve the Contractor of any responsibilities under this contract, including the timely completion of work.

The Contractor is made aware that some existing utilities on the existing bridge contain asbestos and shall be handled in accordance with the latest rules and regulations, standards, requirements and procedures of

CODE 104.16
VALUE ENGINEERING CHANGE PROPOSAL

The Contractor is encouraged to use ingenuity and experience to develop and offer any Value Engineering Change Proposal (VECP) to the State for alternative construction designs, methods, procedures, and other innovations that result in a lower total cost, improved quality, or both. It is the intent of this provision to share with the Contractor any direct cost savings as a result of VECP(s) generated by the Contractor and approved by the State. Any cost savings generated to the Contract as a result of a VECP shall be shared equally between the Contractor and the State. Bid prices shall not rely on the anticipated approval of any VECP(s) by the State. If a VECP is rejected, the Work shall be completed per the Contract requirements at the bid prices. VECP(s) shall only be submitted by the Contractor after the Contract is awarded.

If the State determines that the time for response indicated in the submittal under Item 3e below is insufficient for review, the Contractor will be promptly notified. Based on the additional time needed by the State for review and the effect on the Contractor's schedule occasioned by the added time, the State will evaluate the need for a time adjustment to the Contract in accordance with 108.07.

The Contractor shall have no claim against the State for any delay to the Contract based on the failure to respond within the time indicated in Item 2e or 3e below in the submittal if additional information is needed to complete the review.

- 1) **Submittal of VECP – General.** VECP(s) that will be considered are those contemplated to produce a savings to the State without impairing essential functions and characteristics of the facility including but not limited to, service life, economy of operation, ease of maintenance, desired appearance, safety, and impacts to the traveling public or the environment during and after construction.
- 2) **Submittal of a Conceptual Proposal.** The Contractor may submit a conceptual proposal for preliminary evaluation for VECP(s) that require a significant amount of design or other development resources. The Engineer will evaluate the information provided and advise the Contractor if any conditions or parameters of the Conceptual Proposal are found to be grounds for rejection. Preliminary review of a Conceptual Proposal reduces the Contractor's risk of subsequent rejection but does not commit the State to eventual approval of the full VECP. The following materials and information shall be submitted with each Conceptual Proposal:
 - a) A statement that the proposal is submitted as a Conceptual VECP
 - b) A general description of the difference between the existing Contract and the proposed change, and the advantages and disadvantages of each, including effects on cost, service life, economy of operation, ease of maintenance, desired appearance, safety, and impacts to the traveling public or the environment during and after construction.

- c) A set of conceptual plans and description of the proposed changes to the Contract requirements.
 - d) An estimate of the anticipated cost savings.
 - e) When a response to the Conceptual VECP by the State is required.
 - f) Amount of time necessary to develop a Full VECP.
 - g) Date by which a Contract Change Order must be executed to obtain the maximum benefit from the VECP.
 - h) The effect the VECP will have on the completion dates in the Contract.
- 3) **Submittal of Full VECP.** The following materials and information shall be submitted with each Full VECP.
- a) A statement that the proposal is submitted as a Full VECP.
 - b) A description of the difference between the existing Contract and the proposed change, and the comparative advantages and disadvantages of each including effects on service life, economy of operations, ease of maintenance, desired appearance, safety and impacts to the traveling public or the environment during and after construction.
 - c) A complete set of plans and specifications showing the proposed revisions relative to the original Contract features and requirements. The State requires a RI Professional Engineer's stamp and signature on any Engineering changes.
 - d) A complete cost analysis indicating the final estimated costs and quantities to be replaced, compared to the new costs and quantities generated by the VECP, and the cost effects of the proposed changes on operational, maintenance, and other considerations.
 - e) A statement specifying the date by which a Change Order adopting the VECP must be executed so as to obtain the maximum cost reduction during the remainder of the Contract.
 - f) A proposed revised project schedule illustrating the impacts of the VECP on the Contract completion date(s) and any other milestone dates.
 - g) A description of any previous use or testing of the VECP and the conditions and results therewith. If the VECP was previously submitted on another State project, indicate the date, Contract number, and the action taken by the State.
- 4) **Conditions.** VECP(s) will be considered only when all of the following conditions are met:
- a) VECP(s), approved or not approved by the State, apply only to the ongoing Contract(s) referenced in the Proposal and become the property of the State. The VECP(s) shall contain no restrictions imposed by the Contractor on their use or disclosure. The State has the right to use, duplicate, and disclose in whole or in part any data necessary for the utilization of the VECP. The State retains the right to utilize any accepted VECP or part thereof on any other or subsequent projects without any obligation to the Contractor. This provision is not intended to deny

- rights provided by law with respect to patented materials or processes.
- b) If the State is already considering certain revisions to the Contract, or the Standard Specifications, or has approved certain changes in the Contract for general use which are subsequently incorporated in a VECP, the State will reject the VECP and require the Contractor to proceed without any obligation to the Contractor.
 - c) The Contractor shall have no claim against the State for additional costs or delays resulting from the rejection of a VECP, including but not limited to development costs, loss of anticipated profits, increased material or labor costs.
 - d) The State will determine if a VECP qualifies for consideration and evaluation. It may reject any VECP that requires excessive time or costs for review, evaluation, or investigations, or which is not consistent with the State's design policies and basic design criteria for the Project.
 - e) The Engineer will reject all or any portion of work performed under an approved VECP if unsatisfactory results are obtained. The Engineer will direct the removal of such rejected work and require construction to proceed under the original Contract requirements without reimbursement for any work performed or removal of that work under the VECP. Where modifications to the VECP are approved to adjust to field or other conditions, reimbursement will be limited to the total amount payable for the work at the Contract bid prices as if the work were constructed under the original Contract requirements. The rejection or limitation of reimbursement shall not constitute the basis of any claim against the State for delay or for any other costs.
 - f) The VECP proposed work shall not contain experimental features but shall be proven features that have been used under similar or acceptable conditions on other projects or locations acceptable to the State.
 - g) VECP(s) will not be considered if equivalent options are already provided in the Contract documents.
 - h) The savings generated by the VECP must be sufficient to warrant review and processing.
 - i) A VECP changing the type or thickness or both type and thickness of the pavement structure will not be considered. Also, any VECP that solely substitutes one material for another will not be considered.
 - j) Additional information needed to evaluate VECP(s), shall be provided in a timely manner. Untimely submittals of additional information will result in rejection of the VECP.
 - k) Where design changes are proposed, the additional information could include results of field investigations and surveys, design computations, and field change sheets.
 - l) Approval or disapproval of a VECP on one Contract does not guarantee approval or disapproval on another Contract.
 - m) Approval of the Conceptual VECP in no way obligates the State to approve the Full VECP.
 - n) No work related to a VECP shall be performed under Force Account. Agreed

prices must be determined for all pay items related to the VECP before it is approved.

- o) VECP(s) that only reduce or eliminate Contract pay items will not be considered.
- p) If the VECP creates a significant change as defined in 104.02 that would not have otherwise resulted, the Contractor has no entitlement for additional compensation as provided for in 104.02.

5) **Payment.** If the VECP is accepted and approved, the changes and payment will be authorized with a Change Order. Reimbursement will be made as follows:

- a) The changes will be incorporated into the Contract by changes in quantities of unit bid items, or new agreed price items, as appropriate, under the Contract.
- b) The cost of the revised work as determined from the changes will be paid directly. In addition, the State will pay the Contractor 50 percent of the savings to the State as reflected by the difference between the cost of the revised work and the cost of the related construction required by the original Contract computed at Contract bid prices.
- c) The cost for development, design, and implementation of the VECP are not eligible for reimbursement.
- d) The Contractor may submit VECP(s) for an approved Subcontractor. Subcontractors may not submit a VECP(s) except through the Contractor.
- e) VECP payments are for direct savings or costs. Indirect saving or costs (time, user costs, etc.) will not be included in payment calculations.

**CODE 401.9901
PAY ADJUSTMENTS**

401.01 DESCRIPTION. This specification provides a mechanism for the payment of performance incentives (positive pay adjustments) for binder content, voids, in-place density and rideability.

401.02 MATERIALS. N/A.

401.03 CONSTRUCTION METHODS. N/A.

401.04 METHOD OF MEASUREMENT. Pay adjustments will be measured using the “Method of Measurement” sections of the applicable HMA and rideability specifications.

401.05 BASIS OF PAYMENT. Pay adjustments will be paid using the respective contract unit price for HMA as listed in the proposal in conjunction with the pay adjustment requirements in the HMA and rideability specifications.

**CODE 402.9901
FRICTION COURSE**

DESCRIPTION: Friction Course shall be produced in accordance with the Rhode Island Standard Specifications for Road and Bridge Construction with the following exceptions:

MATERIALS:

1) Performance Graded Binder

The binder shall meet the requirements of PG 64E-28 as specified in AASHTO M 320 and R 29 and shall incorporate at least 2.0% SBS polymer. The nonrecoverable creep compliance versus percent recovery of the binder shall fall above the curve in Figure X1.1 in Appendix X1 of M 332 when plotted. Re-refined engine oil bottoms (REOB) shall not be used in the binder. The Contractor may use an approved warm mix additive (WMA) at a dosage rate recommended by the manufacturer. If a WMA is used it shall be provided at no additional cost to the State.

The mix design shall be a 50 blow Marshall mix meeting the following requirements:

2) Gradation and Asphalt Content Master Range

Sieve Size	Percent Passing
¾"	100
½"	95-100
3/8"	70-100
#4	25-45
#8	20-35
#30	8-15
#50	5-12
#200	2-6
%AC	5.0-7.0
Marshall Stability	750 Minimum
% Voids	5 Minimum
Flow	8-16

3) Mix Production – Lots and Sublots

A standard subplot is 600 tons for HMA sampled at the plant for each production run. A standard lot for each mix is ten sublots. A sample will be randomly selected and tested for each subplot. At least five sublots will be used when calculating pay adjustments.

If the quantity of HMA needed to finish a production run is projected by the Contractor to be less than the standard subplot size of 600 tons, the projected tonnage may be used to select a random sample. If the projected tonnage is not produced or a random sample is unable to be taken, the Engineer may select a sample at the end of the run or at the paver. If no sample is taken, the tonnage will be added to the previous subplot.

Additional samples may be taken at the discretion of the Engineer.

Adjustments to Lots

If less than five sublots are tested after the end of the final standard lot, they will be added to that lot. Five or more sublots tested after the end of the final standard lot will constitute a separate lot.

Plant Pay Adjustments

- (a) Pay adjustments for deviation from the optimum binder content (established by the mix design) in Table 1 will apply:

Table 1 – OBC Pay Adjustments

Deviation from Optimum Binder Content	Pay Adjustment
Less than or equal to 0.1 %	+2%
0.2%	+1%
0.3%	0%
0.4%	-5%
0.5%	-15%
0.6%	-30%
0.7%	-40%
Greater than 0.7 %	-50% or Remove and Replace*

* The decision to make 50% payment or Remove and Replace will be made by the Engineer

Note: All deviation values will be rounded to the nearest 0.1% before applying pay adjustments.

- (b) Calculation of Pay Adjustments for Production Binder Content

For each test, absolute deviations will be used when determining binder content pay adjustments. Absolute deviations are the values of deviation regardless of sign (\pm).

The average of the absolute deviations from the optimum binder content of all of the sublots in each lot will be used to determine the appropriate pay adjustments for the lots. No payment will be made for any pavement that is removed.

All other tolerances shall conform to the RI Standard Specifications.

Placement.

A material transfer vehicle shall be used for the placement of friction course in all travel lanes. Spreading of the mixture shall be performed carefully and the operation shall be continuous. In the event that unforeseen circumstances cause the paving operation to cease, a minimum of three loaded trucks will be on site before paving will be allowed to resume. Particular attention shall be given to the joints and all irregularities shall be removed before compacting.

After placement, the mixture shall be completely and uniformly compacted with powered steel drum rollers. A minimum of three rollers shall be operated to handle the output of the plant. At least one shall be used in the vibratory or oscillatory mode. Rolling shall continue until all roller marks are eliminated, the surface is of uniform texture and true to grade and cross section. At least three passes must be made at all locations on the mat. Each roller shall exert a minimum average force of 150 pounds per inch along the width of each drum. At least two of the rollers must have a minimum operating weight of 20,000 pounds as published by the manufacturer. The first pass with the specified roller shall be completed when the temperature of the layer is at least 280°F.

Each lane may be paved so that a longitudinal drop-off remains until the next paving session. Unless otherwise permitted by the Engineer, each subsequent paving operation shall proceed adjacent to the previous. A 12" notched wedge joint maker shall be used. Notched wedge joints shall be sprayed with tack coat at a rate of 0.12 +0.02/-0.00 gallons per square yard. Transverse joints shall be manually brushed with tack coat. Signs conforming to the MUTCD shall be placed in advance of longitudinal drop offs.

The tack coat shall be RS-1 or RS-1h and shall be uniformly applied at a rate of 0.08 +0.02/-0.00 gallons per square yard to the underlying surface to be paved.

Weather Limitations: Friction course shall not be placed on a wet or damp surface or when the temperature of the surface to be paved, in the shade, is less than 55° F, measured prior to placement. It shall only be placed when the air temperature, in the shade, is at least 55° F. If a WMA (warm mix additive) is used both the air and surface temperature in the shade shall be 45° F or greater.

If the Contractor mobilizes and the Weather Limitations come into effect the Contractor shall bear all costs associated with the stopping, delaying or canceling of operations.

METHOD OF MEASUREMENT:

Tolerance Limitation. Pavement will be considered acceptable when meeting the specifications. Pavement that is not accepted will be excluded from the tolerance allowance. When delivery tickets are directly collected by the Engineer from each truck prior to placing in the hopper, the delivery tickets may be used in the determination of total tonnage delivered and placed. Delivery tickets not collected directly by the Engineer prior to placing in the hopper will not be used to determine tonnage.

When delivery tickets are not used to determine tonnage, the accepted total tonnage delivered and placed will be calculated according to the following formula: [final surface course width] x [project length] x [specified pavement thickness] x [the average unit weight of all acceptance density cores] = contract tonnage. If density cores are not required then 96% of the average unit weight of the plant produced Marshall or Gyratory cores shall be used.

Payment will be made at full contract unit bid prices with pay adjustments for all accepted HMA up to 105% of the contract quantity tonnage. Accepted HMA quantities above 105% and up to 110% of the contract quantity tonnage will be paid at 50% of the contract unit bid prices with additional pay adjustments as applicable.

BASIS OF PAYMENT:

The accepted quantity of the HMA will be paid for at its respective contract unit price per ton as listed in the Proposal. The price so-stated constitutes full and complete compensation for all labor, materials and equipment, and for all incidentals required to finish the work, complete and accepted by the Engineer.

Positive pay adjustments for binder content will be applied to the unit bid price for the applicable item code using Section 401.9901. Negative pay adjustments for binder content will be applied to the unit bid price for the applicable item code using a Report of Change.

CODE 402.9902
FRICION COURSE FOR SHOULDERS

402.01 DESCRIPTION. This specification describes the requirements for friction course to be used in low speed shoulders constructed separately from the travel lanes.

402.02 MATERIALS. The Materials shall be as described within the “Materials” section of Friction Course, Section 402.9901 with the exception that the binder shall meet the requirements of PG 64S-28.

402.03 CONSTRUCTION METHODS. The Construction Methods shall be as described within the “Construction Methods” section of Friction Course, Section 402.9901. Friction Course for Shoulders shall not be used where traffic crosses the shoulder at ramps.

402.04 METHOD OF MEASUREMENT. Friction Course for Shoulders shall be measured using the “Method of Measurement” section of Friction Course, Section 402.9901.

402.05 BASIS OF PAYMENT. The Basis of Payment shall be as described within the “Basis of Payment” section of Friction Course, Section 402.9901.

CODE 413.9901
RIDEABILITY – SURFACE COURSE

413.01 Description. This specification covers pavement rideability as determined by the Engineer in accordance with the rating scale, based upon post paving rideability determination.

413.02 Materials. N/A.

413.03 General. Pavement rideability, or ride quality, will be determined by the Engineer using a profiler on all travel lanes. A travel lane is defined as the primary traveled portion of the roadway excluding ramps, turn lanes, auxiliary lanes, and non-normally traveled pavement surfaces. The profiler will meet all of the equipment requirements of AASHTO M 328.

The surface course ride quality acceptance will be based on the average International Roughness Index (IRI) of three tests using a profiler, for each wheel path for each 0.1-mile section, conducted by the Engineer and reported for each travel lane.

An IRI number in inches per mile will be established using ProVAL software for each 0.1-mile long section for each wheel path in each travel lane. A 300 foot long-wavelength filter will be applied during testing. A 250mm short-wavelength filter will be applied during analysis using ProVAL.

The profile for each wheelpath of each 0.1 mile section in each travel lane will be considered a subplot. A standard lot is defined as 20 consecutive sublots of a single wheelpath of a single travel lane. If a road segment has less than 20 but more than 6 consecutive sublots for each wheelpath, a lot will be comprised of all of the sublots from one wheelpath. If a road segment has 6 or less consecutive sublots for each wheelpath, a lot will be comprised of all of the sublots from the road segment. If the final lots include 10 or more sublots for each wheelpath, they will be considered their own lots. If the final lots are less than 10 sublots, they will be added to the preceding lots.

Areas that are excluded from testing (“leave-out” sections) include the area 15 feet before and after pavement segments with manholes, catch basins or other structures in the travel lane and the area 25 feet before and after bridge joints and project paving limits, all as determined by the Engineer. Areas excluded from testing by the profiler may, at the Engineer’s discretion, be tested using a 10-foot maximum straightedge. The variation of the surface between any two contacts along the straightedge shall be not more than 1/4 inch. Humps and depressions exceeding the specified tolerance shall be subject to correction as directed by the Engineer, at no additional cost to the State.

Sections before “leave-out” sections and the section at the end of the paving limit will be added to the previous subplot if they are less than 0.05 miles or will be considered a full subplot if they are greater than or equal to 0.05 miles.

413.04 Method of Measurement

Calculating the percentage of work that is within specification limits (PWL) for each lot will be performed as follows:

1) The mean (X) of each lot will be determined using each subplot within the lot, calculated using the following equation:

$$X = \frac{\sum x}{n}$$

Where: x = the subplot IRI value
 n = the number of sublots in the lot
 Σ = the summation of

2) The standard deviation (s) of each lot will be determined using each subplot within the lot, calculated using the following equation:

$$s = \sqrt{\frac{n\Sigma(x^2) - (\Sigma x)^2}{n(n-1)}}$$

Where: $\Sigma(x^2)$ = summation of the squares of subplot values
 $(\Sigma x)^2$ = summation of subplot values squared
 n = the number of sublots in the lot

3) The upper quality index (Q_u) of each lot will be determined using the mean and standard deviation of each lot, and will be calculated using the following equation:

$$Q_u = \frac{USL - X}{s}$$

Where: USL = the upper spec limit from Table 1
 X = the lot mean
 s = the lot standard deviation

4) The percentage of the lot that falls below the USL (P_u) will be determined using Table 2, and the Q_u value determined above. The P_u value is determined from the table by entering the column corresponding to the number of sublots (n) in the lot, and locating the row that corresponds with the Q_u value. If Q_u is a negative value, the absolute value of Q_u will be used to determine the table value for P_u and PWL will be equal to 100 minus the table value for P_u . If Q_u is positive the percent within limits (PWL) will be equal to P_u .

5) The pay equation for determining the pay factor for each lot will be determined as follows:

$$Pay\ Factor = \frac{55 + 0.50(PWL)}{100}$$

If the PWL is greater than 90, the bonus (portion of pay factor in excess of 1.00) will be multiplied by 0.6.

6) The pay factor for each lot will be applied to the theoretical tonnage of each respective lot. The theoretical lot tonnage will be obtained by taking the measured length, multiplied by half of the design width of the travel lane, multiplied by the design thickness of the surface course, multiplied by the unit weight derived from 94% of the averages of the theoretical maximum densities for dense graded mixes or 96% of the Marshall or Gyrotory densities for friction course obtained at the plant.

Table 1

Posted Speed Limit	Upper Spec Limit for IRI	Maximum IRI for Sublots
Greater than or Equal to 50 MPH	60 in/mile	120 in/mile
Less than 50 MPH	95 in/mile	170 in/mile

Sublots that exceed the maximum IRI value in Table 1 will be subject to corrective action. In order to produce a uniform cross section, the Engineer may require corrections to the adjoining lanes and shoulders. Corrections shall be at no cost to the State. The method of correction shall be limited to diamond grinding or another approved method.

Where corrections are made after the official Department test, the pavement will be retested by the Engineer to verify that corrections have produced an acceptable ride surface. The PWL will be recalculated after corrective action.

This rideability specification does not relieve the Contractor from responsibility concerning workmanship in accordance with the Specifications and other contract requirements.

413.05 Basis of Payment

An adjusted unit price for each lot of the surface course will be calculated by multiplying the pay factor by the unit price. The adjusted unit price will be applied to the theoretical lot tonnage to determine payment for the lot. Previous payment for respective lot tonnage at bid unit price will be deducted to determine the net pay adjustment (incentive or disincentive) for the lot.

Incentives will be addressed using Item Code 401.9901. Disincentives will be addressed using a Report of Change.

Table 2 – Values for Estimating Percentage of Lot Within Specification Limits

Pu (PWL)	Upper Quality Index (Q _U)														
	n = 3	n = 4	n = 5	N = 6	n = 7	n = 8	n = 9	n = 10	n = 12	n = 15	n = 19	n = 26	n = 38	n = 70	n = 201
								to	to	to	to	to	to	to	to
100	1.16	1.50	1.79	2.03	2.23	2.39	2.53	2.65	2.83	3.03	3.20	3.38	3.54	3.70	3.83
99		1.47	1.67	1.80	1.89	1.95	2.00	2.04	2.09	2.14	2.18	2.22	2.26	2.29	2.31
98	1.15	1.44	1.60	1.70	1.76	1.81	1.84	1.86	1.91	1.93	1.96	1.99	2.01	2.03	2.05
97		1.41	1.54	1.62	1.67	1.70	1.72	1.74	1.77	1.79	1.81	1.83	1.85	1.86	1.87
96	1.14	1.38	1.49	1.55	1.59	1.61	1.63	1.65	1.67	1.68	1.70	1.71	1.73	1.74	1.75
95		1.35	1.44	1.49	1.52	1.54	1.55	1.56	1.58	1.59	1.61	1.62	1.63	1.63	1.64
94	1.13	1.32	1.39	1.43	1.46	1.47	1.48	1.49	1.50	1.51	1.52	1.53	1.54	1.55	1.55
93		1.29	1.35	1.38	1.40	1.41	1.42	1.43	1.44	1.44	1.45	1.46	1.46	1.47	1.47
92	1.12	1.26	1.31	1.33	1.35	1.36	1.36	1.37	1.37	1.38	1.39	1.39	1.40	1.40	1.40
91	1.11	1.23	1.27	1.29	1.30	1.30	1.31	1.31	1.32	1.32	1.33	1.33	1.33	1.34	1.34
90	1.10	1.20	1.23	1.24	1.25	1.25	1.26	1.26	1.26	1.27	1.27	1.27	1.28	1.28	1.28
89	1.09	1.17	1.19	1.20	1.20	1.21	1.21	1.21	1.21	1.22	1.22	1.22	1.22	1.22	1.23
88	1.07	1.14	1.15	1.16	1.16	1.16	1.17	1.17	1.17	1.17	1.17	1.17	1.17	1.17	1.17
87	1.06	1.11	1.12	1.12	1.12	1.12	1.12	1.12	1.12	1.12	1.12	1.12	1.12	1.13	1.13
86	1.04	1.08	1.08	1.08	1.08	1.08	1.08	1.08	1.08	1.08	1.08	1.08	1.08	1.08	1.08
85	1.03	1.05	1.05	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04
84	1.01	1.02	1.01	1.01	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.99	0.99	0.99
83	1.00	0.99	0.98	0.97	0.97	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.95	0.95	0.95
82	0.97	0.96	0.95	0.94	0.93	0.93	0.93	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
81	0.96	0.93	0.91	0.90	0.90	0.89	0.89	0.89	0.89	0.88	0.88	0.88	0.88	0.88	0.88
80	0.93	0.90	0.88	0.87	0.86	0.86	0.86	0.85	0.85	0.85	0.85	0.84	0.84	0.84	0.84
79	0.91	0.87	0.85	0.84	0.83	0.82	0.82	0.82	0.82	0.81	0.81	0.81	0.81	0.81	0.81
78	0.89	0.84	0.82	0.80	0.80	0.79	0.79	0.79	0.78	0.78	0.78	0.78	0.77	0.77	0.77
77	0.87	0.81	0.78	0.77	0.76	0.76	0.76	0.75	0.75	0.75	0.75	0.74	0.74	0.74	0.74
76	0.84	0.78	0.75	0.74	0.73	0.73	0.72	0.72	0.72	0.71	0.71	0.71	0.71	0.71	0.71
75	0.82	0.75	0.72	0.71	0.70	0.70	0.69	0.69	0.69	0.68	0.68	0.68	0.68	0.68	0.67
74	0.79	0.72	0.69	0.68	0.67	0.66	0.66	0.66	0.66	0.65	0.65	0.65	0.65	0.64	0.64
73	0.76	0.69	0.66	0.65	0.64	0.63	0.63	0.63	0.62	0.62	0.62	0.62	0.62	0.61	0.61
72	0.74	0.66	0.63	0.62	0.61	0.60	0.60	0.60	0.59	0.59	0.59	0.59	0.59	0.58	0.58
71	0.71	0.63	0.60	0.59	0.58	0.57	0.57	0.57	0.57	0.56	0.56	0.56	0.56	0.55	0.55
70	0.68	0.60	0.57	0.56	0.55	0.55	0.54	0.54	0.54	0.53	0.53	0.53	0.53	0.53	0.52
69	0.65	0.57	0.54	0.53	0.52	0.52	0.51	0.51	0.51	0.50	0.50	0.50	0.50	0.50	0.50
68	0.62	0.54	0.51	0.50	0.49	0.49	0.48	0.48	0.48	0.48	0.47	0.47	0.47	0.47	0.47
67	0.59	0.51	0.47	0.47	0.46	0.46	0.46	0.45	0.45	0.45	0.45	0.44	0.44	0.44	0.44
66	0.56	0.48	0.45	0.44	0.44	0.43	0.43	0.43	0.42	0.42	0.42	0.42	0.41	0.41	0.41
65	0.52	0.45	0.43	0.41	0.41	0.40	0.40	0.40	0.40	0.39	0.39	0.39	0.39	0.39	0.39
64	0.49	0.42	0.40	0.39	0.38	0.38	0.37	0.37	0.37	0.37	0.36	0.36	0.36	0.36	0.36
63	0.46	0.39	0.37	0.36	0.35	0.35	0.35	0.34	0.34	0.34	0.34	0.34	0.33	0.33	0.33
62	0.43	0.36	0.34	0.33	0.32	0.32	0.32	0.32	0.31	0.31	0.31	0.31	0.31	0.31	0.31
61	0.39	0.33	0.31	0.30	0.30	0.29	0.29	0.29	0.29	0.29	0.28	0.28	0.28	0.28	0.28
60	0.36	0.30	0.28	0.27	0.27	0.27	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.25	0.25
59	0.32	0.27	0.25	0.25	0.24	0.24	0.24	0.24	0.23	0.23	0.23	0.23	0.23	0.23	0.23
58	0.29	0.24	0.23	0.22	0.21	0.21	0.21	0.21	0.21	0.21	0.20	0.20	0.20	0.20	0.20
57	0.25	0.21	0.20	0.19	0.19	0.19	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18
56	0.22	0.18	0.17	0.16	0.16	0.16	0.16	0.16	0.16	0.15	0.15	0.15	0.15	0.15	0.15
55	0.18	0.15	0.14	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13
54	0.14	0.12	0.11	0.11	0.11	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10
53	0.11	0.09	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08
52	0.07	0.06	0.06	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05
51	0.04	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.02
50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Note: If the calculated value of Q_U does not correspond exactly to a value in the table, the next lower value will be used.

Code 415.9901
INTELLIGENT COMPACTION FOR HMA

DESCRIPTION

This work shall consist of the compaction of the HMA utilizing intelligent compaction (IC) rollers within the limits of the work as described in the plans. IC is defined as a process that uses vibratory rollers equipped with a measurement and documentation system that automatically records various critical compaction parameters in real time during the compaction process. IC uses roller vibration measurements to assess the mechanistic properties of the compacted materials to ensure optimum compaction is achieved through continuous monitoring of the operations.

The Contractor shall supply sufficient numbers of rollers and other associated equipment necessary to complete the compaction requirements for the specific materials. At least one IC roller shall be used. The required position for an IC roller is in the initial phase (breakdown) in the paving sequence. Any additional IC rollers shall be used in the intermediate phase.

EQUIPMENT

IC Roller - The IC roller(s) shall meet the following specific requirements:

1. IC rollers shall be self-propelled double-drum vibratory rollers equipped with accelerometers mounted in or about the drum to measure the interactions between the rollers and compacted materials in order to evaluate the applied compaction effort. IC rollers shall be equipped with non-contact temperature sensors for measuring pavement surface temperatures.
2. The output from the roller is designated as the Intelligent Compaction Measurement Value (IC-MV) which represents the stiffness of the material being rolled based on the vibration of the roller drums and the resulting response from the underlying materials.
3. GPS radio and receiver units shall be mounted on each IC roller to monitor the drum locations and track the number of passes of the rollers.
4. IC rollers shall include an integrated on-board documentation system that is capable of displaying real-time color-coded maps of IC measurement values including the stiffness response values, location of the roller, number of roller passes, pavement surface temperatures, roller speeds, vibration frequencies and amplitudes of roller drums.
5. The display unit shall be capable of transferring the data by means of a USB port.
6. An on-board printer capable of printing the identity of the roller, the date of measurements, construction area being mapped, percentage of the construction area mapped, target IC-MV, and areas not meeting the IC-MV target values shall be provided.

The following contact information is provided for three pre-approved vendors. Others may be submitted for approval.

Vendor	Bomag	Sakai	Wirtgen/Hamm
Model	Asphalt Manager	CIS	HCQ
Model No.	BW190AD-4AM	SW880/SW890	HD+ 90 / HD+ 110 HD+ 120 / HD+ 140
Documentation	BCM 05 Office	AithonMT-A	HMV
Company Address	Bomag Americas, Inc. 200 Kentville Road Kewanee, Il. 61443	Sakai America, Inc. 90 International Parkway Adairsville, Ga. 30103	Wirtgen America, Inc. 6030 Dana Way Antioch, TN 37013
Contact Information	Chris Connolly (301) 262-5447 Chris.Connolly@bomag.com	Brandon Crockett (800)-323-0535 B- crockett@sakaiamerica.com	Tim Kowalski (615) 501-0600 tkowalski@Wirtgenamerica.com

Global Positioning System (GPS). The Contractor shall provide GPS technology to achieve accurate and consistent GPS measurements among all GPS equipped devices on the project.

GPS-Related Definitions

- **GPS:** A space-based satellite navigation system that provides location and time information in all weather, anywhere on or near the Earth to determine the location in geodetic coordinates. In this specification, GPS refers to all GPS-related signals including US GPS, and other Global Navigation Satellite Systems (GNSS).
- **Hand-Held GPS rover:** A portable GPS radio/receiver for in-situ point measurements.
- **GPS Base Station:** A single ground-based system that consists of a GPS receiver, GPS antenna, radio and radio antenna to provide L1/L2 differential GPS correction signals to other GPS receivers within a range limited by radio, typically 3 miles (4.8 Km) in radius without repeaters.
- **Network RTK:** Network RTK is a system that use multiple bases in real-time to provide high-accuracy GPS positioning within the coverage area that is generally larger than that covered by a ground-based GPS base station; e.g., VRSTM.
- **GPS Correction Service Subscription:** A service that can be subscribed to receive VRS signals in order to achieve higher accuracy GPS positioning normally via cellular wireless data services; i.e., without the need for a ground-based base station. Examples of GPS Correction Service subscriptions are: Trimble VRSTM, Trimble VRS NOWTM, OmniSTAR, etc.
- **RTK-GPS:** Real Time Kinematic Global Positioning Systems based on the use of carrier phase measurements of the available GPS signals where a single reference station or a

reference station network provides the real-time corrections in order to achieve centimeter-level accuracy.

- **UTM Coordinates:** Universal Transverse Mercator (UTM) is a 2-dimensional Cartesian coordinates system that divides the surface of Earth between 80°S and 84°N latitude into 60 zones, each 6° of longitude in width and centered over a meridian of longitude. Zone 1 is bounded by longitude 180° to 174° W and is centered on the 177th West meridian. The UTM system uses projection techniques to transform an ellipsoidal surface to a flat map that can be printed on paper or displayed on a computer screen. Note that UTM is metric-based.

- **Geodetic Coordinates:** A non-earth-centric coordinate system to describe a position in longitude, latitude, and altitude above the imaginary ellipsoid surface based on a specific geodetic datum. WGS-84 and NAD83 datum are required for use with UTM and State Plans, respectively.

- **ECEF XYZ:** Earth-Centered, Earth-Fixed Cartesian X, Y, Z coordinates.

- **Grid:** Referred to ECEF XYZ in this specification.

- **GUI Display:** Graphical User Interface Display

- **State Plane Coordinate:** A set of 124 geographic zones or coordinate systems designed for specific regions of the United States. Each state contains one or more state plane zones, the boundaries of which usually follow county lines. The current State Plane coordinate is based on NAD83.

- **UTC:** Coordinated Universal Time (UTC) is commonly referred to as Greenwich Mean Time (GMT) and is based on a 24 hours' time scale from the mean solar time at the Earth's prime meridian (zero degrees longitude) located near Greenwich, England.

All GPS devices for this project shall be set to the same consistent coordinate datum/system no matter whether GPS or Grid data are originally recorded. The Rhode Island State Plane Coordinate shall be used. The records shall be in meters.

Ad-hoc local coordinate systems will not be allowed.

Construction Requirements. The Contractor shall provide the GPS system (including GPS receivers on equipment and hand-held GPS receivers (Rovers)) that makes use of the same reference system that can be a ground-based base station or network-RTK, to achieve RTK-GPS accuracy. Examples of combinations are:

1. GPS receivers on equipment and hand-held GPS rovers referenced to the same on-ground base station.

2. GPS receiver on equipment and hand-held GPS receivers referenced to the same network RTK.

GPS Data Records and Formats. The recorded GPS data from the equipment and hand-held GPS rovers shall be in the following formats:

1. Time: The time stamp shall be in military format, hhmmss.ss in either UTC or local time zone. 0.01 second is required to differentiate sequence of data points during post process.

2. GPS: Latitudes and longitude shall in ddmm.mmmmmmmm or decimal degrees, dd.ddddddd. Longitudes are negative values when measuring westward from the Prime Meridian.

3. Grid: Coordinates shall be in meters with at least 3 digits of significance (0.001 m or 1 mm).

When importing data into the data analysis management program, the GPS data and associated measurements shall be stored with minimum data conversions and minimum loss of precisions. Users can then select unit of preference to allow real time unit conversion for the GUI display.

Post-Process GPS Check. Follow the vendor-specific instructions to export data to Veda-compatible formats. The Contractor shall import the equipment data into Veda and enter GPS point measurements from the rover and visually inspect the map and point measurements on the Veda display screen for consistency.

Data Analysis Software. Standardized data analysis software (Veda) is available on the website www.intelligentcompaction.com. As a minimum, the following Essential Data Information and Data Elements shall be included in each data file or section.

Item	Description
1	Section Title
2	Machine Manufacture
3	Machine Type
4	Machine Model
5	Drum/Screed Width (m)
6	Drum Diameter (m) (roller only)
7	Machine Weight (metric ton)
8	CSPC Zone
9	Offset to UTC (hrs)
10	Number of data points

• Essential Data Elements for Each Data Point:

Item	Date Field Name	Example of Data
1	Date Stamp (YYYYMMDD)	e.g. 20080701
2	Time Stamp (HHMMSS.SS -military format)	e.g. 090504.00 (9 hr 5 min. 4.00 s.)
3	Longitude (decimal degrees)	e.g. 94.85920403
4	Latitude (decimal degrees)	e.g. 45.22777335
5	Easting (m)	e.g. 354048.300
6	Northing (m)	e.g. 5009934.900
7	Height (m)	e.g. 339.9450
8	Pass number (rollers only)	e.g. 2
9	Direction index	e.g., 1 forward, 2 reverse
10	Speed (kph) (rollers and pavers)	e.g. 4.0
11	Vibration on	e.g., 1 for yes, 2 for no
12	Frequency (vpm)	e.g. 3500.0
13	Amplitude (mm)	e.g. 0.6
14	Surface temperature (°C) (rollers only)	e.g. 120

Longitude and latitude can be exclusive with easting and northing, and vice versa. The size of data mesh after post-processing shall be less than 18 inches (450 mm) by 18 inches (450 mm) in the X and Y directions.

Equipment. The supplier, make, model, unique identifier, and the GPS system supplier to be utilized.

Process Control During Rolling: In addition to any other QC responsibilities, the Contractor shall be responsible for the following:

1. Daily GPS check testing for the equipment and rover(s).
2. Establishing target number of passes using data from standard testing devices; i.e., Nondestructive density gauges, pavement cores, and roller(s).
3. Monitoring the equipment location during paving operations and the operation of the entire GPS system on the project site.
4. Quality control testing to monitor the pavement temperature.
5. Daily download and analysis of the data from the roller(s).
6. Daily set-up, take down and secure storage of GPS and equipment components

Materials Sampling and Testing.

A minimum of 95% of the mat must be rolled at least three times when analyzed using Veda software. Three 500 foot test sections shall be constructed at the beginning of three different locations determined by the Engineer. The test sections shall be rolled six times at 100% coverage to determine the IC-MV values and temperatures. The minimum frequency of obtaining the data from the equipment shall be two (2) times per day of asphalt compaction operations. The data shall be date and time stamped permitting external evaluation at a later time. Data from the on-board printer shall be submitted to the Engineer upon request.

The raw data and results from the analysis software shall be made available to the Engineer within 24 hours of obtaining the data.

GPS Setup. Prior to the start of production, the Contractor and representatives of the GPS and equipment manufacturer shall conduct the following to check the proper setup of the GPS equipment and the rover(s) using the same datum:

1. On a location nearby or within the project limits, the GPS base station (if required by the GPS) shall be established and the equipment and the GPS rover tied into the same base station.

2. Verification that the equipment and rover are working properly and that there is a connection with the base station.

3. There are two options for comparing the equipment and rover coordinates. Production shall not begin until proper GPS verification has been obtained. The vendor's recommended verification process can be used to augment either of the following options:

- a. GPS verification measurements shall be conducted while the equipment is stationary. The GPS coordinates from the equipment on-board display shall be recorded ensuring that the distance offsets are applied correctly to the center of the front drum (e.g., the measurement is at the equipment GPS receiver position). Place the hand-held GPS receiver on top of the GPS receiver mounted on the equipment and record the coordinates from the hand-held receiver display. The differences of the coordinates between the equipment GPS receiver and hand-held GPS receiver shall be within 2 inches (50 mm) in both the horizontal axes (X and Y). The check for the vertical axis is not required.

- b. A reference location on the project site shall be selected and marked by the Contractor. The equipment shall be placed so that the center of the front drum is on top of the reference location and the location measurement shall be recorded. After moving the equipment from the marked location, a hand-held rover must be used to locate the reference location. The differences of the coordinates in grid shall be within 6 inches (150 mm) in both the horizontal axes (X and Y). The GPS location measurements from the equipment must be used to determine any offsets

that are required so that the GPS coordinate of the equipment is at the center of the front drum or hopper. On some systems, distance offsets are applied to the roller GPS measurements from the on-board display and the coordinates may be on the left or right side of the drum. In those cases the equipment must be moved so that the left or right side of the front drum axle is flush with the reference location. The hand-held rover must be placed on the marked location and the difference of both coordinate records checked. The final GPS coordinate for each data point recorded in data files must be at the center of the front drum or hopper.

4. GPS setup shall be conducted daily during production operations to ensure consistency and accuracy of GPS measurements for all GPS devices prior to the compaction operation.

Documentation. The documentation shall include the following.

1. Equipment. Documentation of the manufacturer and model of the IC rollers used each day of paving. The relative positioning of the equipment in the paving operations shall be noted.
2. Initial Data. At a minimum, the electronic data from equipment and the data analysis software shall be provided to the Engineer upon the completion of the first day's paving.
3. Production Roller Data. The Contractor shall export from the vendor's software all data on a daily basis. The Contractor shall analyze the equipment data for coverage area and uniformity and shall submit the results to the Engineer within 24 hours of the completion of the each day's paving operation.

A summary of all equipment data shall be given to the Department at the completion of the contract.

Assistance and Training

Technical Assistance. The Contractor shall coordinate for on-site technical assistance from the equipment representatives during the initial seven (7) days of production and then as needed during the remaining operations. As a minimum, the equipment representative shall be present during the initial setup and verification testing of the equipment. The equipment representative shall also assist the Contractor with data management using the data analysis software including data input and processing.

On-Site Training. The Contractor shall provide and coordinate on-site training for Contractor and Agency project personnel. Contractor's personnel shall include the paving superintendent, QC technicians (if applicable), and equipment operators. At a minimum, training topics shall include:

1. Background information for the specific system(s) to be used
2. Setup and checks for system(s), GPS receiver, base-station and hand held rovers

3. Operation of the system(s) on the equipment; i.e., setup data collection, start/stop of data recording, and on-board display options
4. Transferring raw data from the equipment; i.e., via USB connections
5. Operation of vendor's software to open and view raw data files and exporting all-passes and proofing data files in Veda-compatible format
6. Operation of Veda software to import the above exported all-passes and proofing data files, inspection of maps, input point test data, perform statistics analysis, and produce reports for project requirements
7. Coverage and uniformity requirements of the HMA specification

METHOD OF MEASUREMENT

Intelligent Compaction for HMA will be measured for payment according to the following method. The total number of days IC is used will be counted and compared to the total number of days paving, and a ratio will be calculated as total-days-IC/total-days-paving which will be used in determining the Basis of Payment.

BASIS OF PAYMENT

The Lump Sum bid price constitutes full and complete compensation for all labor, materials, equipment and incidentals required to finish the work complete and accepted by the Engineer. The accepted quantity for Intelligent Compaction for HMA will be paid for using the contract Lump Sum bid price adjusted as follows. The Lump Sum bid price will be multiplied by the ratio calculated in the Method of Measurement and the resultant amount will constitute the total payment for IC. For example, if total days paving is 8 and total days IC is 6, then the ratio will be 6/8 or 75%, and the total payment for IC will be $0.75 \times \text{LumpSumBidPrice}$. The full contract Lump Sum bid price will be paid when IC was used for all days paving.

Table of Contents - Distribution of Quantities

Project Name - Pine Street Bridge No. 548 (31)

Estimate Name - Addendum No. 2

R.I. Contract No. - 2017-CB-046

FAP Nos: BRO-0548(001)

ItemCode	Description	Page
201.0301	CUTTING AND DISPOSING ISOLATED TREES AND STUMPS (4"- 24")	1
201.0401	REMOVE AND DISPOSE GRANITE CURB	1
201.0403	REMOVE AND DISPOSE SIDEWALKS	1
201.0407	REMOVE AND DISPOSE PAVEMENT AND RIGID BASE	1
201.0409	REMOVE AND DISPOSE FLEXIBLE PAVEMENT	1
201.0419	REMOVE AND DISPOSE FENCE	2
201.0423	REMOVE AND DISPOSE HANDHOLE	2
201.0428	REMOVE AND DISPOSE FRAME AND GRATE OR FRAME AND COVER	2
201.0610	REMOVE AND DISPOSE DIRECTIONAL, WARNING, REGULATORY, SERVICE, AND STREET SIGNS	2
201.0613	REMOVE AND STOCKPILE LIGHT STANDARDS	3
201.0617	REMOVE AND DISPOSE CONDUIT - ALL SIZES	3
202.0100	EARTH EXCAVATION	3
202.9901	HANDLING, HAULING, AND STOCKPILING OF WET CONTAMINATED SOIL	3
202.9905	LOAD, HAUL, AND DISPOSE SOIL AND SEDIMENT, TYPE 2	3
203.0100	STRUCTURAL EXCAVATION EARTH	3
203.0220	STRUCTURAL EXCAVATION ROCK MECHANICAL	4
203.0600	FILL GRAVEL BORROW UNDER STRUCTURES	4
203.0650	CRUSHED STONE FILL UNDER STRUCTURES	4
203.0700	PERVIOUS FILL	4
204.0100	TRIMMING AND FINE GRADING	4
206.0301	COMPOST FILTER SOCK	4
206.9901	INLET SEDIMENT CONTROL DEVICE	5
208.9901	STOCKPILE CONTAMINATED SOIL AND SEDIMENT	5
212.2000	CLEANING AND MAINTENANCE OF EROSION CONTROLS	5
302.0100	GRAVEL BORROW SUBBASE COURSE	5
401.1000	CLASS 19.0 HMA	6
401.2003	CLASS 12.5 HMA FOR PATCHING	6
401.3100	MODIFIED CLASS 9.5 HMA	6
402.9901	FRICITION COURSE	6
402.9902	FRICITION COURSE FOR SHOULDERS	6
403.0300	ASPHALT EMULSION TACK COAT	7
415.9901	INTELLIGENT COMPACTION FOR HMA	7
601.0300	CLASS A PORTLAND CEMENT CONCRETE	7
701.9901	VERIZON TELEPHONE FACILITIES	7
702.0516	FRAME AND GRATE, HIGH CAPACITY, STANDARD 6.3.4	7
702.0543	GRANITE APRON STONE 38'' STANDARD 7.3.8	7
702.9901	NATIONAL GRID DUCTS FOR PINE STREET BRIDGE NO. 548 APPROACHES	8
702.9902	NATIONAL GRID ELECTRIC BRIDGE CROSSING FOR PINE STREET BRIDGE NO. 548	8
703.0708	8" PERFORATED POLYVINYL CHLORIDE PIPE M278 UNDERDRAIN WITH FILTER MATERIAL STANDARD 1.1.0	8
704.0100	RECONSTRUCT CATCH BASIN/CORBEL CONES	8
704.0300	RECONSTRUCT CATCH BASIN/VERTICAL WALLS	8
707.1900	ADJUST FRAME & COVER TO GRADE	9
707.2000	ADJUST FRAME AND GRATE TO GRADE	9
708.9040	CLEANING AND FLUSHING PIPE ALL SIZES	9
708.9041	CLEANING CATCH BASINS ALL TYPES AND SIZES	9
708.9042	CLEANING MANHOLES ALL TYPES AND SIZES	10
713.9901	ADJUST CATHODIC PROTECTION BOX AND RISER TO GRADE	10
800.9901	PINE STREET BRIDGE NO. 548	10
803.9901	REMOVE AND DISPOSE EXISTING BRIDGE SUPERSTRUCTURE	10

Table of Contents - Distribution of Quantities

Project Name - Pine Street Bridge No. 548 (31)

Estimate Name - Addendum No. 2

R.I. Contract No. - 2017-CB-046

FAP Nos: BRO-0548(001)

ItemCode	Description	Page
803.9902	REMOVE AND DISPOSE PORTIONS OF EXISTING BRIDGE SUBSTRUCTURE	10
832.8050	BRIDGE MINIMUM CLEARANCE SIGNS	11
832.8051	BRIDGE IDENTIFICATION SIGNS	11
901.0151	TERMINAL END SECTION SINGLE FACE STANDARD 34.3.2	11
901.9901	STEEL BEAM BRIDGE CONNECTION TRAILING END (W/NESTED RAIL)	11
903.0110	WOVEN WIRE RIGHT-OF-WAY FENCE STANDARD 31.3.0	11
903.0410	TEMPORARY CHAIN LINK FENCE	11
903.0411	TEMPORARY CHAIN LINK GATE	12
905.0110	PORTLAND CEMENT SIDEWALK MONOLITHIC STANDARD 43.1.0	12
905.0115	PORTLAND CEMENT CONCRETE DRIVEWAY STANDARD 43.5.0	12
906.0110	GRANITE CURB, QUARRY SPLIT STRAIGHT, STANDARD 7.3.0	12
906.0111	GRANITE CURB, QUARRY SPLIT CIRCULAR, STANDARD 7.3.0	13
906.0130	GRANITE RAMP STONE STRAIGHT STANDARD 7.3.9	13
906.0131	GRANITE RAMP STONE CIRCULAR STANDARD 7.3.9	13
906.0700	REMOVE, HANDLE, HAUL TRIM RESET CURB EDGING, STRAIGHT, CIRCULAR ALL TYPES	13
906.9903	GRANITE WHEELCHAIR RAMP TRANSITION CURB - STRAIGHT	13
906.9904	GRANITE WHEELCHAIR RAMP TRANSITION CURB - CIRCULAR	14
907.0100	WATER FOR DUST CONTROL	14
909.3021	PRECAST MEDIAN BARRIER SINGLE-FACED STANDARD 40.2.1	14
914.5010	FLAGPERSONS	14
914.5020	FLAGPERSONS - OVERTIME	14
916.9901	NARROW CONDITION IMPACT ATTENUATOR	14
920.9901	FILTER FABRIC FOR CATCH BASIN INLET PROTECTION	15
922.0100	TEMPORARY CONSTRUCTION SIGNS STANDARD 29.1.0 AND 27.1.1	15
923.0105	DRUM BARRICADE STANDARD 26.2.0	16
923.0120	PLASTIC PIPE BARRICADE STANDARD 26.3.0	16
923.0200	FLUORESCENT TRAFFIC CONES STANDARD 26.1.0	17
924.0113	ADVANCE WARNING ARROW PANEL	17
925.0112	PORTABLE CHANGEABLE MESSAGE SIGN	17
926.0121	UNANCHORED PRECAST CONCRETE BARRIER FOR TEMPORARY TRAFFIC CONTROL STANDARD 40.5.0	17
926.0140	REFLECTIVE DELINEATORS FOR TEMPORARY CONCRETE BARRIERS	17
928.9901	TRUCK MOUNTED ATTENUATOR WITH TRUCK MOUNTED FLASHING ARROW BOARD	18
929.0110	FIELD OFFICE	18
931.0110	CLEANING AND SWEEPING PAVEMENT	18
932.0100	CUTTING AND MATCHING ASPHALT	18
932.0210	FULL DEPTH SAWCUT OF BITUMINOUS PAVEMENT AND RIGID BASE	19
932.0230	FULL DEPTH SAWCUT OF PORTLAND CEMENT CONCRETE SIDEWALK/DRIVEWAY	19
935.0400	REMOVING BITUMINOUS PAVEMENT BY MICRO MILLING	19
936.0100	MOBILIZATION AND DEMOBILIZATION	19
937.0200	MAINTENANCE AND MOVEMENT TRAFFIC PROTECTION	19
942.0200	DETECTABLE WARNING PANEL STANDARD 48.1.0	20
943.0200	TRAINEE MAN-HOURS	20
L01.0104	PLANTABLE SOIL 4 INCHES DEEP	20
L02.0101	GENERAL HIGHWAY SEEDING (TYPE 1)	20
L05.0506	JUTE MESH	20
L11.0102	TREE PLANT PROTECTION DEVICE STANDARD 51.1.0	20
T04.6902	'2' STRANDED COPPER CONDUCTOR 600V INSULATION	21
T04.6906	'6' STRANDED COPPER CONDUCTOR 600V INSULATION	21
T04.6910	'10' STRANDED COPPER CONDUCTOR 600V INSULATION	21

Table of Contents - Distribution of Quantities

Project Name - Pine Street Bridge No. 548 (31)

Estimate Name - Addendum No. 2

R.I. Contract No. - 2017-CB-046

FAP Nos: BRO-0548(001)

ItemCode	Description	Page
T04.7300	IN-LINE FUSED DISCONNECT DEVICE WITH FUSE WEATHERPROOF	21
T04.7400	IN-LINE UNFUSED DISCONNECT DEVICE	21
T04.7500	SPLICE KIT	22
T04.9901	23 AWG CATEGORY 6 STP - NETWORK VIDEO CABLE	22
T05.0100	PRECAST TYPE A HANDHOLE STANDARD 18.2.0	22
T05.0310	PULL BOX ON STRUCTURE TYPE W STANDARD 18.6.3	22
T05.0400	BREAK INTO EXISTING HANDHOLE	22
T06.4030	3 IN. RIGID STEEL CONDUIT IN STRUCTURE	22
T06.5130	3 INCH SCHEDULE 40 POLYVINYL CHLORIDE PLASTIC CONDUIT - UNDERGROUND	23
T06.7044	EXPANSION COUPLING WITH TRANSVERSE MOTION 4" PVC	23
T07.9901	FURNISH AND INSTALL 195 WATT LED LUMINAIRE	23
T08.2031	ALUMINUM LIGHTING STD. 30 FT. W/ SINGLE DAVIT ARM EXTN. 10 FT. STANDARD 18.3.0	23
T12.9901	MODIFY TRAFFIC SIGNAL SYSTEMS	23
T12.9902	MAINTENANCE OF TRAFFIC SIGNAL SYSTEMS	24
T12.9910	REMOVE AND REPLACE CAMERA LOWERING DEVICE	24
T12.9911	FURNISH AND INSTALL HARDENED ETHERNET SWITCH WITH SFP FIBER OPTIC TRANSCEIVERS	24
T15.0100	DIRECTIONAL REGULATORY AND WARNING SIGNS	24
T15.2000	PARKING SIGNS	25
T15.9901	REMOVE, STOCKPILE, AND RESET SIGN ON EXISTING FOUNDATIONS	25
T20.0006	6 INCH WHITE FAST - DRYING WATERBORNE PAVEMENT MARKING PAINT	25
T20.0012	12 INCH WHITE FAST - DRYING WATERBORNE PAVEMENT MARKING PAINT	26
T20.0106	6 INCH YELLOW FAST - DRYING WATERBORNE PAVEMENT MARKING PAINT	26
T20.0606	TEMPORARY PAVEMENT MARKING (TAPE) YELLOW AND/OR WHITE - 6 INCH	26
T20.0820	FAST DRYING WATERBORNE PAVEMENT ARROW - STRAIGHT, LEFT, RIGHT, OR COMBINED STANDARD 20.1.0	26
T20.0822	FAST DRYING WATERBORNE PAVEMENT MARKING WORD "ONLY" STANDARD 20.1.0	26
T20.0828	FAST-DRYING WATERBORNE PAINT PAVEMENT MARKING - YIELD LINE SYMBOL	27
T20.1000	REMOVE EXISTING PAVEMENT MARKINGS	27
T20.1010	REMOVE EXISTING PAVEMENT MARKINGS	27
T20.1106	6 INCH TEMPORARY WATERBORNE PAINT PAVEMENT MARKINGS WHITE	27
T20.1112	12 INCH TEMPORARY WATERBORNE PAINT PAVEMENT MARKINGS WHITE	28
T20.1206	6 INCH TEMPORARY WATERBORNE PAINT PAVEMENT MARKINGS YELLOW	28
T20.1310	TEMPORARY WATERBORNE PAINT PAVEMENT ARROW - STRAIGHT, LEFT, RIGHT OR COMBINED STANDARD 20.1.0	28
T20.1314	TEMPORARY WATERBORNE PAINT PAVEMENT MARKING - YIELD LINE SYMBOL	28
T20.2006	6 INCH EPOXY RESIN PAVEMENT MARKINGS WHITE	28
T20.2012	12 INCH EPOXY RESIN PAVEMENT MARKINGS WHITE	29
T20.2016	6 INCH EPOXY RESIN PAVEMENT MARKINGS YELLOW	30
T20.2020	EPOXY RESIN PAVEMENT ARROW - STRAIGHT, LEFT, RIGHT, OR COMBINED STANDARD 20.1.0	30
T20.2022	EPOXY RESIN PAVEMENT MARKING WORD "ONLY" STANDARD 20.1.0	30
T20.2042	EPOXY RESIN PAVEMENT MARKING - YIELD LINE SYMBOL	30
T20.9958	THERMOPLASTIC PAVEMENT MARKINGS - ROUTE SHIELD SYMBOL	31

Table of Contents - Distribution of Quantities

Project Name - Pine Street Bridge No. 548 (31)

Estimate Name - Addendum No. 2

R.I. Contract No. - 2017-CB-046

FAP Nos: BRO-0548(001)

ItemCode	Description	Page
T20.9960	EPOXY RESIN PAVEMENT MARKING WORD "TO"	31
401.9901	PAY ADJUSTMENTS	31

Distribution of Quantities

Project Name - Pine Street Bridge No. 548 (31)
 Estimate Name - Addendum No. 2
 R.I. Contract No. - 2017-CB-046
 FAP Nos: BRO-0548(001)

Item No.	Item Code	Description	UM	Qty.	Pay Code	Seq. No.
001	201.0301	CUTTING AND DISPOSING ISOLATED TREES AND STUMPS (4"- 24")	EACH			
		PINE ST				
		17+15 LT		1.00	0011	01
Item 201.0301 Total:				1.00		
002	201.0401	REMOVE AND DISPOSE GRANITE CURB	LF			
		PINE ST				
		16+98 LT		10.00	0011	01
		17+00 LT		10.00	0011	01
Item 201.0401 Total:				20.00		
003	201.0403	REMOVE AND DISPOSE SIDEWALKS	SY			
		PINE ST				
		ISLAND		48.00	0011	01
		NE CORNER		17.00	0011	01
		NW CORNER		25.00	0011	01
		SE CORNER		40.00	0011	01
		SW CORNER		30.00	0011	01
Item 201.0403 Total:				160.00		
004	201.0407	REMOVE AND DISPOSE PAVEMENT AND RIGID BASE	SY			
		I-95				
		171+85 - 172+65		260.00	0011	01
Item 201.0407 Total:				260.00		
005	201.0409	REMOVE AND DISPOSE FLEXIBLE PAVEMENT	SY			
		PINE ST				
		171+85 - 172+65			0011	01
		NORTHERLY APPROACH		247.00	0011	01
		SOUTHERLY APPROACH		333.00	0011	01

Distribution of Quantities

Project Name - Pine Street Bridge No. 548 (31)
 Estimate Name - Addendum No. 2
 R.I. Contract No. - 2017-CB-046
 FAP Nos: BRO-0548(001)

Item No.	Item Code	Description	UM	Qty.	Pay Code	Seq. No.
005	201.0409	Cont.				
Item 201.0409 Total:				580.00		
006	201.0419	REMOVE AND DISPOSE FENCE	LF			
		PINE ST				
		SE CORNER		45.00	0011	01
		SW CORNER		55.00	0011	01
Item 201.0419 Total:				100.00		
007	201.0423	REMOVE AND DISPOSE HANDHOLE	EACH			
		PINE STREET				
		17+20 RT		1.00	0011	01
		19+30 RT		1.00	0011	01
Item 201.0423 Total:				2.00		
008	201.0428	REMOVE AND DISPOSE FRAME AND GRATE	EACH			
		OR FRAME AND COVER				
		PINE ST				
		17+05 LT		1.00	0011	01
		17+06 LT		1.00	0011	01
		PROJECT WIDE				
		AS DIRECTED BY THE ENGINEER		8.00	0011	01
Item 201.0428 Total:				10.00		
009	201.0610	REMOVE AND DISPOSE DIRECTIONAL,	EACH			
		WARNING, REGULATORY, SERVICE, AND				
		STREET SIGNS				
		PINE ST				
		17+05 RT		1.00	0011	01
		17+09 LT		1.00	0011	01
		19+29 RT		1.00	0011	01
		19+40 LT		1.00	0011	01
Item 201.0610 Total:				4.00		

Distribution of Quantities

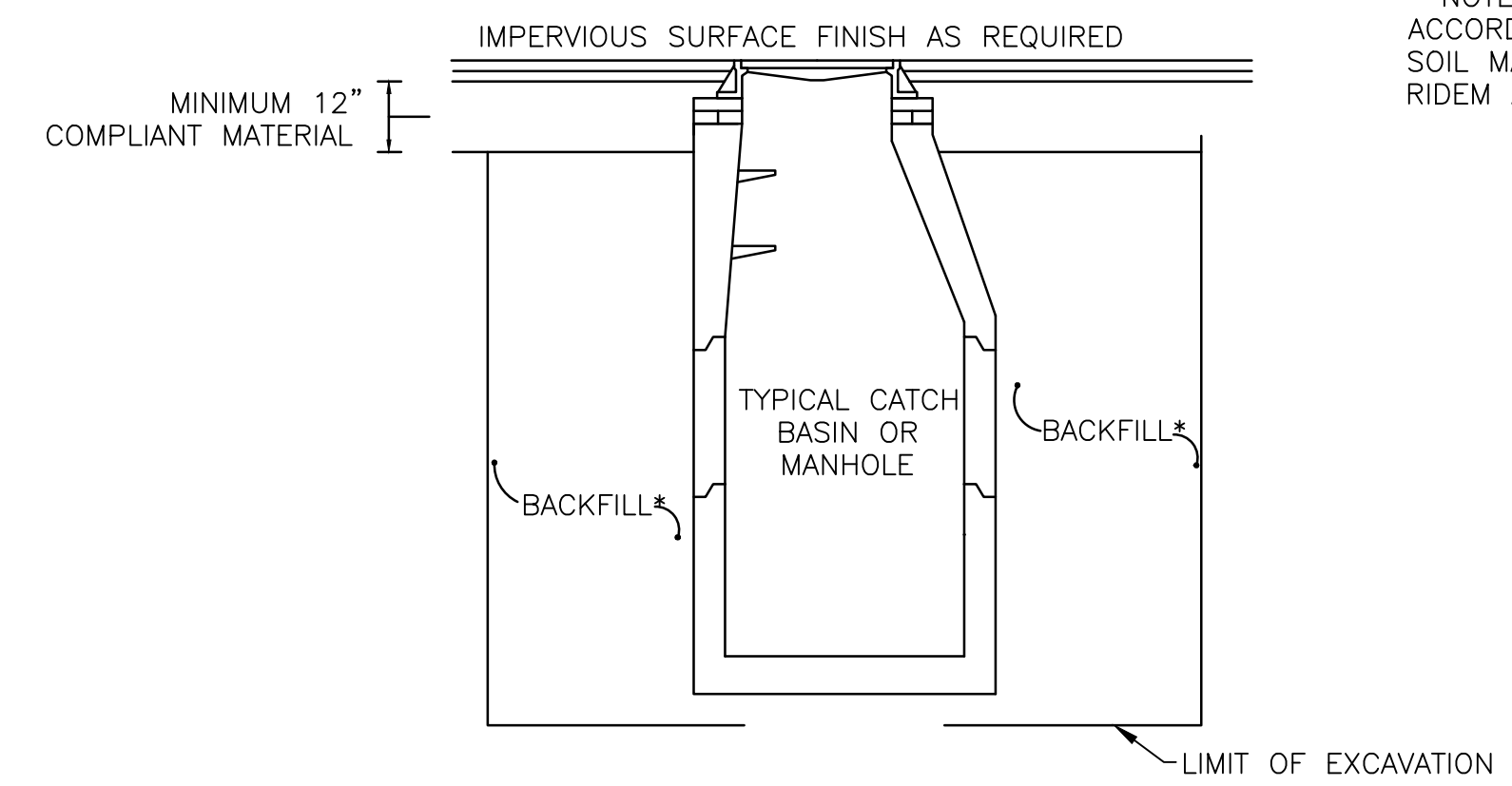
Project Name - Pine Street Bridge No. 548 (31)
 Estimate Name - Addendum No. 2
 R.I. Contract No. - 2017-CB-046
 FAP Nos: BRO-0548(001)

Item No.	Item Code	Description	UM	Qty.	Pay Code	Seq. No.
010	201.0613	REMOVE AND STOCKPILE LIGHT	EACH			
		STANDARDS				
		PINE STREET BRIDGE				
		PINE STREET BRIDGE		2.00	0011	01
		Item 201.0613 Total:		2.00		
011	201.0617	REMOVE AND DISPOSE CONDUIT - ALL	LF			
		SIZES				
		PINE STREET				
		STREET LIGHTING		125.00	0011	01
		Item 201.0617 Total:		125.00		
012	202.0100	EARTH EXCAVATION	CY			
		PINE ST				
		171+85 - 172+65			0011	01
		FROM ITEM 201.0403		20.00	0011	01
		NORTHERLY APPROACH		86.00	0011	01
		SOUTHERLY APPROACH		114.00	0011	01
		Item 202.0100 Total:		220.00		
013	202.9901	HANDLING, HAULING, AND STOCKPILING	CY			
		OF WET CONTAMINATED SOIL				
		PINE STREET				
		PINE STREET		300.00	0011	01
		Item 202.9901 Total:		300.00		
014	202.9905	LOAD, HAUL, AND DISPOSE SOIL AND	TON			
		SEDIMENT, TYPE 2				
		PINE STREET				
		PINE STREET		2,850.00	0011	01
		Item 202.9905 Total:		2,850.00		
015	203.0100	STRUCTURAL EXCAVATION EARTH	CY			

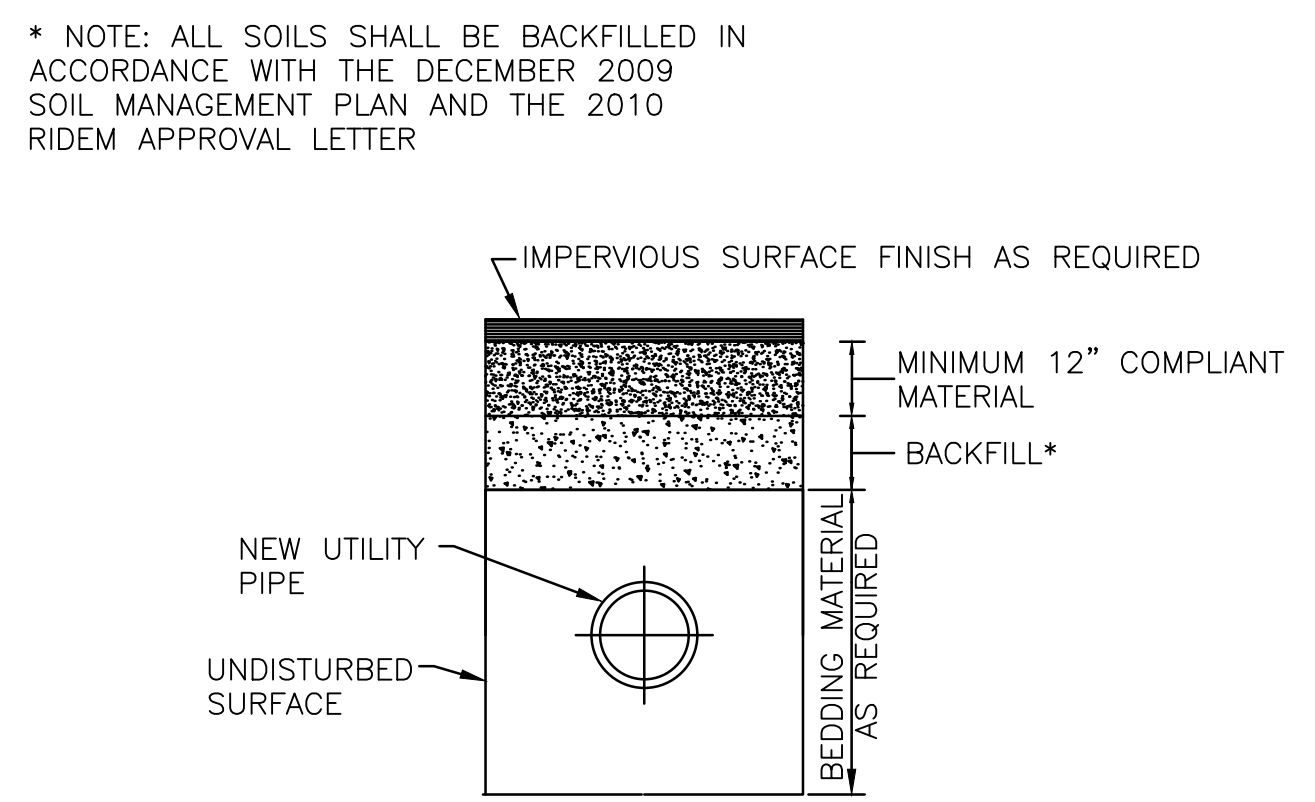
Distribution of Quantities

Project Name - Pine Street Bridge No. 548 (31)
 Estimate Name - Addendum No. 2
 R.I. Contract No. - 2017-CB-046
 FAP Nos: BRO-0548(001)

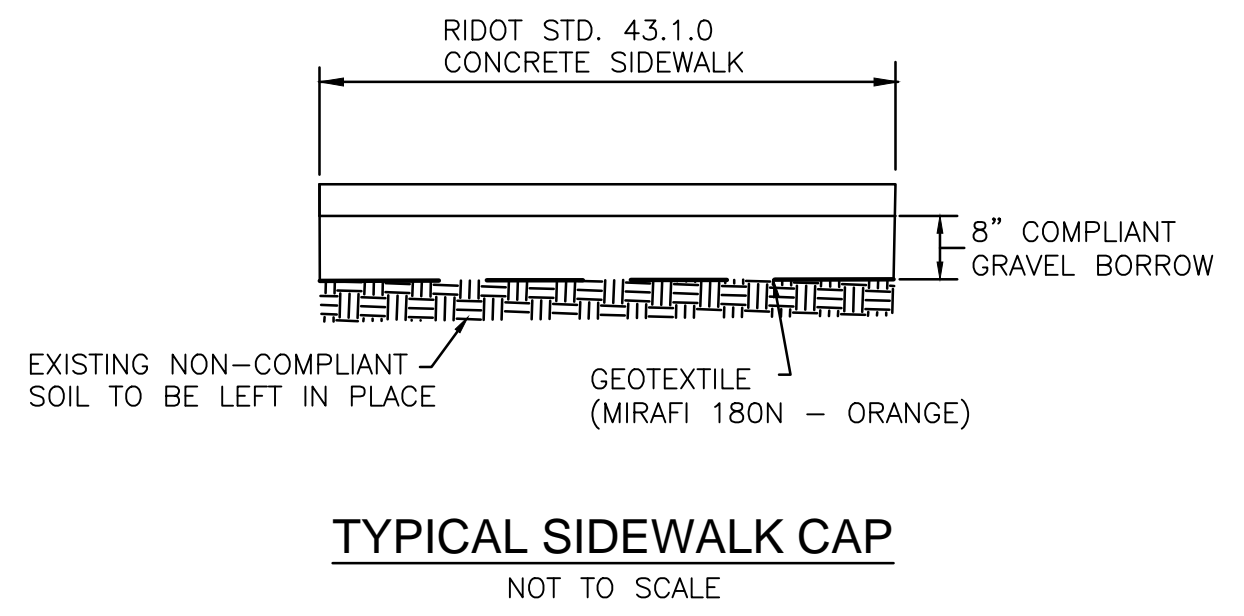
Item No.	Item Code	Description	UM	Qty.	Pay Code	Seq. No.
S138	T20.9958	THERMOPLASTIC PAVEMENT MARKINGS - ROUTE SHIELD SYMBOL MARRIN ST EB LT LANE	EACH	1.00	0011	01
Item T20.9958 Total:				1.00		
S139	T20.9960	EPOXY RESIN PAVEMENT MARKING WORD "TO" MARRIN ST EB LT LANE	EACH	1.00	0011	01
Item T20.9960 Total:				1.00		
140	401.9901	PAY ADJUSTMENTS I-95 PROJECT WIDE	EACH	10,000.00	0011	01
Item 401.9901 Total:				10,000.00		



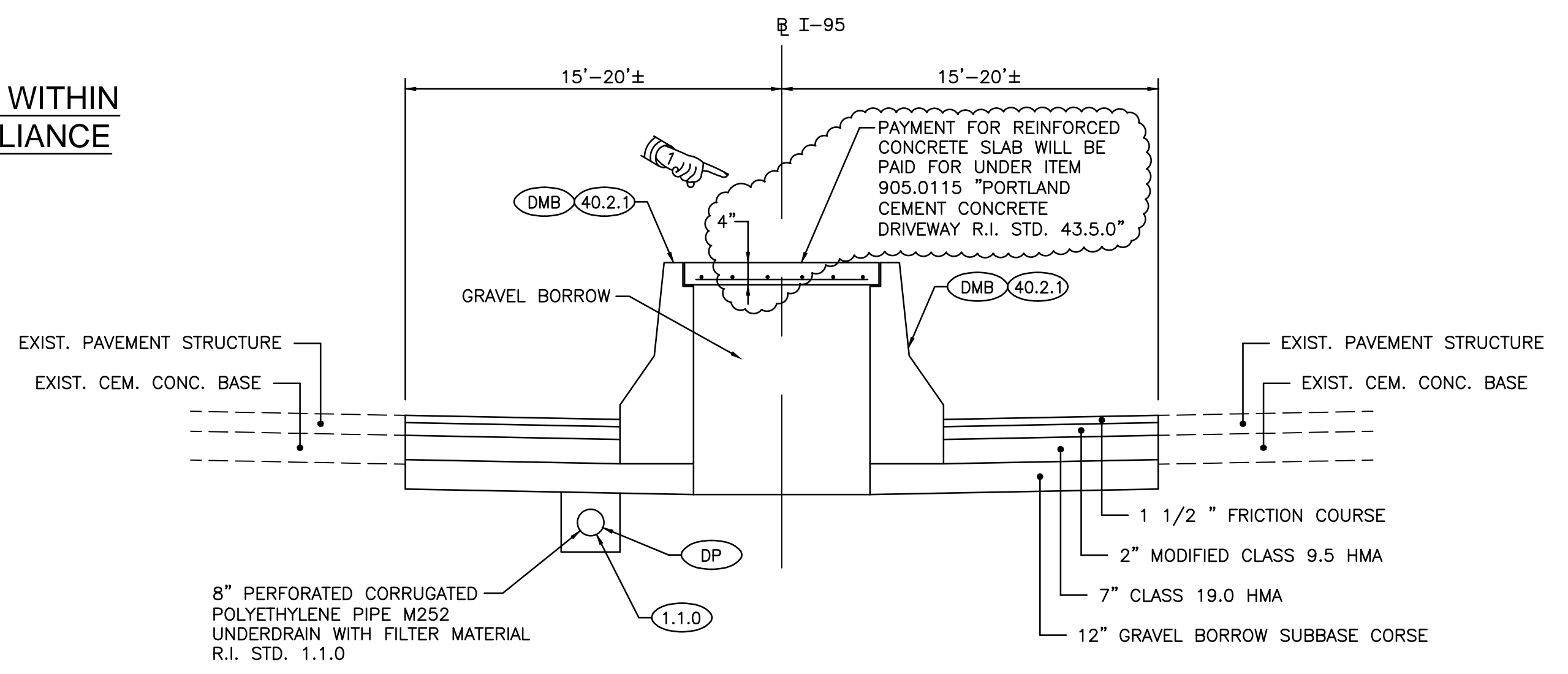
BACKFILL OF STRUCTURES WITHIN AREA OF NON-COMPLIANCE
NOT TO SCALE



TYPICAL PIPE TRENCH WITHIN AREAS OF NON-COMPLIANCE
NOT TO SCALE



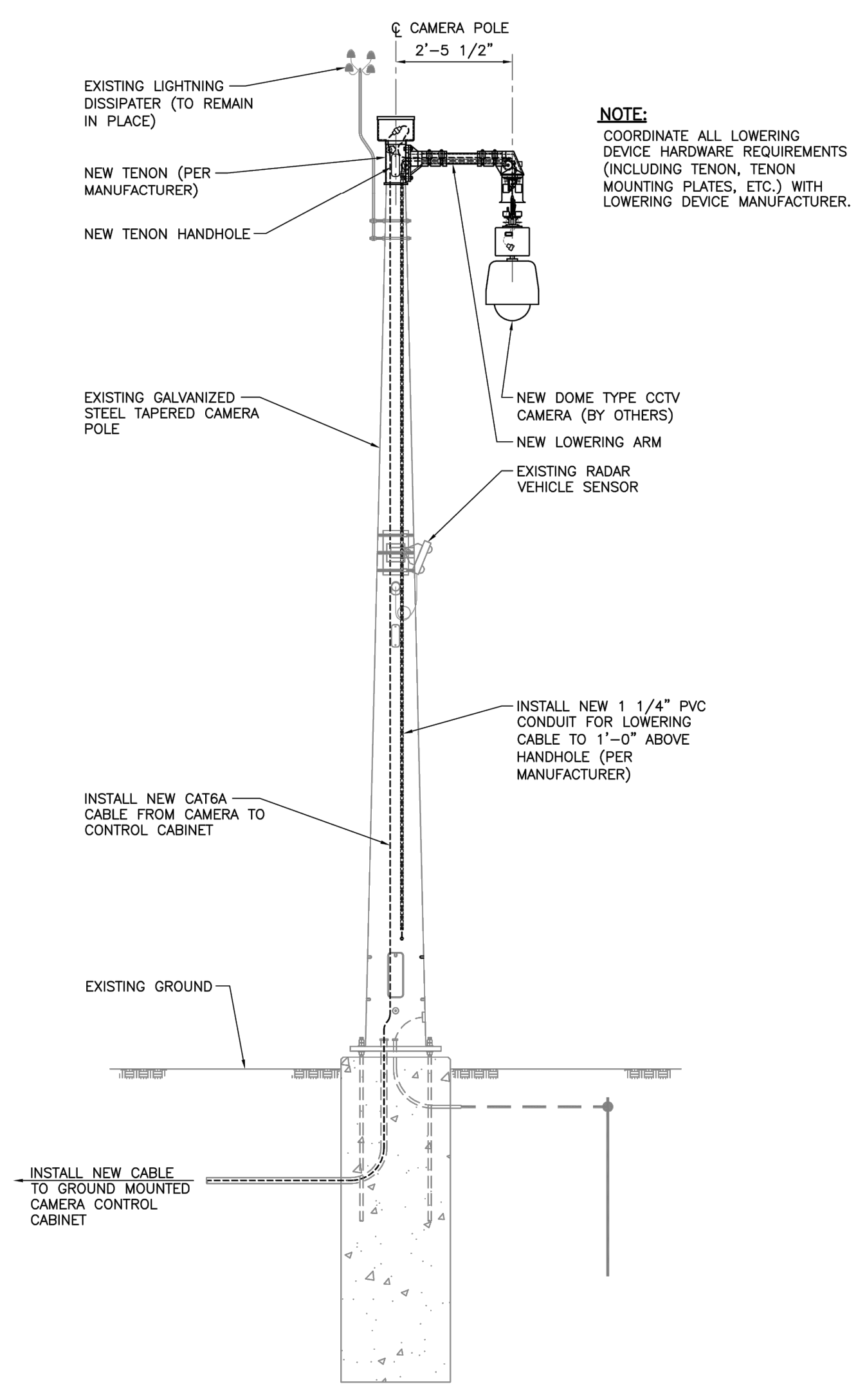
TYPICAL SIDEWALK CAP
NOT TO SCALE



MEDIAN BARRIER DETAIL
STA. 171+85 TO STA. 172+65
NOT TO SCALE

- LEGEND**
- (ACB) ADJUST CATHODIC PROTECTION BOX TO GRADE
 - (CBP) CATCH BASIN INLET PROTECTION DEVICE
 - (CFS) 12" COMPOST FILTER SOCK
 - (DOT) DOTTED PAVEMENT MARKING (LANE LINE EXTENSION)
 - (DOT2) DOTTED PAVEMENT MARKING (THROUGH INTERSECTION)
 - (DSH) DASHED PAVEMENT MARKING
 - (GWT) GRANITE WHEELCHAIR RAMP TRANSITION CURB
 - (ETR) EXISTING TO REMAIN
 - (EVP) EXISTING CLOSED CIRCUIT VIDEO EQUIPMENT POLE MODIFICATION
 - (MM) MICRO MILLING (2")
 - (NCIA) NARROW CONDITION IMPACT ATTENUATOR
 - (TPRM) THERMOPLASTIC ROUTE MARKER DETAIL
 - (6W-T) 6" WHITE PAVEMENT MARKING - TEMPORARY TAPE

- PAVEMENT LEGEND**
- (1) 2" MODIFIED CLASS 9.5 HMA
 - (2) 6" CLASS 19.0 HMA
 - (3) 12" GRAVEL BORROW SUBBASE
 - (F) 1 1/2" FRICTION COURSE
 - (G) 1 1/2" FRICTION COURSE FOR SHOULDERS



EXISTING CLOSED CIRCUIT VIDEO EQUIPMENT POLE MODIFICATION
NOT TO SCALE

NOTE:
COORDINATE ALL LOWERING DEVICE HARDWARE REQUIREMENTS (INCLUDING TENON, TENON MOUNTING PLATES, ETC.) WITH LOWERING DEVICE MANUFACTURER.

GENERAL NOTES:

- ALL SURVEY FIELD BOOKS AND/OR ELECTRONIC DATA SHALL BE SUBMITTED TO THE RIDOT SURVEY SECTION UPON COMPLETION OF THE CONSTRUCTION WORK. FIELD BOOKS SHALL INCLUDE A LISTING OF ALL RI HIGHWAY BOUNDS THAT WERE SET WITH STATIONS, OFFSETS, COORDINATES AND DATE SET AND CERTIFIED BY CONTRACTOR'S PROFESSIONAL LAND SURVEYOR IN CHARGE.
- THE CONTRACTOR MAY NEED TO TEMPORARILY SUPPORT THE EXISTING 12-INCH DRAIN WHEN WORKING IN THE VICINITY OF THE PIPE. ANY COSTS ASSOCIATED WITH TEMPORARILY SUPPORTING THE EXISTING PIPE SHALL BE CONSIDERED INCIDENTAL TO THE VARIOUS ITEMS OF WORK.
- FILTER FABRIC FOR CATCH BASIN INLET PROTECTION SHALL BE ONE LISTED ON THE DEPARTMENT'S APPROVED MATERIAL LIST.

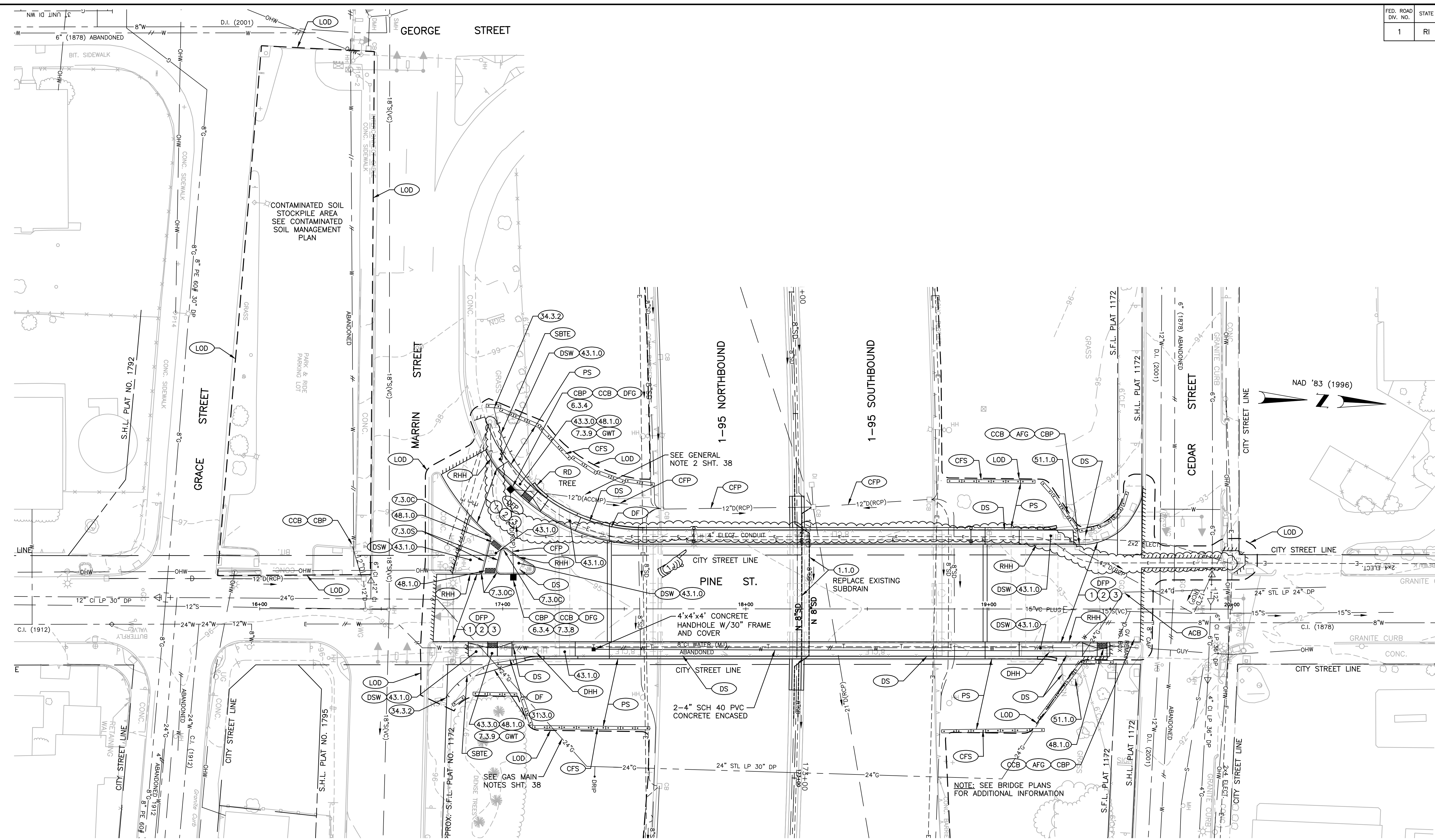
GAS MAIN NOTES:

- CONTRACTOR SHALL FOLLOW THE GUIDELINES LISTED IN NATIONAL GRID'S "GUIDELINES FOR WORKING AROUND GAS UTILITIES", DOCUMENT ATTACHED.
- DEPTH OF GAS FACILITIES ARE UNKNOWN AND COULD BE SHALLOW, USE CAUTION WHEN WORKING IN THE VICINITY OF ANY GAS FACILITY, HAND DIGGING ONLY.
- ALL GAS VALVE BOXES SHALL BE ADJUSTED TO THE NEW ROAD/SIDEWALK SURFACE. VALVE BOXES, IF REQUIRED FOR REPLACEMENT, CAN BE OBTAINED AT NATIONAL GRID'S PROVIDENCE LOCATION, 477 DEXTER STREET, PROVIDENCE, RI OR LINCOLN LOCATION, 642 GEORGE WASHINGTON HIGHWAY (QUANTITIES 5 OR LESS). GAS VALVE BOXES NEED TO BE ACCESSIBLE AT ALL TIMES TO BE OPERATED BY NATIONAL GRID IN THE EVENT OF AN EMERGENCY.
- ALL CATHODIC PROTECTION BOXES (BOXES THAT CONTAIN WIRES THAT GO DOWN TO THE GAS MAIN) SHALL BE ADJUSTED TO THE NEW ROAD/SIDEWALK SURFACE. CARE SHALL BE EXERCISED WHEN ADJUSTING SO AS NOT TO DAMAGE THE WIRES. IF THE WIRES ARE DAMAGED OR IF ASSISTANCE IS NEEDED, CONTACT NATIONAL GRID CORROSION ENGINEER TO VISIT THE SITE. CONTACT ASAD AKINFOLARIN AT 401-215-5678 OR RON VINCENT AT 617-438-5192. NEW BOXES, IF REQUIRED, CAN BE OBTAINED AT NATIONAL GRID'S PROVIDENCE FACILITY, 477 DEXTER ST, PROVIDENCE, RI OR NATIONAL GRID'S LINCOLN FACILITY, 642 GEORGE WASHINGTON HIGHWAY, LINCOLN, RI (QUANTITIES 5 OR LESS). CONTRACTOR SHALL FOLLOW THE GUIDELINES LISTED IN NATIONAL GRID'S "GUIDELINES FOR WORKING AROUND CORROSION CONTROL SYSTEM COMPONENTS", DOCUMENT ATTACHED.
- FOR A GAS LEAK CALL 800-640-1595.

REVISIONS		
NO.	DATE	BY
1	10/2/17	RCC

RHODE ISLAND	
DEPARTMENT OF TRANSPORTATION	
PLANS FOR BRIDGE REPLACEMENT	
PINE STREET BRIDGE NO. 548	
PAWTUCKET,	RHODE ISLAND
JOB SPECIFIC	
PLAN SYMBOLS, LEGEND & NOTES	
CHECKED BY _____ DATE _____ SCALE AS SHOWN	

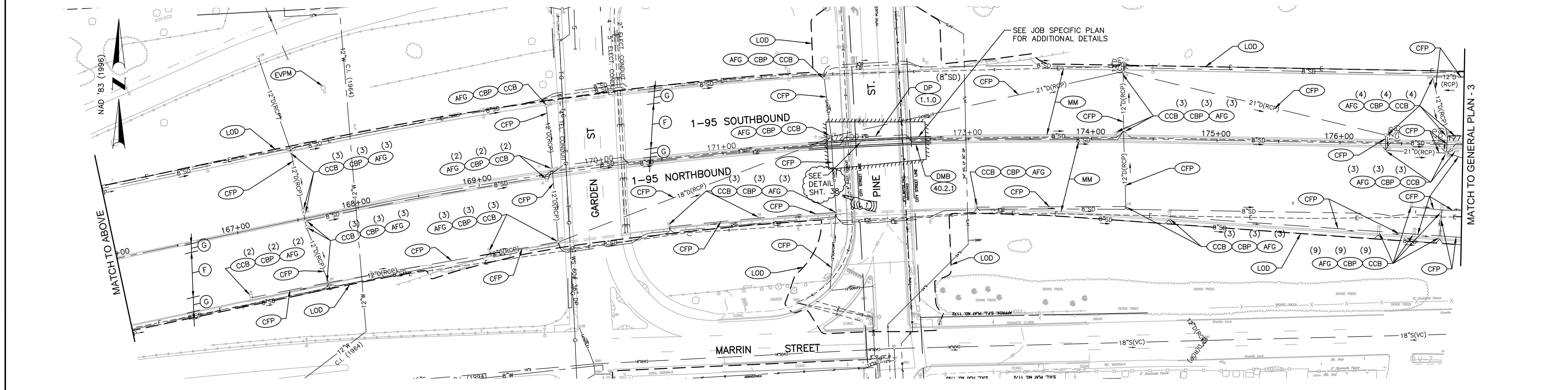
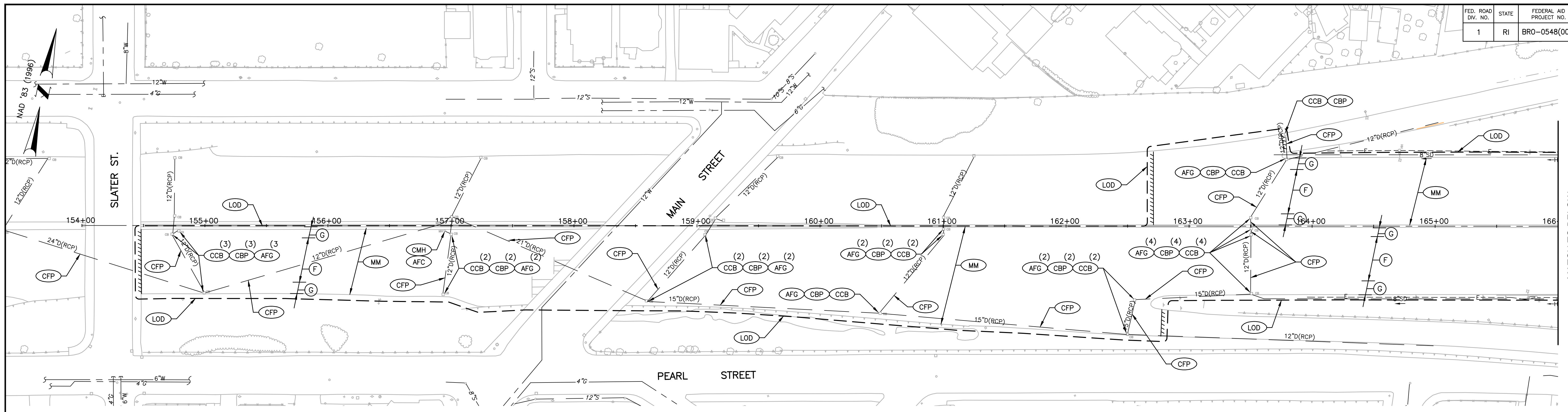
Gordon R. Archibald, Inc.
Civil and Environmental Engineers
Pawtucket, Rhode Island



REVISIONS		
NO.	DATE	BY
1	10/2/17	RCC

RHODE ISLAND DEPARTMENT OF TRANSPORTATION	
PLANS FOR BRIDGE REPLACEMENT PINE STREET BRIDGE NO. 548	
PAWTUCKET, RHODE ISLAND	
GENERAL PLAN - 1 PINE STREET	
CHECKED BY _____	DATE _____
SCALE 1" = 20'	





ADDENDUM NO. 2

REVISIONS		
NO.	DATE	BY
1	10/2/17	RCC

**RHODE ISLAND
DEPARTMENT OF TRANSPORTATION**

**PLANS FOR BRIDGE REPLACEMENT
PINE STREET BRIDGE NO. 548**

PAWTUCKET, RHODE ISLAND

**GENERAL PLAN - 2
ROUTE 95**

CHECKED BY _____ DATE _____ SCALE 1" = 40'



Gordon R. Archibald, Inc.
Civil and Environmental Engineers
Pawtucket, Rhode Island

FILESCAD17Pawtucket\RhodeIsland\GEN\GENERAL_002_ADD02.dwg 10/4/2017 9:40:32 AM LBEB08